TR 143



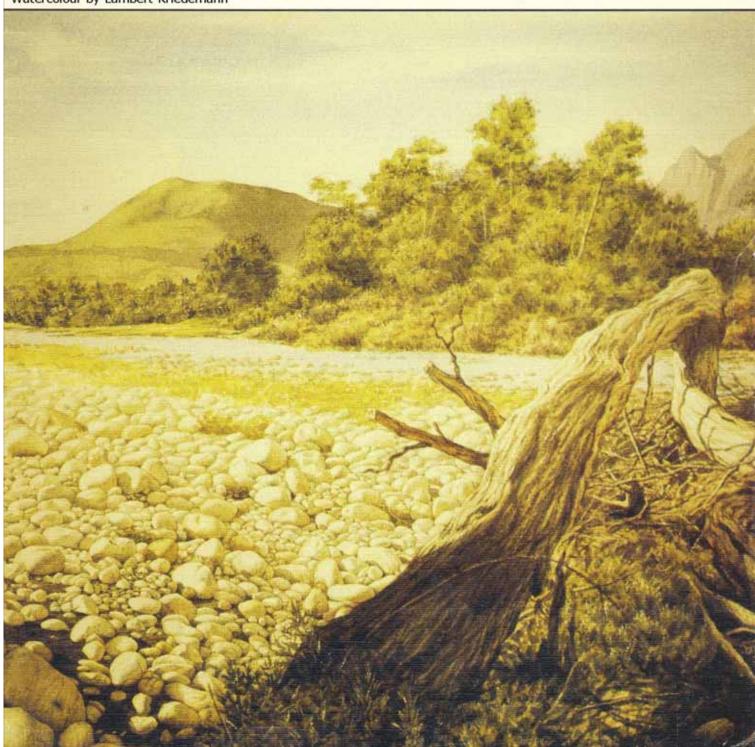
REPUBLIC OF SOUTH AFRICA

## DEPARTMENT OF WATER AFFAIRS

## PHOSPHORUS TRANSPORT IN THE BERG RIVER, WESTERN CAPE

Cover illustration "Boulders, Berg River" Watercolour by Lambert Kriedemann

A. J. Bath



# PHOSPHORUS TRANSPORT IN THE BERG RIVER, WESTERN CAPE.

BY

ANDREW JOHN BATH

HYDROLOGICAL RESEARCH INSTITUTE DEPARTMENT OF WATER AFFAIRS PRIVATE BAG X313 PRETORIA 0001.

## MARCH 1989.

#### ABSTRACT

The objective of this investigation was to develop a dynamic phosphorus export model that describes the transportation of phosphorus through the Berg River drainage basin. Such a model had to consider (1) export of phosphorus from nonpoint sources via surface and subsurface drainage, and from point sources such as wastewater treatment discharges, (2) transportation of phosphorus in the water column along the river channel, taking account of removal and remobilization of phosphorus from and to the water column, and transportation of phosphorus in the bed load.

A phosphorus transport model based on the mass continuity equation was developed, calibrated and verified using discharge and phosphorus concentration data collected from the Berg River. River and effluent discharges were measured using continuous flow recording facilities. Phosphorus concentration measurements were obtained using a flow-proportional sampling strategy.

To predict the temporal and spatial variation in the discharge in the main river channel a hydrodynamic flow model was developed. Input to the model includes the measured upstream and lateral inflow hydrographs as well as estimated ungauged lateral inflow and outflow.

To predict the flux of phosphorus entering the main river channel from agricultural and urban areas a nonpoint source model was developed. A looped phosphorus discharge rating approach was adopted to account for the transients in phosphorus concentration associated with flood events. Further development of the model resulted in the formulation of a semi-mechanistic nonpoint source model accounting for phosphorus export from surface and subsurface drainage.

The phosphorus transport model uses data from the hydrodynamic flow model, nonpoint source model, and measured flux of phosphorus from point sources to predict the phosphorus chemograph at discrete points along the main river channel. The mass transfer of phosphorus between sediments and water column is found to be dependent on the river discharge rate.

The model has found useful application in (1) quantifying the mass of phosphorus exported from point and nonpoint sources, (2) identifying the processes influencing phosphorus transport, (3) designing water quality monitoring networks, and (4) planning future water resource development of the river basin.

## ABSTRACT

The objective of this investigation was to develop a dynamic phosphorus export model that describes the transportation of phosphorus through the Berg River drainage basin. Such a model had to consider (1) export of phosphorus from nonpoint sources via surface and subsurface drainage, and. from point sources such as wastewater treatment discharges, (2) transportation of phosphorus in the water column along the river channel, taking account of removal and remobilization of phosphorus from and to the water column and transportation of phosphorus in the bed load.

A phosphorus transport model based on the mass continuity equation was developed, calibrated and verified using discharge and phosphorus concentration data collected from the Berg River. River and effluent discharges were measured using continuous flow recording facilities. Phosphorus concentration measurements were obtained using a flow-proportional sampling strategy.

To predict the temporal and spatial variation in the discharge in the main river channel a hydrodynamic flow model was developed. Input t o the model includes the measured upstream and lateral inflow hydrographs as well as estimated ungauged lateral inflow and outflow.

To predict the flux of phosphorus entering the main river channel from agricultural and urban areas a nonpoint source model was developed. A looped phosphorus discharge rating approach was adopted to account for the transients in phosphorus concentration associated with flood events. Further development of the model resulted in the formulation of a semi-mechanistic nonpoint source model accounting for phosphorus export from surface and subsurface drainage.

The phosphorus transport model uses data from the hydrodynamic flow model, nonpoint source model, and measured flux of phosphorus from point sources t o predict the phosphorus chemograph at discrete points along the main river channel. The mass transfer of phosphorus between sediments and water column is found to be dependent on the river discharge rate.

The model has found useful application in (1) quantifying the mass of phosphorus exported from point and nonpoint sources. (2) identifying the processes influencing phosphorus transport. (3) designing water quality monitoring networks, and (4) planning future water resource development of the river basin.

### ACKNOWLEDGEMENTS

This research could not have been possible without the aid of numerous individuals and institutions, whose assistance I hereby acknowledge and to whom I express my sincerest thanks:

Professor G v R Marais, of the Department of Civil Engineering, University of Cape Town, for supervising this investigation. His thoroughness, patience and encouragement are very much appreciated.

The Department of Water Affairs, for funding this investigation, and Mr H J Best, Manager Scientific Services, for giving permission to undertake a Ph.D. study.

Mr E Braune, Director of the Hydrological Research Institute, Department of Water Affairs, for enabling this research to take place.

Dr H van Vliet, Deputy Director, Hydrological Research Institute, Department of Water Affairs, for numerous stimulating discussions and moral support.

All the laboratory staff of the Hydrological Research Institute who have contributed to the analysis of the water quality samples.

All the staff of the Directorate of Hydrology, Department of Water Affairs who have contributed to the collection of flow gauging data. All my colleagues at the Department of Water Affairs, amongst others Mrs A Kolbe and Mr B Brown, who assisted me in various ways with the research work reported in this thesis.

Mrs B Sutton for assistance with the word processing.

A very special word of thanks and appreciation goes to my wife Shaula for her endless support.

### SYNOPSIS

(111)

The objective of this investigation was to develop a export model dynamic phosphorus that describes the transportation of phosphorus through the Berg River drainage basin. Such a model had to consider (1) export of phosphorus from nonpoint (diffuse) sources via surface and subsurface drainage, and from point sources such as wastewater treatment. discharges, (2) transportation of phosphorus in the water prism along the river channel, taking account of removal and remobilization of phosphorus from and to the water column, and transportation of phosphorus in the bed load.

In seeking a structure within which a solution could be developed, one proviso constantly was kept in mind: the model must be practical, in the sense that information to calibrate and run the model must be readily obtainable.

are involved in the Many processes generation and transportation of phosphorus. Although research had been reported on some of the important processes, a mechanistic modelling approach was not feasible for reason that the mathematical descriptions of the processes either were not available, or were inadequate - an empirical or semi-empirical lumped parameter approach appeared to be the only practical one; this approach dominated the development of the different models.

### (1v)

### Nonpoint Source Phosphorus Export Model:

In the lumped parameter approach the objective is to seek a parameter, or parameters, in terms of which some or all of the required components can be modelled. In developing the nonpoint phosphorus export, source model for two parameters were identified as potentially useful model parameters. the discharge and the rate-of-change of discharge. From observation nonpoint sources. characteristically the phosphorus on concentration exhibits a behavioural pattern apparently related to discharge. In any river or catchment monitoring system, discharge would be the parameter most commonly measured. For this reason alone selection of discharge as an independent parameter, in terms of which to model the phosphorus component. would not be an unreasonable choice. During flood events, for the same discharge, the total phosphorus concentration is higher during the rising limb of a flood hydrograph than during the falling limb. Incorporating the rate-of-change of discharge, as an independent parameter, empirically provides a mathematical structure that allows separating out the phosphorus concentrations in the rising and falling limbs of the nonpoint source hydrograph.

Using the lumped parameters, discharge and rate-of-change of discharge, it was found possible to give an adequate description of the phosphorus chemographs associated with the sources - called hydrographs from nonpoint the looped phosphorus discharge rating method. This description also was consistent in that the calibration constants in the looped discharge equation (for subcatchments in the Berg River basin) were found to be related functionally to the magnitude of the total subcatchment discharge; this allowed the phosphorus export to be estimated for subcatchments in which no phosphorus measurements were collected.

The looped rating method was applied also to subcatchments which were ungauged: in the Berg River basin only about 40 percent of the catchment area between Paarl and Drie Heuwels Weir is gauged. However, for ungauged subcatchments between gauged subcatchments. it. was found, by interpolation procedures, that the discharge hydrograph for the ungauged subcatchment could be synthesized with reasonable accuracy from the hydrographs of the gauged subcatchments on either side of the ungauged subcatchment. Once the hydrograph for such a subcatchment was available, the chemograph was synthesized by applying the looped rating method using the functionally related constants, as described above.

To calibrate the looped phosphorus-discharge rating model it was essential to monitor the phosphorus concentrations on the rising and falling limbs of flood flows at intervals as short as 4 to 6 hours; monitoring of phosphorus at regular time intervals, daily or weekly, provided completely inadequate information both for calibration of the model and for estimation of the mass of phosphorus exported from a nonpoint source. Flood waves on average lasted only a few days, yet within this period massive changes in phosphorus concentration and discharge (and hence phosphorus load) were observed. Almost 80 percent of the phosphorus exported-from the basin took place during flood events even though the total time of such events constituted less than 3 percent of the total time period Southern African region, where sharp monitored. In the transient flood flows are common, associated extreme transient phosphorus concentrations are to be expected - data acquisition strategies always would need to take this behaviour into account.

Phosphorus transport Berg River

(V)

### Phosphorus channel transport model:

Advective transport of phosphorus along a river channel implicitly requires solution of the time varying discharge at any point in the length of the channel. During flood events there is a time varying discharge to the channel at different points along the channel. The velocity of flow in the channel at any point will depend on a number of parameters such as the bed slope, discharge, bed friction forces, channel cross section and others.

Theoretically the flow could be modelled using the momentum and continuity equations of St. Venant. However, the amount of information required to describe the boundary conditions for such a solution makes these equations guite unsuitable for flow routing. As a consequence the literature records various simplifications to the momentum equation, e.g. neglecting some terms in the momentum equation or replacing this equation completely by an empirical one that indirectly includes the energy effects. With the simplified models the boundary effects can be accommodated to a greater or lesser degree. bγ calibration. Amongst the number of simplified models studied that of Li proved to be the most practical. Li accepts the discharge as the independent parameter in terms of which he formulates the energy/velocity effects. This approach is used in other models but the formulation in the model of Li is such that calibration is readily achievable by measurements in the field. The field measurements include discharge, depth of flow, and cross section at a number of points along the flow path.

To solve the hydrodynamic model the mass continuity and simplified energy equation are rewritten into finite difference form and applied sequentially to a set of contiguous subreaches along the main river channel.

TR 143 March 1989

Discharge is determined in each sub-reach as follows: as input are the calculated or measured discharge hydrographs at the upstream end of a sub-reach and, hydrographs of the lateral gauged and ungauged tributaries in the sub-reach (the ungauged tributary hydrographs are synthesized by appropriate interpolation of the hydrographs from gauged tributaries to either side of the ungauged tributary). The discharge at the downstream end of the sub-reach is calculated by solving the finite difference mass continuity and simplified energy equation. Minor factors, incorporated empirically, are seepage losses and abstractions. The model was calibrated using data over one hydrologic year.

The performance of the hydrodynamic model was assessed by comparing the measured channel hydrograph at the downstream boundary of the catchment (100 km below the upstream boundary), with the simulated hydrograph calculated from the measured upstream hydrograph and the lateral input hydrographs in the sub-reaches between the upper and lower main channel boundaries. Over three years of hydrograph data the simulated and observed hydrographs compare remarkably well.

In developing a model for phosphorus transport along the river channel cognisance had to be taken of the removal of phosphorus from the water column by settlement, biotic assimilation and others; and remobilization of phosphorus into the water column from the riverbed.

To develop a model for removal/remobilization, the phosphorus behaviour along the channel was monitored under steady flow conditions, at different discharges. These showed that the removal conformed to an exponential type formulation with respect to channel distance, but that the exponential "constant" was a function of discharge. From a number of phosphorus concentration profile plots at different discharges an empirical relationship between the constant and discharge was established. This showed that in the Berg River the rate of removal of phosphorus from the water column increased as the discharge dropped below 17 cumecs, and remobilization of phosphorus took place as the flow increased above 17 cumecs.

The phosphorus transport model operates as follows: over a sub-reach the input of phosphorus and discharge is known at the upstream boundary. Along the sub-reach the input of phosphorus and discharge are available from the tributary hydrographs and their associated chemographs developed from the nonpoint source model. The discharge in the sub-reach is determined from the hydrodynamic model. Knowing the discharge, the removal/- remobilization of phosphorus from/to the water column in the sub-reach is calculated. In this fashion the discharge and phosphorus concentration at the downstream end of the sub-reach is determined.

As with the hydrodynamic flow model, the performance of the by comparing the simulated transport model was assessed phosphorus chemograph at the downstream boundary of the channel with the measured chemograph - the correspondence was good. The performance of the phosphorus transport model was all the more acceptable when one considers that there was virtually no calibration leeway available. If the correlation had been poor it would have required a review of the nonpoint phosphorus the removal/remobilization export and models. The aood correspondence indicated that the structure of the model and the calibration procedures were acceptable.

(viii)

The modelling approach adopted above, for the removal or remobilization of phosphorus, in effect left out consideration of the mass of phosphorus stored on the riverbed. Initially it was attempted to model the storage of phosphorus on the bed of the river in order to trace the mass movement in and out of the bed due to removal and remobilization. This attempt was unsuccessful; the model proved to be elaborate and presented difficulties in accommodating the mass of phosphorus stored on the bed and the removal and accretion effects over sequential flood events. Also, experimentally no meaningful field data on the phosphorus stored on the bed could be obtained. As it was felt that the bed load problem could not be abandoned, an attempt was made to model the bed load transport quite independently of the interaction with the water column above. A bed load transport model that had been proposed in the literature was applied except that the bed load contains a proportion of phosphorus material. This model indicated that very little phosphorus would be exported with the bed load. Interpretation of the findings of the bed model is not yet clear.

### Model Implications:

The calibrated model provided information of significant importance as to the behaviour characteristics of phosphorus in the catchment and the implications of various operational and management strategies.

at Drie Heuwels. phosphorus exported almost (1) Of the 80 percent is derived from nonpoint sources, the remaining 20 percent from point sources (the municipal effluents from Paarl and Wellington). This finding provides information, that for the first time in South Africa. nonpoint phosphorus sources may be of much greater importance than realized previously.

- transportation from a (2) Phosphorus nonpoint source is strongly linked to surface runoff during storm events. The indications that the mass present are exported 1s principally a function of the discharge under the rising limb of the hydrograph. The chemograph does not appear to be significantly affected by sequential storm events; this would indicate that the phosphorus source is infinite, a conclusion probably specific to the Berg River basin. A large proportion of the basin is under wheat production and for the soils in this basin phosphorus supplementation needs to be higher than normal.
- (3) The major mass of phosphorus exported from nonpoint sources takes place during storm events. In the Berg River 80 percent of the phosphorus exported during storm events takes place in less than 3 percent of the yearly hydrologic cycle.
- (4) In the main river channel, although removal of phosphorus from the water column takes place under low flow conditions and remobilization of phosphorus into the water column under high flows, the indications are that in the long term there is no, or only very little, net removal of phosphorus in the channel. Thus, all phosphorus that discharges to the main river channel eventually will be exported at the lower catchment boundary — phosphorus storage in the channel is of a temporary nature only.
- (5) The indications are that with the present inter-catchment water transfer facilities, to export water out of the Upper Berg River catchment is feasible but only during the high flow periods, and then only with stringent operational control. Abstraction under low and medium flow conditions will lead to a significant increase in the phosphorus concentration in the lower Berg River which may in turn, affect adversely the water treatment facility at the Withoogte Works.

١

- (6) Augmentation of Voëlvlei Dam from the Berg River. by abstraction at Hermon, may be implemented but only during high flow periods, specifically not during storm events. Even during high flow periods (outside storm events) the phosphorus concentration in the river still may be 3 to 7 times that in the Twenty Four and Klein Berg Rivers, presently the source of water for Voëlvlei. During a storm event. the phosphorus concentration could rise to 700 µg/2, up to 14 times or more than that in the Twenty Four and Klein Berg Rivers.
- (7) Should an impoundment be constructed at Misverstand the quality will be dominated by nonpoint source water drainage. Implementation of the 1 mg/L effluent standard at Paarl and Wellington will reduce the total phosphorus load at the dam by only 10 percent. Construction of retention weirs on the tributaries in the reach from Paarl to Drie Heuwels Weir, should these be 50 percent effective in retaining phosphorus, would reduce the total phosphorus by about 20 percent only. If however retention weirs should be constructed also on the tributaries upstream of Paarl, a preliminary estimate (insufficient data on the upper Berg River system is available) indicates that the total phosphorus load will be reduced by about 50 percent at Misverstand. However, at present there are no definitive data available to verify whether these performance retention weirs in fact will function effectively.
- (8) The high fraction of the phosphorus load delivered from nonpoint sources points to enquiry into methods to reduce phosphorus export from agricultural areas <u>inter alia</u> by improved agricultural practices.

### Conclusions:

- (1) The hydrodynamic phosphorus transportation model, developed in this investigation, provides a reasonably reliable description of the phosphorus generation and phosphorus transportation in the aqueous phase of the Berg River catchment within the Paarl - Misverstand reach.
- (2) The model is largely empirical, but in describing the various phosphorus behavioural patterns it indirectly addresses the mechanisms and processes effecting the behaviour; this may provide material for future research.
- (3) The model serves as a powerful instrument in assessing the implications of a variety of proposed operational and phosphorus management strategies.
- (4) The model provides reliable temporal information on the phosphorus input to any proposed impoundment in the Berg River in the Paarl - Misverstand reach. In this respect the information probably is more extensive and more complete than for any other catchment in South Africa. Evaluation of the trophic status of such an impoundment no longer will be limited by inadequate phosphorus input information, rather by deficiencies in the existing models for assessing the trophic status of an impoundment. It is to be hoped that the availability of a reliable model, to describe the phosphorus mass-time input behaviour to the impoundment, stimulate development of a dynamic eutrophic may impoundment model.

(5) The model in its present form, although site specific is very flexible. With the exception of data from 2 or 3 accurate discharge monitoring stations, other information for calibrating the model can be obtained by field measurements. The model should be applied in other catchments, under different hydrologic regimes, topography, catchment size and configuration, in order to improve or modify it for general application.

TR 143 March 1989

(xiv)

## INDEX

Page:

| ACKNOWL  | DGEMEN | ITS                                  | (1)   |
|----------|--------|--------------------------------------|-------|
| SYNOPSIS | 5      |                                      | (111) |
| INDEX    |        |                                      | (xiv) |
| CHAPTER  | 1:     | INTRODUCTION                         | 1.1   |
| CHAPTER  | 2:     | LITERATURE SURVEY                    | . 2.1 |
| 1        | CONCER | PT OF EUTROPHICATION                 | 2.1   |
|          | 1.1    | Causes and consequences              | 2.1   |
|          | 1.2    | Economics of eutrophication          | 2.5   |
|          | 1.3    | Autotrophic nutrient requirements    | 2.6   |
| 2        | SOURCE | ES OF PHOSPHORUS                     | 2.8   |
|          | 2.1    | Point sources                        | 2.9   |
|          | 2.2    | Nonpoint sources                     | 2.11  |
|          | 2.3    | Point and nonpoint sources compared  | 2.12  |
| 3        | SINKS  | OF PHOSPHORUS                        | 2.13  |
|          | 3.1    | Wetlands as phosphorus sinks         | 2.13  |
|          | 3.2    | Rivers as phosphorus sinks           | 2.14  |
|          | 3.3    | Impoundments as phosphorus sinks     | 2.16  |
| 4        | MODELI | LING PHOSPHORUS BEHAVIOUR            | 2.16  |
|          | 4.1    | Phosphorus nonpoint source models    | 2.17  |
|          | 4.2    | Phosphorus transport models          | 2.23  |
|          | 4.3    | Nutrient load/response relationships | 2.29  |
| 5        | CONTRO | DL OF PHOSPHORUS IN THE ENVIRONMENT  | 2.31  |
| -        | 5.1    | Point source control                 | 2.32  |
|          | 5.2    | Nonpoint source control              | 2.37  |
|          | 5.3    | Management of impoundments           | 2.38  |
| б        | CONCLU | USION                                | 2.40  |
| 7        | REFER  | ENCES                                | 2.42  |

ι

÷,

Ň

|         |       |   | Page: |
|---------|-------|---|-------|
| CHAPTER | ٩.    | DESCRIPTION OF BERG RIVER BASIN           | 3.1   |
| 1       |       | MENT DESCRIPTION                          | 3.1   |
| ,       | 1.1   | Location                                  | 3.1   |
|         |       | Topography                                | 3.3   |
|         | 1.3   |   | 3.5   |
|         | 1.4   |   | 3.7   |
|         | 1.5   | ••  | 3.9   |
|         |       | Agricultural development                  | 3.12  |
|         | 1.7   |   | 3.14  |
|         | 1.8   | Demography                                | 3.17  |
|         | 1.9   | Water resource development                | 3.20  |
| 2       | REFER | · · · ·                                   | 3.24  |
| -       |       |   |       |
| CHAPTER | 4:    | MONITORING STRATEGY AND DATA CAPTURE      | 4.1   |
| 1       | MONIT | ORING STRATEGY                            | 4.1   |
| 2       | PRELI | MINARY SURVEY                             | 4.2   |
|         | 2.1   | Selection of sampling station location    | 4.4   |
|         | 2.2   | Selection of sampling frequency           | 4.6   |
|         | 2.3   | Data storage, processing and presentation | 4.6   |
|         | 2.4   | Results of preliminary survey             | 4.7   |
| 3       | MAIN  | SURVEY                                    | 4.14  |
|         | 3.1   | Sampling location : Main survey           | 4.14  |
|         | 3.2   | Sampling frequency : Main survey          | 4.15  |
|         | 3.3   | Sampling periods                          | 4.17  |
|         | 3.4   | Field methods                             | 4.18  |
|         | 3.5   | Compilation of flow data                  | 4.20  |
| 4       | SUMMA | RY  | 4.21  |
| 5       | REFER | ENCES                                     | 4.23  |

.

.

١

|         |        |  | гаус. |
|---------|--------|--|-------|
| CHAPTER | 5:     | DATA PRESENTATION AND ANALYSIS         | 5.1   |
| 1       | ANALYS | SIS OF FLOW DATA                       | 5.1   |
|         | 1.1    | Main river channel                     | 5.1   |
|         | 1.2    | Point sources                          | 5.8   |
|         | 1.3    | Tributaries                            | 5.8   |
| 2       | ANALYS | SIS OF PHOSPHORUS DATA                 | 5.15  |
|         | 2.1    | Main river channel                     | 5.15  |
|         | 2.2    | Point sources                          | 5.26  |
|         | 2.3    | Tributaries                            | 5.26  |
|         | 2.4    | River sediment samples                 | 5.35  |
| 3       | SUMMAI | RY                                     | 5.37  |
| 4       | REFER  | ENCES                                  | 5.42  |
| CHAPTER | 6:     | DEVELOPMENT OF HYDRODYNAMIC FLOW MODEL | 6.1   |
| 1       | INTRO  | DUCTION                                | 6.1   |
| 2       | MODEL  | SELECTION                              | 6.3   |
| 3       | NUMER  | ICAL SOLUTION                          | 6.6   |
|         | 3.1    | Solution initiation                    | 6.10  |
| 4       | MODEL  | CALIBRATION                            | 6.12  |
|         | 4.1    | Calibration strategy                   | 6.12  |
|         | 4.2    | Calibration of the Berg River          |       |
|         |        | hydrodynamic model                     | 6.14  |
|         | 4.3    | Calibration trials                     | 6.41  |
| 5       | MODEL  | VERIFICATION - MONITORING PERIOD       | 6.46  |
| 6       | MODEL  | EVALUATION                             | 6,58  |
| 7       | CONCL  | USIONS                                 | 6.60  |
| 8       | REFER  | ENCES                                  | 6.63  |
| 9       | NOTAT  | ION                                    | 6.65  |

.

.

•

.

•

.

.

| CHAPTER | 7:     | DEVELOPMENT OF A PHOSPHORUS TRANSPORT MODEL  | 7.1   |
|---------|--------|--|-------|
| 1       | PHOSP  | HORUS NONPOINT SOURCE (NPS) MODEL            | 7.1   |
|         | 1.1    | NPS model selection                          | 7.1   |
|         | 1.2    | NPS model development                        | 7.5   |
|         | 1.3    | Adequacy of NPS model formulation            | 7,19  |
|         | 1.4    | NPS model optimization                       | 7.23  |
|         | 1.5    | NPS model verification                       | 7.26  |
|         | 1.6    | Application to tributaries                   | 7,34  |
|         | 1.7    | NPS model evaluation                         | 7,38  |
| 2       | NPS M  | DDELLING USING HYDROGRAPH DECOMPOSITION      |       |
|         | APPRO  | ACH  | 7.42  |
|         | 2.1    | Hydrograph decomposition                     | 7.45  |
|         | 2.2    | Chemograph decomposition                     | 7.51  |
|         | 2.3    | Model. calibration                           | 7.55  |
|         | 2.4    | Chemograph simulation                        | 7.55  |
|         | 2.5    | Model evaluation                             | 7.56  |
| 3       | PHOSPI | HORUS TRANSPORT MODEL                        | 7.63  |
|         | 3.1    | Introduction                                 | 7.63  |
|         | 3.2    | Model formulation                            | 7.65  |
|         | 3.3    | Modelling sources and sinks                  | 7.67  |
|         | 3,4    | Model for rapid removal stage (Stage I)      | 7.72  |
|         | 3.5    | Model for the slow removal section (Stage 2) | 7.89  |
|         | 3.6    | Model verification                           | 7.110 |
|         | 3.7    | Model evaluation                             | 7.110 |
| 4       | PHOSPH | TORUS BED LOAD MODEL                         | 7.117 |
|         | 4.1    | Model development                            | 7.119 |
|         | 4.2    | Model calibration                            | 7.124 |
|         | 4.3    | Model simulation                             | 7.125 |
|         | 4.4    | Model evaluation                             | 7.126 |
| 5       | CONCLU | JSIONS                                       | 7.127 |
| 6       | REFERE | ENCES  | 7.129 |
| 7       | NOTAT  | ION USED IN CHAPTER 7                        | 7.133 |

,

,

.

•

.

| • | CHAPTER | 8: MODEL APPLICATION                         | 8.1  |
|---|---------|--|------|
|   | 1       | INTRODUCTION                                 | 8.1  |
|   | 2       | PROGRAMS USED IN MODEL SIMULATIONS           | 8.2  |
|   | 3       | PHOSPHORUS LOAD ON MISVERSTAND DAM           | 8.4  |
|   |         | 3.1 Quantification of point and nonpoint     |      |
|   |         | sources                                      | 8.4  |
|   |         | 3.2 Removal and remobilization of phosphorus | 8.7  |
|   |         | 3.3 Phosphorus Export pattern                | 8.9  |
|   |         | 3.4 Implementation of 1 mg/1 point source    |      |
|   |         | contro]                                      | 8.13 |
|   | 4       | PHOSPHORUS NONPOINT SOURCE CONTROL           | 8.24 |
|   | 5       | PRE-IMPOUNDMENTS                             | 8.29 |
|   | 6       | INTER-CATCHMENT TRANSFER                     | 8.34 |
|   | ٦       | VOËLVLEI DAM                                 | 8.42 |
|   | 8       | SUMMARY                                      | 8.48 |
|   | 9       | REFERENCES                                   | 8.49 |
|   | 10      | NOTATION USED IN CHAPTER 8                   | 8.57 |
|   | CHAPTER | 9: DISCUSSION                                | 9.1  |
|   | 1       | OBJECTIVE                                    | 9.1  |
|   | 2       | MODEL DEVELOPMENT                            | 9.1  |
|   |         | 2.1 Nonpoint source phosphorus export model  | 9.2  |
|   |         | 2.2 Phosphorus channel transport model       | 9.4  |
|   | 3       | MODEL EVALUATION '                           | 9.7  |
|   | 4       | MODEL PREDICTIONS                            | 9.8  |
|   | 5       | FUTURE RESEARCH                              | 9.10 |
|   | 6       | CONCLUSIONS                                  | 9.12 |
|   |         |  |      |

٠

.

,

•

•

.

•

.

Page:

| APPENDIX | 1:    | DESIGN OF DATA BASE              | A1.1  |
|----------|-------|----------------------------------|-------|
| ı        | FORM  | AT OF DATA FILES                 | A1.2  |
|          | 1.1   | Flow data files                  | A1.2  |
|          | 1.2   | Water quality data files         | A1.4  |
|          | 1.3   | Composite files                  | A1.4  |
| 2        | DATA  | FILE NOMENCLATURE                | A1.9  |
| APPENDIX | 2:    | SOFTWARE DOCUMENTATION           | A2.1  |
| 1        | DATA  | MANAGEMENT AND SYSTEM UTILITIES  | A2.2  |
|          | 1.1   | Data File Editor                 | A2.4  |
|          | 2.2   | Data File Merger                 | A2.10 |
|          | 1.3   | Data File Splitter               | A2.14 |
|          | 1.4   | Data File Modifier               | A2.17 |
|          | 1.5   | Load integration                 | A2.22 |
| 2        | PLOT  | TING AND DESCRIPTIVE FUNCTIONS   | A2.26 |
|          | 2.1   | Scatter plot                     | A2.28 |
|          | 2.2   | Hydrograph plot                  | A2.31 |
|          | 2.3   | Duration curve                   | A2.34 |
|          | 2.4   | Time series plots                | A2.38 |
| 3        | MODEL | L DEVELOPMENT                    | A2.44 |
|          | 3.1   | Regression analysis              | A2.46 |
|          | 3.2   | Phosphorus nonpoint source model | A2.51 |
|          | 3.3   | Hydrodynamic flow model          | A2.58 |
|          | 3.4   | Transport model : SECTION1       | A2.66 |
|          | 3.5   | Transport model : SECTION2       | A2.73 |
|          | 3.6   | Phosphorus bed load model        | A2.80 |
|          | 3.7   | Pre-impoundment model            | A2.84 |
| 4        | INTER | RACTIVE PROGRAM APPLICATION      | A2.90 |
| APPENDIX | 3:    | WATER QUALITY AND FLOW DATA      | A3.1  |

TR 143 March 1989

### CHAPTER 1

### INTRODUCTION

Enrichment of waterbodies with plant nutrients, a process referred to as eutrophication, has developed into a serious water quality problem throughout the world. In South Africa, because of the paucity of the water resource and the relatively high demand on it, eutrophication and its consequences have manifested themselves to a higher degree than in any other industrialized country. Quantification of eutrophication and its effects, and procedures to manage it have, in consequence, become matters of high priority.

It universally accepted today that the principal 15 nutrient controlling degree eutrophication the of is phosphorus. Efforts at describing and quantifying the effects of eutrophication in waterbodies have led to the development of eutrophication models. such model, developed One by the Overseas Economic Community Development (OECD) has found useful application in South Africa, in quantifying the eutrophic state of impoundments and testing the effects of proposed management strategies.

One of the basic requirements in applying the OECD model (and others) is the magnitude of the phosphorus load on the waterbody. In this respect, however, it has been found that at best phosphorus load calculations are characterized by errors of circa 35 percent. This poor accuracy/precision in load estimation, is regarded as the major source of scatter in the OECD evaluation of the intensity of eutrophication in various waterbodies. Precise and accurate estimates of the phosphorus loads are, in consequence, matters of vital concern in quantifying eutrophication and devising management strategies and implementing them. At present all the important eutrophication models are based on the annual input of phosphorus load to the waterbody. It is very likely, and indeed inevitable, that these models will be refined and extended to produce a dynamic response. Such a model will require, <u>inter alia</u>, temporal changes in discharge, and phosphorus load associated with the discharge to the waterbody.

Quantification of the temporal changes in discharge and phosphorus export load require study of the catchment discharging to the waterbody. Numerous studies have been undertaken to quantify the discharge and phosphorus export from a catchment. However no practical dynamic model has emerged that satisfactorily resolves both discharge and phosphorus export simultaneously.

The problems to be resolved in such a joint model are considerable. With regard to the water movement through the system, the model is required to produce an acceptably accurate description of the discharge hydrograph from each subcatchment, and the discharge hydrograph at any selected point along the main river channel.

With regard to the phosphorus load, there are two aspects to be considered, (1) the "generation" of the phosphorus load, and (2) the transport of the phosphorus along the main channel.

(1) Phosphorus is generated from two sources: firstly, point sources such as wastewater treatment discharges in which the phosphorus concentration and flow (and hence the phosphorus load) are, or can be, readily quantified by appropriate monitoring. Secondly, diffuse sources - called nonpoint sources - in which the phosphorus load is generated by surface and subsurface drainage. Nonpoint phosphorus generation is not so readily quantified; it is a complex phenomenon, <u>inter alia</u> a function of the runoff discharge. 5 gr

regard to (2) With phosphorus transport, once the subcatchment flow with its associated phosphorus load 15 discharged to the main river channel. the phosphorus in the water prism (the wash load) can decline in concentration due to removal of phosphorus to the riverbed principally by settlement and biotic uptake, or can increase due to remobilization of the phosphorus from the bed to the water column during flood flows.

A number of models describing nonpoint source load-discharge behaviour in subcatchments, and transport of phosphorus along the river channel have been presented in the literature.

In this investigation a dynamic model is developed that deals with all the aspects mentioned above, <u>viz</u>. point, nonpoint, and channel hydrograph formation; point and nonpoint dynamic phosphorus generation; and phosphorus removal and remobilization in the main channel river flow. The principal output is a discharge hydrograph and its associated phosphorus chemograph, at any selected point(s) along the main river channel.

In structuring the model it was soon evident that the model could not be built up quantitatively, as yet, on the basic processes that govern the generation and transportation of phosphorus in a drainage basin. Most of the processes (if not all) have been identified conceptually but many cannot be formulated quantitatively in mathematical form or where such mathematical formations are available, require such elaborate calibration inputs that application becomes impracticable. It seems that for the immediate future an empirical or semi-empirical lumped parameter approach is the only feasible one to obtain approximate but practical solutions. In such a model it is attempted to formulate the process components (e.g. phosphorus) in terms of variables that can be measured practically (e.g. discharge) where such relationships appear to have a description potential. Following this approach, the model presented here contains a fair amount of empirical formulation relating one component with another. In particular, discharge is extensively used in the formulation of the other model components and their rates of response of formation. A prime endeavour kept in mind, was that the model must not require extensive input of data to calibrate it, and this input must be of a nature that can be obtained with a relatively small resource allocation.

To develop the model data needed to be available from a suitable river catchment. A number of river systems were investigated and the Berg River, in the Western Cape Province of South Africa, was selected as the most suitable area for the following reasons:

- The river is within 45 to 150 km from Cape Town, enabling rapid and easy access.
- The catchment has a diverse land-use comprising urban, agricultural, industrial and forestry areas.
- The catchment has a seasonal rainfall that varies in intensity over the catchment area from 400 to 3 000 mm per year. During the rainy season (winter) the rainfall pattern is periodic, giving rise to a number of flood events with peak river discharges >200 cumecs. During the dry season (summer) the minimum discharge can reduce to as low as 0.5 cumecs. The flow regime therefore provides an extensive range of flow conditions for modelling purposes.

- There are 16 flow-gauging structures located in the catchment as follows: two on the main river channel 100 km apart, 12 on the subcatchments (not all the subcatchments), and 2 on the discharge lines of the treated municipal effluents.
- The river has been surveyed and sampled over a period of up to 10 years, providing a useful base line of hydrologic and water quality information.

A further reason for selecting the Berg River catchment was that the Water Act (Act 56 of 1958) (Government Gazette, 1984) was amended on 1 August 1980 to include the control of soluble ortho-phosphate in effluent discharges to rivers located in seven "sensitive" catchment areas; the list of river catchments includes the Berg River, declared a "sensitive" catchment because of the proposed construction of an impoundment in the lower reaches. In the Berg River basin are located two of the three impoundments (Wemmershoek and Voëlvlei Dam) supplying water to Cape Town and various satellite municipalities. This river constitutes an important water resource in the Western Cape which must be protected for future utilization.

In this report the developments up to and including the dynamic hydro-phosphorus transport model are set out as follows:

Chapter 2

introduces the causes and consequences of eutrophication, with emphasis on the role played by phosphorus, its behaviour in aquatic systems and methods of quantifying and controlling the transport of phosphorus along river channels.

1.5

- Chapter 3 gives a description of the Berg River catchment in terms of its physical location, topography, climate, geology, soils, agricultural development, hydrology, water quality, demography and water resource development.
- Chapter 4 describes the procedures to collect discharge and water quality data from the Berg River system. An interactive monitoring network approach 15 developed comprising two components. a preliminary survey and main river survey. The preliminary survey 15 used to identify the principle sources and sinks of phosphorus in the drainage basin, and the main river survey to obtain detailed data for the development and calibration of a phosphorus transport model.
- Chapter 5 presents and analyses the water quality and river flow data collected over the monitoring period to show the temporal and spatial variations in flow and quality.
- Chapter 6 proposes the conceptual framework for modelling phosphorus transport in drainage basins; two submodels are identified, a hydrodynamic flow model and a phosphorus transport model. It then describes the development, calibration and verification of the hydrodynamic flow model based on the kinematic wave equation, suitably modified to accommodate ungauged lateral runoff as well as ungauged losses from the main river channel. The model is calibrated against one year's flow data and tested against the flow data over two further years of data.

- Chapter 7 describes the development and calibration of a phosphorus transport model. The model is made-up of three submodels: a phosphorus nonpoint source model, a phosphorus transport model and a phosphorus bed load model.
- Chapter 8 deals with the use of the hydrodynamic and transport models to evaluate phosphorus the implications of various management options on the phosphorus budget of the Berg River system. These options include: imposition of the phosphorus standard on treated wastewater discharges at Paarl and Wellington; nonpoint source control; inter-catchment pre-impoundments: transfer: diversion scheme to fill Voëlvlei Dam; and the construction of an impoundment at Misverstand.

Chapter 9

comprises the conclusions and recommendations from this investigation. It assesses model performance and lists recommendations for further research and application.

## CHAPTER 2

#### LITERATURE SURVEY

### 1 CONCEPT OF EUTROPHICATION

## 1.1 Causes and consequences

Eutrophication is a problem facing many aquatic systems throughout the world (Jones and Lee, 1982). The term eutrophic (eutrophos literally means "well nourished") was originally applied to shallow European lakes, characterized by high dissolved solids, high productivity, concentrations of a deoxygenated hypolimnion, extensive weeds and planktonic algae as well as the presence of non-Salmonid fish. The term was developed to contrast waterbodies that are oligotrophic "providing little (oligotrophos meaning nourishment") typically, upland lakes with deep basins, low dissolved solids, low productivity, an oxygenated hypolimnion, few plant species and Salmonid fish (Moss, 1980). However, it should be emphasized that most lakes will not fall within this neat classification: a spectrum of conditions exists between these two extremes.

The first trophic classification of South African impoundments was undertaken by Toerien, Hyman, and Bruwer (1975). They ranked ninety-eight South African impoundments and found 11 percent highly eutrophic, 50 percent oligotrophic and the rest intermediate. Taylor <u>et al</u>. (1984) and Wiechers <u>et al</u>. (1984) demonstrated a high correlation between the trophic status and the input loading of phosphorus, see Table 2.1.

| Table 2.1   | Selection of South African impoundments ranked<br>according to their phosphorus input loadings, with<br>an indication of their trophic status (from Taylor<br><u>et al</u> ., 1984). |                                  |                    |  |  |
|-------------|--|----------------------------------|--------------------|--|--|
| Impoundment | : Алл  | ual phosphorus loa<br>(g P/m²/y) | d: Trophic status: |  |  |
| Hartbeespoo | rt   | 23.20                            | Hypertrophic       |  |  |
| Rietvlei    |  | 15.82                            | Hypertrophic       |  |  |
| Laing       |  | 13.82                            | Eutrophic          |  |  |
| Roodeplaat  |  | 11.08                            | Hypertrophic       |  |  |
| Bridle Drif | t  | 2.43                             | Eutrophic          |  |  |
| Rust de Win | iter   | 0.40                             | Mesotrophic        |  |  |
| Albert Fall | s  | 0.02                             | Oligotrophic       |  |  |

Grobler and Silberbauer (1984) enquired into the effect an imposition of a phosphorus standard (for effluents) would have on the trophic status of 19 South African impoundments. They concluded that the trophic status of impoundments in which the phosphorus originated principally from point sources, would derive the greatest benefit:

The prolific growth of both planktonic algae and macrophytes associated with eutrophication causes a variety of water quality problems:

(1)Trihalomethanes (THM) are produced when water abstracted from eutrophic impoundments is chlorinated, even after conventional treatment for potable use. THM's are chloroform-related compounds, which if sufficient quantity, ingested 1n may cause į.

certain types of liver damage and cancer (Marx, 1974; Lahl <u>et al</u>., 1981; Williamson, 1981). Recent research (Codd and Bell, 1985; Scott, van Steenderen and Welch, 1985) indicates a positive relationship between the level of eutrophication and the concentration of THM's.

- (2) Livestock and fish deaths may be associated with blooms of toxic algae (e.g. certain species of cyanophycae) (Bruwer, 1979; Codd and Bell, 1985). Their influence on humans is not well documented but Scott <u>et al</u>. (1985) state that certain instances of gastro-enteritis have been caused by consumption of impounded water containing <u>Microcystis</u> spp.
- (3) Recreation is influenced adversely by eutrophication. Water Hyacinth (<u>Eichhornia crassipes</u> (Martius) Solms-Laubach), <u>Salvinia molesta</u> and other floating macrophytes can make waterbodies unusable for sailing; unpleasant odours and algal-scums can make the water offensive to bathers and have health implications (e.g. allergenic response) as well as reduce property values sited on, or near, the shoreline of the waterbody (Walmsley and Butty, 1980).
- (4) Release of water from the hypolimnion of an eutrophic impoundment gives rise to odour problems in the downstream watercourse as well as impairing its ecology and fishing potential (Krenkel, Lee and Jones, 1979). For municipal water supplies, water drawn from the hypolimnion may contain high concentrations of iron and manganese which must be removed, and hence add to the cost of water treatment.

- (5) Eutrophic conditions can cause a considerable increase in the cost of treating water for domestic and industrial purposes. Algae not only present problems in flocculation, sedimentation and filtration but also excrete extra-cellular products which can impart unpleasant odours and tastes to the water (Viljoen, 1984), see Table 2.2. To remove tastes and odours it may be necessary to incorporate activated-carbon columns in the water treatment system, a relatively costly unit process. Biological growth favoured by nutrient enrichment may cause biological fouling in pipes and industrial equipment.
- (6) Abundant growth of macrophytes, also associated with eutrophic conditions, may give rise to navigation and nuisance problems in waterways and irrigation canals. By virtue of article one of the Act on Weeds (South African Act no. 42, 1937) <u>Myriophyllum aquaticum, Lemna minor and Eichhornia grassipes</u> are proclaimed weeds; the Rand Water Board employs a full-time work force to remove these plants from the Vaal Barrage at an annual cost of around R45 000 (Viljoen, 1984).

| Table 2.2 | Algae which  | cause     | problems | s in So   | uth African |
|-----------|--------------|-----------|----------|-----------|-------------|
| ,         | impoundments |           |          | treatment | (based on:  |
|           | Walmsley and | Butty, 19 | 980).    |           |             |

| Algae:        | Problem:   |
|---------------|--|
| Melosira      | filter blockage                                    |
| Microcystis   | filter blockage, taste and odours, toxicity, scums |
| Oscillatoria  | filter blockage, taste, odour, scums               |
| Anabaena      | filter blockage, toxicity, scums                   |
| Euglena       | filter blockage, taste                             |
| Chlamydamonas | filter blockage and penetration                    |
| Dinobryon     | taste, odour                                       |
| Prymnesium    | toxicity to fish                                   |

In contrast to the negative aspects discussed above, Walmsley and Butty (1980) state that eutrophication can have some beneficial effects. Moderate eutrophication may increase the productivity of an impoundment; by harvesting species of economic or recreational interest, for example fish, it should be possible to take advantage of this condition. However, impoundments that become eutrophic may experience a shift in fish species, resulting in the dominance of unpalatable varieties, in which event less favourable angling prospects are to be expected. Irrigation water is improved as a result of a higher nutrient concentration, but again this advantage can be diminished by the fouling of irrigation canals. Except in isolated cases, the disadvantages of eutrophication outweigh the advantages.

#### 1.2 Economics of eutrophication

Bruwer (1979) and Viljoen (1984) have attempted to estimate the cost to the community of the eutrophication of waterbodies in terms of the loss of recreational value and increased water purification costs, but found it virtually impossible to allocate a monetary value. However, in the provision of potable water one may assess the cost of eutrophication by estimating treatment costs associated with the level of eutrophication, in this fashion assist in the choice of sources of raw water at the planning stage of urban developments (Herold and Pitman, 1987).

2.5

### 1.3 Autotrophic nutrient requirements: role played by phosphorus

In addition to sunlight, algae and other aquatic plants need a variety of chemical constituents (nutrients) for growth, principally carbon, nitrogen, phosphorus, oxygen, hydrogen and silicon plus a host of trace nutrients. An important concept which governs the growth of algae is the principle of the limiting nutrient. Briefly, this principle is based on the concept that the mass of algae that can grow is restricted by the mass of that essential element which becomes exhausted first.

### <u>Carbon</u>:

In terms of stoichiometry, algae typically need 106 carbon atoms and 16 nitrogen atoms for each phosphorus atom, for growth and reproduction. The relatively large demand for carbon, as compared to phosphorus, could lead one to speculate that carbon very likely may be the limiting element. This however is rarely the case. Effectively, there is an infinite source of carbon dioxide in the air - the limiting factor with carbon is not in the mass to be supplied but in the rate of supply. Limitation in the rate of carbon supply may arise from high rates of photosynthesis in the upper layers of highly eutrophic waterbodies when the carbonate and bicarbonate species are depleted, indicated by a shift in the pH to values of around 9.5 or higher (NIWR, 1985). For most waterbodies however, carbon is rarely a limiting factor in the rate of biomass generation or the total biomass generated in a waterbody.

# 2.7

#### Nitrogen:

This element has been cited as being an algal growth limiting nutrient in certain waterbodies. This however is rare; nitrogen is available for growth in the nitrate and ammonia forms, if these are deficient, certain groups of organisms, the nitrogen fixers, convert nitrogen gas into organic nitrogen compounds, in this fashion increasing the supply of usable nitrogen. For this reason few impoundments are nitrogen limited.

### **Phosphorus:**

In the large proportion of impoundments phosphorus is the limiting nutrient - algal assay techniques have shown that most fresh water lakes and impoundments are phosphorus limited. A reduction in the phosphorus loading to the waterbody usually will result in an associated reduction in the algal biomass (Rast and Lee, 1983).

### Trace elements:

Micro-nutrients (e.g. iron and silicon) or growth factors (e.g. vitamin Bl2) may be limiting (Lee, Rast and Jones, 1978; Round, 1977) but such situations are rare.

We have mentioned above that when the load of the limiting nutrient is decreased in a waterbody it should result in an associated decrease in the algal biomass. This implies that in the majority of instances by controlling the phosphorus load to a waterbody it should be possible to exercise some control on the autotrophic biomass (Toerien, 1977; Jones and Lee, 1982; Wiechers and Heynike, 1986). However, Sonzogni, Chapra, Armstrong and Logan (1982) state that some forms of phosphorus entering lakes have a limited effect on lake productivity: land runoff, often containing a high proportion of particulate un-utilized by planktonic algae. phosphorus may be These authors found, based on studies carried-out on the Great Lakes. that of the total phosphorus load carried by the rivers to the Great Lakes only 60 percent was potentially bio-available. They concluded that the mass of bio-available phosphorus corresponds to the dissolved reactive portion plus that fraction of the particulate inorganic phosphorus that can be extracted with 0.1 N NaOH. It is possible that the remaining portion of "unavailable" phosphorus may become bio-available, but the quantity and process are not well understood. In contrast, Huettl. Wendt and Corey (1979) estimate the proportion of available phosphorus entering the system at 90 percent of the input. Evidently it is not total mass possible to make generalised statements regarding the bio-availability of phosphorus in surface waters.

### 2 SOURCES OF PHOSPHORUS

The catchment area surrounding an impoundment has an important influence on the quality of that waterbody - runoff derived from within this area eventually will enter the impoundment; any anthropogenic or natural activity within the catchment, which influences the drainage process, concurrently will influence the quality of the impounded water.

Phosphorus entering the aquatic system is derived principally from two sources: point and nonpoint. Point sources are defined as discharges of industrial and municipal effluents (treated and untreated). Nonpoint sources are defined as drainage from agricultural and urban areas to the main river channel itself or tributaries feeding the main river channel.

# 2.1 Point sources

2 F.

In South Africa, municipal and industrial effluent discharges have been identified as a major contributor to the phosphorus load entering the aquatic system (Taylor <u>et al.</u>, 1984). This is illustrated in Tables 2.3 and 2.4; these give respectively typical phosphorus concentrations in municipal wastewaters before treatment, and the annual tonnages of total phosphorus discharged in the effluents after treatment in wastewater plants located in sensitive catchments.

The major sources of phosphorus in domestic wastewater are human excreta and detergents. In a survey conducted by Wiechers and Heynike (1986) between 50 and 60 percent of the phosphorus load received at a wastewater treatment plant originates from human excreta, the remaining fraction mainly from detergents. In combined domestic and industrial waste flows the phosphorus load from industry may cause a significant shift in these percentages.

Phosphorus content of human excreta is related to the dietary habits, but an average daily quantity of phosphorus in excreta is estimated at 1.3 g P per capita. The average daily mass contribution of phosphorus from detergents is estimated at 1.0 g P per capita (Wiechers and Heynike, 1986).

Contributions of phosphorus from industrial effluents are more difficult to estimate because some industries discharge little phosphorus, others, such as fertilizer production, feedlots, milk and meat processing, discharge highly concentrated phosphorus effluents (Wiechers and Heynike, 1986).

2.9

Phosphorus in untreated waste flows can be categorized as organically bound or inorganic, each present in different forms, particulate, colloidal or dissolved. One of the soluble forms, ortho-phosphate, makes up 40 to 75 percent of the total load of phosphorus in the untreated waste flow. During treatment a high percentage of the other forms usually are converted to ortho-phosphate; the net effect is that the proportion of phosphorus in the ortho-phosphate form can increase to 90 percent or more as the waste flow passes through the plant.

|   | hosphorus concent<br>s (mg/l as P) (from     |                                    |                                   |                           |
|---|--|------------------------------------|-----------------------------------|---------------------------|
| City and works:   | ortho-phosphate:                             | tota                               | 1 phosph                          | orus:                     |
| Pretoria, Daspoort  | 7.5  |                                    | 10.5                              |                           |
| Boksburg, Vlakplaats  | 6.5  |                                    | 15.3                              |                           |
| Cape Town, Cape Flats   | -  |                                    | 14.2                              | 1                         |
| Pinetown, Umlaas  | 7.0  |                                    | 12.2                              |                           |
|   | nnage of total phos                          |                                    |                                   |                           |
| · · · · · · · · · · · · · · · · · ·   | · plants to rive                             |                                    |                                   |                           |
| wastewater  | · plants to rive                             |                                    |                                   |                           |
| wastewater<br>catchments  | plants to rive                               | ers in<br>1985                     | the c                             | 2000                      |
| wastewater<br>catchments<br>Catchment:<br>Vaal River                                    | plants to rive                               | ers in<br>1985<br>331              | the c                             | ritical                   |
| wastewater<br>catchments<br>Catchment:  | plants to rive<br>1981<br>1093               | ers in<br>1985                     | the c<br>1995<br>504              | 2000<br>634               |
| wastewater<br>catchments<br>Catchment:<br>Vaal River<br>Crocodile River                 | plants to rive<br>1981<br>1093<br>929        | ers in<br>1985<br>331<br>165       | the c<br>1995<br>504<br>254<br>73 | 2000<br>634<br>322        |
| wastewater<br>catchments<br>Catchment:<br>Vaal River<br>Crocodile River<br>Umgeni River | plants to rive<br>1981<br>1093<br>929<br>330 | ars in<br>1985<br>331<br>165<br>49 | the c<br>1995<br>504<br>254       | 2000<br>634<br>322<br>108 |

(From: Davidson and Howarth, see Grobler and Silberbauer, 1984).

# 2.2 Nonpoint sources

Nonpoint sources of phosphorus include: atmospheric precipitation, urban runoff, and drainage from agricultural lands.

<u>Atmospheric precipitation</u>: Atmospheric wet precipitation, and dry fall-out generally are low, Sonzogni and Lee (1974) for example report 0.02 and 0.08 g  $P/m^2/y$  for these two sources, in the USA. These figures are not dissimilar from observations in South Africa: Simpson and Kemp (1982) report atmospheric deposition of 0.06 g  $P/m^2/y$  for an urban area (Pinetown,South Africa) and Bosman and Kempster (1985) 0.06 g  $P/m^2/y$  for a mixed catchment (Roodeplaat Dam catchment, South Africa). Higher values are to be expected in the proximity of industrial areas, and lower ones in undisturbed catchments.

<u>Urban and agricultural runoff</u>: Weibel, Weidner, Cohen and Christianson (1966) investigated the contributions of nutrients from rainfall and runoff. For urban runoff from a 27 acre residential and light commercial area in Cincinnati, USA, the phosphorus concentration ranged from 0.02-7.3 mg P/2, with an average value of 1.1 mg P/2. For agricultural runoff they investigated the phosphorus contribution from an experimental farm catchment - the concentration ranged from 0.25-3.3 with an average of 1.7 mg P/2. During storm events the phosphorus concentration increased greatly yielding 5 g P/m<sup>2</sup>/y in the runoff. Weibel, Anderson and Woodward (1964) report an average yearly export figure for phosphorus of 0.3 g P/m<sup>2</sup>/y. In urban runoff Uttormark <u>et al</u>. (1974) give total phosphorus export rates of 0.11 to 0.31 g P/m<sup>2</sup>/y. They also supply values for total phosphorus export from croplands, see Table 2.5.

| Crop:            | Total phosphorus (g/m <sup>2</sup> /y): |
|------------------|---|
| Maize            | 0.19-1.00                               |
| Cotton           | 0.017                                   |
| Wheat            | 0.04-0.13                               |
| Lucerne          | 0.02                                    |
| Mixed vegetables | 1.80-3.00                               |

Table 2.5 Total phosphorus export from cropland by surface runoff (after Uttormark <u>et al.</u>, 1974).

A survey carried-out by Hemens, Simpson and Warwick (1977) in the Umgeni catchment in Natal (South Africa), indicate that about 2 percent of the phosphorus applied to the catchment area is exported via river flow.

### 2.3 Point and nonpoint sources compared

The following conclusions, as regards point and nonpoint sources of phosphorus, are indicated:

 A considerable mass of phosphorus is exported from nonpoint sources during storm events; when investigating phosphorus export it is most likely that during storm events a large proportion of the nonpoint annual export load of phosphorus takes place. The effect of storms probably is accentuated in South Africa because storms are of high intensity in certain areas, and the rainfall is seasonal with average rainfall exceeding average evaporation giving rise to depletion of vegetation cover during the dry season. These factors combined can result in substantial soil erosion during a storm event; with erosion, the nutrient load carried by a river will be increased, depending on the fertility of the soil eroded.

- (2) Agricultural and urban areas are more important as sources of phosphorus than atmospheric deposition; phosphorus control strategies for surface runoff, therefore, are more likely to result in the reduction in the phosphorus load to the water system.
- (3) It is not unlikely that in many situations nonpoint sources will yield a substantial fraction of the total phosphorus load carried by the river.

#### **3** SINKS OF PHOSPHORUS

### 3.1 Wetlands as phosphorus sinks

Research carried-out in the United States and Canada indicate that effluents passing through wetlands and marshes are depleted of nitrogen and phosphorus (Nichols, 1983). Wetlands, or reed bed systems, as a form of tertiary wastewater treatment is receiving increasing interest, but the nutrient dynamics of these systems are still poorly understood (Kadlec, 1986). For example, the mechanisms whereby a wetland removes nutrients (adsorption, absorption and precipitation), must have finite capacities. Also, because the adsorption reaction will be partially reversible, under low effluent concentrations adsorbed nutrients may be released back into solution (Logan, 1982). The seasonal growth pattern also will influence uptake of nutrients (Nichols, 1983). During winter, plant die-down may result in nutrient release from cell lysis. Finally, storm events may cause scouring of the wetland causing the remobilization of stored nutrients. Wetlands therefore present a temporary sink for nutrients. Over an extended time scale each catchment will provide different nutrient retention and release characteristics depending on the catchment hydrology (Rast and Lee, 1983; Nichols, 1983; Bath, 1983). Viljoen (1984) is of the opinion that wetlands should not be used as a permanent method of removal of point source phosphorus, rather they should serve to accommodate point source mishaps and peaks of nonpoint source inputs to the river system.

### 3.2 <u>Rivers as phosphorus sinks</u>

Assimilation of nutrients in rivers is one area that has received little attention. The work of Keup (1968) serves as an illustration of the propensity of riverine processes to remove phosphorus from the overlying water column. Keup reported that the phosphorus concentration in the South Platte River, Colorado, USA, decreased below the treated effluent outfall as a function of river distance (see Fig 2.1). He ascribes the removal to biotic activity and formulated a simple empirical relationship to describe the phosphorus concentration profile in the river. However, he also reports that during high flow, phosphorus accumulated along the channel is remobilized and transported downstream. The flow regime therefore is a major factor in the mobility, availability and spatial distribution of phosphorus within a river. Other riverine processes that abstract or return phosphorus to the river water are:

- (1) Adsorption and desorption processes; through these river sediments can act as both a sink and source of and Smech. 1978: Cooke. phosphorus (Green, Logan 1988). Sediments act as scavengers of phosphorus. limited only by the maximum sediment adsorption Desorption of phosphorus usually capacity. 15 in the pH. causing associated with changes a the sediment-phosphorus complex destabilization of (McCallister and Logan, 1978; Logan, 1982).
- (2) The role played by the river biota is described by Simons and Cheng (1985); two pathways are discernible: firstly, absorption of soluble phosphorus by algae; and secondly, sedimentation of particulate phosphorus material. Keup (1968) and Logan (1982) report that under appropriate flow conditions the biota may remove large portions of the discharged phosphorus (up to 90 percent) which is then remobilized under high flow conditions.

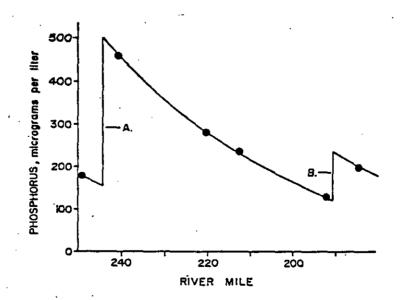


Fig 2.1 Phosphorus in the South Platte River, Colorado. Points A and B are respective projected municipal waste loads from cities with 26 000 and 8 000 sewered populations (from Keup, 1968).

#### 2.16

#### 3.3 Impoundments as phosphorus sinks

Sedimentation of phosphorus in an impoundment makes the nutrient unavailable for plant growth. Lee et al. (1978) are of the opinion that impoundments with hydraulic residence times of greater than a few months tend to be effective phosphorus sinks with retention of between 80 and 90 percent of the input the bottom sediments also loading. However, can be а significant source of phosphorus, particularly in shallow waterbodies where wind-induced currents can cause considerable mixing, resulting in resuspension of bottom sediments to the upper layers of the water column (Grobler, 1985). Studies of the bottom sediments from Hartbeespoort Dam (Transvaal, South Africa) have identified and quantified some of the factors controlling the flux of phosphorus to or from the sediments (NIWR, 1985). These include: the presence or absence of oxygen, phosphorus concentration, temperature and pH of the water, as well as the history of the sediments (episodes of dehydration rewetting). Quantification and modelling of sediment and resuspension in an impoundment is complex because of the number and interaction of the processes. Nonetheless, the net flux of phosphorus, either to or from suspended sediments, can be estimated by phosphorus mass balances for an impoundment. Initial indications are that these fluxes are considerable and may become significant when external loads are reduced to a level where the phosphorus concentration of the water is less than the equilibrium concentration of the sediments.

### 4 MODELLING PHOSPHORUS BEHAVIOUR

To describe the behaviour of phosphorus in a drainage basin three aspects need to be given attention, (1) temporal load (i.e. flow and concentration) of phosphorus entering the river above a given point in the flow path, (2) transport of the phosphorus down the river channel under a variable flow regime, and (3) behaviour of the phosphorus in waterbodies.

# 4.1 Phosphorus nonpoint source models

Phosphorus is delivered to the river via point and nonpoint sources. Usually, point sources can be quantified quite readily over a daily cycle and seasonally. However, with contributions from nonpoint sources, quantification is not a simple matter and a number of approaches, or models, have been proposed to deal with this problem. These models fall into three basic categories, namely:

(1) Export coefficient models.

(2) Phosphorus-discharge rating curve models.

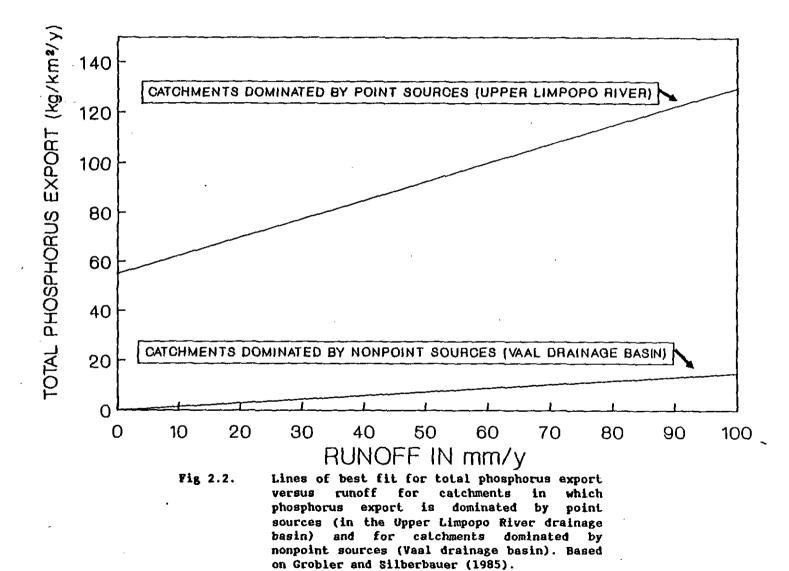
(3) Mechanistic models.

In the following section the models in each category will be introduced with regard to: structure and objectives, assumptions, data requirements, and limitations.

(1). Export coefficient models:

Export coefficient model have been developed to determine the total annual mass of phosphorus exported from <u>ungauged</u> and <u>unmonitored</u> catchments. These models assume that a given land-use will yield a characteristic (annual) quantity of phosphorus per <sup>9</sup> unit area. These export coefficients are determined for a selection of well monitored catchments, under various land-use practises. The coefficients are then applied in unmonitored catchments to predict the total annual phosphorus export loads. Rast and Lee (1983), 'after examining the export coefficients developed by previous authors. produced "generalized" values applicable to the USA, given in Table 2.6. To test the reliability of these coefficients, they estimated the phosphorus load from 38 drainage basins in the USA and compared these with the measured export loads. They concluded that reasonable agreement exists between the observed and predicted results. Export coefficient models thus can provide a first approximate estimate of phosphorus loads in drainage basins where no measured data are available. Export coefficients also can be used to provide information for designing monitoring programs by focusing on the major sources of phosphorus contributing to river systems (Rast and Lee, 1977 and 1983).

Considerable criticism has been directed against the export coefficient models. Kröger (1981), Thornton and Walmsley (1982). Grobler and Silberbauer (1985a), and Prairie and Kalff (1986) state that a large degree of uncertainty is associated with phosphorus loads estimated by means of export coefficients. Grobler and Silberbauer (1985a) concur in this: from data collected from 7 South African catchments over a period of 3-5 years they concluded that two important factors had been ignored in developing the export coefficients: the geology of the catchment and the contribution from point sources. By grouping catchments according to geology and whether the catchment contained mainly point or nonpoint sources, 74 to 99 percent of the deviations can be explained, see Fig 2.2. It is reasonable to conclude that if each drainage basin is considered in the same detail, as done by these authors, the export coefficient approach could be reliable.



. 19

| Table 2.6                            | Catchment nutrient<br>Rast and Lee, 1983)<br>g P/m <sup>2</sup> /y. | export coefficients (after<br>expressed as total phosphorus |
|--------------------------------------|---|---|
| Land-use                             | ·:  | Export coefficient:   |
| urban<br>rural<br>forest<br>atmosphe | ere   | 0.1<br>0.05<br>0.005-0.01<br>0.025                          |

# (2) Phosphorus-discharge rating curve models:

The second category of nonpoint source model is based on the concept that, for a given river station, a correlation exists between the magnitude of the river discharge and the load of phosphorus exported by the river at the specified station. Unlike the export coefficient approach which attempts to quantify the total annual load based only on catchment characteristics, the phosphorus-discharge rating curve model requires a time series of paired discharge and phosphorus concentration data. From these, regression relationships are derived for the discharge - phosphorus concentration. Knowing the discharge hydrograph, the chemograph or loadograph can be derived and the total load determined over any selected interval. Rating curve models require a greater input of data than the export coefficient models, but have the potential to yield better predictions in the quantification of phosphorus loads.

Several mathematical relationships have been proposed to describe the regression relationship between nutrient concentration and river discharge. Prominent regression relationships are: the hyperbolic equation of Durum (1953); the exponential of Ledbetter and Gloyna (1964); and linear of Wang and Evans (1970). Attempts to improve the predictive power of these methods include: the mass balance of Cahill. approach Imperato and Verhoff (1973): incorporation of a flow rate-of-change term in the model proposed by Johnson, Bouldin, Goyette and Hedges (1976); and the use of a load-discharge relationship (instead of a concentration-discharge approach) proposed by Houston and Brooker (1981), Brooker and Johnson (1984) and Grobler, Rossouw, van Eeden and Oliviera (1987).

Conceptually, the work of Johnson <u>et al</u>. (1976) holds significant promise. From an examination of the water quality data associated with the rising and falling limb of the hydrograph for successive flood events they found that, the rising limb, the ortho-phosphate concentration on generally was higher than for the same discharge on the falling limb. This phenomenon they assumed was due to the scouring of river sediments during the beginning of the flood event. Johnson and East (1982) hypothesized that a cyclical (hysteresis) relationship always exists between discharge and concentration under flood conditions, that a particular idealized cycle always resulted from the occurrence of defined extremes of antecedent discharge. rainfall recession conditions. reflecting the and hydro-geological characteristics of a catchment area. They hypothesized that the chemical concentration can be derived from a mass balance approach าก a three component algorithm, governed by the surface, interflow and groundwater discharge; they verified the hypothesis of a looped response using data for a stream draining a small moorland catchment.

Phosphorus-discharge rating curve models have been applied to numerous rivers throughout the world to quantify phosphorus from nonpoint sources, with varying degrees of success. Limitations of the model are the uncertainty due scatter of to the data when the river phosphorus concentrations are plotted as a function of discharge. However, the general consensus is that chemical-discharge rating curves have potential to predict the phosphorus load accurately over a given period of time, provided that:

- Accurate time series of river discharge (hydrograph) data are available.
- (11) Sufficient water quality data are available for model calibration.
- (iii) The scatter of data can be minimized by using the looped rating (hysteresis) curve.
- (3) Mechanistic nonpoint source models:

This category of model attempts to identify the processes that act on the phosphorus. Numerous mechanistic models have been developed with the objective of predicting soluble and particulate phosphorus fractions in runoff from nonpoint sources. These models incorporate processes such phosphorus adsorption isotherm (Wendt and Alberts, as: 1984); adsorption processes combined with bio-assimilation and convection processes (Novotny, Tran, Simisman and Chesters, 1978); and a unit-mass response function (Zingales, Marani, Rinaldo and Bendoricchio, 1984). In each model, the phosphorus behaviour is governed principally by the adsorption and convection processes.

These models are quite complex and necessitate a considerable input of data for both calibration and verification. For example, the model proposed by Novotny <u>et al</u>. (1978) requires a time series of: soil moisture content, soil moisture movement, soil erosion and excess rain. Such input requirements would put a substantial demand on most data bases, this tends to limit their application to research catchments where the necessary data input requirements can be satisfied. Where this has been done this category of models have shown good predictive qualities.

### Conclusion:

By categorizing the nonpoint source models into the three classes it is possible to distinguish a spectrum of methods, ranging from the simplest (export coefficients) to the most complex (mechanistic). Between these extremes lie the rating curve models, a category of model that does not appear to have been investigated as fully as its potential suggests.

### 4.2 Phosphorus transport models

The objective of a phosphorus transport model is the prediction of the movement of phosphorus down the river. The description is a complex one as it must take cognizance of the phosphorus and flow input to the river, the hydrodynamic behaviour of the water mass in the river as well as the physical, chemical and biological processes that act on the phosphorus transported along the river channel (Bedford <u>et al.</u>, 1983).

The input to the river has been reviewed in the previous section (Section 4.1). The hydrodynamic behaviour depends upon the river discharge, cross sectional area of flow. the morphology and slope of the riverbed and lateral inputs. The physical processes include sedimentation, remobilization. adsorption, desorption, diffusion and mixing; the biological processes are primarily biotic assimilation of phosphorus as well as the phosphorus release associated with cell lysis and excretion; the chemical processes are inorganic precipitation, dissolution and absorption.

Models of different levels of complexity have been developed to describe the movement of phosphorus along the river channel. The more elementary models essentially disregard the hydrodynamic aspects, lump two or more processes together and formulate these lump parameters in terms of distance of travel, that is, a lumped steady-state approach is taken. The more advanced models attempt to describe the temporal and spatial variation along the length of the river channel, that is, a dynamic approach is taken.

(1) Steady-state approach to modelling phosphorus transport:

Keup (1968) investigated the change of phosphorus concentration as a function of distance in a number of North American rivers. The discharge of treated sewage effluent causes an abrupt increase in the phosphorus concentration of the river at the point of discharge. Downstream of this point, the phosphorus concentration rapidly diminishes, apparently as a function of river distance. Keup hypothesized that the phosphorus depletion from the water column is caused by biotic assimilation, the solid biotic material settles to the riverbed to increase the phosphorus content of the sediments. During flood events, the phosphorus stored in the sediment is remobilized and transported further downstream. Keup concluded that the transport of phosphorus down the river can be visualized as a series of jumps, in which phosphorus is effectively transported as bed load only during flood events when the river sediments are scoured. Ultimately, the phosphorus will arrive at the estuary, or flood plain, where it becomes permanently stored.

Simons and Cheng (1985) investigated the removal of phosphorus in the Nepean River, New South Wales, Australia, through an extensive series of small impoundments in the river channel. They report that phosphorus added to the river via treated sewage effluents is removed by biotic processes, described as the sum of two exponentials:

Ct Qt = a Co Qo EXP (-K1 t) + (1-a) Co Qo EXP (-K2 t) ..... (2.1)

where

| Ct | 3          | phosphorus concentration at time t, |
|----|------------|-------------------------------------|
| Qt | =          | discharge at time t,                |
| Co | 3          | initial phosphorus concentration,   |
| Qo | =          | initial discharge,                  |
| K1 | <b>=</b> , | first order rate constant,          |
| K2 | =          | first order rate constant, and      |
| a  | =          | constant.                           |

is attributed to the assimilation of soluble phosphorus by particles (assumed to be phytoplankton) and takes place over about 11 days. The slower process is one of sedimentation of nutrient laden particles taking place over 70 days. They also observe a shift in the phosphorus speciation from soluble to particulate, brought about by biotic uptake of soluble phosphorus.

Logan (1982) and Taylor and Kunishi (1971) ascribe phosphorus depletion to sediment/water interaction; the sediments act as scavengers for phosphorus, causing a rapid depletion of the water column until some ຫາບມູ່ພາຍ steady-state is attained. Consequently, the transport of phosphorus along river channels is governed by both biotic and abiotic processes influencing the sedimentation and remobilization of phosphorus.

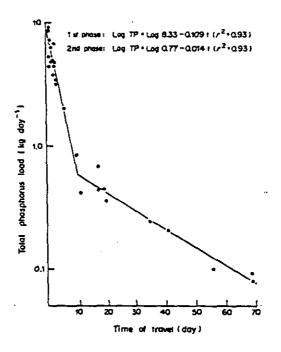


Fig 2.3 Relationship between total phosphorus load and time of travel to stations in the Nepean River between 1.2 and 3.2 km downstream of the Camden sewage treatment works outfall. (From Simons and Cheng, 1985).

(2) Dynamic approach to phosphorus transport:

The objective of a dynamic river channel model is to describe the temporal and spatial variation of phosphorus along the length of the river channel. This type of predictive capability would be of particular importance in river quality modelling in dry and arid climates, like South Africa, where storm events exhibit a combination of low frequency, short duration, and high intensity, inducing abrupt changes in river quality over short intervals of time and distance along the river channel. A large fraction of the total mass of phosphorus transported down the river takes place during the storm induced flood waves.

The movement of phosphorus along a river during a storm is complex, it requires resolution of inputs to the river, transport along the river, while physical, chemical and act on the phosphorus biological. processes during transport. A number of attempts to model the transport of phosphorus along river channels use coupled nonlinear equations (Chen, 1970; Chen and Wells, 1976; Verhoff and Melfi. 1978: Bedford, Sykes and Libicki, 1983). These models however are complex and have achieved varying degrees of success in modelling the transport phenomena.

A review of existing coupled dynamic water quality models yields a sparse literature. Bedford, Sykes and Libicki (1983) present a dynamic water quality model for storm induced flows. The model incorporates a variety of subcomponents to accommodate for the influence of plankton bio-degredation, sedimentation and diffusion. The water quality component is formulated to predict the soluble ortho-phosphate concentration, in addition to seven other chemical species. Calibration is likely to be complex.

TR 143 March 1989

ŝ

Also, the model does not take into account either phosphorus remobilization, bed load transport, or the phosphorus speciation shift caused by the adsorption processes. Nonpoint source inputs to the main river channel are only given a sketchy treatment.

Another multi-parameter dynamic water quality model is that proposed by Chen and Wells (1976) based on an ecological structure to provide chemical and biological information on the Boise River, Idaho (USA). The river is divided into a number of reaches and mass balance equations developed for each one using: the law of conservation of mass and the kinetic principle (stating the rate of change is equal to the product of a coefficient and one or more constituent concentrations that interact to cause the change). The mass balances are then calculated for the biotic and abiotic components. The final result is a model specific to the river in question, requiring a large data set in which to calibrate the model. The main point of interest to be derived from this model, is the manner in which (i) the river is subdivided into sub-reaches and (ii) the various chemical components are calculated using mass balances and (iii) the kinetic principle. However, the lateral input to the river channel and remobilization of phosphorus are not incorporated.

Verhoff and Melfi (1978) attempt to account for the remobilization and sedimentation of phosphorus using a derivation of the mass continuity equation given below.

A  $\partial c/\partial t + Q \partial c/\partial x + qc = qc^{"} + a \partial u/\partial t c$ 

.... (2.2)

where

| Ă   | = | flow cross sectional area,                              |
|-----|---|---|
| Q   | = | river discharge of main river channel,                  |
| q   | = | discharge of lateral inflow per unit length of channel, |
| c   | 2 | phosphorus concentration in main river channel,         |
| C " | = | phosphorus concentration in lateral inflow,             |
| U   | 2 | flow velocity of main river channel,                    |
| x,t | 2 | increments of time and river distance,                  |
| a   | ⇒ | constant.   |

In Eq (2.2), the remobilization of phosphorus is assumed to be proportional to the rate-of-change of discharge, whereby the rising flow causes remobilization of phosphorus, while the decreasing flow causes sedimentation. Although empirical, application of the model for rivers in Western Ohio, USA, would indicate that the model is capable of predicting the transport of phosphorus under flood conditions. Unfortunately, little information is provided by Verhoff and Melfi.

# 4.3 Nutrient load/eutrophication response relationships

A method that has a demonstrated capability to predict the changes in eutrophication related water quality characteristics from changes in phosphorus load, is the Overseas Economic Community Development (DECD) eutrophication modelling approach. This approach was developed from an intensive study of 200 waterbodies to quantify nutrient load/eutrophication response relationships for surface waters (DECD, 1982). Through this study empirical relationships were developed between the phosphorus loading of a waterbody (normalised by mean depth, hydraulic residence time and surface area) and the eutrophication related water quality characteristics of the waterbody such as mean summer chlorophyll, mean summer secchi depth and the rate of oxygen depletion in the hypolimnion of the waterbody (Rast and Lee, 1977; Lee <u>et al.</u>, 1978).

Rast <u>et al</u>. (1983) and Jones and Lee (1982) developed the OECD approach further - they determined the change in position of a waterbody's load/response (i.e. mean summer chlorophyll, secchi depth and oxygen depletion rate) that occurred after its phosphorus load had been altered. They found that a waterbody would track parallel to the line of best fit for each of the quality parameters when the phosphorus loading was changed. For example, by knowing an initial phosphorus load/response, the change in chlorophyll could be estimated for a given change in phosphorus load. Consequently, it was possible to predict the improvement in the trophic status of an impoundment based on a reduction in the phosphorus load.

The OECD modelling approach has found useful application in the management of eutrophication related problems in many South African impoundments (Jones and Lee, 1984). However, the following points have been made in regard to this approach:

- (1) The OECO approach is formulated on an average input estimated over say a year. Grobler and Silberbauer (1984) state the highly variable nature of South African hydrology and associated nutrient inputs may influence the predictive capabilities of the approach.
- (2) Errors in the phosphorus load calculations are regarded as the major source of data scatter in the load/response relationships (OECD, 1982).

Up to now only "steady-state" impoundment modelling has attempted. A predictive hydro-nutrient been mode] for impoundments would be a valuable aid in (1) describing spatial and temporal distribution of algal biomass, and nutrient concentration in waterbodies, (2) location the of ɗam abstraction points and (3) the operational use of the impoundment. Such a model however can be expected to be of great complexity. It will need to take account of the influent river chemograph, hydrograph, temperature of the river water and its density; radiation input, air temperature, turbidity of the water; wind effects on the mixing and stratification. Compounded with this will be movement of phosphorus in the growth, settlement impoundment. algal phosphorus. of remobilization and so on.

### 5 CONTROL OF PHOSPHORUS IN THE ENVIRONMENT

- --

To develop a river management strategy for the maintenance of satisfactory water quality, we require a quantitative description of the yearly hydro-chemical cycle. As yet this ideal situation has not been realised. The more usual situation is that management has operated on individual aspects - no practical integrated model of behaviour has been available. Although numerous models describing nonpoint sources and river transportation have been proposed they have not been integrated to provide a practical solution to the problem of quantifying the phosphorus transport along river channels.

- -!

1. . 24

entry of such loads.

In this section we shall review control procedures based on ad hoc assessment of nutrient input, then review briefly operational procedures to minimise the adverse effects of eutrophication on impoundments.

### 5.1 Point source control

There are two methods available for the control (removal) of phosphorus from point sources, <u>viz</u>. chemical precipitation of phosphorus (WRC, 1985) and biological excess phosphorus removal (WRC, 1984).

Chemical precipitation is based on the precipitation of the ortho-phosphate by the addition of iron or aluminum salts. Precipitation removal is highly effective and can be readily implemented on existing plants (activated sludge or trickling filter). However, this method has two main disadvantages:

- (1) Costs associated with phosphorus removal are high so that small municipalities require allocation of relatively large treatment costs from small budgets. For example, Bath (1985) determined the costs for the Municipality of Paarl to remove phosphorus from their final effluent as: capital outlay of about R100 000, annual running cost for chemicals about of: 16 500 m<sup>3</sup>/d (volumetric flow R270.000 and average effluent total phosphorus concentration of 3.4 mg/1), giving an increased treatment cost of approximately 4 cents per cubic metre of effluent.
- (2) Addition of the salts raises the salinity of the effluent which in some instance may reduce the re-use value of the water downstream.

Biological removal of phosphorus is obtained in specially designed wastewater treatment systems e.g. Modified Bardenpho, UCT, and other systems, WRC (1984). As the removal is biologically mediated, no salt addition is necessary so that the salinity of the effluent is not increased. Generally, the total cost of removal per unit volume of effluent is significantly lower than with chemical precipitation. The disadvantages of the system are:

- (1) The system is relatively complex and requires a relatively high technical component for operation. The system is subject to process upsets so that the removal achievable can not be guaranteed on a continuous basis.
- (2) The concentration of phosphorus that can be removed is dependent on certain wastewater characteristics. Consequently, it may not be possible to remove all the phosphorus. To ensure that the specified maximum effluent phosphorus concentration is not exceeded, supplementary, or back-up chemical precipitation is necessary, to be used as the occasion demands or to supplement the removal continuously.

In an endeavour to control the phosphorus loads entering impoundments, regulations have been gazetted by the South African government to limit the concentration of soluble ortho-phosphate to I mg/% (expressed as P) in domestic and industrial effluents discharging to "sensitive catchments" (Government Gazette, 1984). A "sensitive catchment" is defined as one containing an impoundment whose utility is impaired by Butty. 1980). eutrophication (Walmsley and The 1 mg/L standard for sensitive areas was selected after an assessment of the technical and economic feasibility of phosphorus removal technology at the time the standard was promulgated.

Although the 1 mg/2 effluent standard is uniform for sensitive catchment areas, there is flexibility in implementing it – the standard can be set at higher concentrations for certain effluents by granting of permits (exemptions) where it can be shown that the impact of these effluents on the trophic status of the receiving water will be negligible (Grobler and Silberbauer, 1984). However, for certain areas, consideration also is being given to the introduction of an even stricter phosphorus effluent standard (Best, 1986).

phosphorus standard has received criticism on the The grounds that differences in the phosphorus receiving capacity of impoundments has been ignored (Pretorius, 1983). Also, in some catchments it is suspected that the contribution of (agricultural from nonpoint sources phosphorus and urban exceed the from runoff) mav contribution point sources (effluents). In such an event the enforcement of the effluent phosphorus standard would not result in the expected reduction in phosphorus loading of the particular impoundment.

Other methods of reducing the phosphorus load from treated sewage effluent include mass reduction of the phosphorus component in commercial detergents. In South Africa, detergents contain on average 70 g P/kg detergent and with the higher capita use of detergents could comprise a major fraction of phosphorus discharge to the aquatic environment. As detergents are man-made products their manufacture and composition can be controlled. A number of countries, for example the United States, Canada, the Netherlands, Switzerland and Japan have implemented bans, or reductions, of phosphorus in detergents. part of their strategy to control phosphorus to the as environment. In South Africa, the authorities have opted for a policy of controlling phosphorus by means of an effluent standard. but additional strategies, such as а ban ол phosphorus detergents, are also being evaluated.

The contribution of detergent phosphorus to the total phosphorus load on sewage works in South Africa varies between 35 to 50 percent (Wiechers et al., 1984; Wiechers, 1985; Wiechers and Heynike, 1986). From these figures it is clear that a detergent phosphorus ban could significantly reduce the phosphorus load on a sewage works, but this in itself may not be sufficient to reduce the level required to protect the aquatic environment from eutrophication-related problems. From limnological investigations, Maki, Porcella and Wendt (1984) reported that reduction of phosphorus in wastewaters had not reduced the trophic status of certain American impoundments. They concluded that the reduction of phosphorus in detergents will not result in a significant reduction in the phosphorusloading to dams. However, Pallesen, Berthouex and Booman (1985) state that from intervention analysis, the implementation of the detergent phosphorus-ban has caused a 25.5 percent reduction in the phosphorus load from a Wisconsin water treatment plant. They do not assess the effect this reduction would have on the aquatic environment. Hartig and Horvath (1982) report that the application of the phosphorus-detergent ban has caused a 23 percent decrease in phosphorus loadings from Michigan's Municipal sewage outfalls into the Great Lakes. Etzel et al. (1975) however concluded from algal assay and river sampling techniques, that the P-detergent ban would not have a significant effect on river and dam systems.

Introduction of a phosphorus detergent ban in South Africa does not appear to be vital at present. Wiechers and Heynike (1986) have undertaken a cost benefit analysis, analyzing the effect of a detergent phosphorus ban or conventional phosphorus removal from treated effluents.

| Table 2.7 Cost benefit estimates (1983) for banning<br>detergent phosphorus versus removal of phosph<br>at wastewater treatment works (from: Wiechers<br>Heynike, 1986). |   |                      |                           |
|--|---|----------------------|---------------------------|
| Item:  |   | Annual cost<br>cost: | (R million/y)<br>benefit: |
| Additional   | <u>cost 1tems</u> :                     |                      | ,                         |
| 10% increas  | se in detergent cost                    | 22.7                 |                           |
|  | e in life-cycle of:<br>washing machines | 3.8                  |                           |
|  | washable fabrics                        | 62.5                 |                           |
| Perceived  | benefits:                               |                      |                           |
|  | st for chemical                         |                      |                           |
| P removal:   |   |                      | 4.7                       |
| P removal:   | st for biological                       |                      | 1.2                       |
|  | lt load (saving to                      |                      |                           |
| produce ef<br>TDS):  | fluent with equivalent                  |                      | 22.5                      |
| cost benefi  | t without desalination                  | -                    |                           |
| (15:1):  |   | 89.0                 | 5.9                       |
| cost benef<br>(3:1):   | it with desalination                    | 89.0                 | 28.4                      |

Table 2.7 lists the results of the cost benefit analysis for banning phosphorus from detergents. If the removal of salts added to precipitate the phosphorus at the sewage works is ignored, the cost-benefit ratio for banning phosphorus in detergents is about 15:1. If salt removal is included, then the ratio is 3:1, still indicating that a detergent-ban will not be economically feasible (Wiechers and Heynike, 1986).

Phosphorus transport Berg River

TR 143 March 1989

Since phosphorus the time the standard has been promulgated, industries and municipalities have invested considerable funds on capital equipment to remove phosphorus from their effluents. The question remains whether it is necessary to impose a ban on phosphorus based detergents: Wiechers and Heynike (1986) state that any reduction in the phosphorus load to biological excess phosphorus removal works will assist in achieving the phosphorus standard without chemical addition. On works using chemical phosphorus removal, reduced phosphorus loads will reduce the chemical requirements and mass of sludge produced, thereby reducing overall costs. However, detergent manufacturers state that a phosphorus-free detergent will ultimately cost the consumer more because of increased wear on clothes and increased corrosion of washing machines (De Jong, 1985).

#### 5.2 Nonpoint source control

The Overseas Economic Community Development (OECD) study (OECD-Paris 1982) states that control of nonpoint phosphorus sources is difficult. However, from these studies the opinion is expressed that the upgrading and improvement of all aspects of agricultural practises which may contribute nutrients and sediments to waterbodies, should be encouraged, particularly:

- (1) Control of waste from intensive animal husbandry.
- (2) Control of the dose, period and method of fertilizer application to achieve minimum nutrient loss and optimum uptake by the crop.
- (3) Control of erosion and runoff from tillage land and from forestry operations (Logan, 1982) as well as control of over-irrigation.

In South Africa the control of nonpoint sources is vested in the Conservation of Agricultural Resources Act (Act 43 of 1983) and the Water Act (Act 54 of 1956). However, effective control of nonpoint sources is hampered by our limited understanding, and ability to quantify the mass of nutrients exported via nonpoint sources.

# 5.3 Management of impoundments

In many impoundments throughout the world it has not been possible to control the input of nutrients, either because the nonpoint source is large and difficult to control, or the point source is uncontrolled. In some impoundments, recycling of the internal nutrient load is sufficient to maintain the nutrient concentration in the water column, at eutrophic levels even in the external nutrient load is significantly reduced (Lennox, 1984). Various attempts have been made to minimise the adverse effects of eutrophication by management of the impoundment:

- Physical manipulation e.g. by destratification, hypolimnetic aeration, withdrawal of hypolimnetic water, draw-down and alteration of flushing regime (Oglesby, 1969; Jacoby, Lynch, Welch and Perkins, 1982).
  - Chemical and sediment manipulation e.g. by nutrient precipitation inside the waterbody as well as the inactivation and removal of sediments (Hayes, Clarke, Stent and Redshaw, 1984); also the discharge of nutrient laden hypolimnetic water during periods of impoundment stratification (Walmsley and Butty, 1980).

Biological manipulation e.g. by mechanical harvesting of the biomass (macrophytes, algae. and fish). application of toxic substances (herbicides. algicides, and pesticides) and the direct manipulation of the food chain (Henrikson, Nyman, Oscarson and Stenson. 1980; Clarke, Jarvis, Ashton and Zohary, 1987).

These impoundment management techniques have achieved varying degrees of success. Positive results have been reported using one or more of these management techniques (Oglesby, 1969; Henrikson <u>et al.</u>, 1980; Hayes <u>et al.</u>, 1984).

of impoundment management Application techniques necessitates detailed understanding of the biological. a chemical and hydrodynamics of these systems. Without such information, the control of eutrophication using impoundment management could be ineffective (Taylor et al., 1984). In South Africa, the National Institute of Water Research followed this approach: they conducted an intensive study on phosphorus cycling in Hartbeespoort Dam, a hypertrophic impoundment and to simulate the impoundment (TROFIC) developed a model response. Different management strategies tested on the model, to reduce the size of the phytoplankton standing crop and modify the species composition from predominantly blue-green to green algae. The model predicts that the only biological method likely to control eutrophication in the impoundment is through an algal-species shift, to make the algae more palatable to zooplankton. This, the model predicts, can be brought about by: increase in the N:P ratio: aeration-destratification: or decrease in the pH of the impoundment. The model further predicts that a reduction of the external phosphorus loading to the impoundment may have a minimal effect because the internal nutrient loading will' remain the principle source of nutrient;

it will necessitate the application of chemical precipitation in the lake to reduce the nutrient source (Clarke <u>et al.</u>, 1987). These techniques have not yet been tested in the impoundment, so the predictive capabilities of the model are still unknown.

### 6 CONCLUSION

In so far as it concerns modelling of phosphorus transportation through a basin the literature points to the following conclusions:

- (1) Eutrophication of impoundments affects many potential uses of the impounded waters, for public supply, water transportation in pipelines, fishing, swimming, etc. The financial implication of eutrophication has not been resolved in South Africa but the cost is expected to be high.
- (2) The nutrient identified as a key to the control of eutrophication 1s phosphorus; by controlling possible, phosphorus discharges 1t 15 11 many instances, to limit the trophic status of receiving waterbodies. Description of the eutrophication state macroscopic "static" nature. is still of a No practical dynamic model is available. When such a model is developed, two of the inputs would be the flow hydrograph and associated phosphorus chemograph.
- (3) The principal sources of phosphorus generation in a basin are point and nonpoint (or diffuse) sources. Much controversy still exists concerning the relative importance of these two sources. Up to the present, in South Africa point sources appear to have attained greater recognition than nonpoint sources, but no comparative studies are available.

4

- (4) Quantification of nonpoint source generation is still in the embryonic stage. Mechanistic models of some specific processes have been developed but are, for a of reasons. number not practical. Empirical approaches. in particular the looped phosphorus discharge rating method, appear to have potential. empirically This approach links the nonpoint phosphorus concentration (or load) to the discharge hydrograph; this implies that quantification of the discharge hydrograph is essential in applying this method.
- (5) When phosphorus in the water column is transported along the river channel, under low flow, it is subject to removal by settlement, biotic extraction both in the channel and in wet lands; under high flows and flood events phosphorus is remobilized into the water column. The net removal of phosphorus achieved over a number of seasons, however, is not known with any certainty. Modelling of the removal and remobilization of phosphorus in the channel is poorly developed.
- (6) The empiric link between flow and phosphorus removal implies that remobilization description of and transportation along river channe] phosphorus a of flow requires an adequate description the hydrograph at every point in the channel, under low and high flow, and floods.
- (7) There are numerous models describing flow routing in a channel. All models essentially are based on the continuity and momentum equations of Saint-Venant, but with the momentum equation simplified in various degrees in the respective models. The problem is to find a model that gives an adequate description of the flow hydrograph without making excessive demands on data for calibration.

#### 7 REFERENCES

### Bath, A.J. (1983)

"Literature review on reed beds, their capacity for phosphate uptake and the influence on their ecology by imposing the Phosphate Standard", unpublished report of the Division of Water Pollution Control, Department of Water Affairs, Pretoria, p.14.

# Bath, A.J. (1985)

"Implications of water quality on the proposed river development scheme in the lower Berg River", unpublished report of the Division of Water Pollution Control, Department of Water Affairs, Pretoria, p.49.

Bedford, K.W., Sykes, R.M. and Libicki, C. (1983)

"Dynamic advective water quality model for rivers", Am. Soc. Civ. Eng. Proc. J. Environ. Eng., <u>109</u>, no.3, 535-553.

Best, H.J. (1986),

"Best places phosphate standard in perspective", SA Water Bull., August 1986, 10-11.

Bosman, H.H. and Kempster, P.L. (1985)

"Precipitation chemistry of Roodeplaat Dam catchment", Water SA, <u>11</u>, no.3, 157-164.

Brooker, M.P. and Johnson, P.C. (1984)

"The behaviour of phosphate, nitrate, chloride and hardness in twelve Welsh rivers", Water Res., <u>18</u>, no.9, 1155-1164. Bruwer, C.A. (1979)

"The economic impact of eutrophication in South Africa", Technical report TR94, Department of Water Affairs, Pretoria, RSA.

Cahill, T.H., Imperato, P. and Verhoff, F.H. (1973)

"Evaluation of phosphorus dynamics in a watershed", Am. Soc. Civ. Eng. Proc. J. Environ. Eng. Div., <u>100</u>, no. EE2, 439-458.

Chen, C.W. (1970)

"Concepts and utilities of ecologic model", Am. Soc. Civ. Eng. Proc. J. Sanitary Eng. Div., <u>96</u>, no. SAS, 1085-1097.

Chen, C.W. and Wells, J.T. (1976)

"Boise River ecological modelling", In: Modelling biochemical processes in aquatic ecosystems, Ed. R.P. Canale, Anne Arbor Science.

Clarke, K., Jarvis, A.C., Ashton, P.J. and Zohary, T. (1987)

"The use of TROFIC as an aid for the management of eutrophic lakes", In: Proceedings of a symposium on modelling of aquatic systems, compiled by J.A. Thornton, Occasional report series number 24, Ecosystem programmes, Foundation for Research Development, CSIR, Pretoria, South Africa, p.255

Codd, G.A. and Bell, S.G. (1985)

"Eutrophication and toxic cyanobacteria in fresh waters", Water Pollut. Control, <u>84</u>, no.2, 225-232. Cooke, J.G. (1988)

"Sources and sinks of nutrients in a New Zealand Hill pasture catchment II. Phosphorus", Hydrological Processes, <u>2</u>, 123-133.

De Jong, G.A. (1985)

"Detergents, the consumer and the environment", Proceedings of the International Conference on Management Strategies for Phosphorus in the Environment, Lisbon, 1-4 July 1985, 11-23.

### Durum, W.H. (1953)

"Relationships of the mineral constituents in solution to streamflow, saline river near Russel, Kansas", Trans. Amer. Geophys. Union, <u>34</u>, 435.

Etzel, J.E., Bell, J.M., Lindermann, E.G. and Lancelot, C.J. 1975)

"Detergent phosphate ban yields little phosphorus reduction, parts 1 and 2", Water and Sewage works, September and October, 1975, 91-93.

Government Gazette (1984)

"Requirements for the purification of wastewater or effluent", Government Gazette, <u>227</u>, (991), 12-17.

Green, D.C., Logan, T.J. and Smeck, N.E. (1978)

"Phosphate adsorption-desorption characteristics of suspended sediments in the Maumee River Basin of Ohio", J. Environ. Qual., <u>7</u>, no.2, 208-212.

Grobler, D.C. and Silberbauer, M.J. (1984)

"Impact of eutrophication control measures on the trophic status of South African impoundments", Water Research Commission Rep. no. 130/1/84, Pretoria. Grobler, D.C. and Silberbauer, M.J. (1985a),

"The combined effect of geology, phosphate sources and runoff on phosphate export from drainage basins", Water Res., <u>19</u>, no.8, 975-981.

Grobler, D.C. and Silberbauer, M.J. (1985) "Eutrophication control:a look into the future", Water SA, <u>11</u>, no.2, 69-78.

Grobler, D.C. (1985)

"Management-orientated eutrophication models for South African reservoirs", Ph.D. Thesis, University of the Orange Free State, Bloemfontein, South Africa.

Grobler, D.C., Rossouw, J.N., van Eeden, P. and Oliviera, M. (1987)

"Decision support system for selecting eutrophication control strategies", In: Symposium on systems analysis in water quality management - IAWPRC, London, June 1987.

Hartig, J.H. and Horvath, F.J. (1982)

"A preliminary assessment of Michigan's phosphorus detergent ban", J. Water P. C., <u>54</u>, no.2, 193-197.

Hayes, C.R., Clarke, R.G., Stent, R.F. and Redshaw, C.J. (1984)

"The control of algae by treatment in a eutrophic water supply reservoir", J. Inst. Water Engrs. and Sci., <u>38</u>, no.2, 149-162.

Henrikson, L., Nyman, H.G., Oscarson, H.G. and Stenson, J.A.E. (1980)

"Trophic changes without changes in the external nutrient loading", Hydrobiol, <u>68</u>, no.3, 257-263. Hemens, J., Simpson, D.E. and Warwick, R.J. (1977) "Nitrogen and phosphorus input to the Midmar Dam, Natal", Water SA, <u>3</u>, no.4, 193-201.

"Development and testing of models for the extension of water quality data", In: Proceedings of a symposium on modelling of aquatic systems (Compiled by J.A. Thornton) Occasional report series number 24, Ecosystem programmes, Foundation for Research Development, CSIR, Pretoria, p.255.

Houston, J.A. and Brooker, M.P. (1981)

Herold, C. and Pitman, W. (1987)

"A comparison of nutrient sources and behaviour in two lowland subcatchments of the river Wye", Water Res., <u>15</u>, 49-57.

Huettl, J.P., Wendt, R.C. and Corey, R.B. (1979) "Prediction of alga-available phosphorus in runoff suspensions", J. Environ. Qual., <u>8</u>, no.1, 130-132.

Jacoby, J.M., Lynch, D.D., Welch, E.B. and Perkins, M.A. (1982)

"Internal phosphorus loading in a shallow eutrophic lake", Water Res., <u>16</u>, 911-919.

Johnson, A.H., Bouldin, D.R., Goyette, E.A. and Hedges, A.M. (1976)

"Phosphorus loss by stream transport from a rural watershed: quantities, processes andsources", J. Environ. Qual., <u>5</u>, no.2,148 157.

Johnson, F.A. and East, J.W. (1982)

"Cyclical relationships between river discharge and chemical concentration during flood events", J. Hydrol., <u>57</u>, 93-106. Jones, R.A. and Lee, F.G. (1982)

"Recent advances in assessing impact of phosphorus loads on eutrophication-related water quality", Water Res., <u>16</u>, 503-515.

Jones, R.A. and Lee, F.G. (1984)

"Application of the OECD eutrophication modelling approach to South African dams (reservoirs)", Water SA, <u>10</u>, 109-114.

Kadlec, J.A. (1986)

"Input-output nutrient budgets for small diked marshes", Can. J. Fish. Aquat. Sci., <u>43</u>, 2009-2016.

Keup,L.E. (1968)

"Phosphorus in flowing waters", Water Res., 2, 373-386.

Krenkel, P.A., Lee, G.F. and Jones, R.A. (1979)

"Effects of TVA impoundments on downstream water quality and biota". In: The Ecology of regulated Streams (Edited by Ward, J.V. and Stanford, J.A.), pp.289-306. Plenum Press, New York.

Kröger, A.D. (1981)

"Point and diffuse sources phosphorus loading of rivers and impoundments in the Durban-Pietermaritzburg region", Technical Report No. TR 117, Dept. of Environment Affairs, Pretoria.

Lahl, U., Cetinkaya, M., Duszeln, J. v., Stachel, B. and Thiemann, W. (1981)

"Health risks from volatile halogenated hydrocarbons?", Sci. Total Environ., <u>20</u>, 171-189.

Ledbetter, J.E. and Gloyna, E.F. (1964)

"Predictive techniques for water quality inorganics", Am. Soc. Civil Engreers Proc. Jour. Sanitary. Eng. Div., <u>90</u>, SAI, 127-132.

Lee, G.F., Rast, W. and Jones, R.A. (1978) "Eutrophication of waterbodies: insights for an age-old problem", Environ. Sci. and Tech., <u>12</u>, no.8, 900-908.

Lennox, L.J. (1984)

"Sediment water exchange in Lough Ennel with particular reference to phosphorus", Water Res., <u>18</u>, no.12, 1483-1485.

Logan, T.J. (1982)

"Mechanisms for the release of sediment bound phosphate to water and the effects of agricultural land management on fluvial transport of particulate and dissolved phosphate", Hydrobiol, <u>92</u>, 519-530.

Maki, A.W., Porcella, D.B. and Wendt, R.H. (1984) "The impact of detergent phosphorus bans on receiving water quality", Water Res., <u>18</u>, no.7, 893-903.

Marx, J.L. (1974)
 "Drinking water: another source of carcinogens?", SCI,
 186, 809-811.

McCalister, D.L. and Logan. T.J. (1978)

"Phosphate adsorption-desorption characteristics of soils and bottom sediments in the Maumee River basin of Ohio", J. Environ. Qual., <u>7</u>, no.1, 87-92. Moss, B. (1980)

"Ecology of fresh waters", Blackwell, p.232.

Nichols, D.S. (1983)

"Capacity of natural wetlands to remove nutrients from wastewater", J. Water P.C., <u>55</u>, no.5, 495-505.

NIWR (1985)

"The limnology of Hartbeespoort Dam", South African National Scientific Programmes Report, CSIR, Pretoria, Number 110.

Novotny, V., Tran, H., Simsiman, G.V. and Ghesters, G. (1978)

"Mathematical modeling of land runoff contaminated by phosphorus", J. Water P.C., <u>1</u>, 101-112.

### OECD (1982)

"Eutrophication of waters: monitoring, assessment and control", Organization for Economic Co-operation and Development, Paris.

Oglesby, R.T. (1969)

"Effects of controlled dilution on the eutrophication of a lake", In: Eutrophication, causes, consequences and correctives, National Academy of Sciences, Washington.

Pallesen, L., Berthouex, P.M. and Booman, K. (1985)

"Environmental intervention analysis: Wisconsin's-ban on phosphate detergents", Water Res., <u>19</u>, no.3, 353-362. Prairie, Y.T. and Kalff, J. (1986)

"Effect of catchment size on phosphorus export", Water Resour. Bull., <u>22</u>, no.3, 465-470.

Pretorius, W.A. (1983)

"Should the phosphate concentration in sewage effluents be restricted",Inst. of Municipal Engineers of Southern Africa, September 1983, 23-29.

Rast, W. and Lee, G.F. (1977)

"Summary analysis of the North American (US portion) OECD project: Nutrient loading-lake response relationship and trophic status indices", US EPA Report no. EPA/3-78-008, Ecological Research Series, US Environmental Protection Agency, Corvallis, Oreg.

Rast, W. and Lee, G.F. (1983)

"Nutrient loading estimates for lakes", Am. Soc. Civ. Eng. Proc. J. Environ. Eng., <u>109</u>, no.2, 502-517.

Rast, W., Jones, R.A. and Lee, G.F. (1983) "Predictive capability of the US OECD phosphorus loading-eutrophication response models", J. Water P.C., <u>55</u>, 990-1003.

Round, F.E. (1977)

"The Biology of the Algae", Edward Arnold, London.

Scott, W.E., van Steenderen, R.A. and Welch, D.I. (1985) "Health aspects of eutrophication", Paper presented at symposium on South African waters, CSIR, November 1985, Pretoria. Simons, B.L. and Cheng, D.M.H. (1985)

"Rate and pathways of phosphorus assimilation in the Nepean River at Camden, New South Wales", Water Res., 19, no.9, 1089-1095.

Simpson, D.E. and Kemp, P.H. (1982)

"Quality and quantity of stormwater runoff from a commercial land-use catchment in Natal, South Africa", Wat. Sci. and Technol., <u>14</u>, 323-338.

Sonzogni, W.C. and Lee, G.F. (1974)

"Nutrient sources for Lake Mendota – 1972", Trans Wis. Acad. Sci. Arts Lett, <u>62</u>, 133–164.

Sonzogni, W.C., Chapra, S.C., Armstrong, D.E. and Logan, T.J. (1982)

"Bio-availability of phosphorus inputs to lakes", J. Environ. Qual., <u>11</u>, no.4, 555-563.

Taylor, A.W. and Kunishi, H.M. (1971) "Phosphate equilibria on stream sediment and soil in a watershed draining an agricultural region", J. Agric. Food Chem., <u>19</u>, no.5, 827-831.

Taylor, R., Best, H.J. and Wiechers, H.N.S. (1984) "The effluent phosphate standard in perspective" IMIESA, October 1984, 43-56.

Thornton, J.A. and Walmsley, R.D (1982) "Applicability of phosphorus budget models to Southern African man-made lakes", Hydrobiol, <u>89</u>, 237-245. Toerien, D.F. (1977)

"A review of eutrophication and guidelines for its control in South Africa", Special report Wat. 48, National Institute of Water Research, CSIR, Pretoria, Republicof South Africa.

Toerien, D.F., Hyman, K.L. and Bruwer, R.D. (1975) "A preliminary trophic status classification of some South African impoundments", Water SA, <u>1</u>, no.1, 15-23.

Uttormark, P.D., Chapin, J.D. and Green, K.M. (1974) "Estimating nutrient loading of lakes from nonpoint sources", US EPA Report no. EPA/600/3-74-020, Ecological series, US Environmental Protection Agency, Corvallis, Oreg.

Verhoff, F.H. and Melfi, D.A. (1978)

"Total phosphorus transport during storm events", Am. soc. Civ. Eng. Proc. J. Environ. Eng. Div., <u>104</u>, no. EE5, 1021-1026.

Viljoen, F.C. (1984)

"The necessity of phosphate restrictions within the Vaal River barrage catchment", IMIESA, September 1984, 11-29.

Walmsley, R.D. and Butty, M. (1980)

"Guidelines for the control of eutrophication in South Africa", Water Research Commission and National Institute of Water Research - Council for Scientific and Industrial Research, UDC 574-524 (680), Pretoria 0001, South Africa. Wang, W. and Evans, R.L. (1970)

"Dynamics of nutrient concentration in the Illinois River", J. Water P. C., <u>42</u>, no.12, 2117-2123.

Weibel, S.R., Anderson, R.J. and Woodward, R.L. (1964)
"Urban land runoff as a factor in stream pollution",J.
Water P.C., <u>36</u>, no.7, 914-924.

Weibel, S.R., Weidner, R.B., Cohen, J.M. and Christianson, A.G. (1966)

"Pesticides and other contaminants in rainfall and runoff", J. Amer. Water Works Ass., <u>58</u>, 1075–1084.

Wendt, R.C. and Alberts, E.E. (1984)

"Estimating labile and dissolved inorganic phosphate concentration in surface runoff", J. Environ. Qual., <u>13</u>, no.4, 613-618.

Wiechers, H.N.S., Taylor, R. and Best, H.J. (1984)

"The effluent phosphate standard in perspective: part 2: State of the art of technology for limiting phosphate discharges to the water environment", IMIESA, November 1984, 27-35.

Wiechers, H.N.S. (1985)

"Sources of phosphate which give rise to eutrophication in South African waters", Proceedings of the symposium on the impact of phosphate on South African waters, CSIR, Pretoria, South Africa.

Wiechers, H.N.S. and Heynike, J.J.C. (1986)

"Sources of phosphorus which give rise to eutrophication in South African waters", Water SA, <u>12</u>, no.2, 99-102. Williamson, S.J. (1981)

"Epidemiological studies on cancer and organic compounds in US drinking waters", Sci. Total Environ., 18, 187-203.

WRC (1984)

"Theory, design and operation of nutrient removal activated sludge processes", A collaborative information document prepared for the Water Research Commission by the University of Cape Town, City Council Johannesburg and the National Institute for Water Research of the CSIR, Pretoria.

### WRC (1985)

"Interim guidelines for chemical removal of phosphates from municipal wastewaters", Draft report to Water Research Commission.

Zingales, F., Marani, A., Rinaldo, A. and Bendoricchio, G. (1984)

> "A conceptual model of unit-mass response function for nonpoint source pollutant runoff", Ecol. Model., <u>26</u>, 285-311.

### CHAPTER 3

# DESCRIPTION OF BERG RIVER BASIN

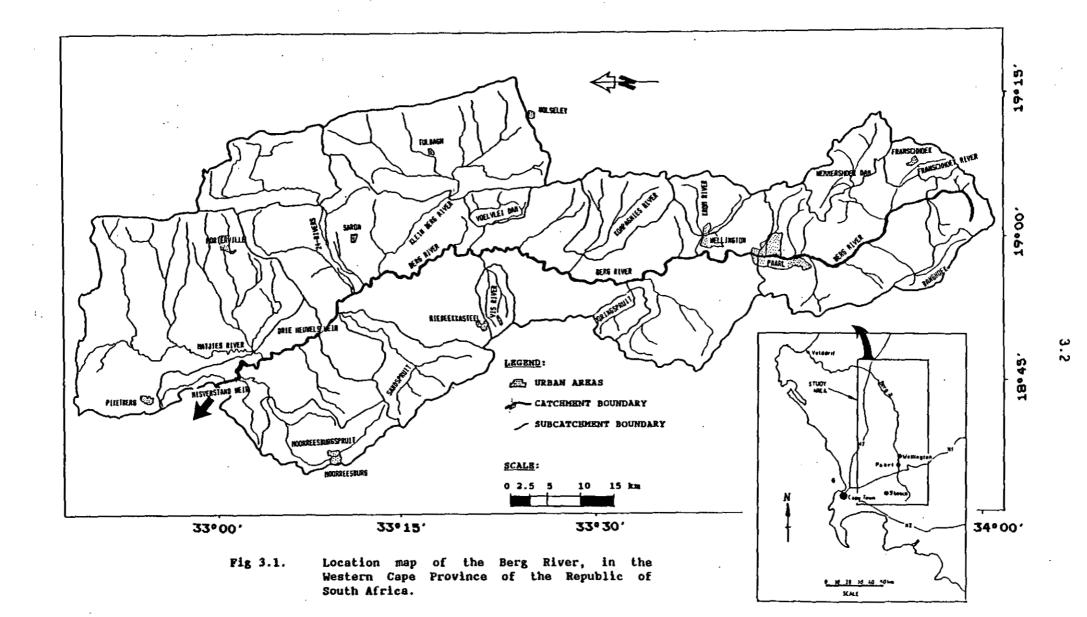
Based on the information given in Chapter 1, the Berg River was selected as a suitable catchment in which to study phosphorus transport. A general description of the Berg River catchment will be given in terms of: geographical location, topography, climate, geology, hydrology, water quality, soils, demography and water resource development.

### 1 CATCHMENT DESCRIPTION

1.1 Location

The Berg River is situated in the Western Cape Province of the Republic of South Africa and rises in the Jonkershoek and Franschhoek mountains from where it flows in a north-westerly direction to discharge into the sea at St. Helena Bay. Its major tributaries are the Franschhoek, Wemmer, Dwars, Krom, Kompagnies, Klein Berg, Twenty-Four, Matjies, Platkloof, Boesmans and Sout Rivers (see Fig 3.1).

The river valley is approximately 160 km long (from headwaters to the sea) while its width varies from 1 to 5 km near its headwaters to between 30 to 45 km at the coast. The length of the river is approximately 270 km, and the catchment covers an area of about 6 415 km<sup>2</sup>.

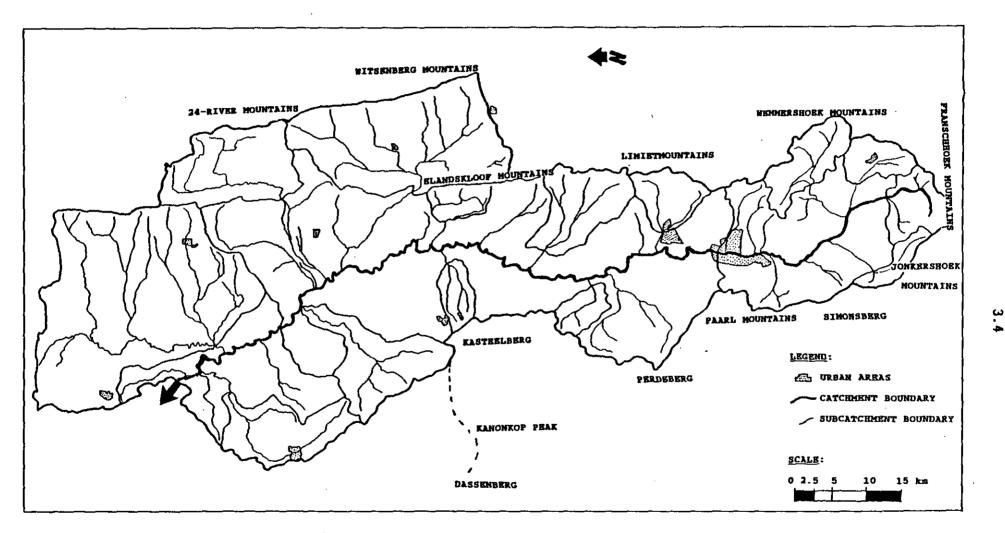


Phosphorus transport Berg River

### 1.2 Topography

The river profile falls about 900 metres after only one eighth of its course. From Paarl, the river profile flattens, falling from only 100 m above sea level to sea level at its mouth, over a distance of 220 km. The lower reach is extremely flat so that sea water intrusion pushes up nearly 100 km from the river mouth under high tide conditions (Kersandt and Marais, 1973).

The Berg River catchment is surrounded in the south by the Franschhoek and Jonkershoek mountains (see Fig 3.2). In the east, going in a south to north direction the basin is bounded by the Wemmershoek, Limiet, Elandskloof mountains, as well as the Witzenberg, Twenty-Four and Olifants River mountains. In the north the divide swings west to the Ketberg, Gryskop and along the Piquetberg to the Platteberg. From the Platteberg the divide swings to a south-westerly direction to meet the sea approximately at Rooibaai, just north of Veldrif. The western divide runs north from the Jonkershoek mountain along the Simonsberg and Paar) mountain. From the Paarl mountain, the divide proceeds slightly westerly along the Perdeberg and then northwards again to the Kasteel mountain, just west of Riebeck-Kasteel. From the Kasteel mountain the divide runs west to Kanonkop and south to the Dassenberg. After the Dassenberg, the divide swings west to the Kattenberg and then north-west to the Contreberg, passing just north of Darling, from where it swings north again to meet the coast just south of Veldrif.





,

.

1

### 1.3 <u>Climate</u>

.

The Berg River has a Mediterranean climate and falls within the winter rainfall region of the Western Cape. The rainfall is mainly of a cyclonic nature caused by atmospheric turbulences drawing in air masses from various regions: warm air is drawn-in from regions over the Atlantic Ocean from the west between the  $12^{th}$  and  $13^{th}$  parallel, colder air from the sea south of the mainland and relatively dry air from the southern parts of the country (Kersandt and Marais, 1973).

Frontal rains are caused by air masses with differing moisture contents, temperatures and densities. The mountain ranges cause the air to be forced upward resulting in a reliable mountain rainfall compared with the frontal plains.

The rainfall in the mountains is high, up to 3 000 mm per year. The melting snow that falls on the peaks and upper slopes of the mountains during intermittent cold spells in winter also contributes to the river flow. In the adjoining valleys, rainfall varies from 900 mm to 1 200 mm annually, but drops to between 400 and 500 mm in the hilly plain which the river travels for most of its length (Fourie and Görgens, 1977). The distribution in mean annual precipitation for the Berg River catchment is shown in Fig 3.3 (from Forster and van der Berg, 1985).

In the annual distribution of rainfall, some 80 percent falls during the six winter months, April to September. Due to the influence of the mountain ranges, there is a distinct spatial and temporal component in rainfall pattern. June is the wettest month for all but the Vredenburg region, near the mouth, where July is the wettest. January generally is the driest month but February is the driest in the Piketberg region.

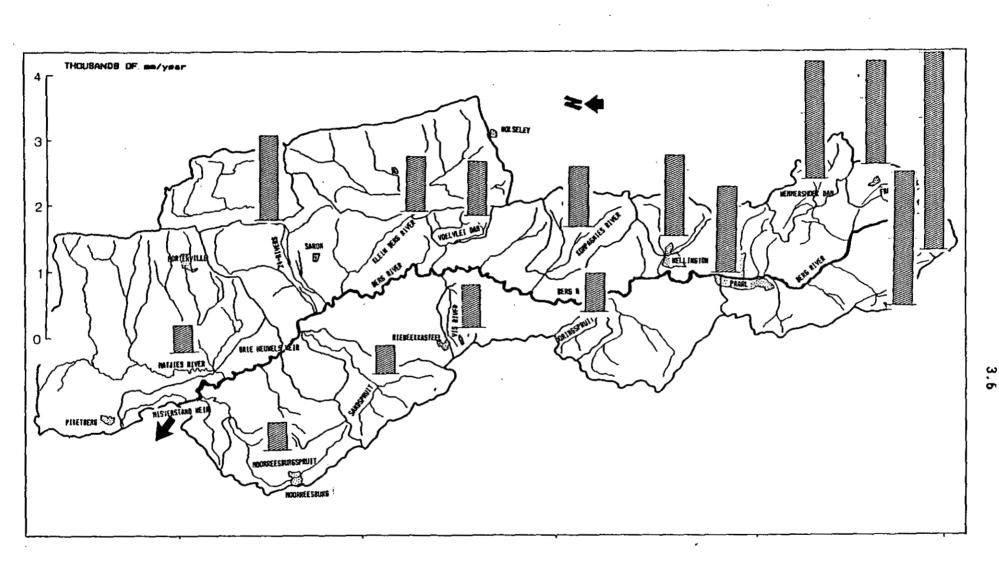


Fig 3.3. Distribution in mean annual precipitation in the Berg River basin (from Forster and van der Berg, 1985).

.

January and February are the hottest months of the year in the Berg River catchment. In February mean daily maximum temperatures vary from 24°C along the coast, to 32°C in the north-east, and inland temperatures of over 40°C are recorded.

The predominant wind direction in the summer months is the "South-Easter" which in exposed areas such as Voëlvlei Dam causes a 25 percent increase in evaporation rate compared with Wellington. Kersandt and Marais (1973) report annual evaporation figures for Voëlvlei Dam of 2 711 mm and Wellington 2 220 mm. During the winter months the dominant wind is the "North-Wester" bringing rain to the region.

### 1.4 Geology

The geology of the Berg River basin is shown in Fig 3.4. The catchment consists of semi-perennial streams arising in the mountains composed of Table Mountain Sandstone (TMS). Further north, in the Paarl area, several tributaries arise in granite hills and flow through clay soils derived from weathered granite.

Below Paarl the overlying TMS has been progressively eroded exposing bedrock of Malmesbury shale. Malmesbury shale remains the main underlying rock formation down to the mouth of the river. In the middle reaches of the Berg River, the Klein Berg and Twenty-Four rivers are semi-perennial tributaries rising from areas dominated by TMS.

The Berg River is geologically an old river; this is born out by (1) the very rapid fall in profile from headwaters to a point at Paarl and the gentle slope thereafter down to the mouth of the river, (2) the degree of meandering of the main

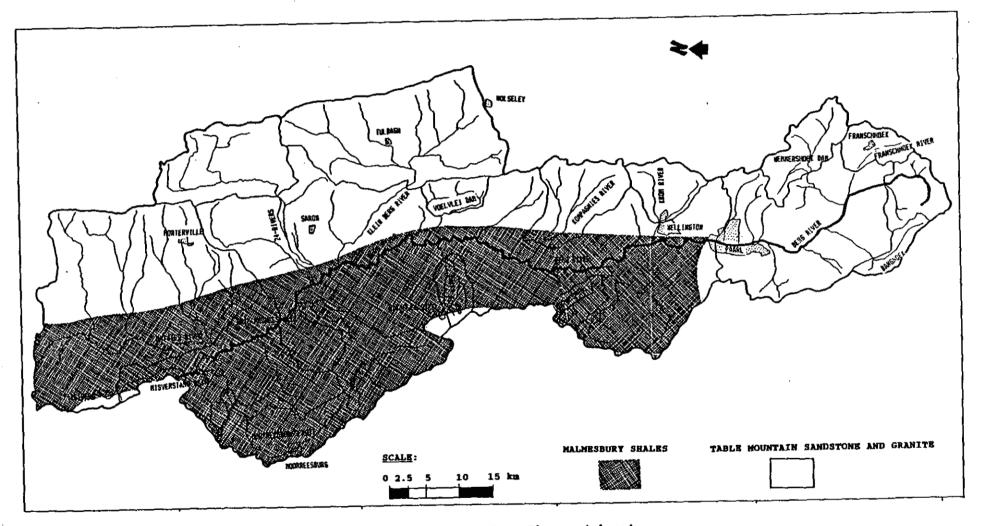


Fig 3.4. Geology of the Berg River catchment.

Phosphorus transport Berg River

3.8

river channel, (3) the existence of multiple channels separated by low lying islands in the lower reaches and (4) the great width of the river valley. Fourie and Steer (1971) state that the profile is also influenced by the change in bedrock formation from Table Mountain Sandstone (TMS) in the upper reaches to Malmesbury shales in the lower reaches.

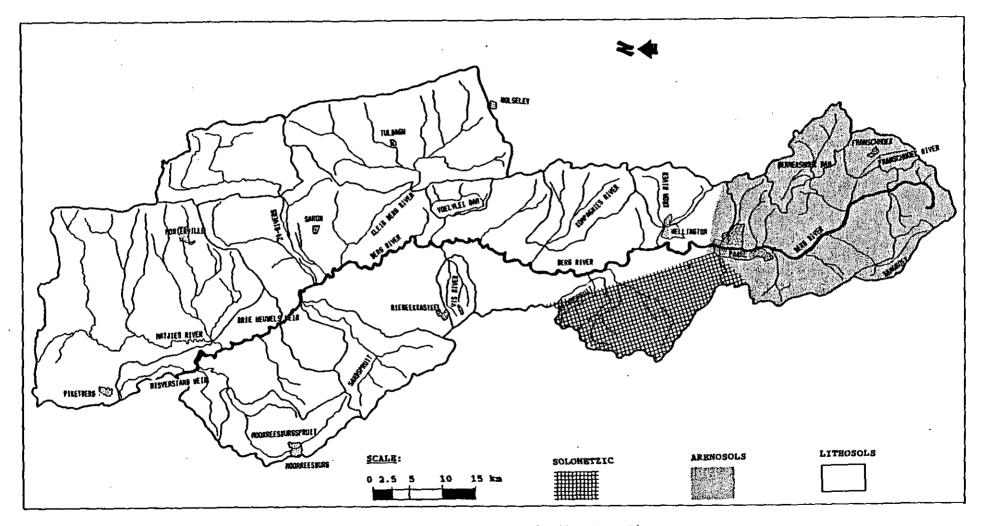
Ploughing of the relatively shallow soils has in several areas resulted in fragments of shale being brought to the surface. This in turn has facilitated the process of mineral decomposition, increasing the concentration of soluble salts in drainage waters.

### 1.5 <u>Soils</u>

The distribution of soil types in the river catchment are shown in Fig 3.5. The undisturbed soils, exposed on cuttings, consist of two horizons:

- Top soil containing an abundance of fine clay and silt particles mixed with organic matter (A horizon);
- (2) subsoil of disintegrating rock partially devoid of organic matter (B horizon).

Under these horizons lie the parent rock. The top soil has been formed by the action of chemical, biological and physical processes on the parent bedrock. These changes are brought about by the combined action of weather, plants and soil organisms. The soils in the Berg River catchment are chiefly derived from Malmesbury shales and TMS.



:

# Fig 3.5. Distribution of soil types in the Berg River catchment.

3.10

.

Soils derived from Malmesbury shales are brown, sandy, and gravely loams, usually of shallow depth. Narrow horizons of small ferruginuous concretions (hardpan) and rock fragments often are found at depths varying from 100 to 450 mm below the surface. Theses horizons overlie a clay layer which varies from 20 to 450 mm in thickness and is impervious and plastic when wet. The clay layer is underlain by the parent material, the Malmesbury shales.

When the top soil (A horizon) is shallow, ploughing breaks the hardpan and mixes it with the underlying subsoil producing a sandy loam with concretionary characteristics. From an agricultural aspect these soils are generally poor in phosphates and nitrogen, fairly acid and tend to cake after rain. This type of soil tends to produce "alkaline" soils where drainage is poor as the salts are drawn upwards from the bedrock by capillary action. These soils are suitable for grain production.

Soils derived from TMS decompose gradually to arenaceous acid soils, usually in thin horizons on the mountain slopes, containing an abundance of unweathered sandstone particles (see Fig 3.5). The top soil (A horizon) usually is a dark brown sand containing organics, and averages about 150 mm in depth. The subsoil (B horizon) consists of a thin band of white sand strata overlying the bedrock. On more gentle slopes the A horizon deepens to 450 mm or more in depth and the B horizon may be a yellow-brown sandy loam or sandy clay.

At the foot of the mountains, the surface layer may be underlain by 300 to 600 mm of whitish sand and the lower B horizon may be reddish-brown or yellow-brown with hardpan characteristics. The B horizon may consist of iron oxide concretions which may change to a heavily illuviated sandy clay which is more or less impervious. All TMS derived soils are poor in plant nutrients but support a remarkable variety of indigenous fynbos and proteas. The deeper soils are suitable for the cultivation of vines and fruit trees, but only with copious amounts of fertiliser and manure (Kersandt and Marais, 1973).

### 1.6 Agricultural development

The distribution of agricultural activity in the Berg River catchment is governed by rainfall, soil type, climate as well as the availability and quality of water used for irrigation.

The slopes of the valleys along the upper reaches of the Berg River from Franschhoek to Wellington are suitable for the cultivation of vines, fruit trees and commercial forestry, because of the deep soil and dependable rainfall (see Fig 3.6).

Up to the Second World War (1945) limited irrigation from the river was practised. Because of the decrease in rainfall in the catchment area to the north of Wellington, grain farming used to be generally practised, but the onset of irrigation resulted in a rapid increase in the number of fruit orchards and vineyards, replacing grainlands. The main areas for irrigation in the catchment lie between the Franschhoek and Banghoek valleys, and the areas around Paarl and Wellington. Considerable irrigation development has also taken place in the vicinity of Tulbagh. Vines are the predominant crop in both these areas which are characterised by good quality drainage waters during the irrigation season. A limited amount of irrigation has taken place along the banks of the Berg River as far as Misverstand Weir (see Fig 3.6). In the remaining areas dryland farming is practised interspersed with pastoral, cattle and pig farming.

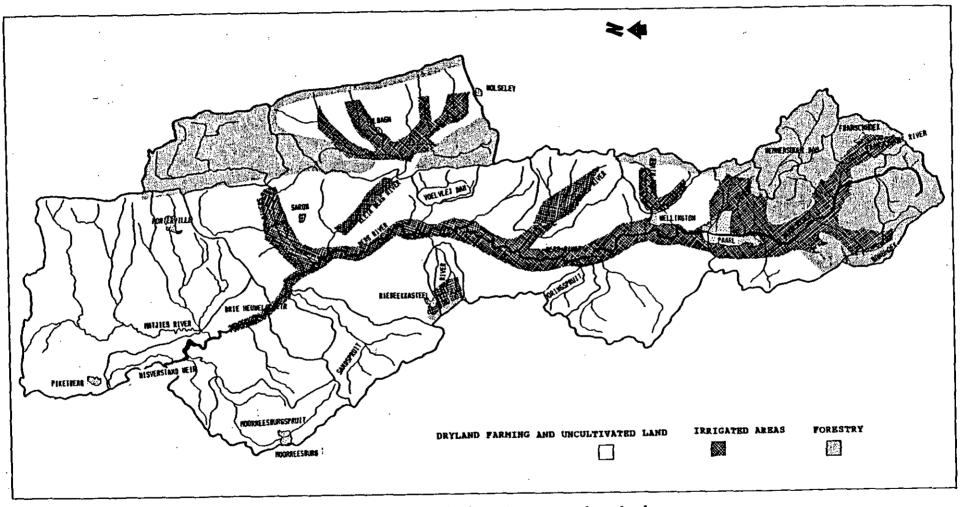


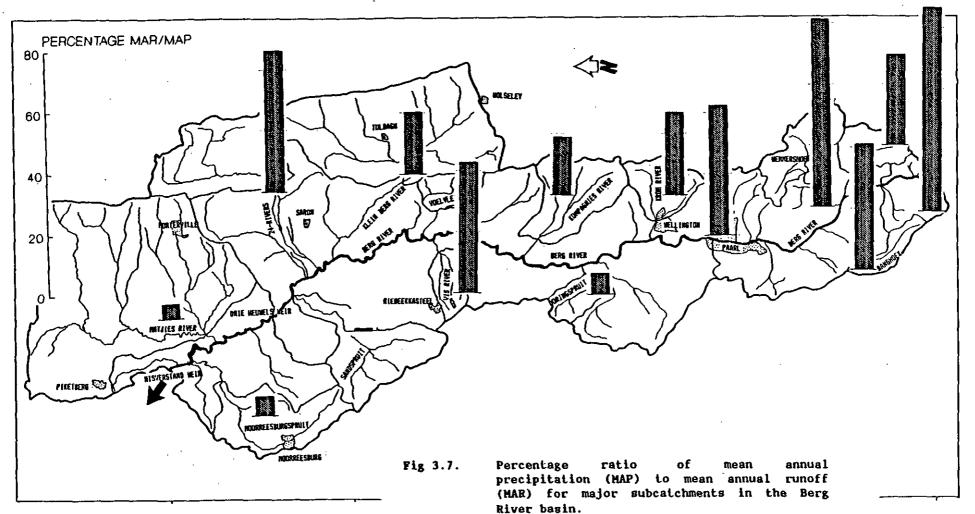
Fig 3.6. Distribution of irrigated areas, dry land farming and forestry in the Berg River catchment.

### 1.7 Hydrology and water quality

The water quality of the Berg River is a product of two geological regions. The first is the good water quality draining from the Table Mountain Sandstone outcrops of the Jonkershoek and Franschhoek Mountains. The steep slopes and shallow soils of the area produce a rapid response runoff which can be as much as 66 percent of the rainfall (Fig 3.7). The median total dissolved solids (TDS) concentration of this runoff is between 15 and 60 mg/2 with a median phosphorus concentration of between 10 and 50  $\mu$ g/2.

The second geological region is the more saline water quality from the low lying Malmesbury Shale north of Paarl. The runoff from these areas averages about 20 percent of the rainfall (Fig 3.7) with streams exhibiting a median TDS concentration of between 1 000 and 7 000 mg/ $\mathfrak{L}$  and a median phosphorus concentration of between 50 and 300 µg/ $\mathfrak{L}$ . Fortunately, the high concentrations of salt and phosphorus are associated with tributaries with low runoff which are diluted by the runoff from the upper catchment.

In Fig 3.8 the simulated annual mass export of TDS is shown for the main subcatchments in the river basin. With a few exceptions, the tributaries on the west bank of the main river channel downstream of Wellington run dry during the summer months. This is fortunate because these drain extensive areas of Malmesbury shale which produces flows with high salt concentrations. The tributaries on the east bank drain TMS and contribute a lower salt load compared with the west bank tributaries.



Phosphorus transport Berg River

3.15

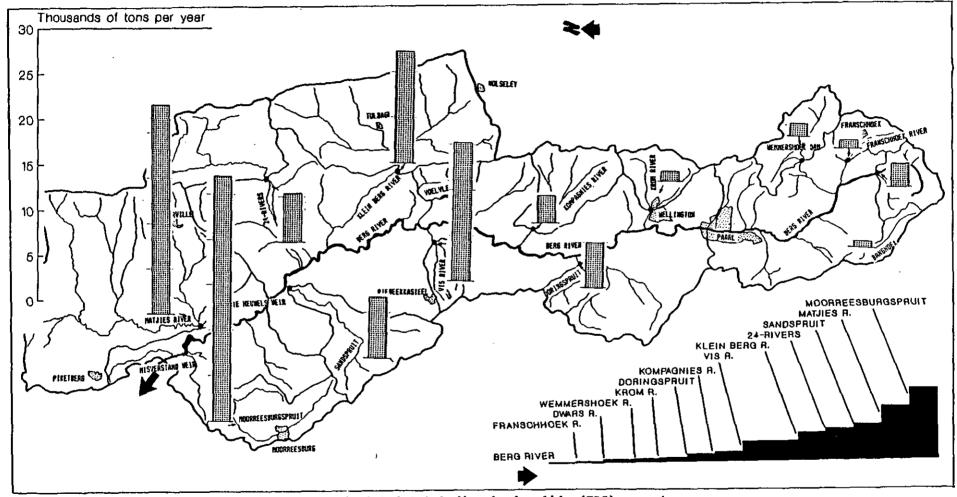


Fig 3.8. Simulated total dissolved solids (TDS) export from major subcatchments in the Berg River basin (from Forster and van der Berg, 1985). The inset shows the cumulative input of TDS to the main river channel of the Berg River. Return of irrigation water to the main river channel in the form of seepage is increasing the salinity of the river. The seepage water is mineralised due to evapotranspiration and leaching of ground salts, causing an increase in the salinity down the length of the river (Fourie and Steer, 1971; Kersandt and Marais, 1973; Fourie 1976).

The combined effect of high salt and low nutrient content of the soils in the lower catchment requires the addition of copious amounts of fertiliser and manure (Kersandt and Marais, 1973). A proportion of these nutrients are exported from the land during surface runoff or as leachate, and discharges to the main river channel. There is little information available on the mass export of phosphorus from the agricultural areas but it is expected to be high because of the sheet erosion of top soil and the intensive fertilising of the soil.

### 1.8 Demography

Apart from the small village of Franschhoek along the headwaters of the river and some villages along the lower reaches, Piketberg, Vredenburg, Veldrif, Laaiplek, Saldanha Bay and Langebaan, there are only two sizeable towns in the catchment, Paarl and Wellington. The population distribution of the catchment, for both urban and agricultural areas, is shown in Fig 3.9.

### Paarl:

Extending along the banks of the Berg River for a distance of about 10 km Paarl has a total population of about 63 000 (Central Statistical Service, 1987). Water is drawn from reservoirs on Paarl mountain which are partially filled by pumping approximately 0.9 million cubic metres from the Berg

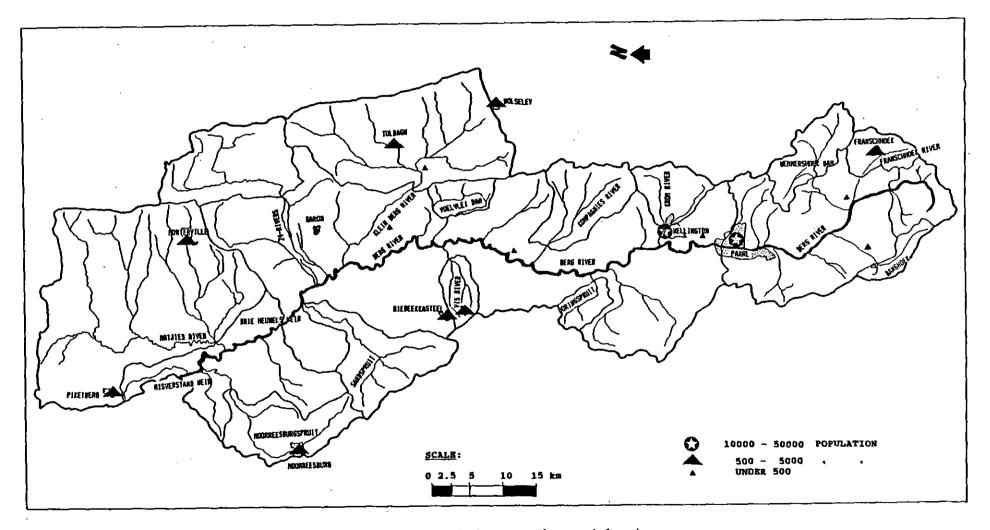


Fig 3.9. Demography of the Berg River catchment.

TR 143 March 1989

River every year. This water is filtered and chlorinated before entering the mains supply. The supply is augmented from Wemmershoek Dam; the water is used for agricultural, industrial, and domestic purposes.

In Paarl, vineyards are interdispersed with residential and industrial areas, giving a runoff which is a combination of urban, industrial and agricultural sources. The principle industries are wine and spirit production, food processing and canning, textiles, and manufacture of cigarettes.

wastewater treatment works at Paarl was The first constructed in the 1930's and consisted of a conventional biological filtration works for the domestic sewage and a series of evaporation ponds for the industrial wastewaters. In the early 1950's, as a result of serious contamination of the Berg River by seepage from the industrial ponds (Fourie and an extensive monitoring investigation was Steer, 1971), undertaken. The domestic, distillery and industrial effluents were separated and by 1957 the first extensions to the works were completed, comprising extensions to the bio-filters and to the industrial ponds. In 1960 an extensive maturation pond system was constructed, for tertiary treatment of effluent prior to disposal in the Berg River. Due to the increase in hydraulic load to the works, an aerated lagoon system was constructed plus the addition of maturation ponds (Pers. Comm. Reid, 1987).

13-11

TR 143 March 1989

#### Wellington:

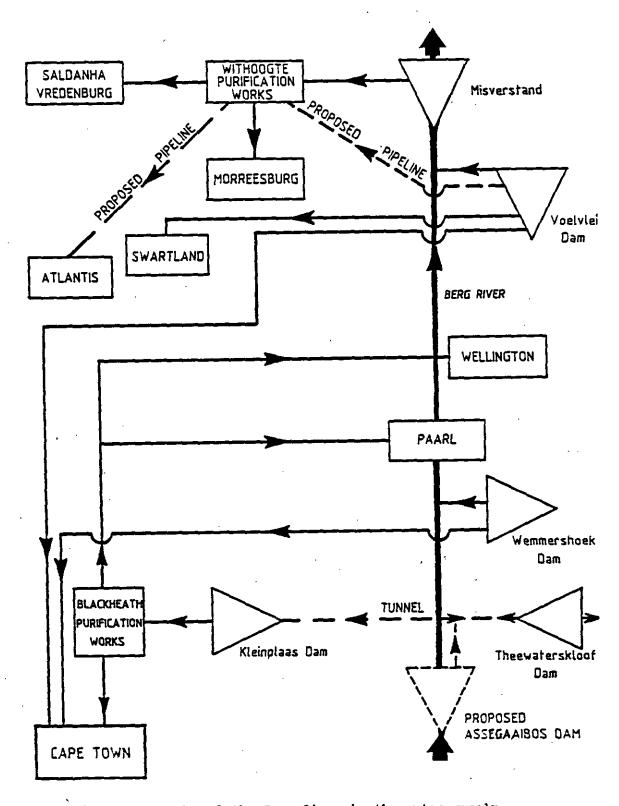
Wellington is situated 10 km downstream from Paarl with a population of about 32 500 (Central Statistical Service, 1987). Water is obtained from the Wemmershoek Dam for both industrial and domestic purposes. Industrial development is similar to that of Paarl, i.e. production of wines and spirits, canning and processing of fruit, and textile manufacture. A tannery on the boundary of the municipality treats its own effluent by means of evaporation ponds.

A sewerage system and a treatment works were installed in 1950, for domestic sewage only. The treatment consists of a series of bio-filters, discharging into maturation ponds and chlorination, prior to release into the Berg River.

The industrial effluents are separate from the domestic effluents. The industrial effluents pass to a series of evaporation/oxidation ponds. Fourie and Steer (1971) report considerable infiltration to the groundwater from these ponds. To minimize seepage to the river, ponds have been lined and located as far from the river as possible.

### 1.9 Water resource development

The Berg River catchment is one of the main sources of water for household and industrial purposes in the Western Cape. Cape Town receives the bulk of its water requirements from the Wemmershoek and Voëlvlei Dams in the Berg River catchment (see Fig 3.10). The water supply of a number of smaller towns in the vicinity are supplied also from these dams. The Berg River pump station, located about 60 km from the mouth of the river, supplies water to the Saldanha, Vredenburg and Veldrif areas, since 1942. The plant is dependent on the flow in the river to minimise seawater intrusion (Fourie and Steer, 1971) but the water abstracted often is very saline, with TDS of around 2 000 mg/R (Fourie and Steer, 1971).



# Fig 3.10.

Role of the Berg River in the water supply network of the Western Cape Province of South Africa (from Forster, 1985). The first Voëlvlei scheme was completed in 1953; it consisted of a weir across the Klein Berg River to divert a maximum flow of 1.3 million cubic metres per day of water into a canal leading to Voëlvlei, an impounded natural lake at that time with a capacity of 50 million cubic metres.

In 1969, the dam wall of Voëlvlei was raised to increase capacity to 170 million cubic metres, and the maximum flow from the Klein Berg River into Voëlvlei Dam was increased to 1.7 million cubic metres per day. A diversion canal from the Twenty Four rivers was completed in 1972 to carry an additional 2.9 million cubic metres per day to Voëlvlei Dam (White Paper, 1968).

In the upper reaches of the Berg River catchment, the Wemmers River was impounded in 1961 to produce a storage facility of capacity of 59 million cubic metres, known as the Wemmershoek Dam. During low flow in the Berg River, this dam releases compensation discharges down the Wemmers and Berg Rivers to maintain channel flow as far as the Voëlvlei Canal. More recently, the Theewaterskloof Dam (capacity of 484 million cubic metres) was constructed on the Sonderend River which has the provision for releasing water through a tunnel into the Berg River at Robertsviei (see Fig 3.10). The dam releases are also used for flow compensation in the Berg River to provide the farmers and irrigation boards with water during the summer months. There is a proposal to build a dam in the upper catchment of the Berg River at Assegaaibos to divert 100 million cubic metres per year to the Theewaterskloof Dam via the Theewaterskloof Tunnel.

.. -

TR 143 March 1989

In the lower reaches, a weir has been built across the Berg River at Misverstand to enable water to be abstracted and pumped to a holding reservoir at Withoogte. The water is treated at Withoogte to supply the Saldanha region via an extensive pipeline system. The reservoir at Withoogte is sufficiently large to bridge periods when pumping from Misverstand Weir must be suspended temporarily because of highly saline, or turbid water (White Paper, 1976).

The minimum guaranteed winter flow at Misverstand, with the present and proposed upper catchment diversions, is estimated at 200 million cubic metres (Fourie and Steer, 1971). The site of the weir at Misverstand is suitable for the construction of a large dam in which most of the winter runoff could be stored. This dam is likely to be built around the year 2000 because of the lower than expected increase in water demand in the Atlantis-Saldanha region. However, the highly variable salinity River the turbidity in the lower Berg reduces and attractiveness of the Misverstand site for an impoundment, also very little information is available on the eutrophication potential of the proposed impoundment.

## 2 REFERENCES

Central Statistical Services (1987) Personal Communication.

Forster, S.F. and van der Berg, E. (1985)

"The modelling of the Berg River", Unpublished Report, Department of Water Affairs, Pretoria, South Africa, August 1985.

Fourie, J.M. (1976)

"Mineralisation of the Western Cape Rivers", Draft final report, NIWR, CSIR, Bellville, South Africa.

Fourie, J.M. and Steer, A.G. (1971)

"Water quality survey of the Berg River for the period 1963 to 1970", A research report of the National Institute for Water Research, Pretoria, CSIR, p.80.

Fourie, J.M. and Görgens, A.H.M. (1977)

"Mineralization studies of the Berg River (1974 to 1976)", A research report of the National Institute for Water Research, Pretoria, CSIR, no.334, p.30.

Kersandt, U. and Marais, G.v.R. (1973)

"A mathematical model for the hydro-salinity flow systems of the Upper Berg River basin", University of Cape Town, Department of Civil Engineering, Research Report, no. W.6.

Reid, I.K. (1987)

Consulting Engineer, Ninham Shand, Cape Town, Personal Communication.

White Paper (1968)

"Report on the proposed betterments for the Berg River Government Water Scheme (Swartland Region)", W.P.K.-'68, Republic of South Africa.

White Paper (1976)

"Supplementary report on the proposed Berg River (Saldanha) <sup>}</sup>Project", W.P.N.-<sup>1</sup>76, Republic of South Africa.

TR 143 March 1989

### 1.2 Topography

The river profile falls about 900 metres after only one eighth of its course. From Paarl, the river profile flattens, falling from only 100 m above sea level to sea level at its mouth, over a distance of 220 km. The lower reach is extremely flat so that sea water intrusion pushes up nearly 100 km from the river mouth under high tide conditions (Kersandt and Marais, 1973).

The Berg River catchment is surrounded in the south by the Franschhoek and Jonkershoek mountains (see Fig 3.2). In the east, going in a south to north direction the basin is bounded by the Wemmershoek, Limiet, Elandskloof mountains, as well as the Witzenberg, Twenty-Four and Olifants River mountains. In the north the divide swings west to the Ketberg, Gryskop and along the Piquetberg to the Platteberg. From the Platteberg the divide swings to a south-westerly direction to meet the sea approximately at Rooibaai, just north of Veldrif. The western divide runs north from the Jonkershoek mountain along the Simonsberg and Paar) mountain. From the Paarl mountain, the divide proceeds slightly westerly along the Perdeberg and then northwards again to the Kasteel mountain, just west of Riebeck-Kasteel. From the Kasteel mountain the divide runs west to Kanonkop and south to the Dassenberg. After the Dassenberg, the divide swings west to the Kattenberg and then north-west to the Contreberg, passing just north of Darling, from where it swings north again to meet the coast just south of Veldrif.

### 1.3 <u>Climate</u>

.

The Berg River has a Mediterranean climate and falls within the winter rainfall region of the Western Cape. The rainfall is mainly of a cyclonic nature caused by atmospheric turbulences drawing in air masses from various regions: warm air is drawn-in from regions over the Atlantic Ocean from the west between the  $12^{th}$  and  $13^{th}$  parallel, colder air from the sea south of the mainland and relatively dry air from the southern parts of the country (Kersandt and Marais, 1973).

Frontal rains are caused by air masses with differing moisture contents, temperatures and densities. The mountain ranges cause the air to be forced upward resulting in a reliable mountain rainfall compared with the frontal plains.

The rainfall in the mountains is high, up to 3 000 mm per year. The melting snow that falls on the peaks and upper slopes of the mountains during intermittent cold spells in winter also contributes to the river flow. In the adjoining valleys, rainfall varies from 900 mm to 1 200 mm annually, but drops to between 400 and 500 mm in the hilly plain which the river travels for most of its length (Fourie and Görgens, 1977). The distribution in mean annual precipitation for the Berg River catchment is shown in Fig 3.3 (from Forster and van der Berg, 1985).

In the annual distribution of rainfall, some 80 percent falls during the six winter months, April to September. Due to the influence of the mountain ranges, there is a distinct spatial and temporal component in rainfall pattern. June is the wettest month for all but the Vredenburg region, near the mouth, where July is the wettest. January generally is the driest month but February is the driest in the Piketberg region. January and February are the hottest months of the year in the Berg River catchment. In February mean daily maximum temperatures vary from 24°C along the coast, to 32°C in the north-east, and inland temperatures of over 40°C are recorded.

The predominant wind direction in the summer months is the "South-Easter" which in exposed areas such as Voëlvlei Dam causes a 25 percent increase in evaporation rate compared with Wellington. Kersandt and Marais (1973) report annual evaporation figures for Voëlvlei Dam of 2 711 mm and Wellington 2 220 mm. During the winter months the dominant wind is the "North-Wester" bringing rain to the region.

#### 1.4 Geology

The geology of the Berg River basin is shown in Fig 3.4. The catchment consists of semi-perennial streams arising in the mountains composed of Table Mountain Sandstone (TMS). Further north, in the Paarl area, several tributaries arise in granite hills and flow through clay soils derived from weathered granite.

Below Paarl the overlying TMS has been progressively eroded exposing bedrock of Malmesbury shale. Malmesbury shale remains the main underlying rock formation down to the mouth of the river. In the middle reaches of the Berg River, the Klein Berg and Twenty-Four rivers are semi-perennial tributaries rising from areas dominated by TMS.

The Berg River is geologically an old river; this is born out by (1) the very rapid fall in profile from headwaters to a point at Paarl and the gentle slope thereafter down to the mouth of the river, (2) the degree of meandering of the main river channel, (3) the existence of multiple channels separated by low lying islands in the lower reaches and (4) the great width of the river valley. Fourie and Steer (1971) state that the profile is also influenced by the change in bedrock formation from Table Mountain Sandstone (TMS) in the upper reaches to Malmesbury shales in the lower reaches.

Ploughing of the relatively shallow soils has in several areas resulted in fragments of shale being brought to the surface. This in turn has facilitated the process of mineral decomposition, increasing the concentration of soluble salts in drainage waters.

### 1.5 <u>Soils</u>

The distribution of soil types in the river catchment are shown in Fig 3.5. The undisturbed soils, exposed on cuttings, consist of two horizons:

- Top soil containing an abundance of fine clay and silt particles mixed with organic matter (A horizon);
- (2) subsoil of disintegrating rock partially devoid of organic matter (B horizon).

Under these horizons lie the parent rock. The top soil has been formed by the action of chemical, biological and physical processes on the parent bedrock. These changes are brought about by the combined action of weather, plants and soil organisms. The soils in the Berg River catchment are chiefly derived from Malmesbury shales and TMS. Soils derived from Malmesbury shales are brown, sandy, and gravely loams, usually of shallow depth. Narrow horizons of small ferruginuous concretions (hardpan) and rock fragments often are found at depths varying from 100 to 450 mm below the surface. Theses horizons overlie a clay layer which varies from 20 to 450 mm in thickness and is impervious and plastic when wet. The clay layer is underlain by the parent material, the Malmesbury shales.

When the top soil (A horizon) is shallow, ploughing breaks the hardpan and mixes it with the underlying subsoil producing a sandy loam with concretionary characteristics. From an agricultural aspect these soils are generally poor in phosphates and nitrogen, fairly acid and tend to cake after rain. This type of soil tends to produce "alkaline" soils where drainage is poor as the salts are drawn upwards from the bedrock by capillary action. These soils are suitable for grain production.

Soils derived from TMS decompose gradually to arenaceous acid soils, usually in thin horizons on the mountain slopes, containing an abundance of unweathered sandstone particles (see Fig 3.5). The top soil (A horizon) usually is a dark brown sand containing organics, and averages about 150 mm in depth. The subsoil (B horizon) consists of a thin band of white sand strata overlying the bedrock. On more gentle slopes the A horizon deepens to 450 mm or more in depth and the B horizon may be a yellow-brown sandy loam or sandy clay.

At the foot of the mountains, the surface layer may be underlain by 300 to 600 mm of whitish sand and the lower B horizon may be reddish-brown or yellow-brown with hardpan characteristics. The B horizon may consist of iron oxide concretions which may change to a heavily illuviated sandy clay which is more or less impervious. All TMS derived soils are poor in plant nutrients but support a remarkable variety of indigenous fynbos and proteas. The deeper soils are suitable for the cultivation of vines and fruit trees, but only with copious amounts of fertiliser and manure (Kersandt and Marais, 1973).

### 1.6 Agricultural development

The distribution of agricultural activity in the Berg River catchment is governed by rainfall, soil type, climate as well as the availability and quality of water used for irrigation.

The slopes of the valleys along the upper reaches of the Berg River from Franschhoek to Wellington are suitable for the cultivation of vines, fruit trees and commercial forestry, because of the deep soil and dependable rainfall (see Fig 3.6).

Up to the Second World War (1945) limited irrigation from the river was practised. Because of the decrease in rainfall in the catchment area to the north of Wellington, grain farming used to be generally practised, but the onset of irrigation resulted in a rapid increase in the number of fruit orchards and vineyards, replacing grainlands. The main areas for irrigation in the catchment lie between the Franschhoek and Banghoek valleys, and the areas around Paarl and Wellington. Considerable irrigation development has also taken place in the vicinity of Tulbagh. Vines are the predominant crop in both these areas which are characterised by good quality drainage waters during the irrigation season. A limited amount of irrigation has taken place along the banks of the Berg River as far as Misverstand Weir (see Fig 3.6). In the remaining areas dryland farming is practised interspersed with pastoral, cattle and pig farming.

### 1.7 Hydrology and water quality

The water quality of the Berg River is a product of two geological regions. The first is the good water quality draining from the Table Mountain Sandstone outcrops of the Jonkershoek and Franschhoek Mountains. The steep slopes and shallow soils of the area produce a rapid response runoff which can be as much as 66 percent of the rainfall (Fig 3.7). The median total dissolved solids (TDS) concentration of this runoff is between 15 and 60 mg/2 with a median phosphorus concentration of between 10 and 50  $\mu$ g/2.

The second geological region is the more saline water quality from the low lying Malmesbury Shale north of Paarl. The runoff from these areas averages about 20 percent of the rainfall (Fig 3.7) with streams exhibiting a median TDS concentration of between 1 000 and 7 000 mg/ $\mathfrak{L}$  and a median phosphorus concentration of between 50 and 300 µg/ $\mathfrak{L}$ . Fortunately, the high concentrations of salt and phosphorus are associated with tributaries with low runoff which are diluted by the runoff from the upper catchment.

In Fig 3.8 the simulated annual mass export of TDS is shown for the main subcatchments in the river basin. With a few exceptions, the tributaries on the west bank of the main river channel downstream of Wellington run dry during the summer months. This is fortunate because these drain extensive areas of Malmesbury shale which produces flows with high salt concentrations. The tributaries on the east bank drain TMS and contribute a lower salt load compared with the west bank tributaries. Return of irrigation water to the main river channel in the form of seepage is increasing the salinity of the river. The seepage water is mineralised due to evapotranspiration and leaching of ground salts, causing an increase in the salinity down the length of the river (Fourie and Steer, 1971; Kersandt and Marais, 1973; Fourie 1976).

The combined effect of high salt and low nutrient content of the soils in the lower catchment requires the addition of copious amounts of fertiliser and manure (Kersandt and Marais, 1973). A proportion of these nutrients are exported from the land during surface runoff or as leachate, and discharges to the main river channel. There is little information available on the mass export of phosphorus from the agricultural areas but it is expected to be high because of the sheet erosion of top soil and the intensive fertilising of the soil.

### 1.8 Demography

Apart from the small village of Franschhoek along the headwaters of the river and some villages along the lower reaches, Piketberg, Vredenburg, Veldrif, Laaiplek, Saldanha Bay and Langebaan, there are only two sizeable towns in the catchment, Paarl and Wellington. The population distribution of the catchment, for both urban and agricultural areas, is shown in Fig 3.9.

### Paarl:

Extending along the banks of the Berg River for a distance of about 10 km Paarl has a total population of about 63 000 (Central Statistical Service, 1987). Water is drawn from reservoirs on Paarl mountain which are partially filled by pumping approximately 0.9 million cubic metres from the Berg River every year. This water is filtered and chlorinated before entering the mains supply. The supply is augmented from Wemmershoek Dam; the water is used for agricultural, industrial, and domestic purposes.

In Paarl, vineyards are interdispersed with residential and industrial areas, giving a runoff which is a combination of urban, industrial and agricultural sources. The principle industries are wine and spirit production, food processing and canning, textiles, and manufacture of cigarettes.

wastewater treatment works at Paarl was The first constructed in the 1930's and consisted of a conventional biological filtration works for the domestic sewage and a series of evaporation ponds for the industrial wastewaters. In the early 1950's, as a result of serious contamination of the Berg River by seepage from the industrial ponds (Fourie and an extensive monitoring investigation Steer, 1971). was undertaken. The domestic, distillery and industrial effluents were separated and by 1957 the first extensions to the works were completed, comprising extensions to the bio-filters and to the industrial ponds. In 1960 an extensive maturation pond system was constructed, for tertiary treatment of effluent. prior to disposal in the Berg River. Due to the increase in hydraulic load to the works, an aerated lagoon system was constructed plus the addition of maturation ponds (Pers. Comm. Reid, 1987).

14--3

TR 143 March 1989

#### Wellington:

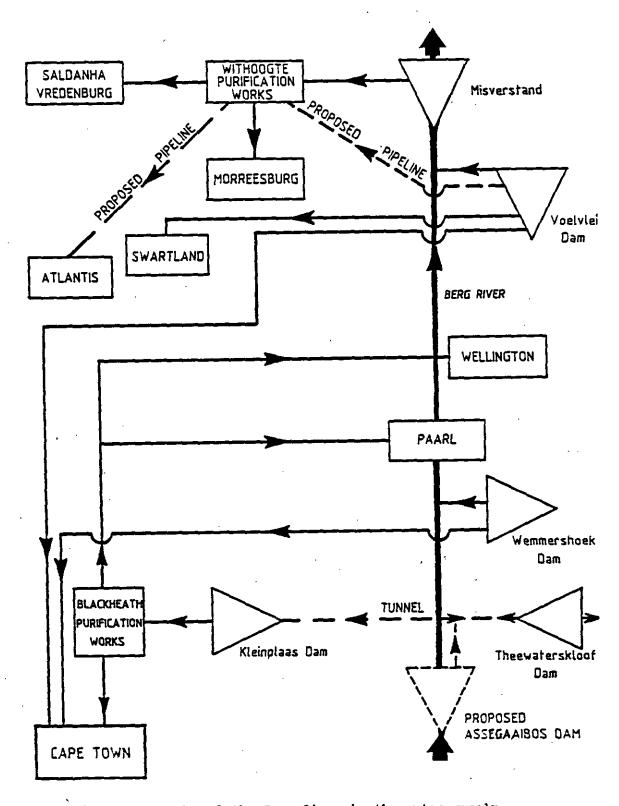
Wellington is situated 10 km downstream from Paarl with a population of about 32 500 (Central Statistical Service, 1987). Water is obtained from the Wemmershoek Dam for both industrial and domestic purposes. Industrial development is similar to that of Paarl, i.e. production of wines and spirits, canning and processing of fruit, and textile manufacture. A tannery on the boundary of the municipality treats its own effluent by means of evaporation ponds.

A sewerage system and a treatment works were installed in 1950, for domestic sewage only. The treatment consists of a series of bio-filters, discharging into maturation ponds and chlorination, prior to release into the Berg River.

The industrial effluents are separate from the domestic effluents. The industrial effluents pass to a series of evaporation/oxidation ponds. Fourie and Steer (1971) report considerable infiltration to the groundwater from these ponds. To minimize seepage to the river, ponds have been lined and located as far from the river as possible.

### 1.9 Water resource development

The Berg River catchment is one of the main sources of water for household and industrial purposes in the Western Cape. Cape Town receives the bulk of its water requirements from the Wemmershoek and Voëlvlei Dams in the Berg River catchment (see Fig 3.10). The water supply of a number of smaller towns in the vicinity are supplied also from these dams. The Berg River pump station, located about 60 km from the mouth of the river, supplies water to the Saldanha, Vredenburg and Veldrif areas, since 1942. The plant is dependent on the flow in the river to minimise seawater intrusion (Fourie and Steer, 1971) but the water abstracted often is very saline, with TDS of around 2 000 mg/2 (Fourie and Steer, 1971).



# Fig 3.10.

Role of the Berg River in the water supply network of the Western Cape Province of South Africa (from Forster, 1985). The first Voëlvlei scheme was completed in 1953; it consisted of a weir across the Klein Berg River to divert a maximum flow of 1.3 million cubic metres per day of water into a canal leading to Voëlvlei, an impounded natural lake at that time with a capacity of 50 million cubic metres.

In 1969, the dam wall of Voëlvlei was raised to increase capacity to 170 million cubic metres, and the maximum flow from the Klein Berg River into Voëlvlei Dam was increased to 1.7 million cubic metres per day. A diversion canal from the Twenty Four rivers was completed in 1972 to carry an additional 2.9 million cubic metres per day to Voëlvlei Dam (White Paper, 1968).

In the upper reaches of the Berg River catchment, the Wemmers River was impounded in 1961 to produce a storage facility of capacity of 59 million cubic metres, known as the Wemmershoek Dam. During low flow in the Berg River, this dam releases compensation discharges down the Wemmers and Berg Rivers to maintain channel flow as far as the Voëlvlei Canal. More recently, the Theewaterskloof Dam (capacity of 484 million cubic metres) was constructed on the Sonderend River which has the provision for releasing water through a tunnel into the Berg River at Robertsviei (see Fig 3.10). The dam releases are also used for flow compensation in the Berg River to provide the farmers and irrigation boards with water during the summer months. There is a proposal to build a dam in the upper catchment of the Berg River at Assegaaibos to divert 100 million cubic metres per year to the Theewaterskloof Dam via the Theewaterskloof Tunnel.

.. -

TR 143 March 1989

In the lower reaches, a weir has been built across the Berg River at Misverstand to enable water to be abstracted and pumped to a holding reservoir at Withoogte. The water is treated at Withoogte to supply the Saldanha region via an extensive pipeline system. The reservoir at Withoogte is sufficiently large to bridge periods when pumping from Misverstand Weir must be suspended temporarily because of highly saline, or turbid water (White Paper, 1976).

The minimum guaranteed winter flow at Misverstand, with the present and proposed upper catchment diversions, is estimated at 200 million cubic metres (Fourie and Steer, 1971). The site of the weir at Misverstand is suitable for the construction of a large dam in which most of the winter runoff could be stored. This dam is likely to be built around the year 2000 because of the lower than expected increase in water demand in the Atlantis-Saldanha region. However, the highly variable salinity River the turbidity in the lower Berg reduces and attractiveness of the Misverstand site for an impoundment, also very little information is available on the eutrophication potential of the proposed impoundment.

### 2 REFERENCES

Central Statistical Services (1987) Personal Communication.

Forster, S.F. and van der Berg, E. (1985)

"The modelling of the Berg River", Unpublished Report, Department of Water Affairs, Pretoria, South Africa, August 1985.

Fourie, J.M. (1976)

"Mineralisation of the Western Cape Rivers", Draft final report, NIWR, CSIR, Bellville, South Africa.

Fourie, J.M. and Steer, A.G. (1971)

"Water quality survey of the Berg River for the period 1963 to 1970", A research report of the National Institute for Water Research, Pretoria, CSIR, p.80.

Fourie, J.M. and Görgens, A.H.M. (1977)

"Mineralization studies of the Berg River (1974 to 1976)", A research report of the National Institute for Water Research, Pretoria, CSIR, no.334, p.30.

Kersandt, U. and Marais, G.v.R. (1973)

"A mathematical model for the hydro-salinity flow systems of the Upper Berg River basin", University of Cape Town, Department of Civil Engineering, Research Report, no. W.6.

Reid, I.K. (1987)

Consulting Engineer, Ninham Shand, Cape Town, Personal Communication.

White Paper (1968)

"Report on the proposed betterments for the Berg River Government Water Scheme (Swartland Region)", W.P.K.-'68, Republic of South Africa.

White Paper (1976)

"Supplementary report on the proposed Berg River (Saldanha) <sup>}</sup>Project", W.P.N.-<sup>1</sup>76, Republic of South Africa.

TR 143 March 1989

### **CHAPTER 4**

### MONITORING STRATEGY AND DATA CAPTURE

### **3 MONITORING STRATEGY**

The development of a phosphorus transport model requires a description of the processes aovernina the guantitative transport phenomena. To acquire this information, water quality and flow data have to be collected from the catchment using a water quality monitoring network. The design of a monitoring otherwise requires a systematic approach vast network quantities of data may be collected yielding little information - the "data-rich but information poor" syndrome (Ward, Loftis and McBride, 1986).

The problem in design of a monitoring network i.e. a network that would supply the appropriate information at the required density, is that initially one does not know where and when the critical situation may develop that requires a greater frequency of sampling. This point is also made by Moss (1980) where he states:

"It is a paradox of network design that the statistical parameters controlling the optimality of a network are frequently the unknowns that the network is being designed to estimate".

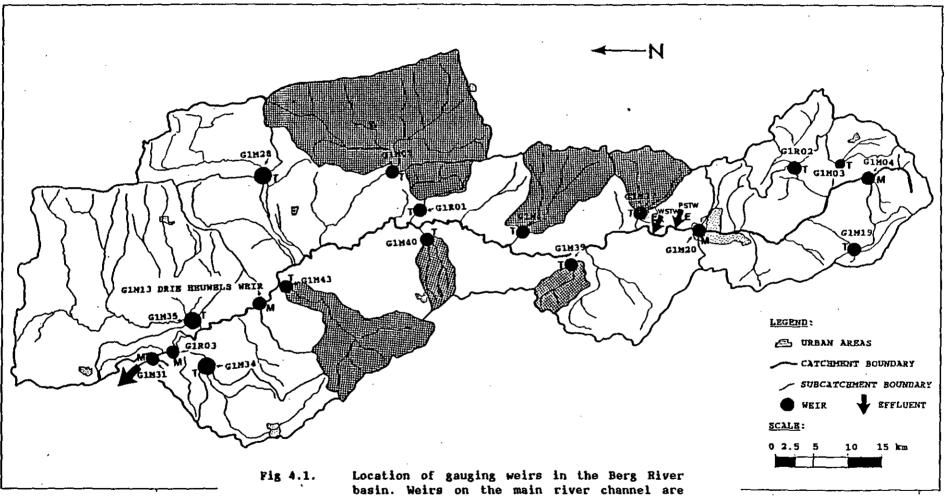
Establishment of an optimal monitoring network is unlikely to be achieved on the first attempt. As needs develop, or as new ones are identified, the monitoring network must be adjusted accordingly. Thus, the optimal network design is developed by a process of iteration. This approach was followed to develop an optimum monitoring network for water quality in the Berg River system.

### 2 PRELIMINARY SURVEY

The primary objective of the investigation was to describe the movement of phosphorus through the Berg River system. We have seen that such a description requires both phosphorus concentration and discharge in order to determine the phosphorus loads.

When the investigation was inaugurated there were virtually no data on phosphorus, but flow data were available for a number of gauging weirs. The only extensive measurements on phosphorus concentration and associated discharge were from the effluent wastewater treatment works of Paarl and Wellington. 1rregular of only measurements phosphorus However. concentration had been taken of the river upstream and downstream of the Paarl and Wellington works \$0 that information on phosphorus load in the main river channel was rudimentary. Furthermore, measurements were of little value as the measurement technique for the determination of phosphorus at low concentration was suspect. No measurements of phosphorus had been taken down the river, or on the tributaries.

With regard to the measurement of flow, continuous data were available at 3 points on the main river channel (weirs: GIMO4, GIM20 and GIMI3) and on 12 lateral inflows (two on the sewage works effluent line weirs: GIQO1 and GIQO2), one on the water release from Voëlvlei Dam (weir: GIRO1), and nine on the tributaries. The locations of the gauging weirs are shown in Fig 4.1; main channel gauging stations are identified by the letter "M", weirs on effluent lines by "E", and weirs on tributaries by "T".



basin. Weirs on the main river channel are denoted by "H", weirs on the effluent lines are denoted by "E", and weirs on tributaries to the main river channel by "T". 7.

2.1 Selection of sampling station location

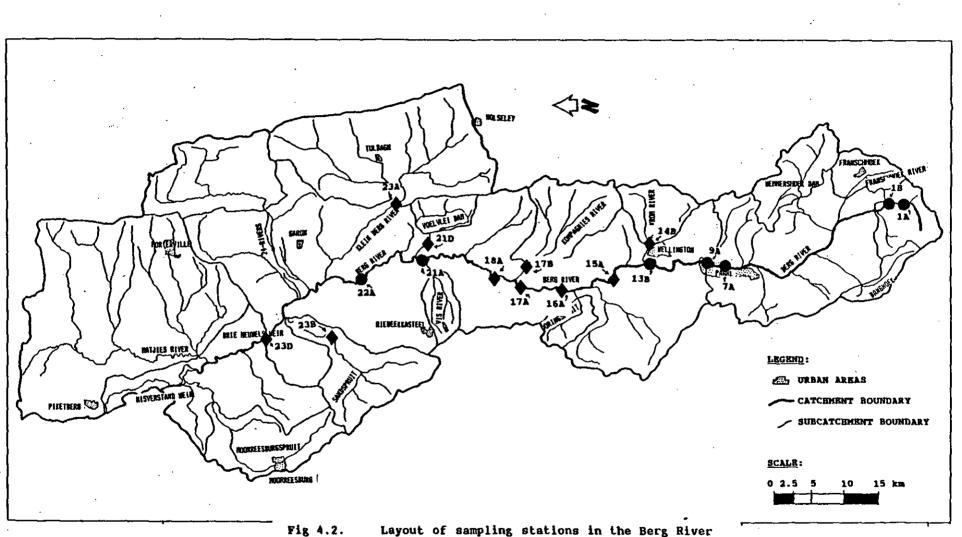
In the preliminary survey the objective was to form an approximate assessment of the variation of phosphorus concentration and load along the main river channel. With this information it would be possible to identify regions that were important contributors and require more intensive sampling.

A number of sampling stations were sited on the main river channel below reaches that receive substantial lateral flows, some of which were suspected to be contributors of phosphorus. These stations were all near existing gauging weirs so that the phosphorus loads at the stations could be calculated as accurately as possible. These stations were located above and below.

- Tunnel discharge from the Theewaterskloof Dam outlet (Stations 1A and 1B),
- (2) urban runoff canals for Paarl (Stations 7A and 9A),
- (3) treated effluent discharge at Paarl and Wellington (Stations 9A and 13B),
- (4) point of water release from Voëlvlei Dam (Stations 21A and 22A).

These seven stations are shown on Fig 4.2.

To obtain an estimate of the nonpoint phosphorus loads exported from the tributaries and diffuse surface discharges to the main river channel, eight "secondary" stations were selected down the river between Wellington and Drie Heuwels Weir. These stations were selected on the basis of: (1) easy access, (2) good mixing in the river, and (3) where there was



Layout of sampling stations in the Berg River basin for the Preliminary survey. Primary stations are denoted by circles, and secondary stations by a diamond, see text for details. 4.5

no gauging weir, a river reach with stable cross sectional profile in order to estimate river discharge using a field method (see Section 3.4 Field Methods). These "secondary" stations are shown in Fig 4.2 (Stations: 14B, 15A, 16A, 17A, 17B, 18A, 21D, 23A, 23B and 23D).

Each sampling station was identified by an alpha-numeric. The numeral increases at consecutive stations down the length of the river, e.g. at the headwaters the station is labelled IA and at the downstream of the river, at Misverstand Weir, labelled 25A. The alpha symbol is incorporated in the station-code so that in any reach of the river should a new station be added between two existing stations, the new station could be coded to indicate its approximate location. For example a new station located between existing stations IA and 2A would be coded IB.

### 2.2 <u>Selection of sampling frequency</u>

Samples were collected at each sampling station at a frequency of between once and three times a month, for a period of one year, to span the hydrologic year. At each station, water samples were collected for analysis and at the same time river discharge calculated either from the gauging weir or by using the manual field method (see Section 3.4).

### 2.3 Data storage, processing and presentation

 The water quality and flow data were stored on computerized data base to enable rapid processing and presentation of data. Information on the design of the data base is given in Appendix 1. A number of computer programs were produced for the processing and presentation of water quality data; documentation and listings of these programs are given in Appendix 2.

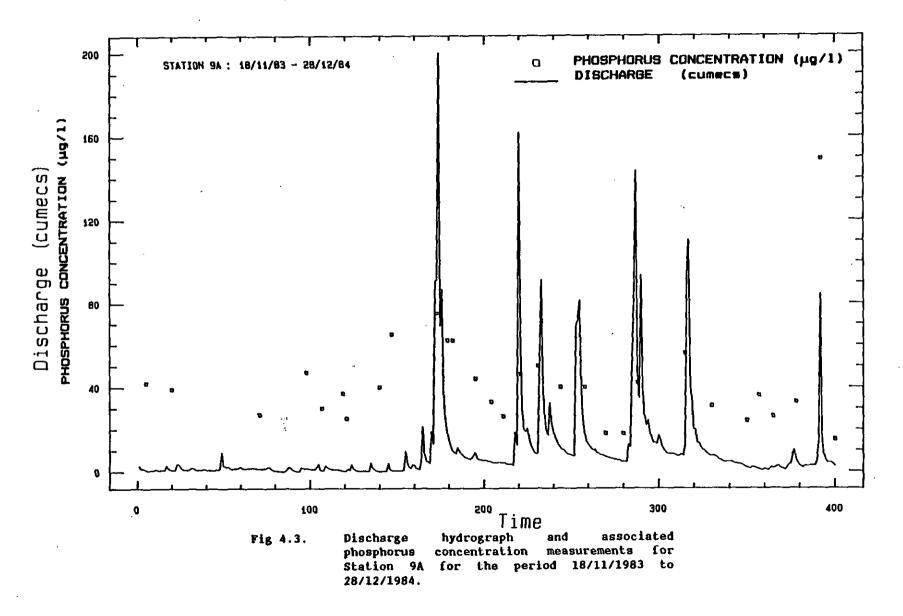
# 2.4 Results of preliminary survey

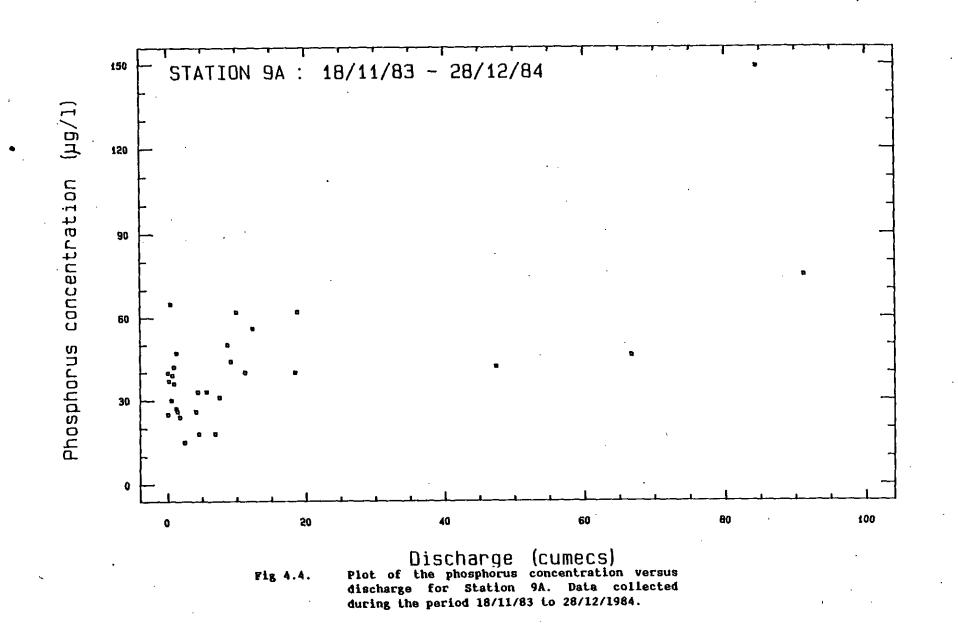
The objective of the preliminary survey was to obtain information for implementation of the monitoring program for the main river survey. There is little merit in presenting a detailed analysis of the data obtained in the preliminary survey - only such data will be presented that shows the need for the modifications in the monitoring program for the main river survey.

Fig 4.3 the discharge hydrograph and phosphorus In concentration measurements are shown for Station 9A from 24/11/1983 to 18/11/1984, the period over which the preliminary survey approximately extended. Station 9A monitors the drainage from an area in which phosphorus is principally derived from nonpoint sources. It is immediately apparent that the discharge ranged from 0.5 to as high as 200 cumecs, that the flood flows were peaky and extended over relatively short periods of time. Under this flow regime the phosphorus measurements, at intervals of one or two weeks, did not provide any information on the phosphorus behaviour during floods, except one data point which indicated that the phosphorus concentration was phosphorus concentration versus Plotting the very high. discharge (Fig 4.4) indicated that (1) the concentration increases with discharge, (2) there is scatter in the plotted points, and (3) no information is available as to the behaviour of phosphorus during flood events.

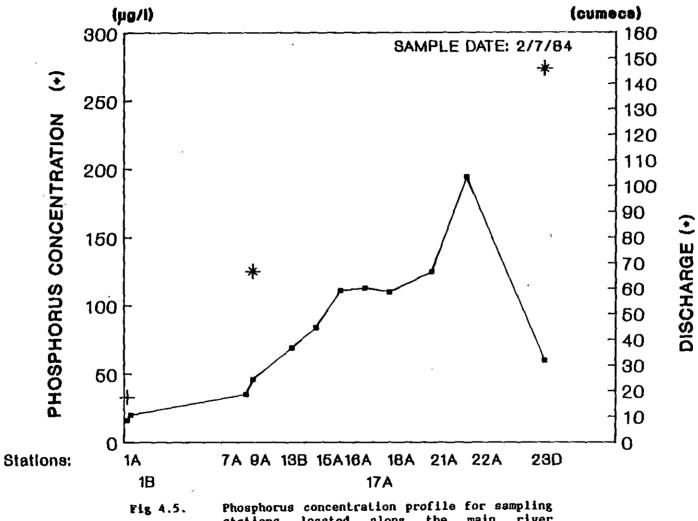
Along the river channel, on a selected day during a flood event abrupt changes in the phosphorus concentration were measured (Fig 4.5), that is, high transient effects are apparent, induced by flood waves entering the main river channel at different points along the channel.

4.7





TR 143 March 1989



stations located along the main river channel. Samples collected on 2/7/1984 during flood flow conditions.

ï

:

.

:

1

4.) 0

In the main channel clearly the behaviour of phosphorus during flood events demand closer scrutiny; this implies that during flood events the frequency of sampling of phosphorus should be increased to such a level that a time series of phosphorus concentration (chemograph) could be distinguished. This chemograph, in association with the discharge hydrograph should provide information as to the phosphorus load exported.

The transient behaviour along the main river channel makes it virtually impossible to estimate the nonpoint source contributions by doing mass balances. Contributions of phosphorus from tributaries draining nonpoint sources therefore need to be assessed individually. Again, this implies high frequency sampling during flood events.

Adequate monitoring of nonpoint source subcatchments is particularly important because the chemograph in association with the discharge hydrograph provides information to develop a relationship between the discharge and phosphorus concentration for incorporation in a model.

By plotting the phosphorus concentration down the length of the main river channel from headwaters to Drie Heuwels Weir, under steady state high and low flow conditions respectively (see Figs 4.6 and 4.7) it became apparent that the stations upstream of Paarl on the main river channel (IA, IB and 4A) may be omitted from the monitoring network because there appear to be no major inputs of phosphorus in this stretch of the river. Sampling station 16A also could be omitted; under both high and low flow conditions the remaining stations provided sufficient information for the description of the phosphorus profile (see Figs 4.6 and 4.7). 2.1 Selection of sampling station location

In the preliminary survey the objective was to form an approximate assessment of the variation of phosphorus concentration and load along the main river channel. With this information it would be possible to identify regions that were important contributors and require more intensive sampling.

A number of sampling stations were sited on the main river channel below reaches that receive substantial lateral flows, some of which were suspected to be contributors of phosphorus. These stations were all near existing gauging weirs so that the phosphorus loads at the stations could be calculated as accurately as possible. These stations were located above and below.

- Tunnel discharge from the Theewaterskloof Dam outlet (Stations 1A and 1B),
- (2) urban runoff canals for Paarl (Stations 7A and 9A),
- (3) treated effluent discharge at Paarl and Wellington (Stations 9A and 13B),
- (4) point of water release from Voëlvlei Dam (Stations 21A and 22A).

These seven stations are shown on Fig 4.2.

To obtain an estimate of the nonpoint phosphorus loads exported from the tributaries and diffuse surface discharges to the main river channel, eight "secondary" stations were selected down the river between Wellington and Drie Heuwels Weir. These stations were selected on the basis of: (1) easy access, (2) good mixing in the river, and (3) where there was no gauging weir, a river reach with stable cross sectional profile in order to estimate river discharge using a field method (see Section 3.4 Field Methods). These "secondary" stations are shown in Fig 4.2 (Stations: 14B, 15A, 16A, 17A, 17B, 18A, 21D, 23A, 23B and 23D).

Each sampling station was identified by an alpha-numeric. The numeral increases at consecutive stations down the length of the river, e.g. at the headwaters the station is labelled IA and at the downstream of the river, at Misverstand Weir, labelled 25A. The alpha symbol is incorporated in the station-code so that in any reach of the river should a new station be added between two existing stations, the new station could be coded to indicate its approximate location. For example a new station located between existing stations IA and 2A would be coded IB.

### 2.2 <u>Selection of sampling frequency</u>

Samples were collected at each sampling station at a frequency of between once and three times a month, for a period of one year, to span the hydrologic year. At each station, water samples were collected for analysis and at the same time river discharge calculated either from the gauging weir or by using the manual field method (see Section 3.4).

### 2.3 Data storage, processing and presentation

 The water quality and flow data were stored on computerized data base to enable rapid processing and presentation of data. Information on the design of the data base is given in Appendix 1. A number of computer programs were produced for the processing and presentation of water quality data; documentation and listings of these programs are given in Appendix 2.

# 2.4 Results of preliminary survey

The objective of the preliminary survey was to obtain information for implementation of the monitoring program for the main river survey. There is little merit in presenting a detailed analysis of the data obtained in the preliminary survey - only such data will be presented that shows the need for the modifications in the monitoring program for the main river survey.

Fig 4.3 the discharge hydrograph and phosphorus In concentration measurements are shown for Station 9A from 24/11/1983 to 18/11/1984, the period over which the preliminary survey approximately extended. Station 9A monitors the drainage from an area in which phosphorus is principally derived from nonpoint sources. It is immediately apparent that the discharge ranged from 0.5 to as high as 200 cumecs, that the flood flows were peaky and extended over relatively short periods of time. Under this flow regime the phosphorus measurements, at intervals of one or two weeks, did not provide any information on the phosphorus behaviour during floods, except one data point which indicated that the phosphorus concentration was phosphorus concentration versus Plotting the very high. discharge (Fig 4.4) indicated that (1) the concentration increases with discharge, (2) there is scatter in the plotted points, and (3) no information is available as to the behaviour of phosphorus during flood events.

Along the river channel, on a selected day during a flood event abrupt changes in the phosphorus concentration were measured (Fig 4.5), that is, high transient effects are apparent, induced by flood waves entering the main river channel at different points along the channel.

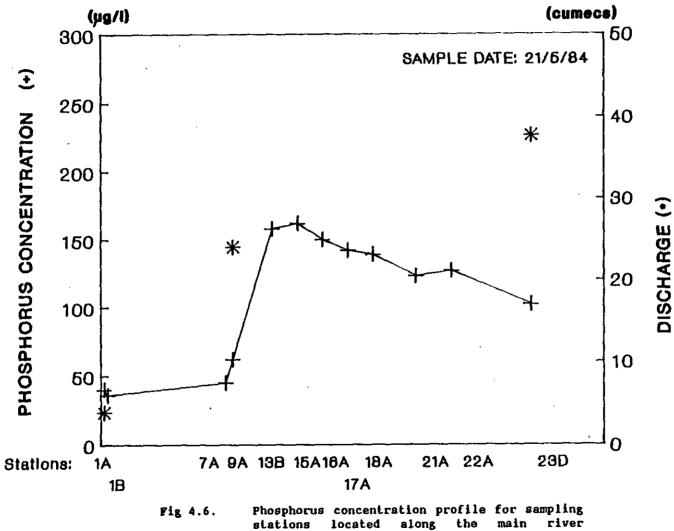
4.7

In the main channel clearly the behaviour of phosphorus during flood events demand closer scrutiny; this implies that during flood events the frequency of sampling of phosphorus should be increased to such a level that a time series of phosphorus concentration (chemograph) could be distinguished. This chemograph, in association with the discharge hydrograph should provide information as to the phosphorus load exported.

The transient behaviour along the main river channel makes it virtually impossible to estimate the nonpoint source contributions by doing mass balances. Contributions of phosphorus from tributaries draining nonpoint sources therefore need to be assessed individually. Again, this implies high frequency sampling during flood events.

Adequate monitoring of nonpoint source subcatchments is particularly important because the chemograph in association with the discharge hydrograph provides information to develop a relationship between the discharge and phosphorus concentration for incorporation in a model.

By plotting the phosphorus concentration down the length of the main river channel from headwaters to Drie Heuwels Weir, under steady state high and low flow conditions respectively (see Figs 4.6 and 4.7) it became apparent that the stations upstream of Paarl on the main river channel (IA, IB and 4A) may be omitted from the monitoring network because there appear to be no major inputs of phosphorus in this stretch of the river. Sampling station 16A also could be omitted; under both high and low flow conditions the remaining stations provided sufficient information for the description of the phosphorus profile (see Figs 4.6 and 4.7).



g 4.6. Phosphorus concentration profile for sampling stations located along the main river channel. Samples collected on 21/5/1984 during high flow conditions. 12

4

7

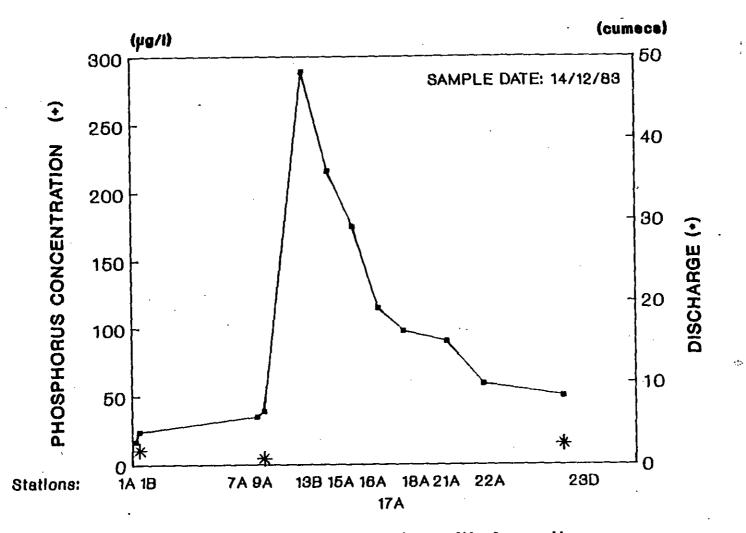


Fig 4.7. Phosphorus concentration profile for sampling stations located along the main river channel. Samples collected on 14/12/1983 during low flow conditions.

### 3 MAIN SURVEY

The information derived from the preliminary survey indicated that a greater emphasis should be placed on obtaining water quality data for: (1) lateral inflows to the main river channel, particularly phosphorus contributed from nonpoint sources, and (2) obtaining information on the transient behaviour of phosphorus during flood events.

### 3.1 <u>Sampling location : Main Survey</u>

Taking account of the observations mentioned above, the following sampling stations were selected. On the main river channel, eight sampling stations were located, as shown in Fig 4.8.

- (1) Stations 9A and 13B were selected to measure water quality upstream and downstream of the municipal wastewater discharges from Paarl and Wellington as in the preliminary survey.
- (2) At Station 23D the downstream water quality was measured.
- (3) Five sampling stations were located between these to provide water quality information on the spatial variation along the main river channel (Stations: 15A, 17A, 18A, 21A and 22A).

To monitor the contribution of phosphorus from lateral sources six sampling stations were located on tributaries selected considering their location on the east and west banks, their spacing in the drainage basin, and had continuous flow gauging:

| (1) | Krom River              | (Station 14B) |
|-----|-------------------------|---------------|
| (2) | Doringspruit            | (Station 15D) |
| (3) | Kompagnies River        | (Station 17B) |
| (4) | Canal from Voëlvlet Dam | (Station 21D) |
| (5) | Klein Berg River        | (Station 23A) |
| (6) | Sandspruit              | (Station 23B) |

In addition, the two stations were located on the discharge lines of the Paarl and Wellington wastewater treatment works to monitor the phosphorus loading from these sources (Stations PSTW and WSTW). The location of the sampling stations is shown in Fig 4.8.

### 3.2 Sampling frequency: Main survey

The sampling frequency on the main river channel and tributaries was selected from the following considerations. From the preliminary survey it was evident that during the dry period i.e. low flow periods, the phosphorus concentration at selected points along the river, and from the tributaries tended to be fairly stable. Consequently, the frequency of sampling was instituted at between 10 to 14 days.

One of the most important pieces of information derived from the preliminary survey was that the peak phosphorus concentration associated with river discharge. 15 peak frequency approximately manual sampling Consequently. а proportional to flow, was proposed. High flow periods could be predicted fairly well from weather forecasts. When the forecast indicated a rainy period the proportional sampling procedure The highest frequency of sampling was implemented. was approximately once every hour in order to obtain precise information of the phosphorus movement under flood conditions. During off peak periods the frequency of sampling was reduced; under sustained high flow conditions the sampling was reduced to once a day.

4.15

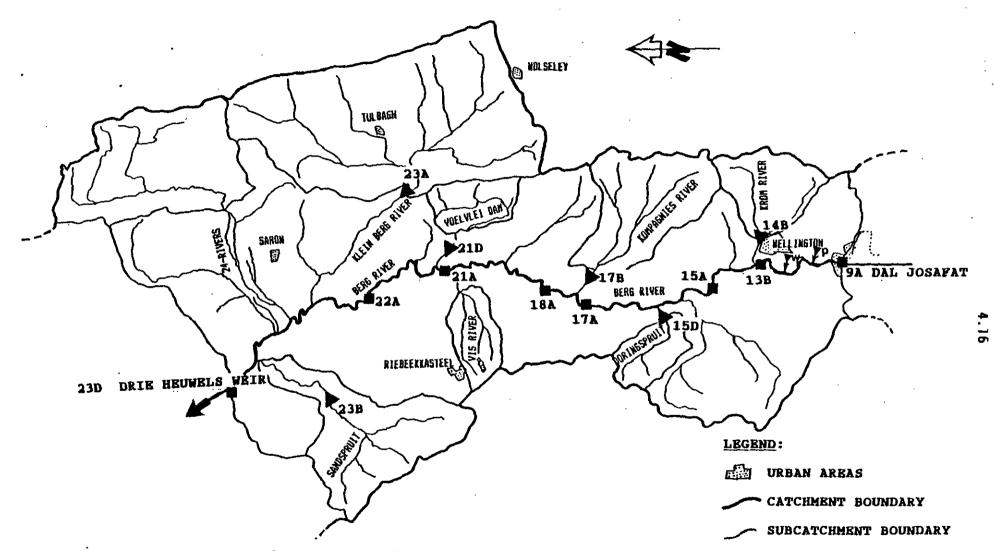


Fig 4.8. Sampling station location - main river survey. Sampling stations located on the main river channel are shown by a square, stations located on tributaries by a triangle. At Drie Heuwels Weir (Station 23D), the phosphorus chemographs associated with flood events were found to be attenuated and samples were collected every 19 hours using an automatic sampling device; the method is described in Section 3.4.

## 3.3 <u>Sampling periods</u>

The monitoring network was operated from November 1983 until October 1986, a total period of three years which was subdivided into six consecutive 180-day periods.

These periods are numbered sequentially and approximately coincide with the dry and wet seasons of the Western Cape. Further information is given on each period in Table 4.1.

| Period No: | Start date: | End Date: | Season:  | Runoff: |
|------------|-------------|-----------|----------|---------|
| 1          | 24/11/83    | 22/05/84  | summer   | low     |
| 2          | 23/05/84    | 18/11/84  | winter - | high    |
| 3          | 19/11/84    | 17/05/85  | summer   | Jow     |
| 4          | 18/05/85    | 05/11/85  | winter   | high    |
| 5          | 06/11/85    | 04/05/85  | summer   | low     |
| 6          | 05/05/86    | 31/11/86  | winter   | htgh    |

Table 4.1 Description of data periods.

Phosphorus transport Berg River

TR 143 March 1989

#### 3 MAIN SURVEY

The information derived from the preliminary survey indicated that a greater emphasis should be placed on obtaining water quality data for: (1) lateral inflows to the main river channel, particularly phosphorus contributed from nonpoint sources, and (2) obtaining information on the transient behaviour of phosphorus during flood events.

#### 3.1 <u>Sampling location : Main Survey</u>

Taking account of the observations mentioned above, the following sampling stations were selected. On the main river channel, eight sampling stations were located, as shown in Fig 4.8.

- (1) Stations 9A and 13B were selected to measure water quality upstream and downstream of the municipal wastewater discharges from Paarl and Wellington as in the preliminary survey.
- (2) At Station 23D the downstream water quality was measured.
- (3) Five sampling stations were located between these to provide water quality information on the spatial variation along the main river channel (Stations: 15A, 17A, 18A, 21A and 22A).

To monitor the contribution of phosphorus from lateral sources six sampling stations were located on tributaries selected considering their location on the east and west banks, their spacing in the drainage basin, and had continuous flow gauging:

| (1) | Krom River              | (Station 14B) |
|-----|-------------------------|---------------|
| (2) | Doringspruit            | (Station 15D) |
| (3) | Kompagnies River        | (Station 17B) |
| (4) | Canal from Voëlvlet Dam | (Station 21D) |
| (5) | Klein Berg River        | (Station 23A) |
| (6) | Sandspruit              | (Station 23B) |

In addition, the two stations were located on the discharge lines of the Paarl and Wellington wastewater treatment works to monitor the phosphorus loading from these sources (Stations PSTW and WSTW). The location of the sampling stations is shown in Fig 4.8.

#### 3.2 Sampling frequency: Main survey

The sampling frequency on the main river channel and tributaries was selected from the following considerations. From the preliminary survey it was evident that during the dry period i.e. low flow periods, the phosphorus concentration at selected points along the river, and from the tributaries tended to be fairly stable. Consequently, the frequency of sampling was instituted at between 10 to 14 days.

One of the most important pieces of information derived from the preliminary survey was that the peak phosphorus concentration associated with river discharge. 15 peak frequency approximately manual sampling Consequently. а proportional to flow, was proposed. High flow periods could be predicted fairly well from weather forecasts. When the forecast indicated a rainy period the proportional sampling procedure The highest frequency of sampling was implemented. was approximately once every hour in order to obtain precise information of the phosphorus movement under flood conditions. During off peak periods the frequency of sampling was reduced; under sustained high flow conditions the sampling was reduced to once a day.

At Drie Heuwels Weir (Station 23D), the phosphorus chemographs associated with flood events were found to be attenuated and samples were collected every 19 hours using an automatic sampling device; the method is described in Section 3.4.

## 3.3 <u>Sampling periods</u>

The monitoring network was operated from November 1983 until October 1986, a total period of three years which was subdivided into six consecutive 180-day periods.

These periods are numbered sequentially and approximately coincide with the dry and wet seasons of the Western Cape. Further information is given on each period in Table 4.1.

| Period No: | Start date: | End Date: | Season:  | Runoff: |
|------------|-------------|-----------|----------|---------|
| 1          | 24/11/83    | 22/05/84  | summer   | low     |
| 2          | 23/05/84    | 18/11/84  | winter - | high    |
| 3          | 19/11/84    | 17/05/85  | summer   | Jow     |
| 4          | 18/05/85    | 05/11/85  | winter   | high    |
| 5          | 06/11/85    | 04/05/85  | summer   | low     |
| 6          | 05/05/86    | 31/11/86  | winter   | htgh    |

Table 4.1 Description of data periods.

Phosphorus transport Berg River

TR 143 March 1989

#### 3.4 Field methods

At each sampling station indicated in Figs 4.2 and 4.8, the following field methods were used:

- (1)Two water samples were collected: one sample (one litre volume) for total suspended solids analysis and one sample (335 m% volume) for nutrient analysis (total phosphorus and soluble ortho-phosphate). The sample bottles were made of high density polyethylene with a high density water tight lid. The bottles were thoroughly rinsed in river water prior to collection of the sample, which was taken from a mid-depth level, at least 2 m from the river bank to avoid disturbance of river sediments. The nutrient sample was preserved with 20 mg/l mercury (II) chloride, stored at approximately 10°C in an insulated container, prior to analysis. Analytical methods are described by van Vliet, Sartory; Schoonraad, Kempster and Gerber (1988).
- (2) At gauging weirs, the river discharge was determined by reading the stage height and converting this reading into river discharge using the discharge rating-curve table for the specific weir. The rating curve tables were developed by the Department of Water Affairs (Directorate of Hydrology). At sampling stations along the main river channel without gauging facilities (i.e. Stations 13B, 17A, 18A, 21A, 22A) a manual flow determination method was used, based on the method developed by Robins and Crawford (1954):
  - The width of the river (W) is measured using a thirty-metre measuring tape stretched across the river from bank to bank, secured at either end by metal pegs;

#### 3.4 Field methods

At each sampling station indicated in Figs 4.2 and 4.8, the following field methods were used:

- (1)Two water samples were collected: one sample (one litre volume) for total suspended solids analysis and one sample (335 m% volume) for nutrient analysis (total phosphorus and soluble ortho-phosphate). The sample bottles were made of high density polyethylene with a high density water tight lid. The bottles were thoroughly rinsed in river water prior to collection of the sample, which was taken from a mid-depth level, at least 2 m from the river bank to avoid disturbance of river sediments. The nutrient sample was preserved with 20 mg/l mercury (II) chloride, stored at approximately 10°C in an insulated container, prior to analysis. Analytical methods are described by van Vliet, Sartory; Schoonraad, Kempster and Gerber (1988).
- (2) At gauging weirs, the river discharge was determined by reading the stage height and converting this reading into river discharge using the discharge rating-curve table for the specific weir. The rating curve tables were developed by the Department of Water Affairs (Directorate of Hydrology). At sampling stations along the main river channel without gauging facilities (i.e. Stations 13B, 17A, 18A, 21A, 22A) a manual flow determination method was used, based on the method developed by Robins and Crawford (1954):
  - The width of the river (W) is measured using a thirty-metre measuring tape stretched across the river from bank to bank, secured at either end by metal pegs;

the profile of the river is determined by dividing the total river width into six (j) sub-widths of length, L<sub>1</sub>. The river depth (d<sub>1</sub>) was measured at each sub-width using a levelling staff;

the mean flow velocity (V<sub>1</sub>) within each sub-width is determined using a portable Ott Flow Meter.

In Fig 4.9 a sketch of the river cross section shows the dimensions and terms described above. The total river discharge  $(Q_t)$  is calculated as the sum of the discharges for each of the sub-widths, calculated from

$$Q_{t} = \sum_{i=1}^{j} ((d_{i} L_{i}) V_{i})$$

. (4.7)

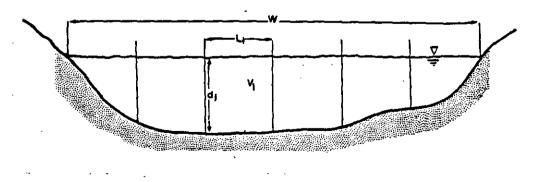


Fig 4.9 Schematic diagram of cross section of river showing terms used in Eq (4.1).

#### Phosphorus transport Berg River

#### 3 MAIN SURVEY

The information derived from the preliminary survey indicated that a greater emphasis should be placed on obtaining water quality data for: (1) lateral inflows to the main river channel, particularly phosphorus contributed from nonpoint sources, and (2) obtaining information on the transient behaviour of phosphorus during flood events.

#### 3.1 <u>Sampling location : Main Survey</u>

Taking account of the observations mentioned above, the following sampling stations were selected. On the main river channel, eight sampling stations were located, as shown in Fig 4.8.

- (1) Stations 9A and 13B were selected to measure water quality upstream and downstream of the municipal wastewater discharges from Paarl and Wellington as in the preliminary survey.
- (2) At Station 23D the downstream water quality was measured.
- (3) Five sampling stations were located between these to provide water quality information on the spatial variation along the main river channel (Stations: 15A, 17A, 18A, 21A and 22A).

To monitor the contribution of phosphorus from lateral sources six sampling stations were located on tributaries selected considering their location on the east and west banks, their spacing in the drainage basin, and had continuous flow gauging:

| (1) | Krom River              | (Station 14B) |
|-----|-------------------------|---------------|
| (2) | Doringspruit            | (Station 15D) |
| (3) | Kompagnies River        | (Station 17B) |
| (4) | Canal from Voëlvlet Dam | (Station 21D) |
| (5) | Klein Berg River        | (Station 23A) |
| (6) | Sandspruit              | (Station 23B) |

In addition, the two stations were located on the discharge lines of the Paarl and Wellington wastewater treatment works to monitor the phosphorus loading from these sources (Stations PSTW and WSTW). The location of the sampling stations is shown in Fig 4.8.

#### 3.2 Sampling frequency: Main survey

The sampling frequency on the main river channel and tributaries was selected from the following considerations. From the preliminary survey it was evident that during the dry period i.e. low flow periods, the phosphorus concentration at selected points along the river, and from the tributaries tended to be fairly stable. Consequently, the frequency of sampling was instituted at between 10 to 14 days.

One of the most important pieces of information derived from the preliminary survey was that the peak phosphorus concentration associated with river discharge. 15 peak frequency approximately manual sampling Consequently. а proportional to flow, was proposed. High flow periods could be predicted fairly well from weather forecasts. When the forecast indicated a rainy period the proportional sampling procedure The highest frequency of sampling was implemented. was approximately once every hour in order to obtain precise information of the phosphorus movement under flood conditions. During off peak periods the frequency of sampling was reduced; under sustained high flow conditions the sampling was reduced to once a day.

At Drie Heuwels Weir (Station 23D), the phosphorus chemographs associated with flood events were found to be attenuated and samples were collected every 19 hours using an automatic sampling device; the method is described in Section 3.4.

## 3.3 <u>Sampling periods</u>

The monitoring network was operated from November 1983 until October 1986, a total period of three years which was subdivided into six consecutive 180-day periods.

These periods are numbered sequentially and approximately coincide with the dry and wet seasons of the Western Cape. Further information is given on each period in Table 4.1.

| Period No: | Start date: | End Date: | Season:  | Runoff: |
|------------|-------------|-----------|----------|---------|
| 1          | 24/11/83    | 22/05/84  | summer   | low     |
| 2          | 23/05/84    | 18/11/84  | winter - | high    |
| 3          | 19/11/84    | 17/05/85  | summer   | Jow     |
| 4          | 18/05/85    | 05/11/85  | winter   | high    |
| 5          | 06/11/85    | 04/05/85  | summer   | low     |
| 6          | 05/05/86    | 31/11/86  | winter   | htgh    |

Table 4.1 Description of data periods.

Phosphorus transport Berg River

TR 143 March 1989

#### 3.4 Field methods

At each sampling station indicated in Figs 4.2 and 4.8, the following field methods were used:

- (1)Two water samples were collected: one sample (one litre volume) for total suspended solids analysis and one sample (335 m% volume) for nutrient analysis (total phosphorus and soluble ortho-phosphate). The sample bottles were made of high density polyethylene with a high density water tight lid. The bottles were thoroughly rinsed in river water prior to collection of the sample, which was taken from a mid-depth level, at least 2 m from the river bank to avoid disturbance of river sediments. The nutrient sample was preserved with 20 mg/l mercury (II) chloride, stored at approximately 10°C in an insulated container, prior to analysis. Analytical methods are described by van Vliet, Sartory; Schoonraad, Kempster and Gerber (1988).
- (2) At gauging weirs, the river discharge was determined by reading the stage height and converting this reading into river discharge using the discharge rating-curve table for the specific weir. The rating curve tables were developed by the Department of Water Affairs (Directorate of Hydrology). At sampling stations along the main river channel without gauging facilities (i.e. Stations 13B, 17A, 18A, 21A, 22A) a manual flow determination method was used, based on the method developed by Robins and Crawford (1954):
  - The width of the river (W) is measured using a thirty-metre measuring tape stretched across the river from bank to bank, secured at either end by metal pegs;

the profile of the river is determined by dividing the total river width into six (j) sub-widths of length, L<sub>1</sub>. The river depth (d<sub>1</sub>) was measured at each sub-width using a levelling staff;

the mean flow velocity (V<sub>1</sub>) within each sub-width is determined using a portable Ott Flow Meter.

In Fig 4.9 a sketch of the river cross section shows the dimensions and terms described above. The total river discharge  $(Q_t)$  is calculated as the sum of the discharges for each of the sub-widths, calculated from

$$Q_{t} = \sum_{i=1}^{j} ((d_{i} L_{i}) V_{i})$$

. (4.7)

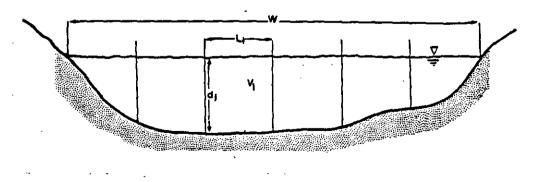


Fig 4.9 Schematic diagram of cross section of river showing terms used in Eq (4.1).

#### Phosphorus transport Berg River

- (3) During Periods 4 and 6 an automatic sampler was installed at Drie Heuwels Weir (Station 23D). This was done to obtain as accurate a description of the phosphorus chemograph as possible. This station is located at the bottom of the study area being investigated and consequently the data could serve both for calibration and verification of the proposed hydrodynamic phosphorus transport model. The data from Period 6 were used for model calibration (measured phosphorus values were obtained at most of the flood hydrographs) and the data for Period 4 used for model verification.
- (4) Riverbed sediments were collected during low river flow in Period 5 and during high flow in Period 6, at Stations 9A, 13B, 18A and 21A. At each station, two 500 mg wide necked bottles were filled with the riverbed sediment removed from an area • of approximately 150 mm by 150 mm to a depth of 20 One sample preserved with approximately mn. 20 mg/2 mercury (II) chloride was dispatched for total phosphorus analysis, while the other was used for granulometric analysis. To determine the median sieve size of the riverbed sediments granulometric methods were used which are reported in the standard test methods (van Vliet et al., 1988).

#### 3.5 Compilation of flow data

The gauging weirs located in the Berg River are operated and maintained by the Directorate of Hydrology, Department of Water Affairs, at Sandhills near Worcester. The recorded data for the gauging weirs shown on Fig 4.1, for the survey period (November 1983 - October 1986) were processed as follows:

- (3) During Periods 4 and 6 an automatic sampler was installed at Drie Heuwels Weir (Station 23D). This was done to obtain as accurate a description of the phosphorus chemograph as possible. This station is located at the bottom of the study area being investigated and consequently the data could serve both for calibration and verification of the proposed hydrodynamic phosphorus transport model. The data from Period 6 were used for model calibration (measured phosphorus values were obtained at most of the flood hydrographs) and the data for Period 4 used for model verification.
- (4) Riverbed sediments were collected during low river flow in Period 5 and during high flow in Period 6, at Stations 9A, 13B, 18A and 21A. At each station, two 500 mg wide necked bottles were filled with the riverbed sediment removed from an area • of approximately 150 mm by 150 mm to a depth of 20 One sample preserved with approximately mn. 20 mg/2 mercury (II) chloride was dispatched for total phosphorus analysis, while the other was used for granulometric analysis. To determine the median sieve size of the riverbed sediments granulometric methods were used which are reported in the standard test methods (van Vliet et al., 1988).

#### 3.5 Compilation of flow data

The gauging weirs located in the Berg River are operated and maintained by the Directorate of Hydrology, Department of Water Affairs, at Sandhills near Worcester. The recorded data for the gauging weirs shown on Fig 4.1, for the survey period (November 1983 - October 1986) were processed as follows:

- (1) The hydrograph recorded at the weir is in analog format (of stage readings) and digitized at 12-hourly intervals at: 12h00 (noon) and 00h00 (midnight).
- (2) The stage values for each time interval are converted to the discharge value using the stage/discharge table for the specific gauging weir.
- (3) The data are saved on floppy disk (using the program DISKID, see Appendix 2).

Due to the consistent maintenance and inspection of the gauging weirs in the Berg River catchment by the Department of Water Affairs a complete record of flow was available for the upstream station at Paarl (Station 9A). At other gauging weirs malfunctioning of the recorder equipment occurred very infrequently. To patch the missing flow data records, linear interpolation was used to generate the flow values over the period of missing data. Fortunately, the gauging chart sheets were changed once a week so that loss of data would extend a maximum of seven days. Over the sampling period of three years flow data were patched for 5 weirs, on 11 occasions.

#### 4 SUMMARY

The iterative approach to monitoring network design (1)of an efficient for evolution scheme allowed quality data. In particular, collecting water development of a variable interval sampling frequency was of crucial importance in obtaining optimal the monitoring effort information from fixed-interval sampling frequency would have given greatly reduced information for the same effort.

- Application of flow-proportional sampling frequency. (2) provided detailed information on the temporal variation exhibited in the phosphorus concentration of lateral inflows and along the main river channel. This had particular importance during flood events and periods of high flow when abrupt spatial and temporal gradients in the phosphorus concentration were . observed.
- (3) Use of an automatic sampler at Drie Heuwels Weir, during Periods 4 and 6, provided a water quality data set containing phosphorus measurements taken every 19 hours. These data were important in defining the downstream boundary conditions accurately, for subsequent use in model calibration.

## 5 **REFERENCES**

Moss, M.E. (1980)

"Some basic considerations in the design of hydrologic data networks", Wat. Resour. Res., <u>15</u>, no.6, 1673-1676.

Robins, C.R. and Crawford, R.W. (1954)

"A short accurate method for estimating the volume of stream flow", J. Wildlife Mgt., <u>18</u>, no.3, 366-369.

van Vliet, H.R., Sartory, D.P., Schoonraad, I.J.,

Kempster, P.L., and Gerber, F.A. (1988)

"Analytical methods manual", Technical Report, Department of Water Affairs, Pretoria, TR 136.

Ward, R.C., Loftis, J.C., McBride, G.B. (1986)

"The "data-rich but information-poor" syndrome in water quality monitoring", Environ. Manage., <u>10</u>, no.3, 291-297.

#### CHAPTER 5

#### DATA PRESENTATION AND ANALYSIS

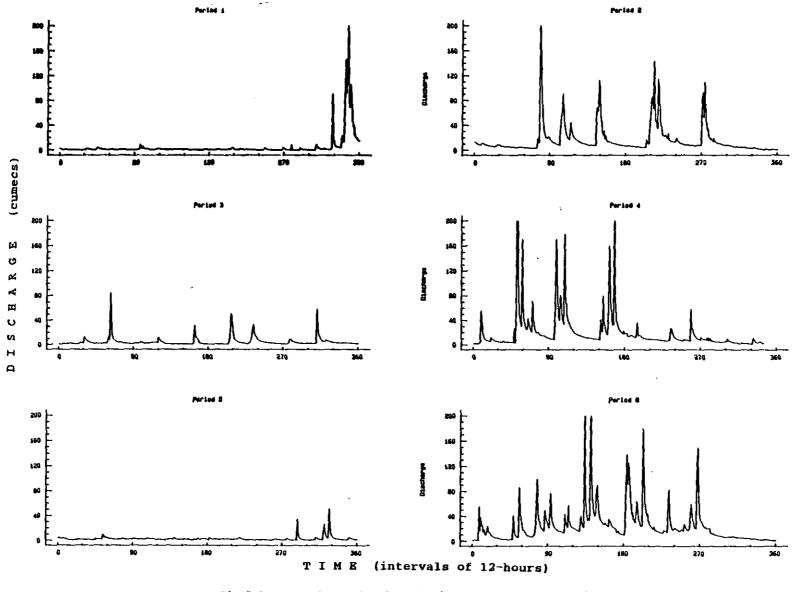
The objective of this chapter is to: (1) present water quality and river flow data collected during the preliminary and main river surveys; (2) process the data to show the temporal and spatial variation in quality and flow; and (3) examine the interdependence between variables.

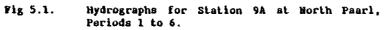
To simplify analysis, the data set will be divided into two groups: (1) data associated with sampling stations located on the main river channel; and (2) data associated with the lateral inflows to the main river channel.

#### 1 ANALYSIS OF FLOW DATA

#### 1.1 Main\_river\_channel

Within the study area, the main river channel is gauged at North Paar) (Station 9A) and Drie Heuwels Weir (Station 23D). In Fig 5.1 the hydrographs for the gauging weir at North Paarl (Station 9A) are shown for Periods 1 to 6. During low flow (summer periods) the river discharge ranges from between 0.2 to 2 cumecs; during high flow (winter periods) the discharge may exceed 200 cumecs. After a single flood event the recession limb of the hydrograph may extend for a period of up to 70 days before the base flow condition is re-established. During successive flood events, the frequency of storm events may prevent the river discharge from returning to a baseflow condition. This is illustrated in Fig 5.2, during the winter flow Period 6 (of 180-days) there were 10 storm events over a





ŧ

٠

;

.

TR 143 March 1989

170 PERIOD 6 G1M20 136 102 68 34 Ð 190 230 270 310 150

Time (intervals of 12-hours) section of the hydrograph measured at station 9A (Period 6) showing a number of flood hydrographs and associated recession curves.

Phosphorus transport Berg River

Fig 5.2.

(cumecs)

Discharge

TR 143 March 1989

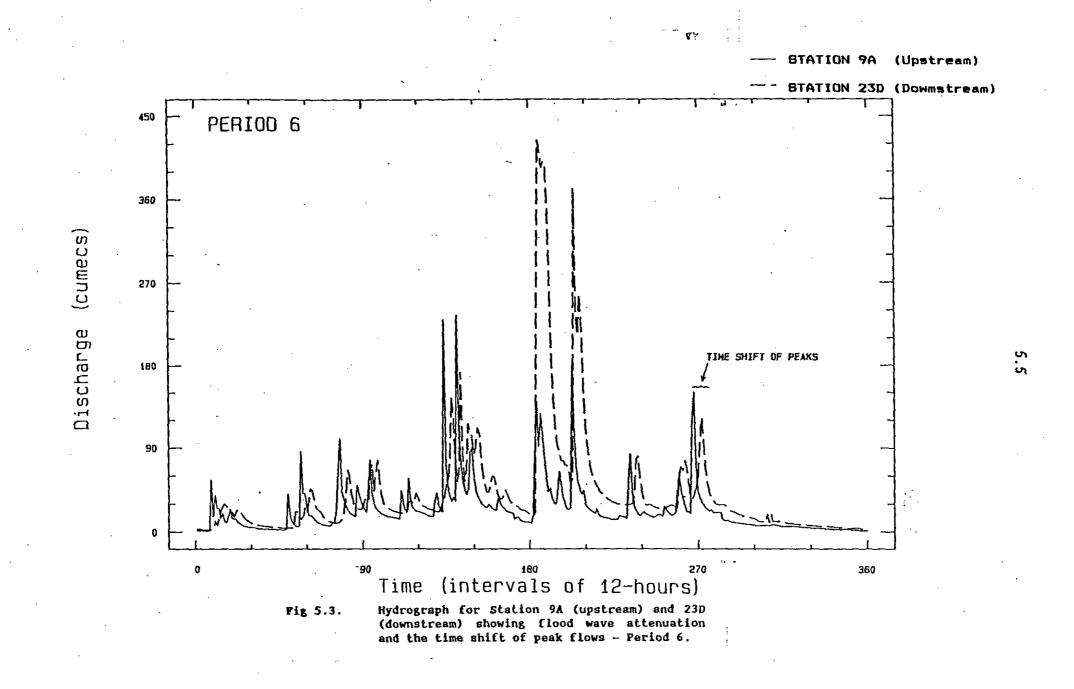
υ . period of 100 days, in which time the recession limbs of the hydrograph were truncated, lasting only a few days before the next storm.

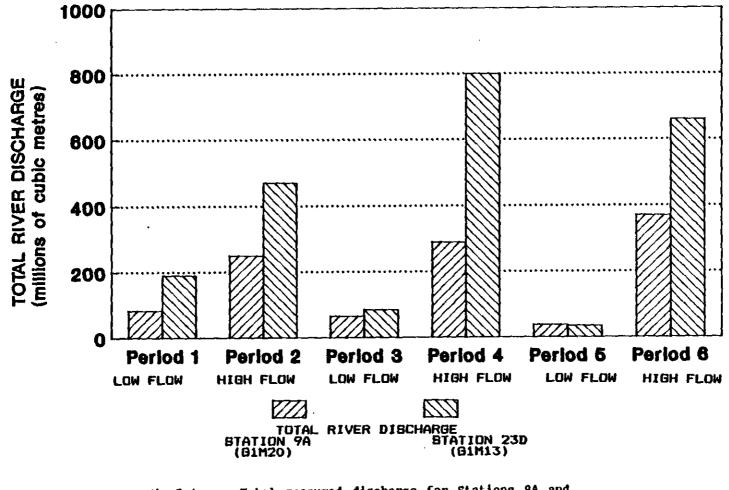
At Paarl during the summer, Periods 1, 3 and 5, (each a period of 180 days) the total runoff ranged from 2.0 to 17.2 million cubic metres. During the winter, Periods 2, 4 and 6, the total runoff per 180-days ranged between 34.7 and 57.8 million cubic metres.

At Drie Heuwels Weir, 90 km downstream of Paarl, the flood hydrographs have characteristics similar to the upstream hydrographs, except that at Drie Heuwels the peaks are higher, there is a time shift of peaks with respect to the peaks at Paarl and the peaks are more attenuated (Fig 5.3).

To calculate the total river discharge for each Period, the hydrographs for Station 9A and 23D during Periods 1 to 6 were integrated and the total discharge volumes per period are shown in Fig 5.4. During Periods 3 and 5 (low flow conditions) the Weir total runoff at Paarl and at Drie Heuwels are approximately equal, provisionally indicating that lateral inflows and abstraction and infiltration between Paarl and Drie Heuwels Weir tended to compensate each other. However, during Periods 2, 4 and 6 (high flow conditions) the differences in the total runoff between these two stations are pronounced. brought about by the substantial inflow from lateral sources over the 90 km reach.

All the <u>gauged</u> tributaries discharging between Station 9A and 23D were added to the discharge at Station 9A to give a calculated estimate of the discharge at 23D, for each period. In Fig 5.5 the calculated and measured discharges at Drie Heuwels Weir are shown. During the high flow periods, the calculated discharges are significantly <u>less</u> than the measured flow for reason of the substantial inflow from <u>ungauged</u> areas.





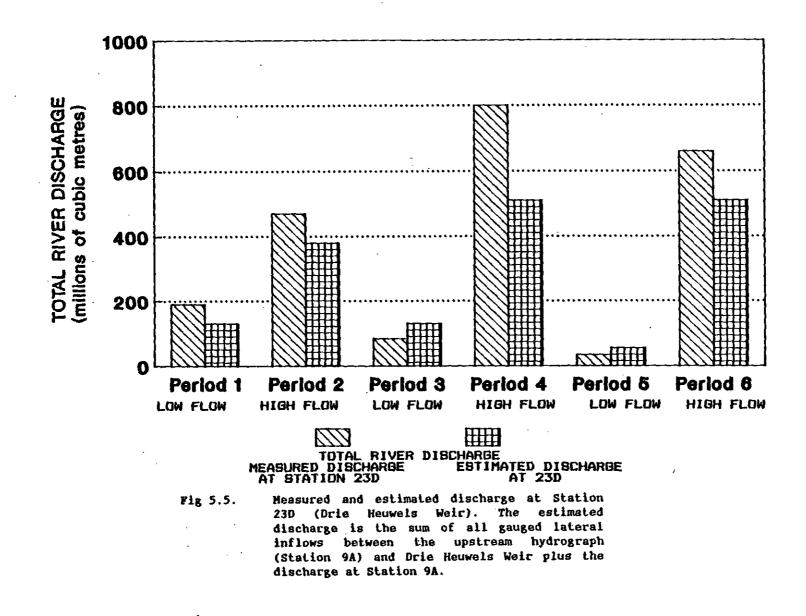
. .

Fig 5.4. Total measured discharge for Stations 9A and 23D for Periods 1 to 6.

#### Phosphorus transport Berg River

TR 143 March 1989

2.20



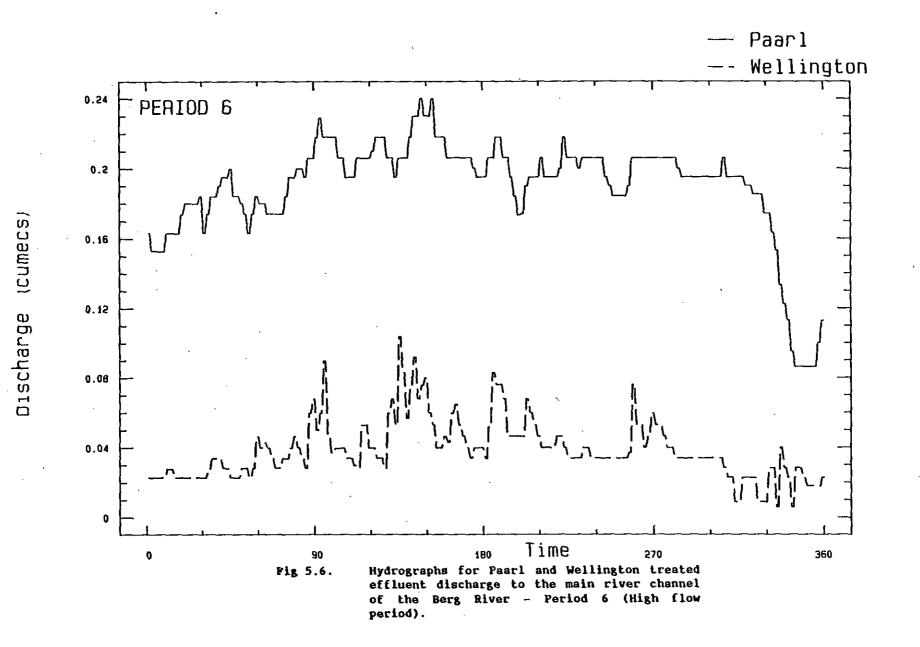
During the low flow period, the calculated discharge tends to be more than the measured; the most likely reasons are abstraction by riparian users along the river channel, and seepage losses from the river channel to the ground water (effects which are not accounted for in the calculated flow).

#### 1.2 Point sources

Hydrographs of the effluent discharges from the wastewater treatment works at Paarl and Wellington are shown in Fig 5.6 for Period 6. Influx of stormwater to the sewerage system gives rise to a pattern of rising and falling discharge at the beginning and towards the end of the wet period, falling to as low as 50 percent of the peak discharges. Also during the summer months a small proportion of the effluent from the Wellington works is used to irrigate the local golf course resulting, on occasion, in an effluent discharge of as low as 0.01 cumec.

## 1.3 Tributaries

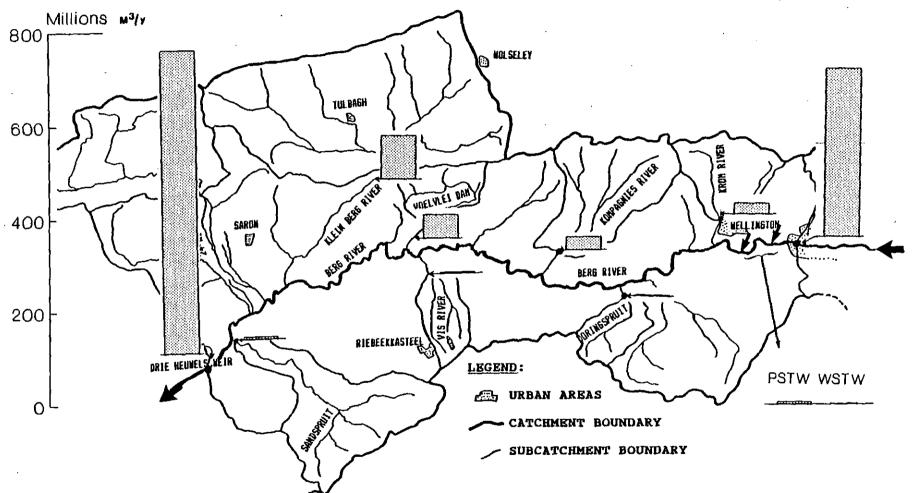
The mean annual runoff from gauged tributaries to the main river channel between Paarl and Drie Heuwels Weir are shown volumetrically (millions of cubic metres per year) in Fig 5.7, and as yield (mm of runoff per year) in Fig 5.8. Tributaries on the west bank of the main river channel have a relatively low yield compared with tributaries on the east bank which arises from differences in the rainfall and runoff characteristics of the two groups of subcatchments. This is illustrated by the discharge hydrographs from two drainage areas (the Kompagnies River and Sandspruit), of approximately the same size, located respectively in the east and west of the drainage basin, see



Phosphorus transport Berg River

TR 143 March 1989

5,9



Hean annual runoff for gauged tributaries -Fig 5.7. runoff expressed in million cubic metres per year (from Forster and van der Berg, 1985). Paarl and Wellington wastewater discharges are shown in the inset, denoted by PSTW and WSTW respectively.

#### SCALE:



5.10

Phosphorus transport Berg River

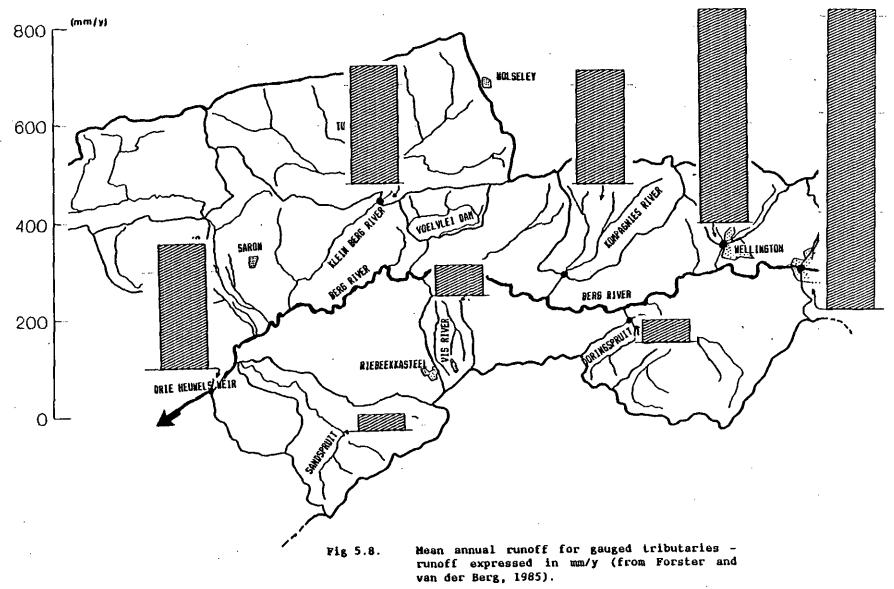
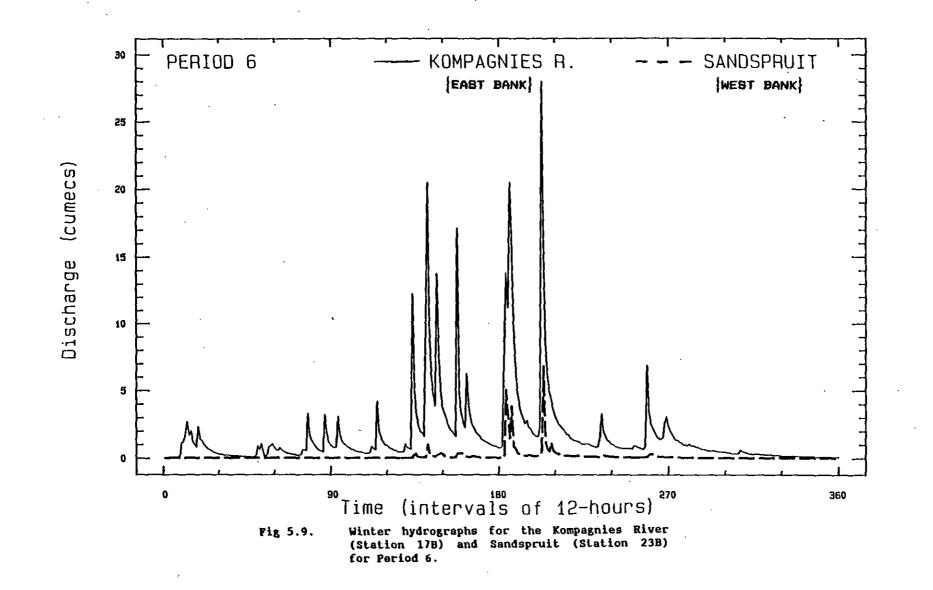


Fig 5.9. The Kompagnies River is located in mid-catchment on the east bank of the main river channel and has a total surface area of 120.9 km<sup>2</sup> (see Fig 5.7). The Sandspruit is located in the lower section of the catchment on the west bank of the main river channel and has a total area of 150.3 km<sup>2</sup>. Both subcatchments have dryland farming, but the Kompagnies also has a small percentage of the drainage area under irrigation.

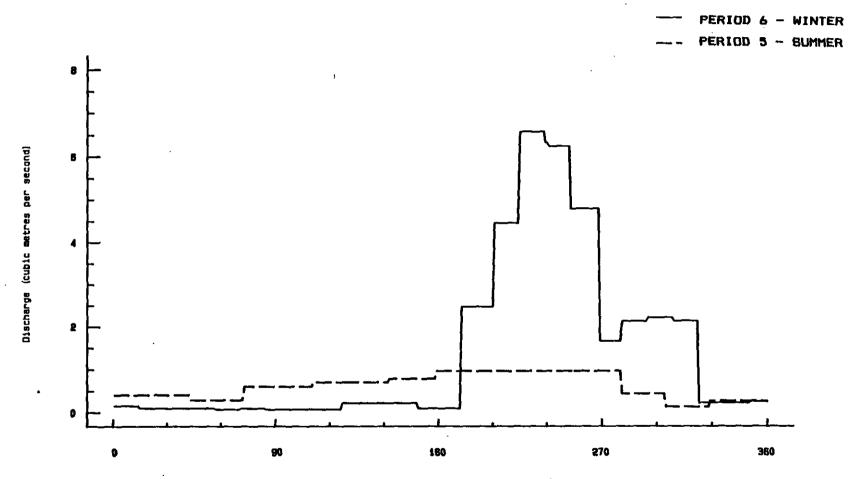
Comparison of the hydrographs shows that these tributaries not only have different yields (mm per year) but also have different runoff responses. During winter high flow period the Sandspruit shows a rapid hydrograph response with a peak discharge of 9 cumecs and a recession hydrograph limb lasting for a maximum of 6 days; baseflow during the dry spells ranges from 0 to 0.02 cumec. In contrast, the Kompagnies River has a peak discharge in excess of 25 cumecs and hydrograph recession curve lasting up to 15 days; baseflow ranges around 0.05 cumec (Fig 5.9). Other tributaries in the Berg River basin have hydrograph responses similar to the ones presented above but with some variation in runoff response caused by differences in the geology, land use, soil type, topography, climate and size of the subcatchments.

To supply irrigation water during the dry summer periods, compensation water is released from Voëlvlei Dam into the Berg River. Summer releases range from 0.2 to 1.0 cumecs. During the wet winter period water is released from Voëlvlei Dam to maintain the water level in the impoundment at an acceptable operational level. Typical hydrographs for summer and winter periods are shown in Fig 5.10.

Based on the information given above, the flow regime of the river channel between Paarl and Drie Heuwels Weir is governed by:



TR 143 March 1989



Time (intervals of 12-hours)

Fig 5.10.

Summer and winter hydrographs for the outlet canal from Voëlvlei Dam – Period 5 (summer) and Period 6 (winter).

- (1) The upstream hydrograph at Paarl.
- (2) The gauged flow inputs for point sources (municipal discharges and Voëlvlei Dam) and tributaries.
- (3) The ungauged flow inputs from tributaries and direct surface runoff.

(4) In-channel losses.

ļ

(5) Riparian abstraction.

The summation of these runoff components gives rise to steady flow conditions during the summer dry period and rapid temporal and spatial variations during the winter rainy season.

# 2 ANALYSIS OF PHOSPHORUS DATA

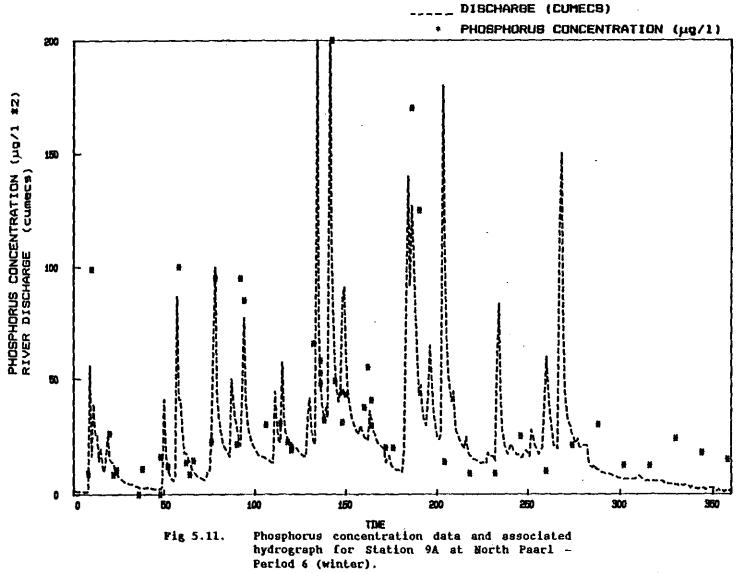
The phosphorus concentration data collected during the sampling program are presented under two headings; the phosphorus regime in the main river channel and the phosphorus regime of the lateral inputs comprising point sources (municipal and Voëlvlei Dam) and nonpoint sources (tributaries and direct runoff).

## 2.1 Main river channel

In Fig 5.11 the phosphorus concentration data and associated hydrograph are shown for the gauging station at North Paarl (Station 9A), for Period 6. During low river flows (when the flow is less than 10 cumecs) the phosphorus concentration ranges from 10 to 35  $\mu$ g/2, during high flows

Phosphorus transport Berg River

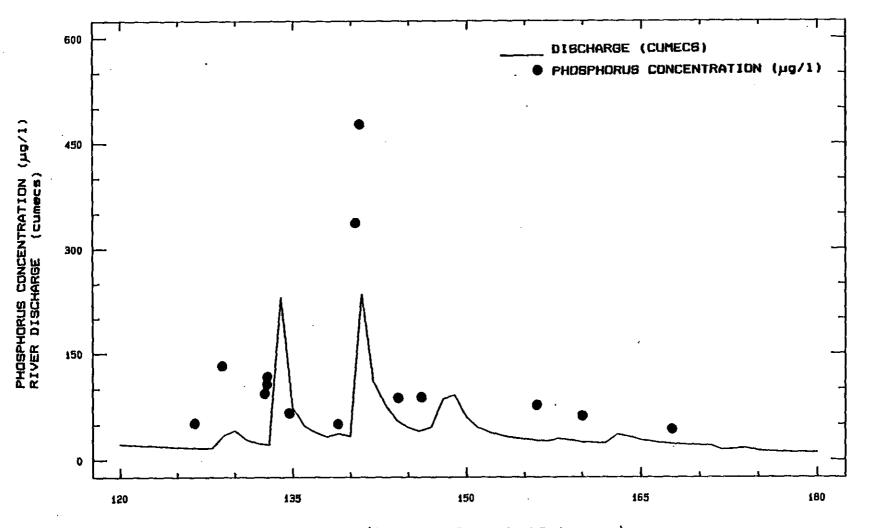
TR 143 March 1989



TR 143 March 1989

peaks of up to 700  $\mu$ g/t can be measured. The data in Fig 5.11 do not give a clear picture of the inter-relationships between the hydrograph and chemograph response during a flood event. To obtain this data two flood events were monitored with the resultant hydrograph and chemograph shown in Fig 5.12. the rising limb of a hydrograph the phosphorus During concentration increases dramatically. However, after peak flow there is a rapid reduction in the phosphorus concentration. In Fig 5.13 the phosphorus concentration data are plotted as a function of the river discharge (measured at the time of sampling). As the river discharge increases so does the phosphorus concentration, but the relationship is associated with a large amount of scattering of the data points. By plotting the phosphorus concentration data for the rising and falling limbs of the flood hydrograph it is apparent that during the rising limb of the flood hydrograph the phosphorus concentration is very much higher compared with the same discharge on the falling limb (see Fig 5.13) - a hysteresis or looped \_effect appears to be associated with the phosphorus transport from nonpoint sources. This phenomenon was also observed by Cahill et al. (1974), Johnson et al. (1976) and Zingales et al. (1984).

The measured phosphorus data collected at Paarl (Station 9A) immediately upstream of the wastewater discharges and at Lady Loch Bridge 7 km downstream (Station 13B) are shown in Fig 5.14. Comparing the individual phosphorus concentrations at Paarl with the values measured at Lady Loch Bridge (Fig 5.14) it is apparent that the effluent discharges cause an increase in the phosphorus concentration. During low flow conditions the phosphorus concentration at Lady Loch Bridge may be increased by a factor of up to 7 times the phosphorus concentration measured at Paarl. During high flow conditions (with discharges exceeding 12 cumecs) the phosphorus concentration is only



Time (intervals of 12-hours)

Fig 5.12.

Phosphorus concentration data and associated hydrograph for two flood events at Station 9A during Period 6 (winter period).

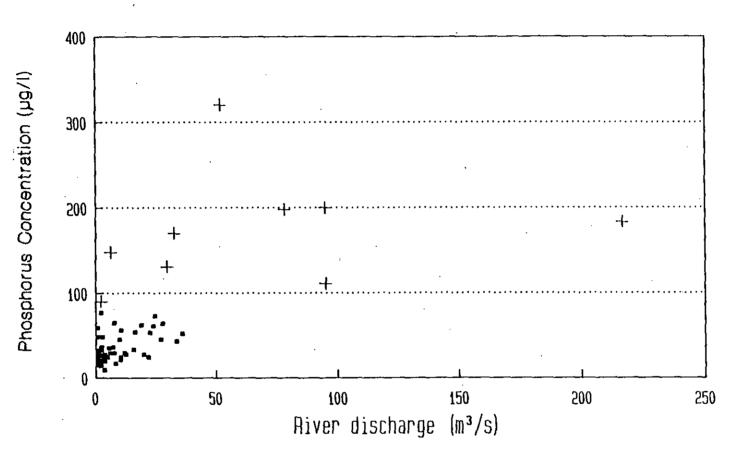
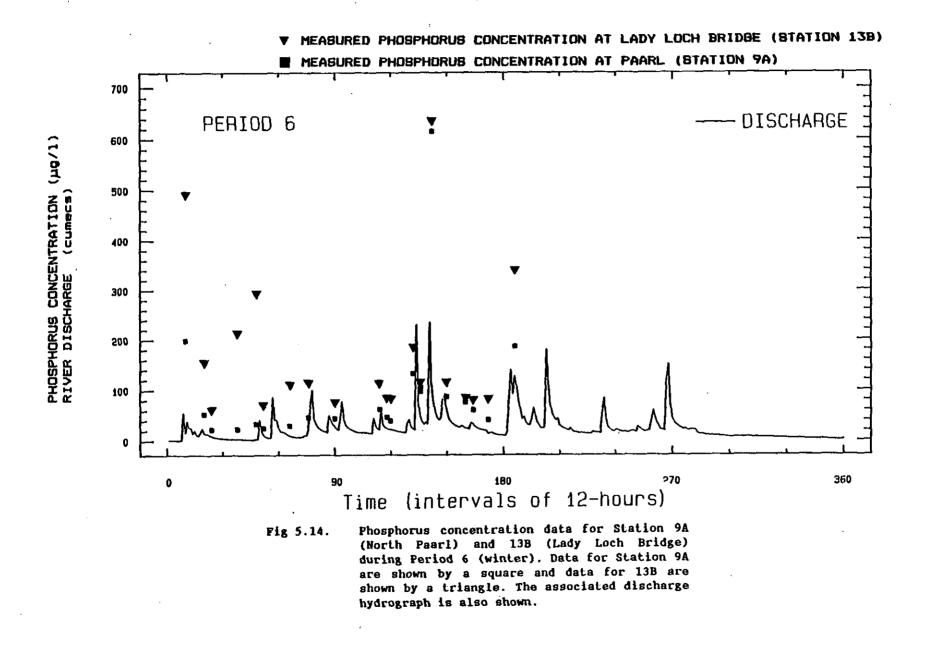


Fig 5.13. Phosphorus concentration measurements plotted versus discharge for Station 9A. Data on the rising limb of the flood hydrograph are shown by a cross and data on the falling limb by a square.

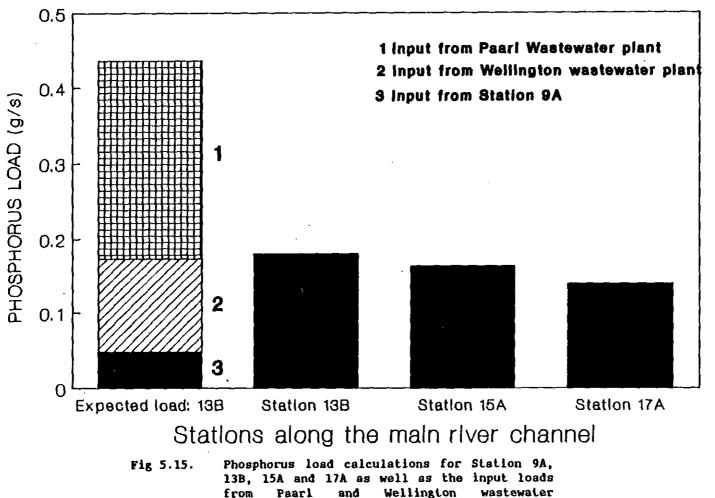


TR 143 March 1989

marginally increased at Lady Loch Bridge, by a factor of about 1.5 times. Consequently, the phosphorus concentrations at Lady Loch Bridge are directly influenced by the magnitude of the river flow and the wastewater discharges from Paarl and Wellington treatment works. However, the situation is not straightforward: forming a mass balance on the phosphorus between Paarl and Lady Loch Bridge, during low flow up to 70 percent of the phosphorus discharged from the treatment works at Paarl and Wellington did not reach Lady Loch Bridge. Also, the rate of disappearance of phosphorus appears to be higher between Paarl and Wellington than that downstream of Lady Loch Bridge (see Fig 5.15).

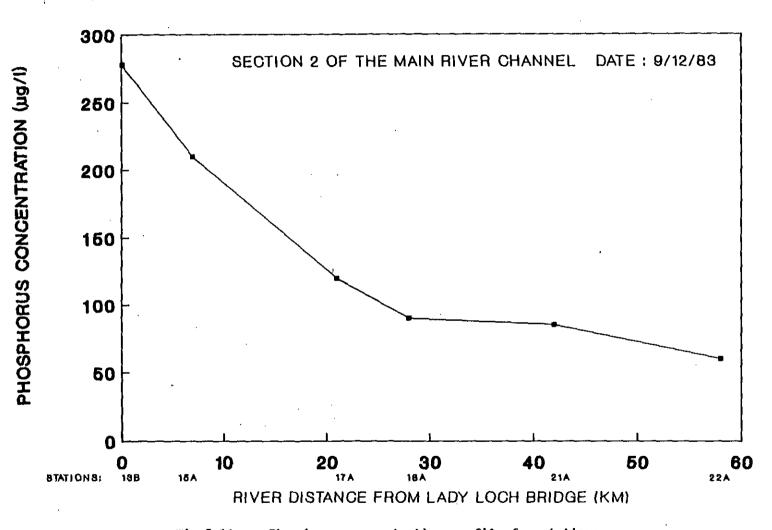
Between Lady Loch Bridge (Station 13B) and Drie Heuwels Weir (Station 23D) the phosphorus concentration profile is markedly affected by the flow conditions, for example:

- During low flow conditions there is a marked reduction in the phosphorus concentration along the main river channel (Fig 5.16).
- (2) During steady high flow conditions the phosphorus concentration is steady throughout the length of the main river channel as far as Drie Heuwels Weir (Fig 5.17).
- (3) During flood events at any specific time, there are abrupt changes in phosphorus concentration along the river channel (Fig 5.18). These are due to lateral inflows and the transient state in phosphorus concentration during the rising and falling limb of the flood hydrograph. Consequently, the phosphorus profile at any specific time will change significantly with the passage of time.



treatment works. Samples collected on 27/2/1986 during low flow conditions.

TR 143 March 1989

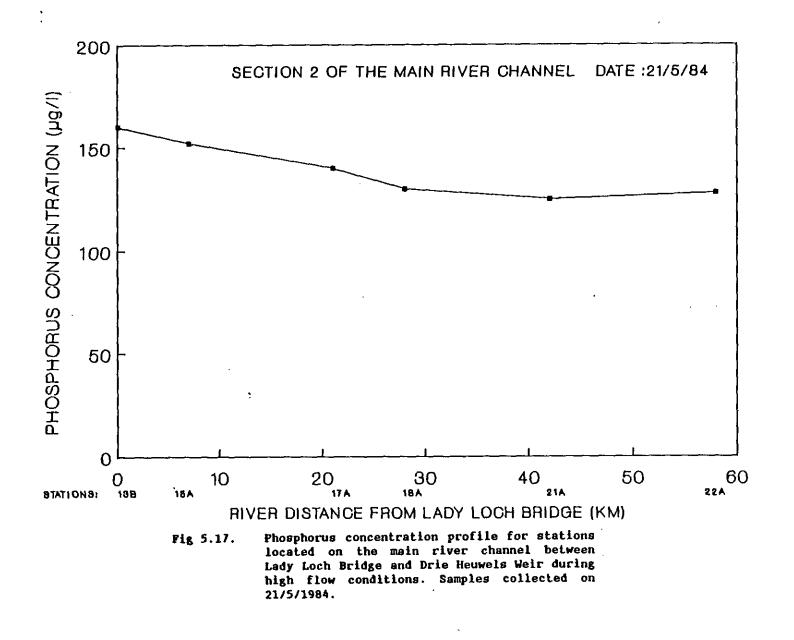




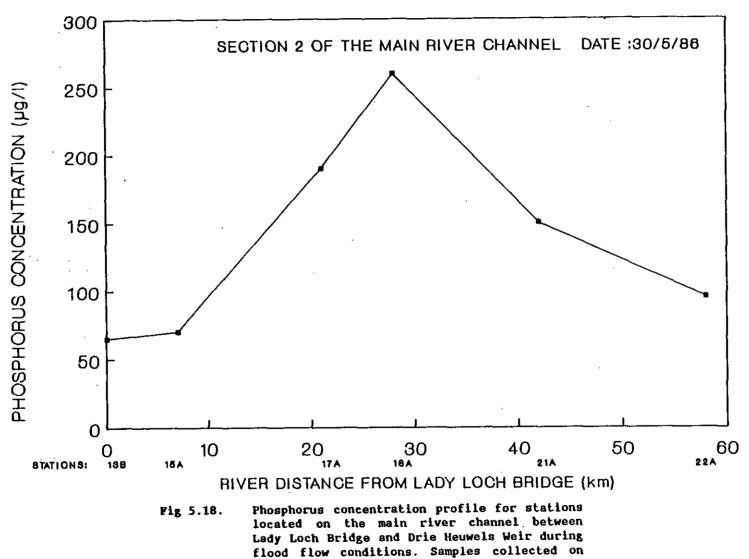
Phosphorus concentration profile for stations located on the main river channel between Lady Loch Bridge and Drie Heuwels Weir during low flow conditions. Samples collected on 9/12/1983.

TR 143 March 1989

1-



TR 143 March 1989



30/5/1986.

S

#### 5.26

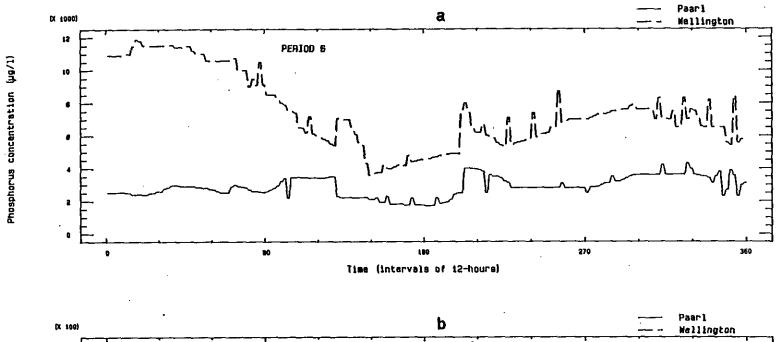
#### 2.2 Point sources

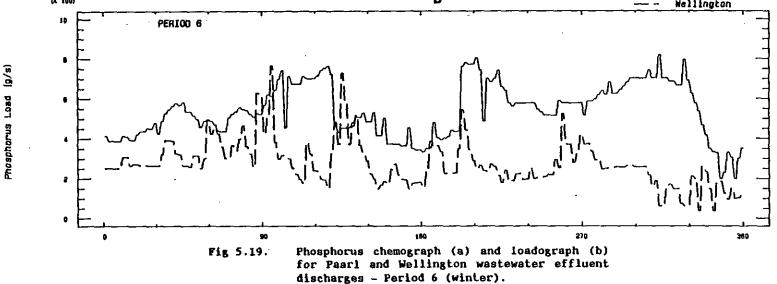
In Fig 5.6 the hydrographs and in Fig 5.19 (a) the associated phosphorus chemographs for Paarl and Wellington wastewater treatment works effluents are shown for Period 6. The phosphorus concentration from the Paarl works ranges from 1 900 to 4 500  $\mu$ g/L and from the Wellington works from 3 900 12 000 µg/%. Concentration decline with flow to increase indicates that the mass loading per dav 15 approximately constant so that with increased flow there is However there is some additional dilution effect. some phosphorus discharge during the high flow periods. This is indicated by plotting the mass of phosphorus discharged against time, see Fig 5.19 (b).

In Fig 5.20 the mass phosphorus discharged for both the Paarl and Wellington works are shown for Periods 1 to 6. The total loads over the six periods ranged from 4.2 to 11.9 tons for Paarl, and from 1.1 to 3.9 tons for Wellington. Again, during the dry periods the phosphorus loads are lower than loads discharged during the wet winter periods.

## 2.3 <u>Tributaries</u>

The phosphorus concentration data collected at discrete intervals for Stations on the Krom River (Station 14B), Kompagnies River (Station 17B), Klein Berg River (Station 23A), and Sandspruit (Station 23B) are plotted in Figs 5.21 to 5.24 respectively, together with the associated hydrograph. During conditions of baseflow, measured phosphorus concentrations ranged from 10 to 50 μg/L. In flood events, during the rising limb of the flood hydrograph the phosphorus concentrations increased and reached peaks exceeding 700  $\mu$ g/%; during the recession limb the concentration





TR 143 March 1989



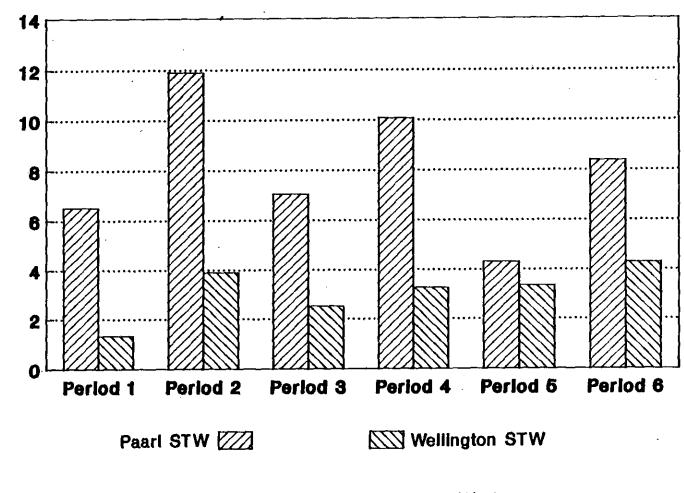
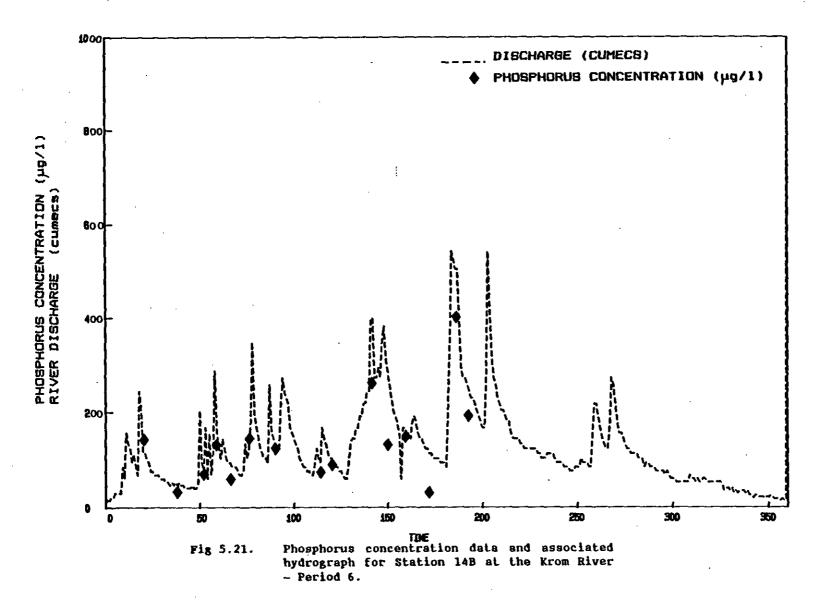
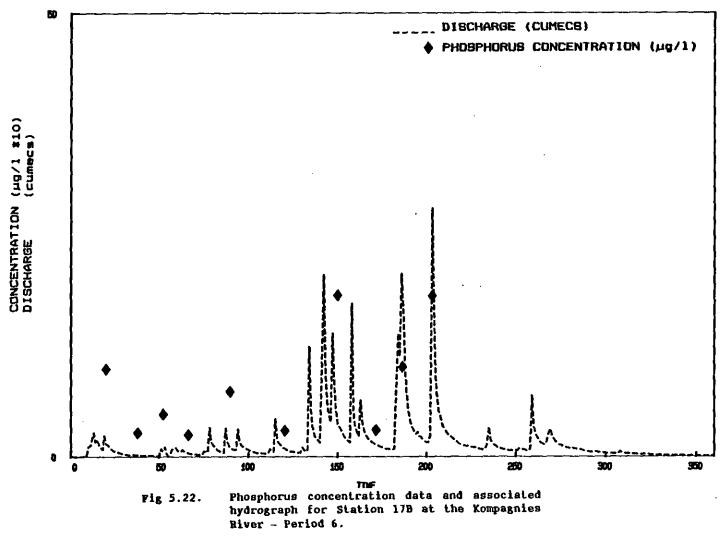


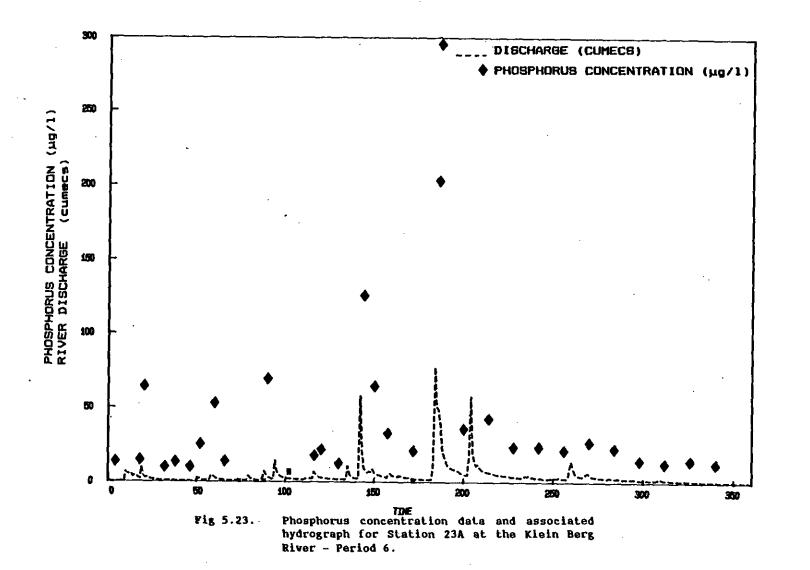
Fig 5.20. Phosphorus loadings for Paarl and Wellington wastewater effluent discharges - Periods 1 to 6. Loads expressed in tons per period of 180 days.



5.29

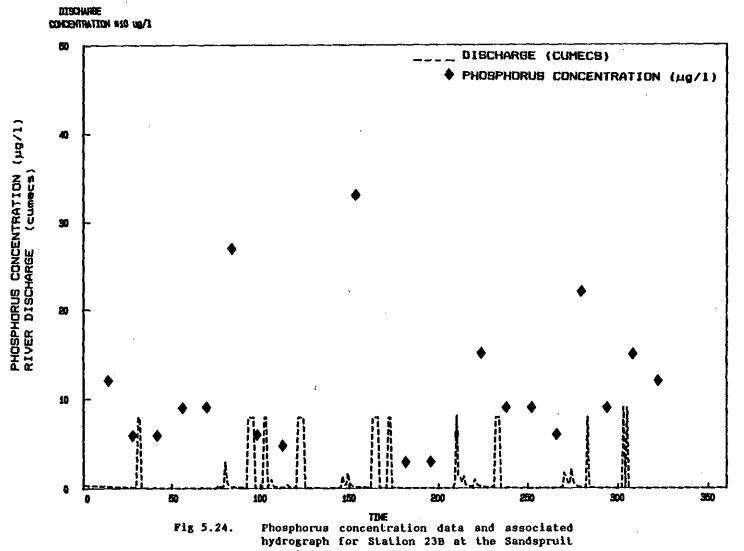
---- A -





5,31

TR 143 March 1989



- Period 2.

۰,

of phosphorus at the latter is also derived mainly from

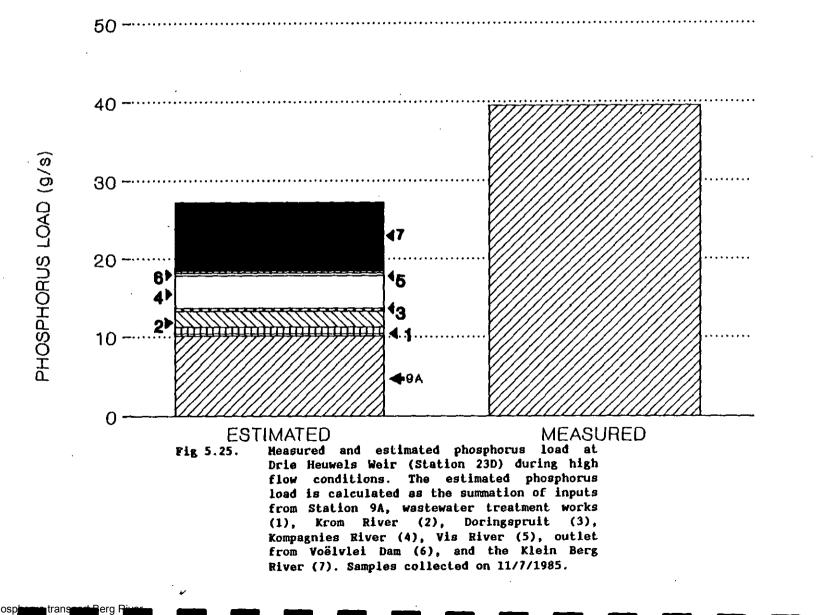
The phosphorus measurements (shown in Figs 5.11 to 5.14 and 5.21 to 5.24) are adequate to show the behaviour of phosphorus transport but inadequate to calculate accurately the mass over a given time interval, transport of phosphorus particularly during flood events. Further processing of the phosphorus data will require the development of mathematical techniques to assist in the integration of these discrete data values in order to calculate the total phosphorus load over an extended time base, see Chapter 7.

In Fig 5.25 the instantaneous phosphorus loads are calculated for one set of sampling data (collected during high river flow on 11/7/1985). The contribution of phosphorus from gauged point and nonpoint sources make up about 74 percent of the phosphorus load measured at Drie Heuwels Weir, the remaining 26 percent of the measured load contributed by inputs and scouring of the riverbed material. ungauged Consequently, the modelling of phosphorus transport behaviour in the Berg River must take particular account of the influx from point and nonpoint sources as well as phosphorus remobilization from bottom sediments.

2

to

nonpoint sources.



## 2.4 <u>River sediment samples</u>

Phosphorus bed load estimation requires the collection of sediment samples from the riverbed for the determination of:, the median particle size and the phosphorus content. Four sampling stations were chosen along the main river channel: Station 9A (the upstream point), Station 13B (point immediately downstream of the effluent discharges), Station 21A and Station 22A (the downstream point).

Two batches of samples were collected: one batch collected during the summer low flow period (Period 5), and the second batch collected during the winter high flow period (middle of Period 6). The median particle size and phosphorus content for these samples are shown in Fig 5.26. The median particle size decreases down the length of the river corresponding to the changing morphology of the riverbed substrate, from coarse material at Paarl, to fine silt material at Station 22A (70 km downstream). This corresponds to the decrease in median particle size from 0.6 mm at Paarl, to 0.35 mm at Station 22A.

The phosphorus content of the sediment samples (expressed as mg P/g of sediment) are shown in Fig 5.26, reflecting a constant value for the phosphorus concentration between individual stations and for the summer and winter periods. This information indicates that the sedimentation of phosphorus in proximity to the wastewater works and the scour of bed material during the winter storms have a minimal influence on the phosphorus content of the riverbed sediments.

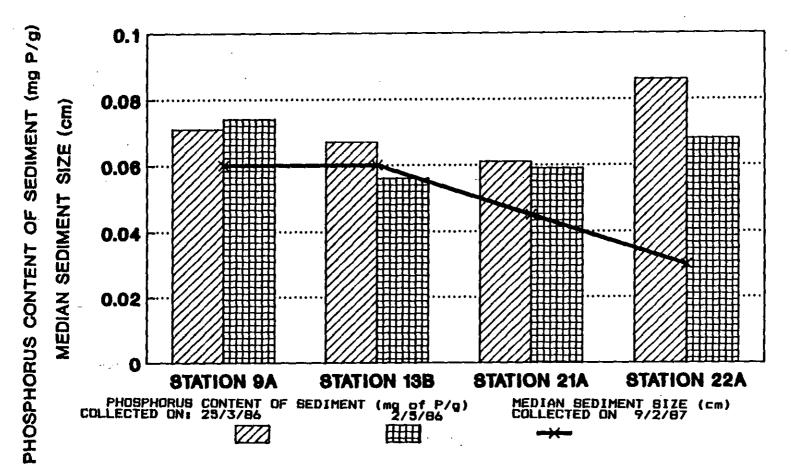


Fig 5.26. Hedian particle size and phosphorus concentration of river bed sediments collected at sampling stations located along the main river channel of the Berg River.

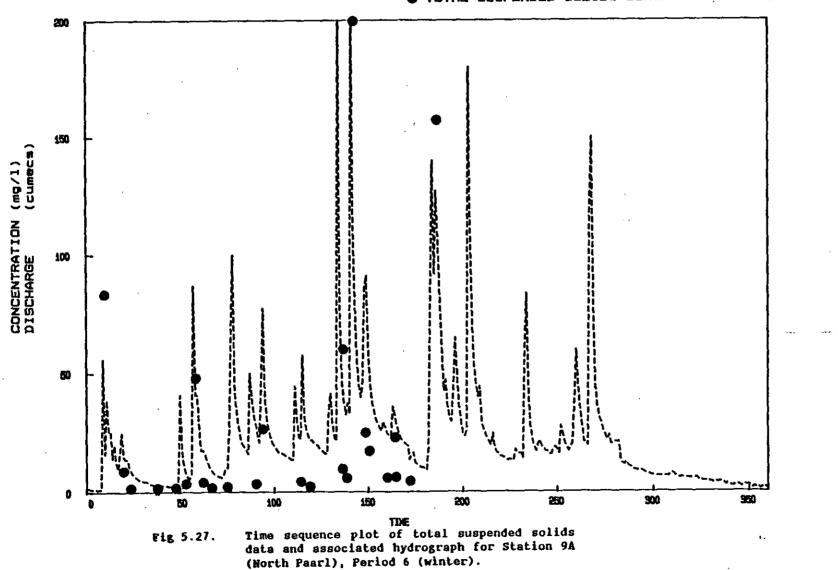
# Total suspended solids data:

Water samples were collected for total suspended solids analysis at Stations 9A. 14B. and 23D to provide some information on the relationship between the mass transport of phosphorus and wash load. In Fig 5.27 the total suspended solids (TSS) concentration data for Station 9A are shown. The peak in the TSS concentration is associated with the peak river discharge, with the concentration reducing abruptly after peak flow (Cooke, 1988; Irvine and Drake, 1987). During peak flow the maximum recorded TSS concentration is 1 700 mg/2 and during low flow the value ranges between less than 1 to 19 mg/L. In Fig 5.28 the total suspended solids concentration is plotted versus flow showing that the concentration of total suspended solids increases with flow but a wide scatter of data points is associated with the relationship. Further processing of the data shown in Fig 5.28 indicates that the suspended solids concentration is higher on the rising limb of the flood hydrograph compared with the same discharge on the falling limb (Irvine and Drake, 1987). Based on this information it is apparent that processes influencing the export of phosphorus and TSS during flood events are closely related.

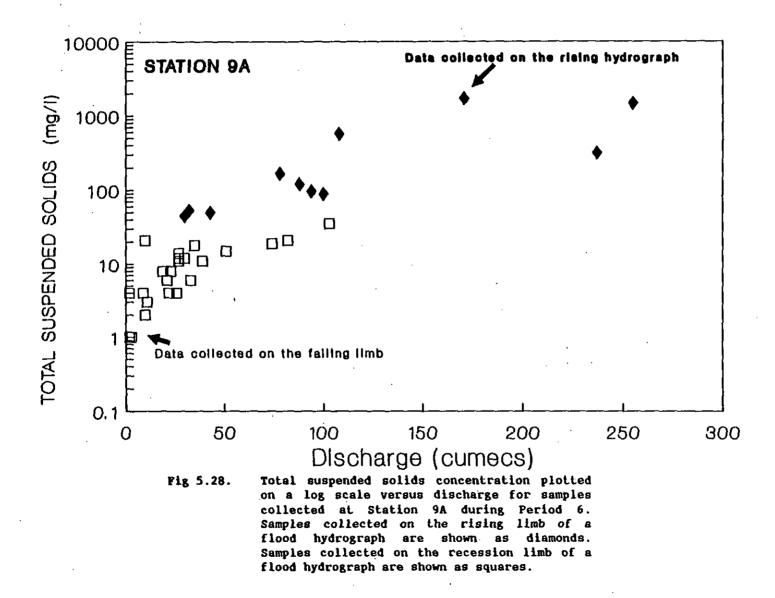
#### 3 SUMMARY

Analysis of the water quality and associated flow data provide the following information about the behaviour of phosphorus in drainage basins:

(1) In a storm event, the export of phosphorus from nonpoint sources gives rise to a higher phosphorus concentration during the rising limb of the flood hydrograph than during the recession limb; exhibiting



- - - DISCHARGE (Cumecs) • TOTAL SUBPENDED SOLIDS CONCENTRATION (mg/1)



hysteresis effect. This behaviour the so called applies to both the tributaries and the main river channel discharges. The discharge and concentration characteristics of the lateral flows therefore appear to have a significant effect on the main channel characteristics. This implies that for a reliable chemo-hydrodynamic description of the main channel discharge the lateral nonpoint hydrographs and associated phosphorus concentrations form essential inputs.

- (2) The transport of phosphorus along the main river channel is influenced by two discharge-dependent processes: removal of phosphorus from the water column and remobilization of phosphorus into the water column. During low flow, physical, chemical and biological removal of phosphorus from the water column of the river to sediments has a pronounced effect on the phosphorus concentration along the main river channel. During high flow, phosphorus is remobilized from river sediments to the water column of the river.
- (3) During low flow, the phosphorus contribution from point sources plays an important role in the phosphorus budget of the river channel; under high flow conditions the nonpoint sources dominate the phosphorus budget of the river.
- (4) In a river in which the flow pattern is dominated by flood events, because of the high phosphorus concentration transients associated with flood waves, weekly and daily sampling are inadequate to allow reliable estimates to be made on the mass of phosphorus transported. It would seem that procedures

need to be developed whereby, from continuous flow hydrograph and discrete phosphorus measurements, a continuous time series of phosphorus values can be generated, from which the phosphorus load can be estimated.

(5) For an adequate description of the phosphorus transport along the main river channel it is essential to have a hydrodynamic description of the river flow along the main river channel. Such a hydrodynamic flow model must take into account the ungauged lateral runoff as well as the influences of in-channel losses and abstractions.

In Chapters 6 and 7 the conclusions given above will be implemented to develop a hydro-phosphorus transport model.

TR 143 March 1989

5.42

**4** REFERENCES

Cahill, T.H., Imperato, P. and Verhoff, F.H. (1974) "Evaluation of phosphorus dynamics in a watershed", Am. Soc. Civ. Eng. Proc. J. Environ. Eng. Div., <u>100</u>, no. EE2, 439-458.

Cooke, J.G. (1988)

"Sources and sinks of nutrients in a New Zealand hill pasture catchment II. Phosphorus", Hydrological Processes, <u>2</u>, 123-133.

Forster, S.F. and van der Berg, E. (1985)

"The modelling of the Berg River", unpublished report, Department of Water Affairs, Pretoria, South Africa, August 1985.

Irvine, K.N. and Drake, J.J. (1987)

"Process-orientated estimation of suspended sediment concentration", Water Resour. Bull., <u>23</u>, no.6, 1017-1025.

Johnson, A.H. Bouldin, D.R., Goyette, E.A. and Hedges, A.M. (1976)

"Phosphorus loss by stream transport from a rural watershed: quantities, processes and sources", J. Environ. Qual., <u>5</u>, no.2, 148-157.

Zingales, F., Marani, A. and Bendoricchio, G. (1984)

"A conceptual model of unit-mass response function for nonpoint source pollutant runoff", Ecol. Model., <u>26</u>, 285-311.

# CHAPTER 6

6.1

# DEVELOPMENT OF HYDRODYNAMIC FLOW MODEL

# 1 INTRODUCTION

In Chapter 5, amongst the number of conclusions, there are two important ones in regard to, phosphorus export to the river channel, and phosphorus transport along the river channel;  $\underline{viz}$ .

- (1) Export of phosphorus from nonpoint sources gives rise to higher phosphorus concentrations during the rising limb than during the falling limb of the nonpoint source hydrograph, exhibiting a hysteresis effect the phosphorus export to the river channel is significantly affected by the magnitude of the flow from the nonpoint sources.
- (2) Transport of phosphorus along the river channel is influenced by removal from the water column to the channel bed and remobilization from the bed to the water column. Both processes are dependent on the magnitude of the river discharge.

The two conclusions above are sufficient to establish that the hydrodynamic flow regime in the river tributaries and the inextricably linked to the export of channe1 are river river channel and along the channel. phosphorus to the Conceptually the interaction of the flow on the phosphorus export and transport can be depicted as in Fig 6.1. The hydrodynamic behaviour is completely independent of the phosphorus transport whereas the phosphorus transport 15 heavily dependent on the hydrodynamic behaviour.

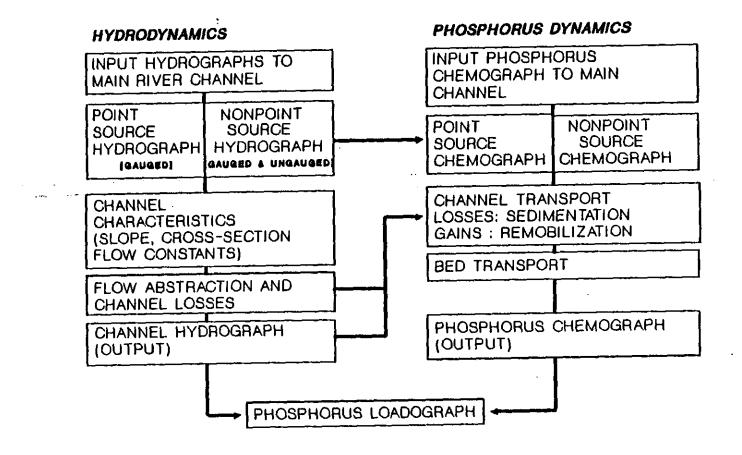


Fig 6.1. Framework showing the major processes associated with the transport of phosphorus along river channels.

ŧ

TR 143 March 1989

σ

N

In this chapter attention will be focused on the hydrodynamic description; in Chapter 7 the phosphorus transport aspect will be addressed.

## 2 MODEL SELECTION

The basic mathematical model describing the flow in open channels is that due to Saint-Venant, in which he derived two equations, the continuity and momentum equations, to describe the movement of water along a channel. The continuity equation is

```
p = t6 A6 + x6 Q6
```

. (6.1)

where

| z | flow cross sectional area (m <sup>2</sup> ), |  |  |  |
|---|--|--|--|--|
| = | discharge (cumecs),                          |  |  |  |
| 3 | lateral discharge per unit length of channel |  |  |  |
|   | (cumecs/m),                                  |  |  |  |
| 2 | time (s), and                                |  |  |  |
| = | distance (m).                                |  |  |  |
|   | 2  |  |  |  |

Equation (6.1) has two unknowns A and Q and hence a second independent equation is required to obtain a solution. This equation is derived considering the energy relationships in a small segment of the channel length, dx, and leads to the momentum equation, Eq (6.2).

So - Se = v/g av/ax + 1/g av/at + ay/ax

.. (6.2)

where

| So | = | bed slope,           |
|----|---|----------------------|
| Se | = | energy slope,        |
| V  | = | flow velocity (m/s), |
|    |   |                      |

g = acceleration due to gravity (m/s<sup>2</sup>),

y = depth of flow (m).

The terms in the left hand side of Eq (6.2) represent the bed and energy slopes, and those on the right-hand side the convective and local accelerations and pressure head, respectively.

6.4

As yet the model proposed by Saint-Venant <u>per se</u> has found little practical application because of the difficulties in describing the boundary conditions. As a consequence various simplifications have been proposed to the momentum equation, by neglecting certain terms, or indeed, replacing the momentum equation by another that indirectly includes the energy effects. These simplified models have the advantages that the boundary effects can be accounted for by calibration (to a greater or lesser degree) and the solution procedures are easier. The simplified models of course have the disadvantages that the simulation can reproduce the observed behaviour only approximately depending on the simplification, and with each set of simplifications the range of problems that can be resolved is restricted.

A number of simplified models have been published in the literature to suit specific classes of problems, see Table 6.1. These models often are accompanied by suggested numerical techniques to obtain solutions. In selecting a model it is essential to take cognizance of (1) the model requirements <u>viz</u>. boundary conditions, channel description and (2) the desired

outputs. Considering (2) the output should be a reasonable description of the channel hydrograph at any selected point along the main river channel; this is necessary because we shall show in Chapter 7 that the phosphorus chemograph is implicitly linked to the flow hydrograph. With regard to (1) from practical limitations, channel description is possible only in the crudest terms - the momentum equation needs to be replaced by a velocity or discharge equation of the simplest form in which the "constants" defining the velocity or discharge can be readily estimated in the field.

| Model:                          | Author:                   | Year:          |
|---------------------------------|---------------------------|----------------|
| Implicit dynamic routing        | Fread                     | (1973)         |
| Kinematic wave<br>approximation | Li, Simons and Stevens    | (1975)         |
| Kinematic wave<br>approximation | L1                        | (1979)         |
| Diffusion and<br>kinematic wave | Weinmann and Laurenson    | (1979)         |
| Linear reservoirs               | Ponce                     | (1980)         |
| Convection-diffusion            | Koussis                   | (1980)         |
| Diffusion-wave                  | Akan and Yen              | <b>(1981</b> ) |
| Advection-dispersion            | Koussis, Saenz and Tollis | (1983          |
| Nonlinear Routing               | Bates and Pilgrim         | (1985          |

Table 6.1 List of hydrodynamic models investigated.

In selecting a model the complexity of the model must be balanced by the required output and the input data that are available; these were the considerations that entered in the selection of the model proposed by Li <u>et al</u>. (1975), from the number of models examined (shown in Table 6.1) Li <u>et al</u>. (1975) replace the momentum equation by

 $A = \alpha Q^{\beta} \qquad \dots \qquad (6.3)$ 

where  $\alpha$  and  $\beta$  are constants.

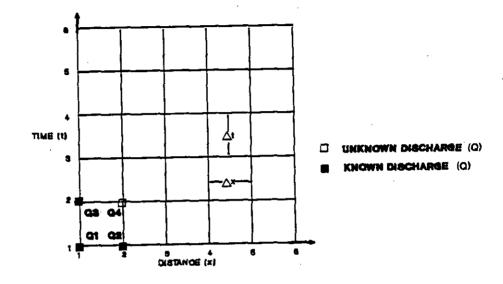
Some of the other models also may have served our purpose, but the practicality with which this model could be calibrated from available data and its ability to give reasonable simulation of the observed behaviour, justified its selection.

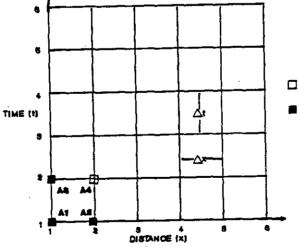
3 NUMERICAL SOLUTION

The model proposed by Li <u>et al</u>. (1975) uses a four-point implicit solution scheme with a rectangular x-t grid using the discharge values of three points (Q1, Q2 and Q3) to determine the fourth unknown discharge (Q4). In Fig 6.2 the rectangular x-t grid is shown. For convenience, the increment of time, At, is usually taken as constant, however, the river distance,  $\Delta x$ , may vary between grid points. Equation (6.1) is written in finite difference form to give

 $[(Q4-Q3)/\Delta x(1-a) + (Q2-Q1)/\Delta x(a)] + [(A4-A2)/\Delta t(1-b) + (A3-A1)/\Delta t(b)] = 0.5[(1-b)q4 + b q3 + (1-b)q2 + b q1]$ 

..... (6.4)







KNOWN FLOW AREA (A)



Rectangular x-t grid showing spatial and temporal discharge and flow cross-sectional area relations. where

a = the time-weighting factor, and
b = the space weighting factor.

Converting the discharge, Q, to cross sectional area, A, using Eq (6.3) we obtain

The right-hand side of Eq (6.5) contains only known quantities, which for convenience are represented by  $\Omega$ .

where

$$\Omega = \Delta t / \Delta x [Q3(1-a) - (Q2-Q1)(a)] + [\alpha Q2^{\beta}(1-b) - (\alpha Q3^{\beta} - \alpha Q1^{\beta})(b)] + [0.5 \ \Lambda t [(1-b)q4 + b q3 + (1-b) q2 + bq1] ..... (6.6)$$

let  $\theta = \Delta t / \Delta x$  and  $\tau = Q4$ .

then the left-hand side of Eq (6.5) can be written as

$$f(\tau) = \Theta(1-a)\tau + \alpha(1-b)\tau^{\beta}$$
 ..... (5.7)

The solution to Eq (6.5) is the solution,  $\tau^*$ , which satisfies the condition

$$f(\tau^*) = \Theta(1-a)\tau^* + \alpha(1-b)\tau^*^B = \Omega$$
 ..... (6.8)

Equation (6.8) is nonlinear in  $\tau^*$  and is solved using an iterative technique. Let  $\tau^{\kappa}$  be the value of  $\tau$  at the  $\kappa^{\text{th}}$  iteration. The Taylor series expansion of the function  $f(\tau)$  around  $\tau^{\kappa}$  is

$$f(\tau) = f(\tau^{\kappa}) + (\tau - \tau^{\kappa}) f'(\tau^{\kappa}) + \frac{1}{2} (\tau - \tau^{\kappa})^{2} f''(\tau^{\kappa}) + \frac{1}{6} (\tau - \tau^{\kappa})^{3} f'''(\tau^{\kappa}) + \dots - \dots$$

..... (6.9)

in which  $f'(\tau^{\kappa})$ ,  $f''(\tau^{\kappa})$  and  $f'''(\tau^{\kappa})$  are the first, second and third derivatives of the function at  $\tau^{\kappa}$ . Dropping terms higher than third order one obtains

 $f(\tau) \simeq f(\tau^{\kappa}) + (\tau - \tau^{\kappa}) f'(\tau^{\kappa}) + \frac{1}{2(\tau - \tau^{\kappa})^2} f''(\tau^{\kappa})$ 

.... (6.10)

Iteration forces  $f(\tau^{\kappa+1})$  to approach the value

$$\Omega = f(\tau^{\kappa}) + (\tau^{\kappa+1} - \tau^{\kappa})f'(\tau^{\kappa}) + 0.5(\tau^{\kappa+1} - \tau^{\kappa})^2 f''(\tau^{\kappa})$$

(6.11)

The solution of Eq (6.11) is

$$\mathbf{x}^{\kappa+1} = \mathbf{x} - \frac{f'(\tau)}{\kappa} + \left[ \begin{cases} \frac{f'(\tau)}{\kappa} \\ f''(\tau) \end{cases} - \frac{2[f(\tau) - \Omega]}{\kappa} \end{bmatrix}_{(\kappa)} - \frac{2[f(\tau) - \Omega]}{\kappa} \end{bmatrix}_{(\kappa)}$$
(6.12)

where

$$f(\tau^{\kappa}) = \theta(1-a)\tau^{\kappa} + \alpha(1-b)(\tau^{\kappa})^{\beta}$$
..... (6.13)
$$f'(\tau^{\kappa}) = \theta(1-a) + \alpha\beta(1-b)(\tau^{\kappa})^{\beta-1}$$
..... (6.14)

$$f''(\tau^{\kappa}) = \alpha\beta(\beta-1)(1-b)(\tau^{\kappa})^{\beta-2} \qquad (6.15)$$

The iteration is stopped when the difference between the left-hand side and right-hand side is less than a selected tolerance e.g.  $\epsilon$ <0.01 $\Omega$  when

$$|f(\tau^{\kappa+1}) - \Omega| \leq c$$
 ..... (6.16)

# 3.1 Solution initiation

The key to rapid convergence is the choice of the initial value for Q4. This is best achieved using a linear scheme to obtain the first approximation.

In the mass continuity equation, Eq (6.1), write  $\partial A/\partial t = (\partial A/\partial Q)(\partial Q/\partial t)$  ..... (6.17) From Eq (6.3) we get  $\partial A/\partial Q = \alpha \beta Q^{\beta-1}$  ..... (6.18) Substitution of Eqs (6.17 and 6.18) into Eq (6.1) yields  $q = \partial Q/\partial x + \alpha \beta Q^{\beta-1} \partial Q/\partial t$  ..... (6.19) The finite difference form of Eq (6.19) is as follows  $(Q4-Q3)/\Delta x(1-a) + (Q2-Q1)/\Delta x(a) + \alpha \beta [(Q3 + Q2)/2]^{\beta-1} [(Q4-Q2)/\Delta t(1-b) + (Q3-Q1)/\Delta t(b)]$  $= \frac{1}{2}[(1-b)q4 + b q3 + (1-b)q2 + b q1]$  ..... (6.20)

where 
$$\tau o = 04$$
 and solving for  $\tau o$  gives

$$\pi \sigma = \left[ (1-a)/\Delta x + \alpha \beta \frac{(Q3+Q2)}{2}^{B-1} (1-b)/\Delta t \right]^{-1}$$

$$Q3/\Delta x(1-a) - (Q2-Q1)/\Delta x(a) - \alpha \beta \left[ (Q3+Q2)/2 \right]^{B-1}$$

$$\left[ Q2/\Delta t(1-b) + (Q3-Q1)/\Delta t(b) \right] + \frac{1}{2} \left[ (1-b)q4 + b q3 + (1-b) q2 + b q1 \right]$$

.. (6.21)

This solution is employed in the computer program, QMODEL, nich simulates the flow hydrographs at discrete points along ne main river channel of the Berg River, see Appendix 2.

#### TR 143 March 1989

6.12

## 4 MODEL CALIBRATION

# 4.1 <u>Calibration strategy</u>

The following is an outline of the scheme to calibrate the model. The sequence below should, in the main, serve for calibration of the model for other river channels.

(1) Calibration period:

The calibration period should span an annual cycle of flow for which the maximum amount of information has been obtained.

(2) Upstream and downstream hydrographs:

Of the greatest importance is the availability of accurate upstream and downstream hydrographs taken over the same period. This requirement is definitive, without it no reliable calibration is possible. It is essential therefore that the gauging weirs at these two locations are accurate over the full range of flows to be simulated.

(3) Division of the main river channel into sub-reaches:

Although the sub-reaches may be equal in length, it is more likely that each reach will have a different length. This is because the points of division are usually determined by the location of water quality sampling stations. (4) Lateral inflow hydrographs observed over the same period as in (2) above and their location along the main river channel:

It is unlikely that a complete set of such measurements will be available i.e. the availability may range from nothing to near 100 percent. The more complete the information on lateral inflow data the more reliable the simulation. Even if no lateral inflow data are available, providing the upstream and downstream hydrographs are accurate, it is possible to make an estimation of a "lumped" lateral discharge hydrograph by repeated trials using the upstream hydrograph with trial lateral discharge hydrographs until the observed downstream hydrograph is simulated correctly.

Where there are gauged tributaries more or less evenly spaced along the channel with at least one gauging weir in each sub-reach, it may be possible to estimate the ungauged hydrograph for each sub-reach by multiplying the gauged hydrograph by the ratio of the ungauged runoff area to the gauged area for the respective sub-reaches, see Section 4.2.

(5) Estimation of the coefficients a and B in Eqs (6.4 to 6.8, 6.20 and 6.21) for each sub-reach:

These values are determined from field measurements of the flow cross sectional area (A) at the corresponding flow (Q) over a range of discharges (see Section 4.2). If a sub-reach is ungauged, Q will have to be estimated by manual methods (see Chapter 4, Section 3.4).

(6) Estimation of the weighting factors a and b, in Eqs (6.4 to 6.8, 6.20 and 6.21):

These factors are components of the numerical scheme itself. Li (1979) states that these must have numerical values between 0 and 0.5, to ensure stability in the numerical scheme. From trial simulations it would appear that the influence of these weighting factors on the simulated channel hydrograph are not marked and values of a=0.4 and b=0.3, seem adequate (see Section 4.2).

(7) Lateral outflows:

Data on channel seepage losses are, as a result of their not directly measurable. insidious nature. Data ΟЛ abstractions are seldom reliable. Usually lateral outflow data are either unreliable or not available. However, lateral losses are significant only during low flow periods. These are also the times when the magnitude of the lateral losses can be assessed most readily, providing the upstream and downstream hydrographs and estimates of the lateral inflows during these periods, are available. By performing repeated simulations for the low flow periods and by incorporating different outflow rates per sub-reach, the rate that allows the closest correspondence between the observed and simulated downstream hydrograph, forms an estimate of loss/abstraction the seepage rates (see Section 4.2).

### 4.2 Calibration of the Berg River hydrodynamic model

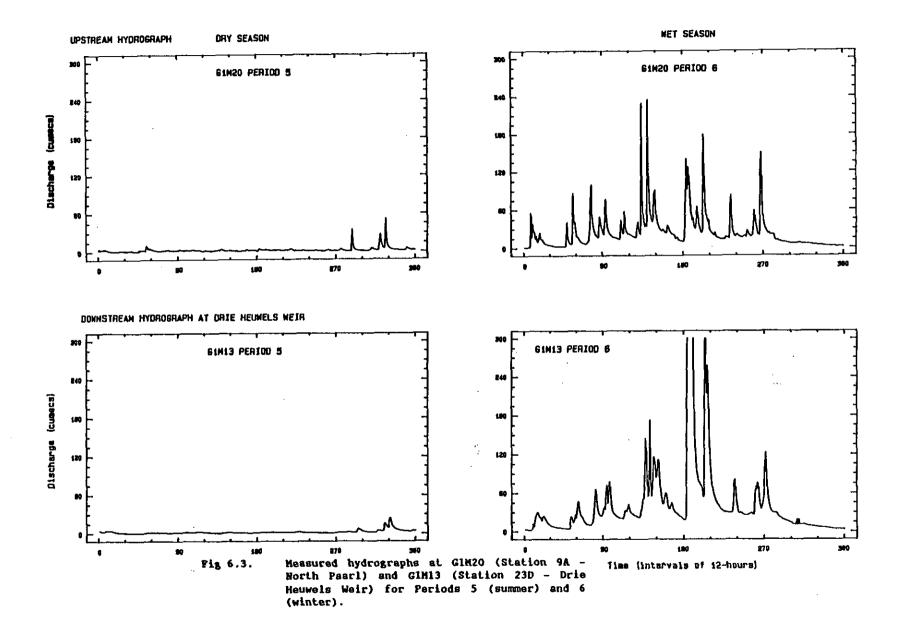
In this section the calibration of the hydrodynamic model for the Berg River will be set out in detail, following the calibration strategy outlined above.

### (1) Calibration period:

Two consecutive 180-day periods were used to calibrate the model: Period 5 (November 1985 to 1986) and Period 6 (May 1986 to November 1986). These two periods span the third hydrologic year in this investigation. Bue to the experience gained in collecting data during the previous two cycles, the data in the third year are the most comprehensive.

(2) Upper and lower channel hydrographs:

The upper and lower hydrographs, forming the boundary hydrographs for the channel length being modelled, are located at gauging weirs GIM20 and GIM13 (see Fig 6.3). It was mentioned in Section 4.1 that a prime requirement for calibration of the model is that the gauging weirs at the upper and lower ends are accurate. At the time this investigation was commenced (November 1983) the accuracies of these weirs were estimated to be + 5 percent at low flow and + 10 percent at high flow (Pers. Comm. van Wyk, 1988). the time before these estimates refer to However. Misverstand Diversion Weir was constructed in 1977. The gauging weir at Drie Heuwels, a sharp crested weir, lies about 17 km upstream of Misverstand Weir. The height of the weir wall above bed level is 5 m. The mean bed slope between Misverstand and Drie Heuwels is about 1:3000, thus the sharp crest level of the gauging weir is about 1.50 m above the flood crest level of the Misverstand Weir, see Fig 6.4.



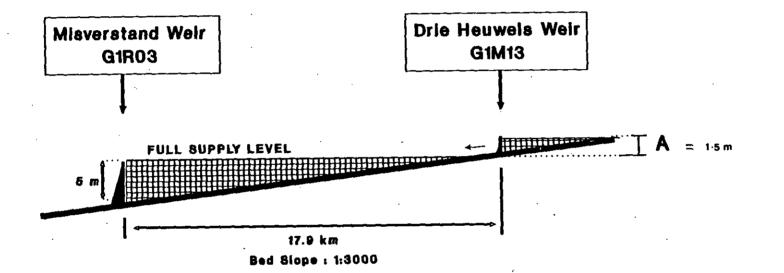


Fig 6.4. Schematic diagram of the relationship between full supply level of the impounded water at Misverstand Weir (GIRO3) and the gauging weir at Drie Heuwels (GIM13). The term "A" represents the difference in level between full supply at Misverstand and the gauging weir crest at Drie Heuwels.

Calculation of the backwater curves from Misverstand, at different flow rates in the river, indicate that above flows of about 120 to 150 cumecs the back-water curve is likely to interfere with the calibration of Drie Heuwels Weir. see Fig 6.4 (Pers. Comm. Rowlston, 1988). The interference effect will be even greater should (1) a flood discharge occur in the Matjies River (6 km downstream of Drie Heuwels Weir) at the same time as a flood in the main river channel and (11) over-bank flow occur in the main river channel downstream of the weir during high flows. These effects will result in the backwater curve rising even higher. In Figs 6.5 and 6.6 the Drie Heuwels Weir is shown under low and high flows respectively. The drowned state of the gauging weir is readily apparent in Fig 6.6. at the rated discharge of 200 cumecs (stage head of 2.5 m); there is no free fall or indeed, any indication of the weir itself, apart from the stilling-well and gauging hut! Thus, the rating curve for Drie Heuwels Weir is likely to be unreliable for rated discharges 10 excess of about 120 cumecs.

The hydrographs over the calibration period for the gauging weir, G1M2O, and Drie Heuwels Weir, G1M13, are shown in Fig 6.3. The discharge at Drie Heuwels Weir include the unreliable discharges greater than 120 cumecs.

(3) Sub-reach divisions:

The intention was to have water quality stations every ten to fifteen kilometres; within this range the exact locations of the sampling stations were fixed virtually totally by ease of access. The location of these stations define the divisions between the sub-reaches, as shown in Fig 6.7.

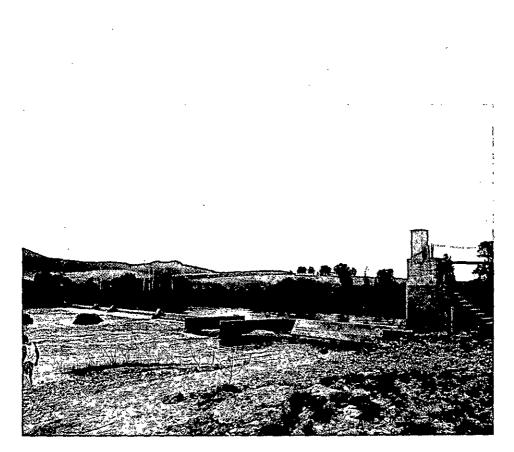
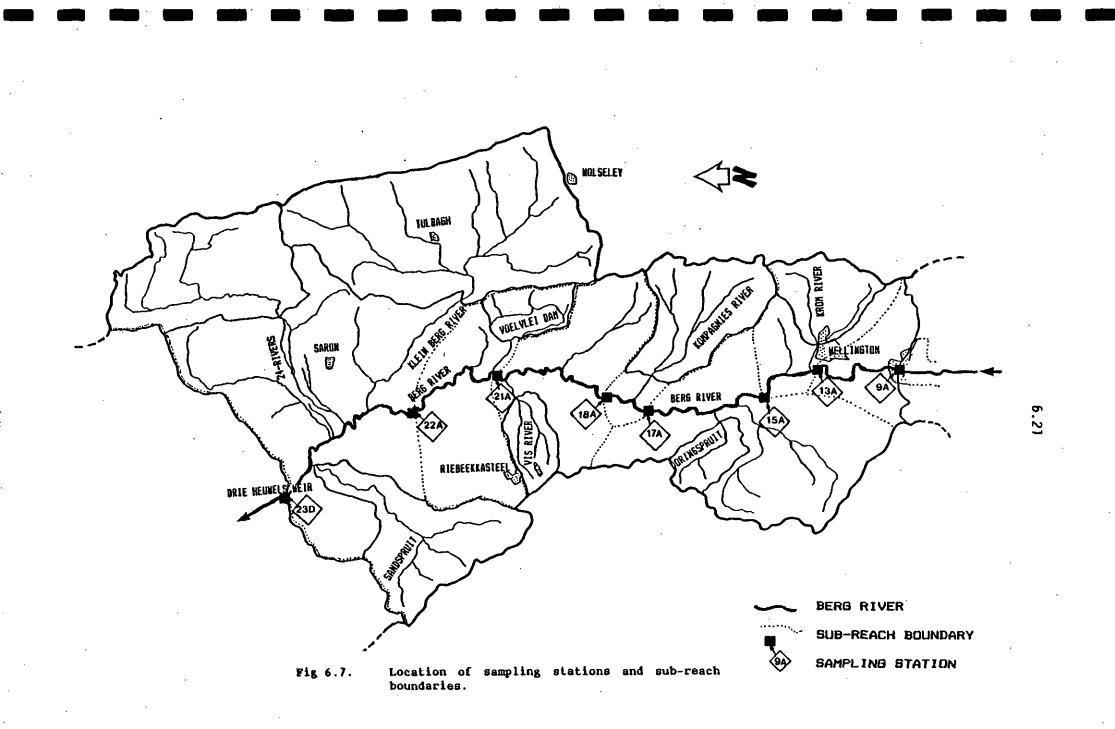


Fig. 6.5 Drie Heuwels Weir during summer low flow.



Fig. 6.6 Drie Heuwels Weir during Winter flood flow, note total submergence of weir.



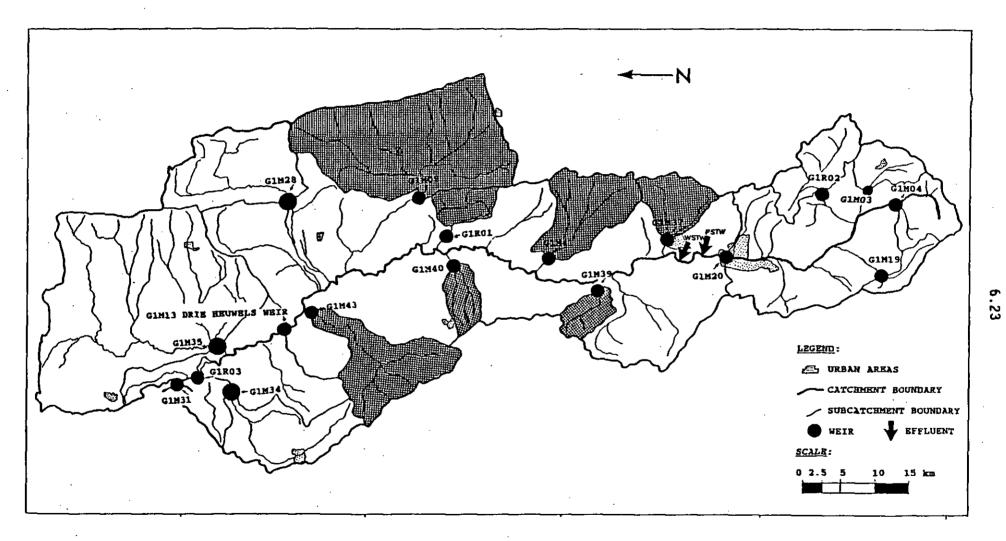
(4) Lateral inflows to the main river channel:

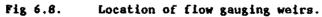
Gauged lateral hydrographs are available at six gauging stations on tributaries in the catchment (Stations G1M37, G1M41, G1M40, G1M08, G1M43); two gauging weirs G1M39. record effluent outfall hydrographs from the Paarl and Wellington sewage treatment works, respectively (Stations PSTW and WSTW); a gauging weir measures the dam release from Voëlvlei (Station GIROIC). The location of gauging weirs are shown in Fig 6.8. The hydrographs for each gauged effluent tributary. discharges from Paar] and from Wellington and release from Voëlvlet Dam are shown in Figs 6.9 and 6.10.

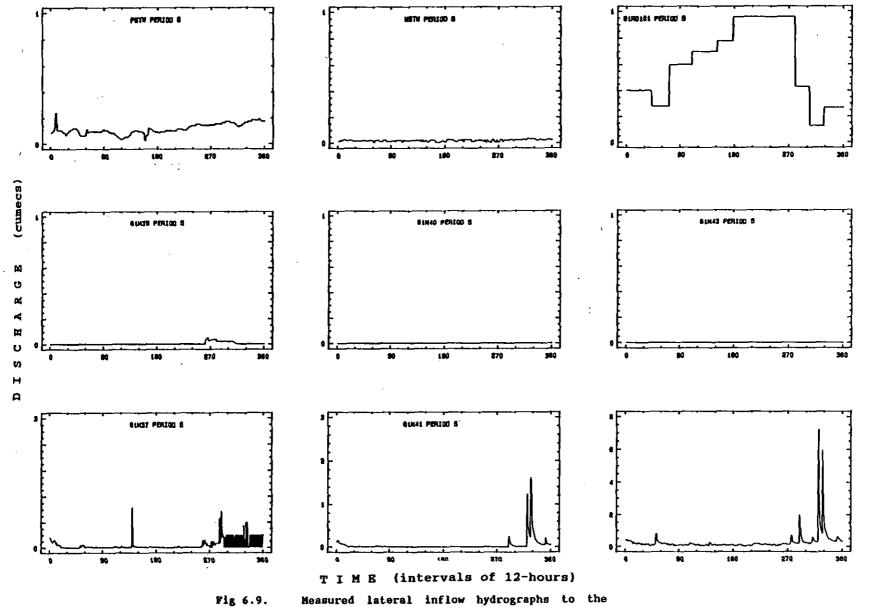
With regard to ungauged lateral inflows, these were estimated as follows: The gauged tributaries and their Fig associated drainage areas are shown in. 6.11. Approximately 60 percent of the total drainage area between Paarl (gauging Station G1M20) and Drie Heuwels Weir (Station GIMI3) is ungauged. However, the gauged drainage areas are relatively evenly spaced down the east and west banks of the river. Hence, the simplest method to obtain estimates of the ungauged hydrographs for each sub-reach was adopted. This method is described as follows:

- (i) On a topographical map, mark-out the drainage areas of each sub-reach on the east and west banks of the main river channel.
- (11) For each sub-reach on the east and west banks respectively, determine the gauged drainage area and the ungauged area (see Table 6.2). The discharge from the ungauged areas is given by the hydrograph for the gauged area times the ungauged area divided by the gauged area (see Table 6.3). Calculations shown in Table 6.3 are performed using the program LATERL12, see Appendix 2.

Phosphorus transport Berg River



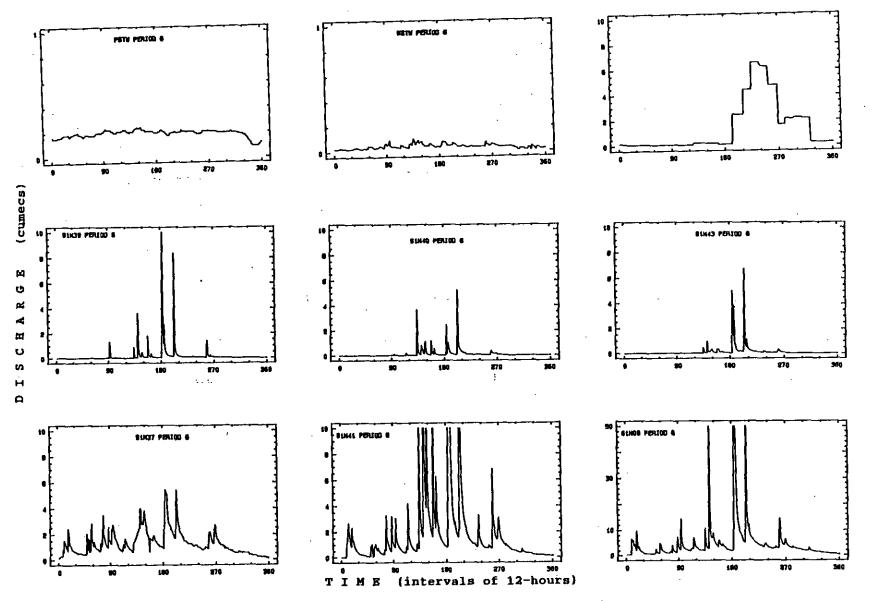




main river channel - Period 5 (summer).

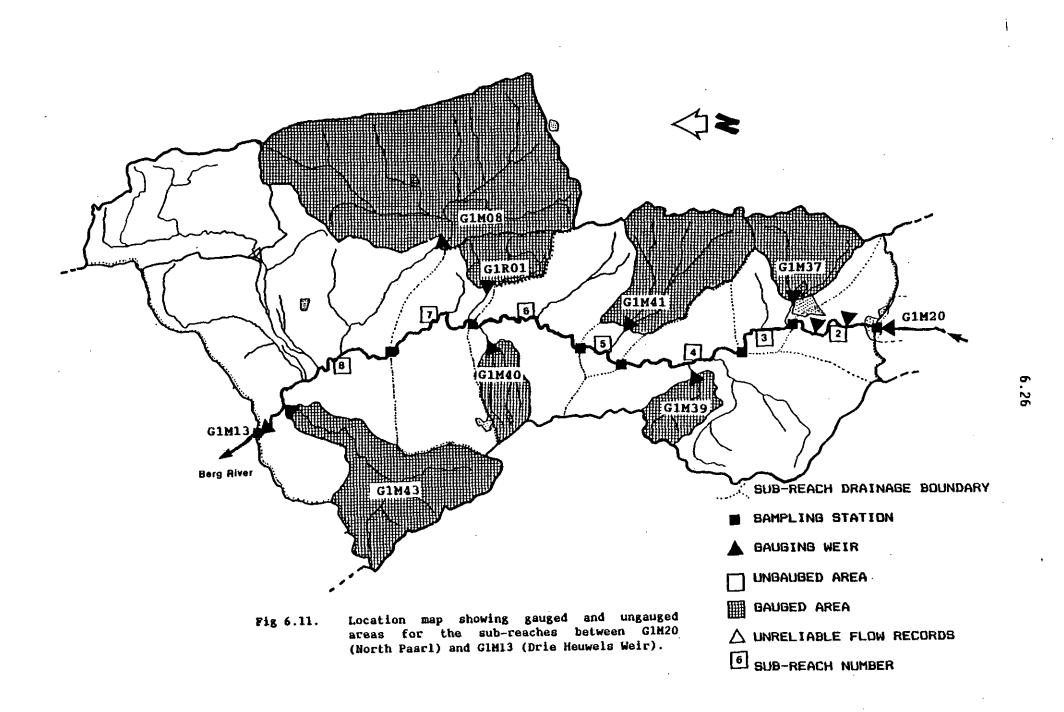
TR 143 March 1989

6.24





Measured lateral inflow hydrographs to the main river channel - Period 6 (winter).



### Phosphorus transport Berg River

| Bank:      | Gauged: |       | Ungauged: |      |
|------------|---------|-------|-----------|------|
| Sub-reach: | West:   | East: | West:     | East |
| 2          |         |       |           | 59   |
| 2 .<br>3   | -       | 52    | -         | 96   |
| <b>4</b> · | 37      | -     | 225       | 40   |
| 5          | -       | 120   |           | 28   |
| 6          | 39      | -     | 72        | 92   |
| 7          |         | 25    | •         | 168  |
| 8          | 147     | 389   | 145       | 314  |

Table 6.2 Area of gauged and ungauged catchment within each sub-reach drainage area, given in  $km^2$ , see Fig 6.7.

of lateral inflow to each Table 6.3 Determination sub-reach of the main river channel between Paarl and Drie Heuwels Weir. The lateral inflow is calculated as the sum of: (i) the gauged drainage i.e. GIM37, and (ii) ungauged drainage i.e. G1M37\*96/52, calculated from the gauged hydrograph, G1M37, times the ungauged area  $(96 \text{ km}^2)$ divided the gauged area by (52 km<sup>2</sup>).

| Bank:<br>Sub-reach: | West:                 | East:                   |
|---------------------|-----------------------|-------------------------|
| 2                   | -                     | PSTW+WSTW+(G1M37*59/52) |
| 3                   | -                     | G1M37+(G1M37*96/52)     |
| 4                   | G1M39+(G1M39*225/37)  | (G1M41*40/120)          |
| 5                   | -                     | G1M41*(G1M41*28/120)    |
| 6                   | G1M40+(G1M40*72/39)   | (G1M41*92/120)          |
| . 7                 | (G1N43*168/147)       | GIROI                   |
| 8                   | G1M43+(G1M43*145/147) | G1M08+(G1M08*314/389)   |

6.27

Phosphorus transport Berg River

(5) Estimation of the coefficients  $\alpha$  and  $\beta$  in Eqs (6.4 to 6.8, 6.20 and 6.21) for each sub-reach:

The relationship suggested between the flow cross sectional area and discharge proposed by the Li, (1979) model is given by Eq (6.3) i.e.

 $A = \alpha Q^{B} \qquad \dots \qquad (6.22)$ 

For each sub-reach  $\alpha$  and  $\beta$  will differ. These were determined at each sampling station. The approach suggested by Dingman (1984) was followed to determine these constants: The flow cross sectional area is taken as a rectangle with y equal to the depth, w equal to the width, v equal to the average flow velocity and A equal to the flow cross sectional area. The discharge, Q, is given by

Q = A v = w y v ..... (6.23)

The flow cross sectional area, A, is determined by the procedure described in Chapter 4, Section 3.4.

The flow velocity, v, is determined either from the gauged discharge, Q, from

v = Q/A ..... (6.24)

or, if no gauging weir is located nearby, v, is determined manually as set out in Chapter 4, Section 3.4. and the discharge, Q, is determined from

Q = V A ..... (6.25)

Most river cross sections can be approximated by a rectangle (Dingman, 1984); in the Berg River the measurements indeed indicate a cross section approximately of this form, see Fig 6.11(a). For a series of discharges, Q, and measuring the corresponding water surface width, W, the depth, y, is determined from

y = A / W ..... (6.26)

Dingman (1984) relates w, y, and v to the river discharge, Q, using coefficients c, d, e, f, g and h

 $W = c Q^{d}$  ..... (6.27)

 $v = g Q^n$  ..... (6.29)

then manipulates the coefficients in Eqs (5.27 to 6.29) to determine  $\alpha$  and B, using the following method:

The formulations, Eqs (6.27 to 6.29), imply

ceg = 1

f

and

d+f+h = 1

now, if we put

$$wy = Q/v = Q(Q^{-n})/g$$

.. (6.30)

then

ce = 1/g

... (6.31)

Phosphorus transport Berg River

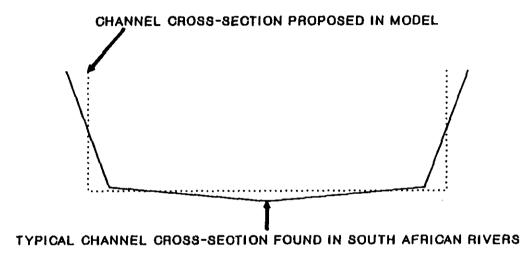


Fig 6.11(a). Schematic diagram showing the typical channel cross-section found in South African rivers, and the cross-section used in the hydrodynamic flow model.

1

|   | and   |   |  |
|---|---|---|--|
|   | d+f = 1-h   |   | (6.32)   |
|   | this leads to   |   |  |
|   | $\alpha = 1/g$  | • • • • • •   | (6.33)   |
|   | $\beta = 1-h$   | • • • • •   | (6.34)   |
| , | The values for w, y and v for each stat<br>channel were determined as described above<br>y, w and v separately against discharge Q (<br>curvilinear least squares regression for e<br>determine the coefficients c, d, e, f, g<br>REGRESS, see Appendix 2). The final coeff<br>were then computed using Eqs (6.33 and 6.3 | . After<br>see Fig<br>each was<br>and h<br>ficients | plotting<br>6.12), a<br>used to<br>(program<br>c and ß |

values for  $\alpha$  and  $\beta$  for each station along the main river channel are shown in Table 6.4 and illustrated in Fig 6.13, showing plots of log A versus log Q. It is evident that the values do not differ greatly.

| Table 6.4 | Channel geometry $\alpha$ and $\beta$ . | coefficients |  |
|-----------|---|--------------|--|
| station:  | <b>a</b> :                              | ß:           |  |
| 138       | 1.80                                    | 0.85         |  |
| 15A       | , J <b>.85</b>                          | 0.87         |  |
| 17A       | 1.65                                    | 0.95         |  |
| 18A       | 1.75                                    | 0.86         |  |
| 21A       | 1.85                                    | 0.85         |  |
| 22A       | 2.47                                    | 0.95         |  |
| 230       | 2.20                                    | 0.99         |  |
| Mean:     | 1.92                                    | 0.90         |  |

Phosphorus transport Berg River

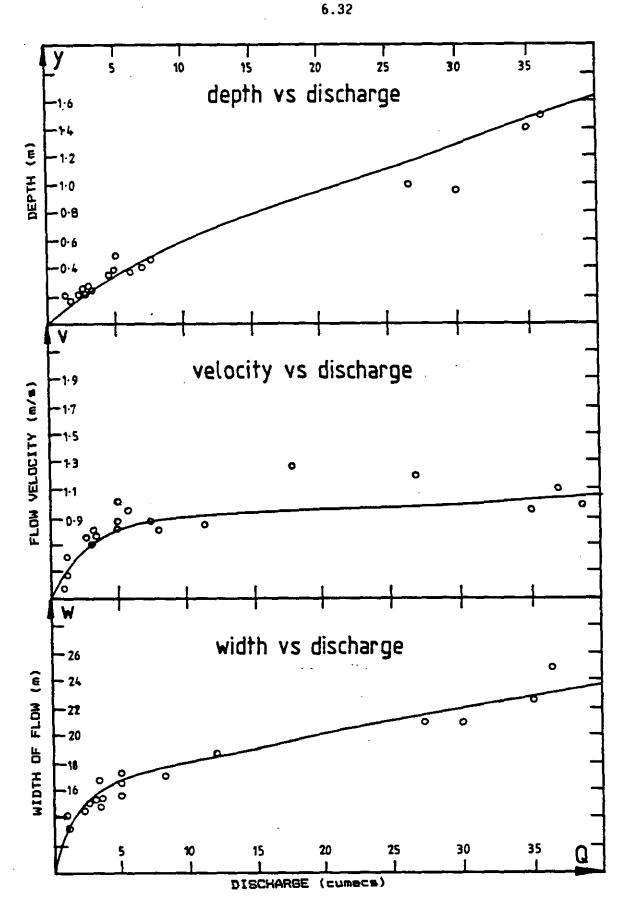
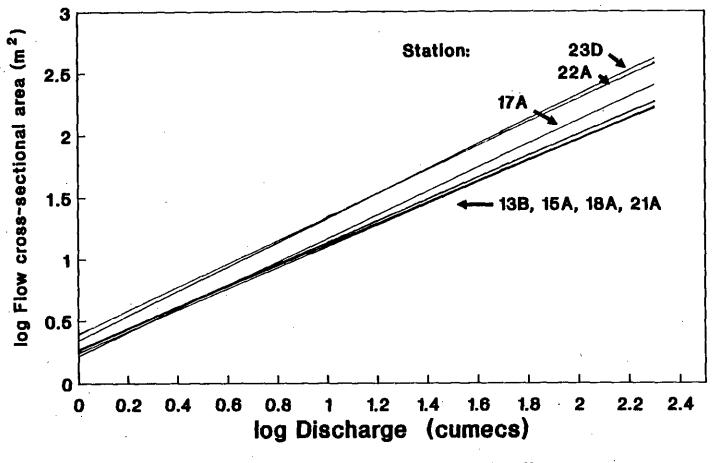


Fig 6.12. River channel depth (y), flow velocity (v) and flow width (w) plotted as a function of discharge (Q) at Station 13B (Lady Loch Bridge).



### Fig 6.13. Plot of log river discharge versus log flow cross-sectional area for stations located along the main river channel.

Leliavsky (1959) discusses this formulation and concludes that it tends to constant values for special situations. He gives the "Indian" values for  $\alpha$  and  $\beta$  which we can convert to the metric equivalents,  $\alpha=2.23$  and  $\beta=0.83$ . These values caused the rising and falling limbs of the simulated hydrograph to precede the measured ones. Good fits were obtained with the values for  $\alpha$  and  $\beta$  shown in Table 6.4. It would appear that in the event of no data being available for  $\alpha$  and  $\beta$ , good fits can be obtained by trial simulations for a set of paired values in the neighbourhood of  $\alpha=2.00$  and  $\beta=0.90$ .

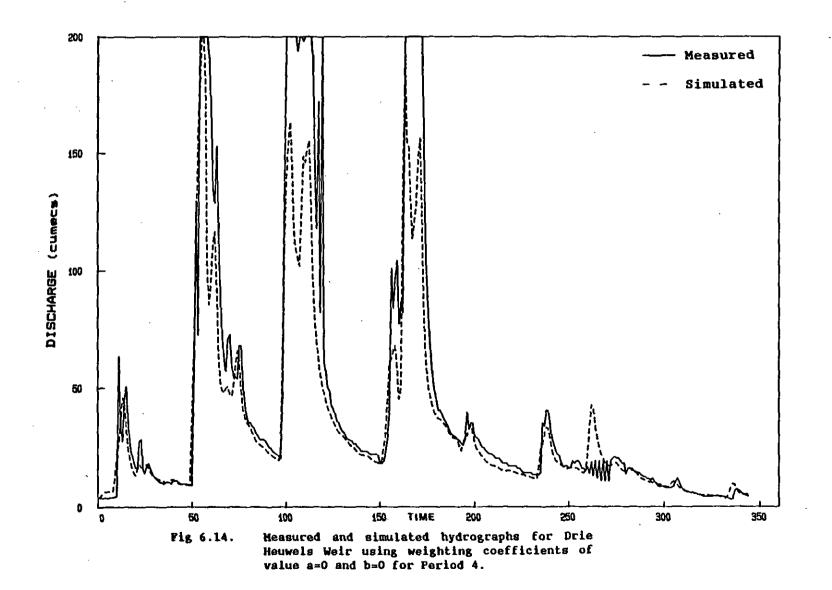
(6) Time and space weighting factors in Eqs (6.4 to 6.8, 6.20 and 6.21):

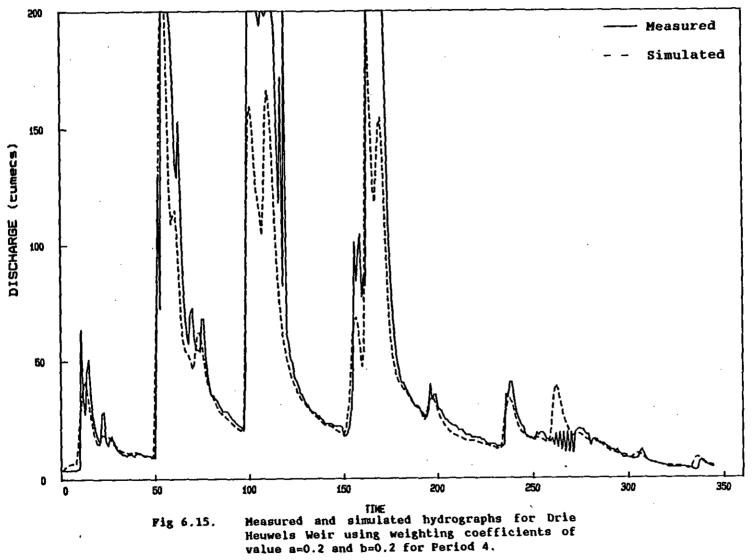
The weighting factors a and b in the implicit numerical solution method are not directly influenced by physical conditions in the catchment. Rather, they are pertinent only to the mathematics of the numerical solution technique and the time and space steps used in the input data. This suggests the use of a trial-and-error approach when investigating their effect on model output (Keefer, 1976).

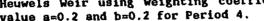
Two guidelines are available: firstly, the values must lie between zero and 0.5 otherwise the solution becomes unstable if values outside these limits are used, and secondly, setting both values to zero, the scheme becomes explicit (Richtmyer and Morton, 1957). An explicit scheme solves the unknown discharge directly in terms of the known ones. The implicit method does not predict the discharge directly from the equation but determines the discharge by iteration; it is more accurate then the explicit method, is more stable and during peak flow conditions and gives predictions that can be significantly higher than the explicit method. The most appropriate values for a and b were found only after the model was in operation. Initially arbitrary values for a and b equal to 0.3 were used in the model calibration and afterwards a range of values were tested to determine the influence of a and b on the simulations (see Figs 6.14 to 6.17). The value 0.4 for the time-weighting factor a, and 0.3 for the space-weighting factor b, appeared to provide the most favourable results.

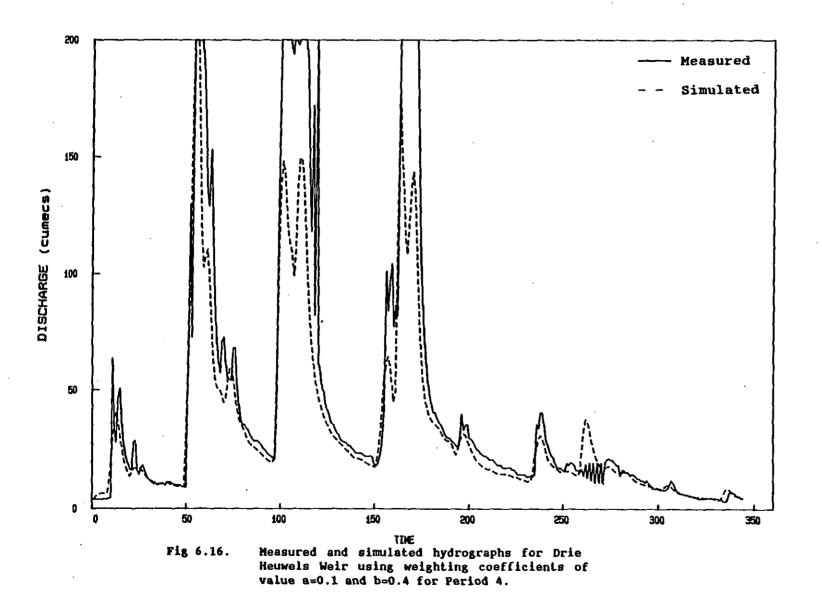
(7) Main channel losses:

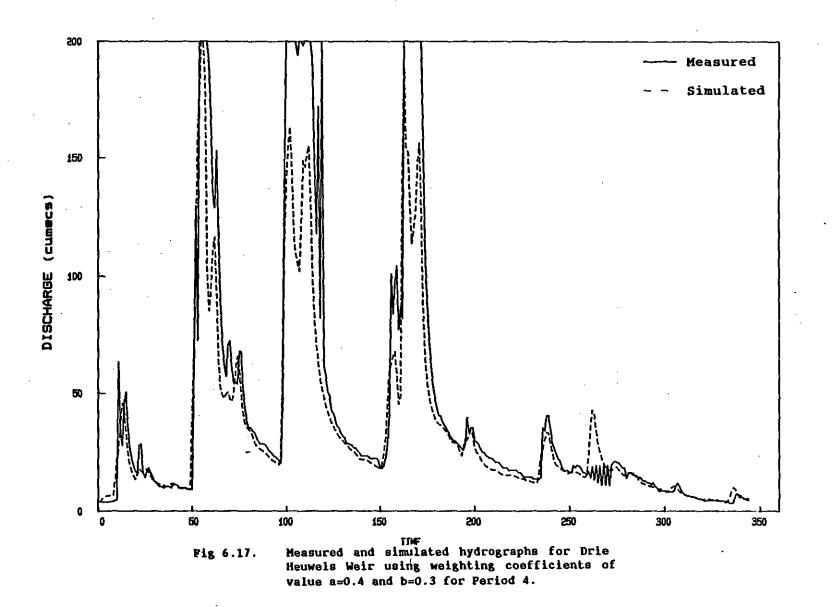
Having dealt with ungauged inflow it is now appropriate to examine the influence of ungauged channel losses. This was done as follows: The winter period calibration was done against the data set for the wet period not taking lateral outflows into account - it was assumed that during the wet periods the channel losses due to seepage and abstraction would be only an insignificant fraction of the channel Applying the model thus calibrated the mode 1 flow. consistently over-estimates the channel flow at Drie Heuweis Weir during dry periods. To accommodate channel losses, a constant term for flow losses per sub-reach length was incorporated. The "best" value was estimated by trial simulations of the model with different abstraction rates until such time as the difference between the simulated and measured hydrographs at Drie Heuwels Weir was minimised. An in-channel loss of 0.05 cumecs per sub-reach gave best overall improvement to the hydrograph at Drie Heuwels Weir during the low flow periods (Fig 6.18), this rate had virtually no effect on the high flow predictions.

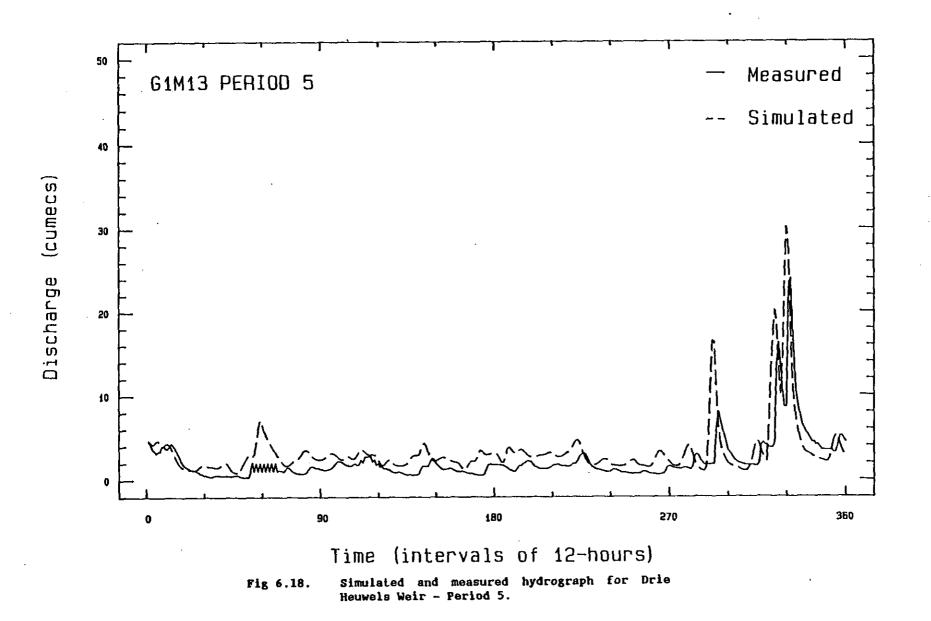














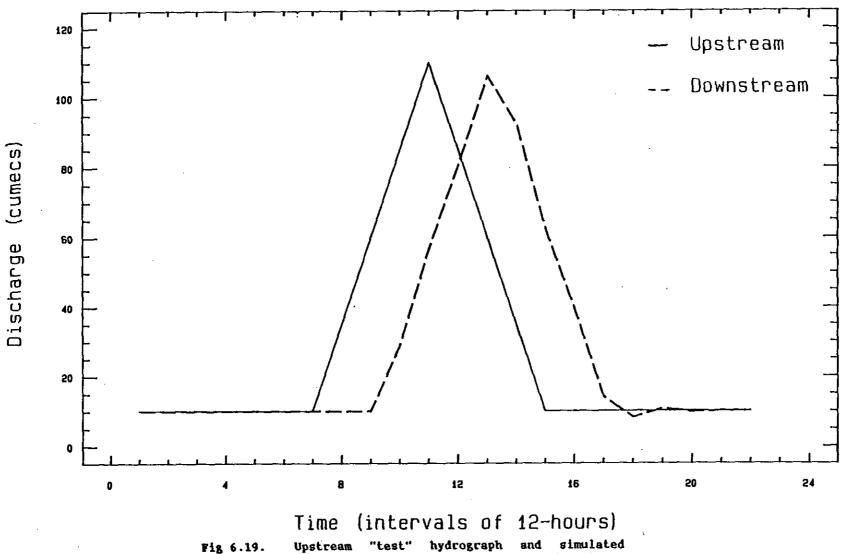
### 4.3 Calibration trials

(1) Continuity and the numerical technique:

It is necessary to check in what measure the implicit and explicit numerical techniques conserve the continuity condition implied by the continuity (wave) equation, Eq (6.1). To do this, at the top gauging station GIM20, an idealized hydrograph input was made: comprising an event period of 10 days, a continuous input of 10 cumecs and a superimposed equilateral triangular flood wave of 4 days duration, rising to 100 cumecs, to give a peak total flow of 110 cumecs, Fig 6.19. Allow no lateral inflows and outflows, and select 12 hours as the time element.

The hydrograph generated at Drie Heuwels Weir, Station GIM13, also is shown in Fig 6.19. The following can be noted

- (i) There is a time shift of approximately 24-hours, the estimated time of travel down the 90 km long channel.
- (ii) There is virtually no or only slight attenuation of the flood wave. Theoretically with the kinematic wave approximation there should be no attenuation but Li (1979) intimates that the numerical technique gives rise to a slight pseudo-attenuation effect.
- (111) The implicit and explicit solution are virtually identical; differences only become apparent when a multiple peak input hydrograph is used. In "real life" simulations on the Berg River, observable differences were found between the two methods, so that the implicit method, which theoretically should be more accurate, was used in preference to the explicit method.



TR 143 March 1989

Upstream "test" hydrograph and simulated downstream hydrograph. The downstream hydrograph shows some attenuation and is

shifted in time by 24-hours.

## -

(iv) From a print-out of the generated hydrograph, the total discharge at Drie Heuwels Weir was calculated over the 10 day interval and compared with the total upstream input at Paarl.

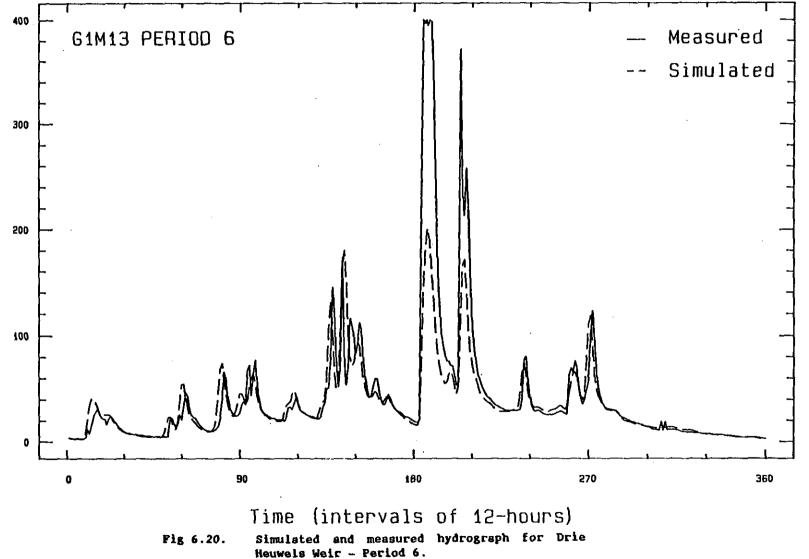
| Input mass flow  | 3 | 25.920 million cubic metres  |  |
|------------------|---|------------------------------|--|
| Output mass flow | = | 25.894 million cubic metres  |  |
| Error            | Ξ | -0.0259 million cubic metres |  |
|                  | = | -0.01 percent                |  |

For all practical purposes the numerical technique satisfies continuity.

(2) Nodel calibration - Wet season:

The input data for Period 6, a wet period (May 1986 to November 1986) are shown in Fig 6.3 for the upper channel hydrograph and the lateral input hydrographs in Fig 6.10. Accepting: (1) the flow constants  $\alpha$  and  $\beta$  shown in Table 6.4; (ii) the time and spatial weighting coefficients a=0.4and b=0.3 in the numerical solution procedure; (iii) the method of estimating the ungauged runoff hydrograph the implicit numerical (explained and (1v) earlier) technique; a trial simulation was run over the time period of 180-days to determine the hydrograph at Drie Heuweis gauging weir. In Fig 6.20 the measured and simulated hydrographs are shown.

It is at once apparent that the simulated and observed hydrographs are in reasonable accord provided the flood flows do not exceed about 120 to 150 cumecs. With higher flows the differences become gross. At high flows the predicted results provide support for the earlier observations that the discharge calibration at Drie Heuwels



Weir becomes grossly in error at discharge values in excess of about 120 cumecs. There is sufficient evidence to accept that observed discharges greater than about 120 cumecs should not be admitted in the river analysis.

(3) Model Calibration - Dry season:

The model was applied without modification to simulate the dry season Period 5 (November 1985 to May 1986). The input hydrograph at Paarl is shown in Fig 6.3 and the lateral flow hydrographs in Fig 6.9.

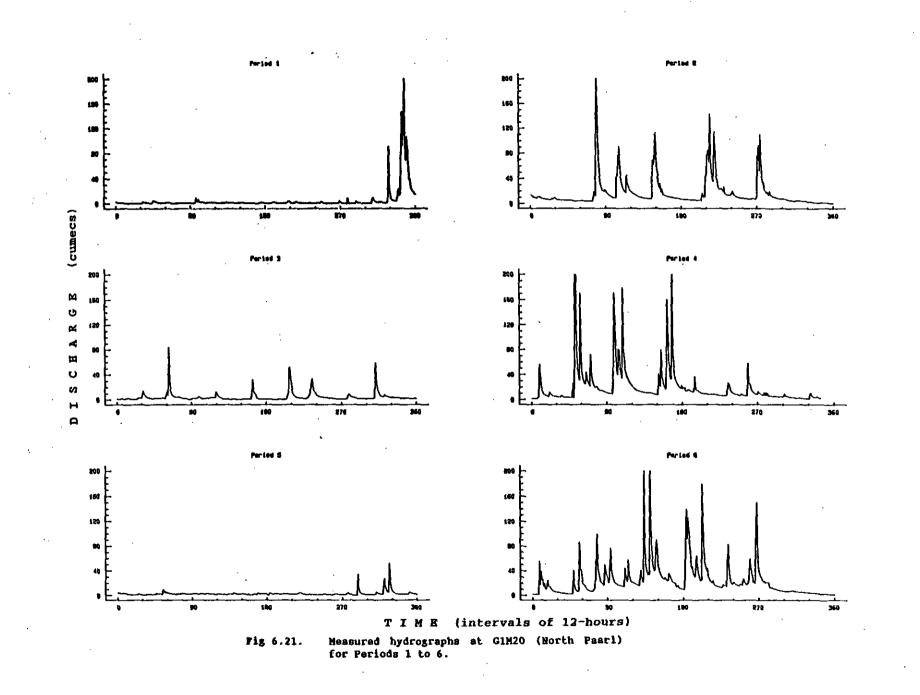
The predicted and observed hydrographs at Drie Heuwels Weir are shown in Fig 6.18 (to a larger scale for clarity). It is clear that the model consistently over-estimates the flow at Drie Heuwels Weir, probably due to seepage and due to abstraction for irrigation by farms along the banks of the main river channel. To accommodate these it was found by trial that a loss rate of 0.1 cumec per sub-reach brought the low flow hydrograph pattern into line with the observed. This implies an outflow of about 0.7 cumecs over the seven sub-reaches, spanning a 89 km length of river. Period 5 (1985-1986) was an exceptionally hot and dry summer season and this is a likely cause for the high outflow rate. Considering the dry Periods 1 and 3, these required much lower outflow rates, of 0.05 cumecs per sub-reach to give a good fit to the respective low flow hydrographs.

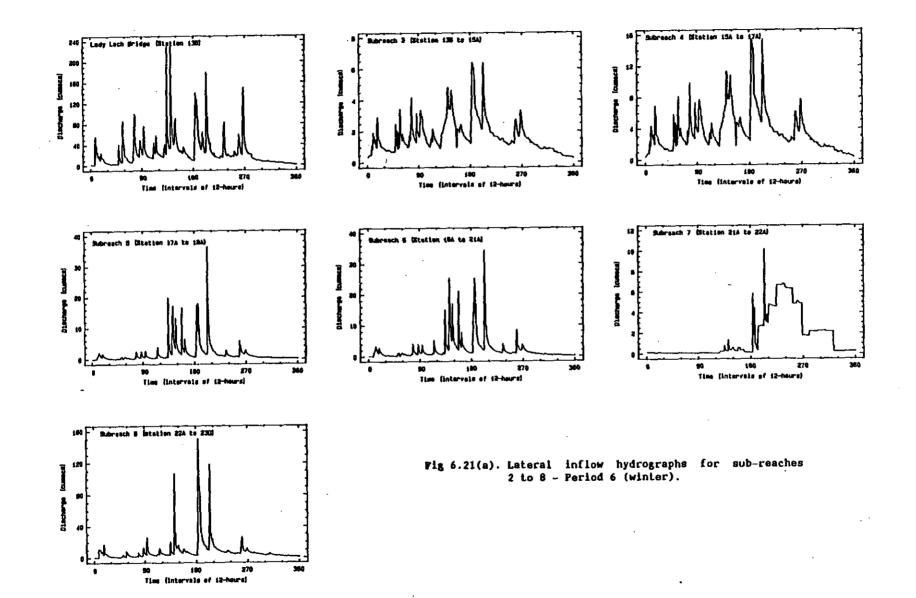
5 MODEL VERIFICATION - MONITORING PERIOD

To verify the calibration of the model given above, the model is used to simulate the hydrographs at Drie Heuwels Weir for Periods 1 to 4 using:

- (i) the measured channel hydrograph at Paarl (G1M2O), Fig 6.21,
- (ii) lateral inflow hydrographs, see Fig 6.21(a),
- (iii) main channel outflow rate of 0.05 cumecs per sub-reach,
- (iv) channel geometry coefficients in Table 6.4,
- (v) time and space weighting factors of a=0.4 and b=0.3.

The measured and simulated hydrographs at Drie Heuwels, are shown in Figs 6.22 to 6.27 all plotted to the same scale. Observed flows in excess of 120 cumecs are not plotted because these are shown to be unreliable. In Figs 6.28 to 6.30, observed and simulated flows during the dry periods 1, 3 and 5 are shown plotted to a discharge scale eight times larger than that in Figs 6.22 to 6.27.





. . . . .

1.

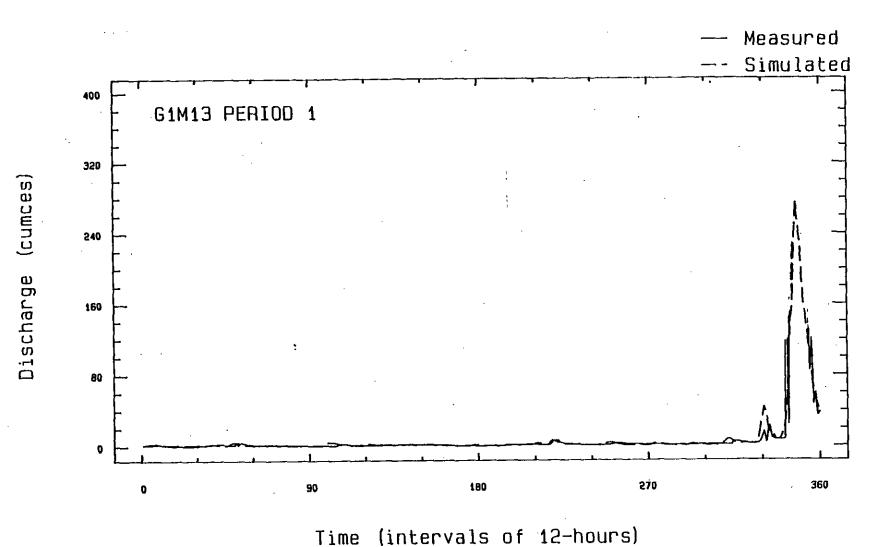
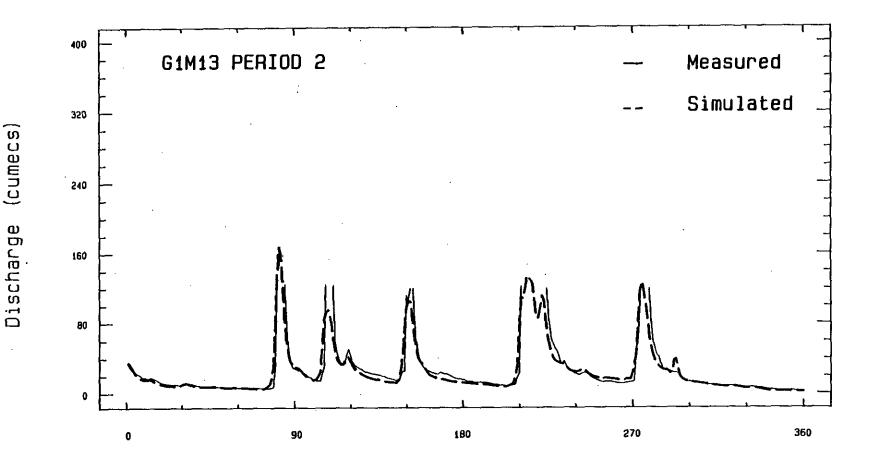


Fig 6.22.

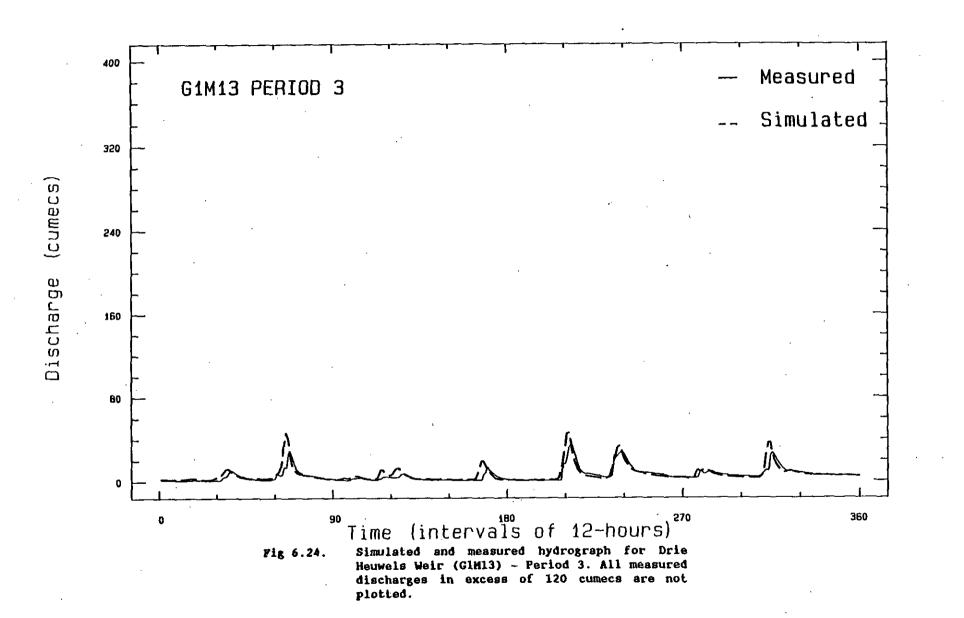
Simulated and measured hydrograph for Drie Heuwels Weir (G1M13) - Period 1. All measured discharges in excess of 120 cumecs are not plotted. 6.49



# Time (intervals of 12-hours)

Fig 6.23.

Simulated and measured hydrograph for Drie Heuwels Weir (GIM13) - Period 2. All measured discharges in excess of 120 cumecs are not plotted.



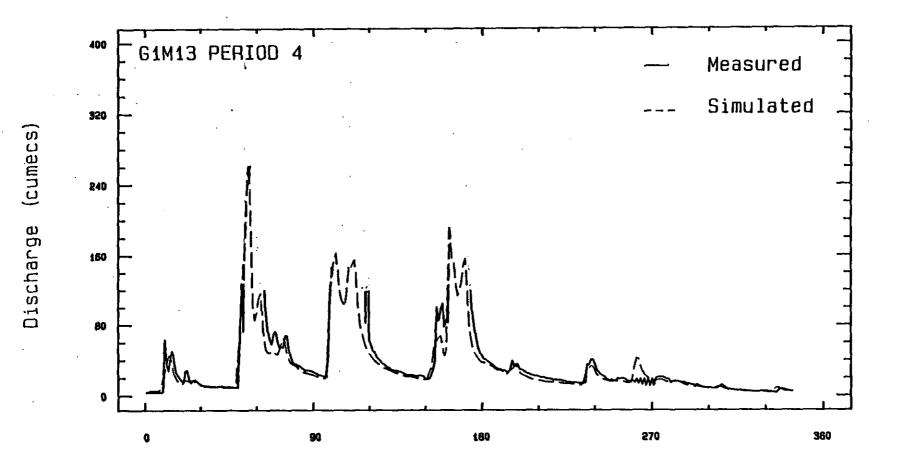
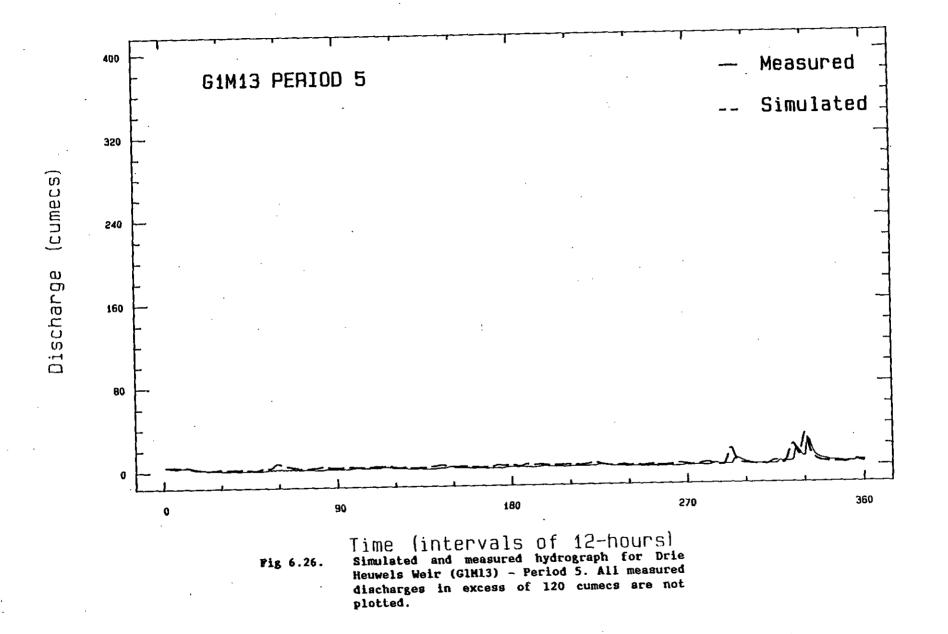


Fig 6.25. Time (intervals of 12-hours) Big 6.25. Simulated and measured hydrograph for Drie Heuwels Weir (GIM13) - Period 4. All measured discharges in excess of 120 cumecs are not plotted.



6.53

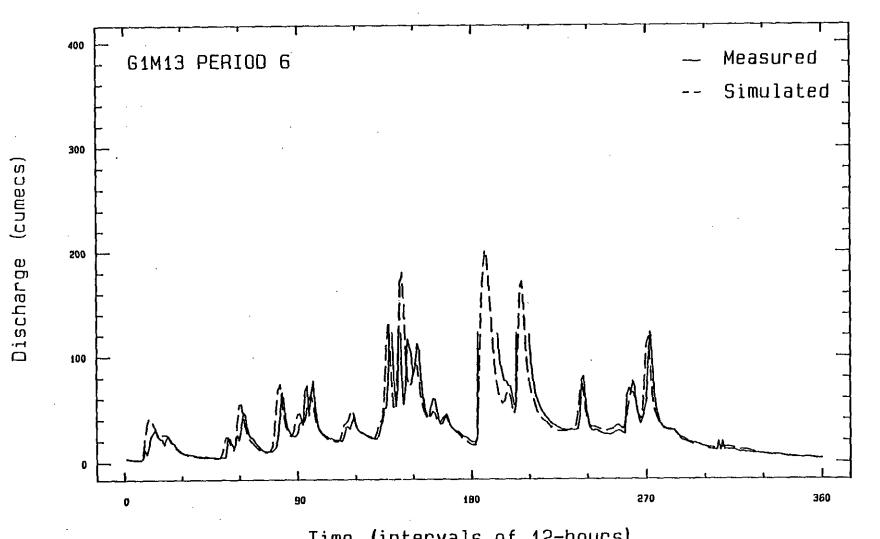
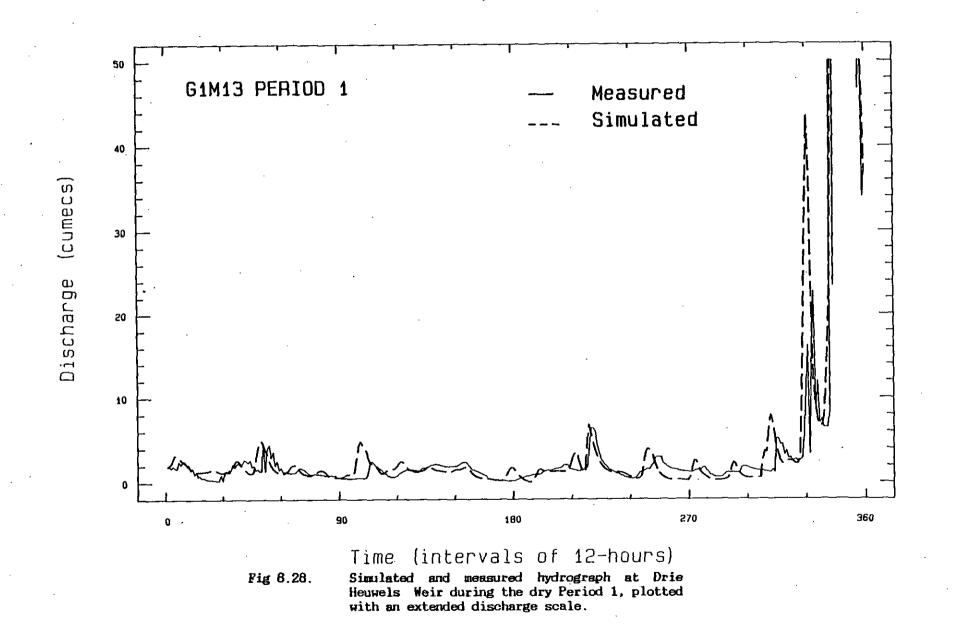
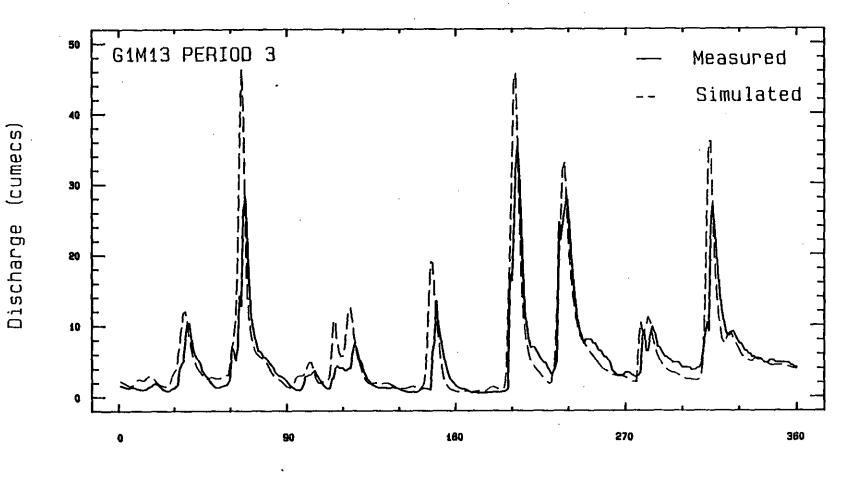


Fig 6.27.

Time (intervals of 12-hours) simulated and measured hydrograph for Drie Heuwels Weir (GIMI3) - Period 6. All measured discharges in excess of 120 cumecs are not plotted.



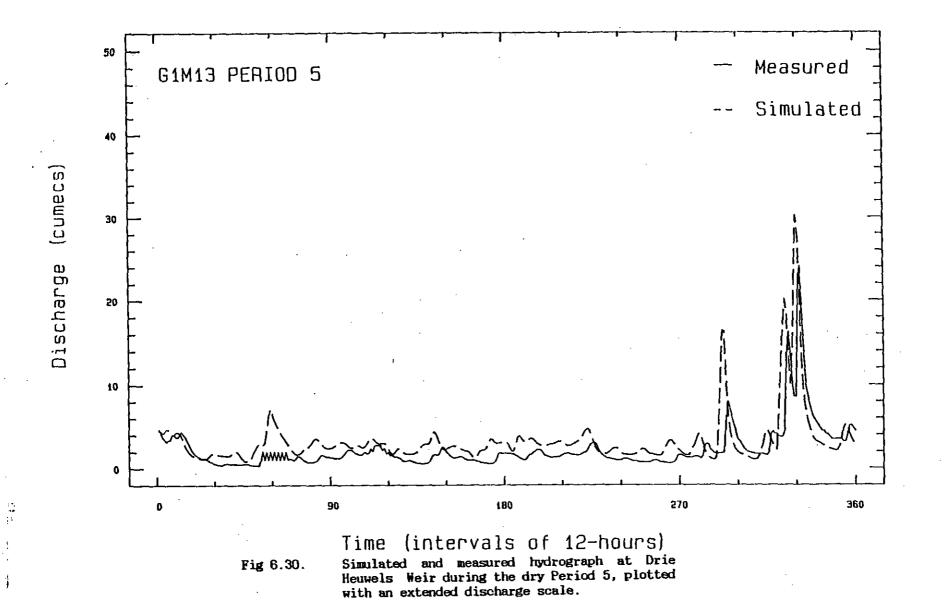
6.55



# Time (intervals of 12-hours)

Fig 6.29.

Simulated and measured hydrograph at Drie Heuwels Weir during the dry Period 3, plotted with an extended discharge scale. 6.56



6.57

Phosphorus transport Berg River

#### 6 MODEL EVALUATION

### (1) Model performance:

Taking a general overview on the predicted and observed hydrograph at Drie Heuwels, these compare remarkably well over the range of flows 2 to 120 cumecs. It is most unfortunate that the measured discharges greater than 120 cumecs are completely unreliable, due to the backwater effects from the Misverstand diversion weir. Consequently, it is not possible to assess the performance of the model for river flows in excess of 120 cumecs. Based on the Berg River experience with this model, there is good reason to expect that it could also be useful in this kind of flow modelling of other rivers.

(2) Approximation of Li's model:

The model proposed by Li (1979) fall under the category of kinematic flow models. Basically (i) over every element of the flow path it preserves continuity, that is, it calculates a mass balance over the element and (ii) at any point along the channel reach it makes provision for estimating discharge or velocity of flow. This provision, a postulation, based on experience, is stated by Eq (6.3) i.e.

 $A = \alpha Q^{\beta} \qquad \dots \qquad (6.35)$ 

On this formulation hinges the prediction of the movement of the flow along the channel. If the structure of the formulation is inadequate then inevitably the predictions must suffer accordingly. The good general fit between the observed and predicted hydrograph gives support to the assumption that Eq (6.35) is of an acceptable form. Even if the flood predictions are correct, out of phase time shifts of the rising and falling limbs of the predicted wave can be expected if the values of  $\alpha$  and  $\beta$  are in error. Clearly the values of  $\alpha$  and  $\beta$  will be influenced by the slope, bed friction and other factors. These values should be determined at a number of points along the reach; the seven pairs of values for  $\alpha$  and  $\beta$  determined along the 90 km reach i.e. one pair every 11 km approximately appear to have been adequate to accommodate for the change in channel geometry over this total reach. Furthermore, the rather crude field procedures for determining  $\alpha$  and  $\beta$ which could be applied only during low flows nevertheless appear to be adequate and give values that are successful, an aspect that would commend the model to those wishing to construct dynamic transport models of nutrients.

(3) Out-of-phase peaks:

Comparing the flood hydrographs during the dry periods (Figs 6.28 and 6.30) the predicted flood waves are slightly before the observed flood waves. This also occurs during the wet season but only marginally so. In the Berg River there are numerous low concrete dams in the main channel. These structures are erected by farmers to hold water in the summer low flow period. The effect of these dams is to delay a flood wave, by backing-up a volume of water behind the dam. The model, relying on data from off-channel sources, does not allow for obstructions in the main channel.

In wet periods, discharges are high enough to reduce or eliminate the out-of-phase behaviour due to obstructions. The slight out of phase behaviour still apparent probably arises from the small errors in the estimation of channel coefficients  $\alpha$  and  $\beta$ .

### (4) "Mystery" peaks:

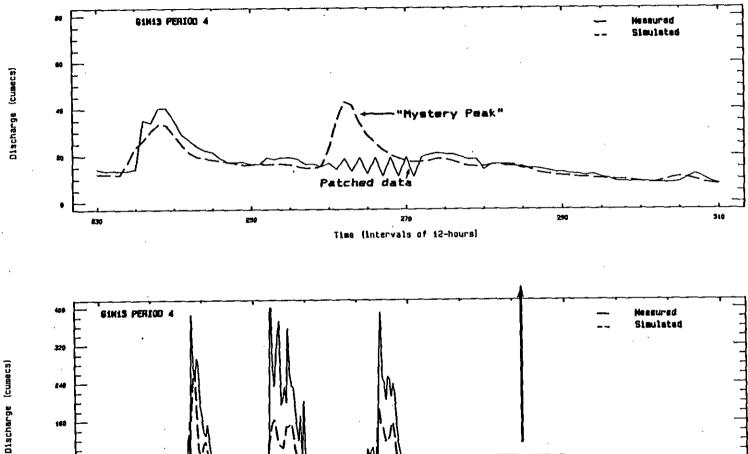
In Periods 4 and 5 two "mystery" peaks were observed in the simulated hydrograph, but not in the observed data, see Figs 6.18 and 6.31. The reason for the non appearance of the peak in the measured hydrograph at Drie Heuwels is that for those few days, no stage height recordings were made at Drie Heuwels Weir, due to a malfunction of the equipment. The data were originally "patched" by extrapolating from the pre-malfunction and post-malfunction data. The model however utilizes the upstream information, which manifests the flood peak, and reproduces the peak. The existence of this peak at Drie Heuwels Weir was verified from field observations.

### 7 CONCLUSIONS

The objective in this chapter was to develop a flow model capable of predicting the hydrograph at any point in the main river channel. The model devised by Li (1979), suitably modified for application for the Berg River, appears to be adequate in achieving this objective, successfully simulating the measured hydrographs at the downstream end of the main river channel.

An interesting feature of this model is that it provides both the necessary output and information about the discharge characteristics of the entire catchment.

To attain the maximum model accuracy, the ungauged lateral runoff is estimated using an areal-weighted coefficient. The channel geometry is characterised by the model using two coefficients  $\alpha$  and  $\beta$ . These coefficients are assumed to represent the average conditions in the river sub-reach which in terms of model output seems acceptable.



248 165 SEE ABOVE 270 360 180 . Time fintervals of 12-hours Simulated and measured hydrograph at Drie Heuwels Weir, Period 4, showing the presence Fig 6.31. of the "Mystery Peak".

ው . ച

It can therefore be concluded that the model has the ability to predict, with sufficient accuracy, the hydrograph at a downstream station. The model is also capable of patching the flow records when the original data are missing. This hydrodynamic-flow model is now in a suitable form for use in conjunction with the other sub-components of the model to predict the transport of phosphorus along the main river

channel.

8 REFERENCES

Akan, A.O. and Yen, B.C. (1981)

"Diffusion-wave routing in channel networks", Am. Soc. Civ. Eng. Proc. J. Hydraul. Div., <u>107</u>, no. HY6, 719-732.

Bates, B.C. and Pilgrim, D.H. (1985)

"Simple models for nonlinear runoff routing", Trans. Inst. Eng. Aust. Civ. Eng., CE28, no.4, 284-291.

Dingman, S.L. (1984)

"Fluvial hydrology", First edition, USA : W.H. Freeman & Co., p.383.

Fread, D.L. (1973)

"Technique for implicit dynamic routing in rivers with tributaries", Wat. Resour. Res., <u>9</u>, no.4, 918-926.

Keefer, T.N. (1976)
 "Comparison of linear systems and finite difference
 flow-routing techniques", Wat. Resour. Res., <u>12</u>,
 no.5, 997-1006.

Koussis, A.D. (1980)

"Comparison of Muskingum method difference schemes", Am. Soc. Civ. Eng. Proc. J. Hydraul. Div., <u>106</u>, no. HY5, 925-929.

Koussis, A.D., Saenz, M. and Tollis, I.G. (1983)

"Pollution routing in streams", Am. Soc. Civ. Eng. Proc. J. Hydraul. Div. , <u>109</u>, no.12, 1636-1651. Leliavsky, S. (1959)

"An introduction to fluvial hydraulics", Constable and Company Ltd, London.

- Li, R.M., Simons, D.B. and Stevens, M.A. (1975) "Nonlinear kinematic wave approximation for water routing", Wat. Resour. Res., <u>11</u>, no.2, 245-252.
- Li, R. M. (1979)

"Water and sediment routing from watersheds", In Modelling of rivers, Ed H.W. Shen, John Wiley and Sons.

Ponce, V. M. (1980)

"Linear reservoirs and numerical diffusion", Am. Soc. Civ. Eng. Proc. J. Hydraul. Biv., <u>106</u>, no. HY5, 691-699.

Richtmyer, R.D. and Morton, K.W. (1957) "Difference methods for initial-value problems", Second Edition, John Wiley and Sons, p.405.

Rowlston, W.S.J. (1988)

Deputy Chief Engineer, Hydraulic Studies, Department of Water Affairs, Pretoria, Personal Communication.

van Wyk, N.J. (1988)

Deputy Chief Engineer, Hydrological Network, Department of Water Affairs, Pretoria, Personal Communication.

Weinmann, P.E. and Laurenson, E.M. (1979)

"Approximate flood routing methods: a review", Am. Soc. Civ. Eng. Proc. J. Hydraul. Div., <u>105</u>, no. HY12, 1521-1536. 6.65

.

9 NOTATION USED IN CHAPTER 6

| A,A1,A2,A3,A4 | 3          | flow cross sectional area (m <sup>2</sup> ) |
|---------------|------------|---|
| t             | 2          | time (s)                                    |
| Q,Q1,Q2,Q3,Q4 | *          | River discharge (cumecs)                    |
| x             | 2          | river distance (m)                          |
| q,q1,q2,q3,q4 |            | lateral discharge (cumecs)                  |
| So            | =          | bed slope                                   |
| Se            | 2          | energy slope                                |
| V             | =          | flow velocity (m/s)                         |
| g             | 7          | acceleration due to gravity $(m/s^2)$       |
| у.            | =          | depth of flow (m)                           |
| a,B           | =          | channel geometry coefficients               |
| a,b           | <b>'</b> = | time and space weighting factors            |
| <del>0</del>  | =          | quotient of time and distance increments    |
| τ             | =          | predicted discharge (Q4) (cumecs)           |
| τ <b>*</b>    | , <b>=</b> | discharge term in Eq (6.8) (cumecs)         |
| Δt            | =          | increment of time (s)                       |
| Δx            | =          | increment of distance (m)                   |
| τ0            | =          | discharge using linear scheme (cumecs)      |
| £             | =          | right-hand side of Eq (6.5)                 |
| c,d,e,f,g,h   | =          | channel geometry regression coefficients    |

### CHAPTER 7

### DEVELOPMENT OF A PHOSPHORUS TRANSPORT MODEL

In Chapter 6 the development and calibration of the hydrodynamic flow model was presented. That model constituted the first stage in the development of a phosphorus transportmodel. In this chapter the next stage in the development of the phosphorus transport model is presented, consisting of three sub-models: (1) phosphorus nonpoint source model; (2) phosphorus transport model and (3) a phosphorus bed load model.

### 1 PHOSPHORUS NONPOINT SOURCE (NPS) MODEL

### 1.1 NPS model selection

The objective of this sub-model is to quantify the mass of phosphorus exported from nonpoint sources into the main river channel. Such a model is complex due to the interaction of a large number of processes associated with the mobilization of phosphorus in the nonpoint source area (Novotny <u>et al</u>., 1978). Conceptually the model must take account of the processes shown in Fig 7.1.

To quantify the phosphorus export from a nonpoint source we can use one of two approaches:

 Develop a mechanistic model incorporating each of the processes shown in Fig 7.1.

Develop a lumped parameter model.

# NONPOINT SOURCE MODEL

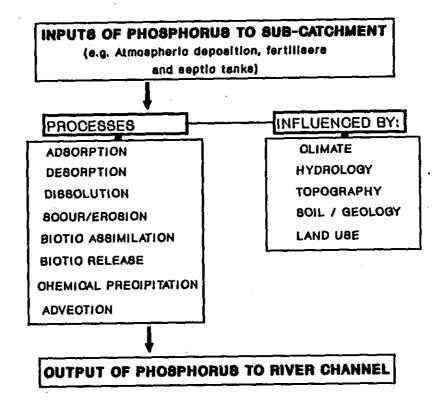


Fig 7.1. Conceptual framework showing the processes associated with the release of phosphorus from nonpoint sources. . N

Phosphorus transport Berg River

The first approach, although the ideal, presents severe practical difficulties in isolating each process and tracing their dynamic behaviour (Wang and Evans, 1970; Betson and McMaster, 1975). The literature reports a number of models formulated to quantify one or more of the processes (Taylor and Kunishi, 1971; McCallister and Logan, 1978; Novotny <u>et al.</u>, 1978; Logan, 1982; Casey and Farr, 1982; Wendt and Alberts, 1984; Zingales <u>et al.</u>, 1984). However, such models have been applied only in defined research catchments which have been designed specifically to isolate and measure the processes being investigated.

Lack of available information forced the conclusion that for the Berg River basin the only feasible approach to nonpoint source phosphorus modeling is the lumped parameter approach. A difficulty with this approach is to identify the lumped parameter in terms of which an adequate description of the nonpoint phosphorus export can be formulated and is practical. Johnson et al. (1976) selected the nonpoint discharge as the lumped parameter and linked the phosphorus export to it. They found that a plot of phosphorus concentration versus discharge showed significant scatter. They speculated that the scatter part, to a different relationship between 10 was due. phosphorus concentration and the discharge on the rising and the falling limbs of the discharge hydrograph respectively. On separating out the phosphorus data on the rising and on the falling limbs they found that for a given discharge the phosphorus concentration was higher on the rising then on the falling limb, giving rise to a looped or hysteresis effect. They hypothesized that the cause for the higher phosphorus concentration on the rising limb is the mobilization of phosphorus from riverbeds and surface drainage during the beginning of the flood event.

To formulate the phosphorus concentration over a flood event they accepted a basic linear relationship between the phosphorus concentration, P, and the discharge, Q; the hysteresis effect they accommodated by hypothesizing that the phosphorus concentration is proportional to the rate-of-change of discharge,  $\Delta Q/\Delta t$ , i.e.

$$P = A0 + A1 Q + A2 (\Delta Q/\Delta t)$$
 ..... (7.1)

where

| Р        | = | ortho-phosphate concentration, |
|----------|---|--------------------------------|
| Q        | = | instantaneous river discharge, |
| ∆0/∆t    | 3 | rate-of-change of discharge,   |
| A0,A1,A2 | 7 | regression coefficients.       |

The value of  $\Delta Q/\Delta t$  is positive on the rising limb and negative on the failing limb of the hydrograph; by a suitable choice of the proportionality constant the looped or hysteresis effect observed experimentally, can be accommodated to a degree.

It is not difficult to find objections against the formulation for the hysteresis effect, because there appears to be no rational physical basis for it. However, if by its use a mathematical structure can be established which allows the phosphorus concentration to be simulated approximately correctly and consistently over a number of flood events then it has value as an interim parameter until a better one is discovered or, perhaps, a mechanistic explanation for it comes to light.

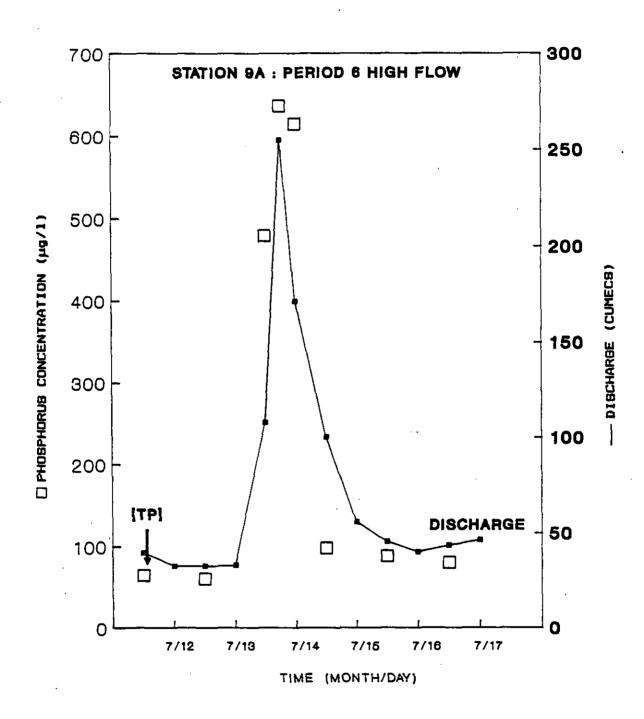
### 1.2 NPS model development

### Hysteresis manifestation on the Berg River:

It was stated above that the looped phosphorus-discharge approach could be an acceptable practical predictive method if over a number of flood hydrographs it provides consistently good estimates of the measured phosphorus concentration. Accordingly, an inquiry was initiated into the feasibility and consistency of the looped phosphorus-discharge rating approach.

To check if the looped phosphorus discharge (hysteresis) effect is present in the phosphorus chemograph on the Berg River, data, collected over one flood event at Station 9A on the main river channel, were analysed. In Fig 7.2 a flood hydrograph with associated phosphorus concentration data are shown, and in Fig 7.3 a plot of phosphorus concentration versus discharge. Clearly for any selected discharge, the phosphorus concentration on the rising limb of the flood hydrograph is higher than on the falling limb. Furthermore, the phosphorus concentration shows a rapid reduction after the peak flow has passed, that is, a marked hysteresis effect is exhibited. It seemed therefore that the formulation of Johnson <u>et al</u>. (1976), Eq (7.1) has merit. It remained to determine whether the formulation is consistent in that it applies over a series of flood events.

Equation (7.1) can be presented graphically in a three dimensional plot as follows: choose the discharge, Q, and the rate-of-change of discharge,  $\Delta Q/\Delta t$ , as the two axis in the XY plane, and the total phosphorus concentration, TP, on the Z axis, see Fig 7.4(a). Define  $\Delta Q/\Delta t$  as the present discharge minus the previous discharge divided by the time intervals between the two discharges; then on the rising limb of the



## Fig 7.2.

Phosphorus concentration data and associated hydrograph for one flood event at Station 9A (North Paarl) during Period 6.

7.6

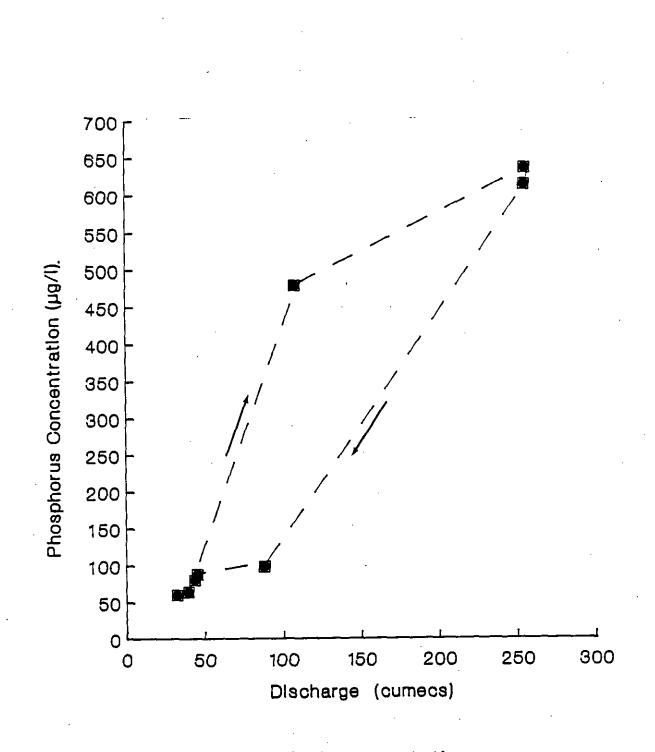


Fig 7.3.

Plot of the phosphorus concentration versus discharge for Station 9A (North Paarl) on the main river channel.

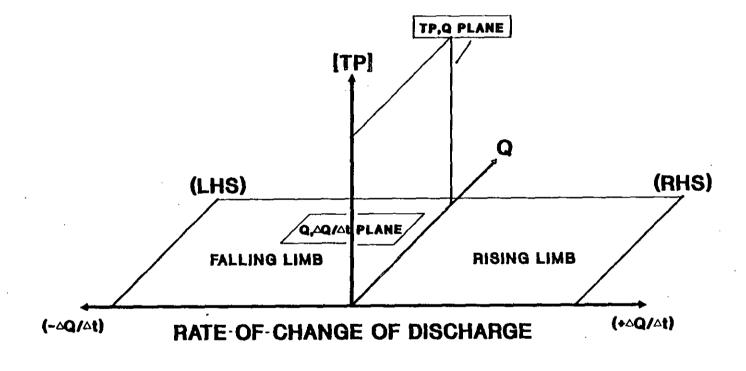


Fig 7.4(a). Three dimensional grid used for empirical nonpoint source model.

Phosphorus transport Berg River

TR 143 March 1989

7.8

hydrograph  $\Lambda Q/\Lambda t$  is positive and on the falling limb, negative. If the phosphorus concentration, TP, is a function of the discharge. Q. and rate-of-change,  $\Delta Q/\Delta t$  then

$$TP = f(Q, \Delta Q/\Delta t)$$
 ..... (7.2)

then the phosphorus concentration, TP, plots as a surfaceover the (Q,  $\Delta$ Q/At) plane see Fig 7.4(b). If the phosphorus concentration is a linear function of Q and  $\Delta$ Q/At as proposed in Eq (7.1), then the TP surface is a plane lying at a slope Al to Q axis and a slope A2 to the  $\Delta$ Q/At axis, intersecting the TP axis at A0; where A0, A1 and A2 are positive constants, see Fig 7.4(c).

### Selection of NPS drainage area:

To develop the looped phosphorus discharge approach it is important to select a drainage basin for which accurate hydrograph and associated water quality data are available; without accurate data no reliable mathematical descriptive formulation can be achieved. Once the mathematical structure is developed then subsequently, for other drainage basins in the same hydrological region, less information will be needed to calibrate the model constants.

The nonpoint source drainage area selected for developing the mathematical structure of the model was that draining via gauging station GIM20 (Station 9A) on the Berg River at Paarl. Accurate total phosphorus concentrations, TP, at reasonably close intervals and continuous flow records were available over the entire period of the three year investigation.

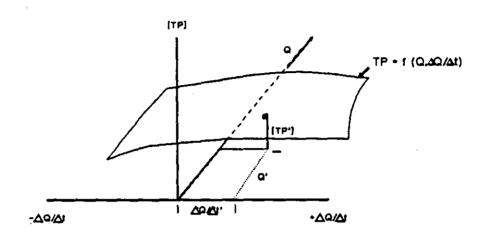


Fig 7.4(b). Three dimensional plot of the phosphorus surface over the  $Q-\Delta Q/\Delta t$  plane.

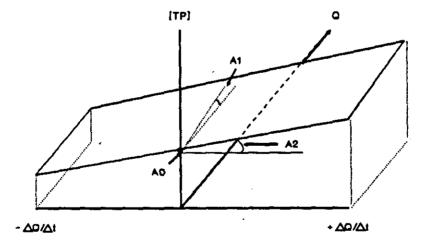


Fig 7.4(c). Three dimensional plot of the phosphorus plane lying at a slope Al to the Q axis, and at a slope A2 to the  $\Delta Q/\Delta t$  axis, intersecting the TP axis at A0; where A0, A1 and A2 are positive constants. For every phosphorus measurement the time of sampling was noted and from the discharge hydrograph, the term  $\Delta Q/\Delta t$  was determined using

$$\Delta Q/\Delta t = \frac{Q_{to} - Q_{t-1}}{to - (t-1)} \qquad .... (7.2a)$$

where

| Q <sub>to</sub>  | = | the discharge at time of sampling, |
|------------------|---|------------------------------------|
| Q <sub>t-1</sub> | = | discharge 12-hours previously,     |
| to               |   | time of sampling,                  |
| t-1              |   | time 12-hours previously.          |

From the matrix of triple data - phosphorus concentration, discharge and the rate-of-change of discharge - the data were sorted into two matrices, those with a positive rate-of-change with negative rate those a (+<u>A</u>Q/<u>A</u>t) and discharge of  $(-\Delta Q/\Delta t)$ . The matrix with the negative rate-of-change of discharge data correspond to the recession limb conditions and those with a positive rate of change to the rising limb conditions.

To make a preliminary assessment whether the phosphorus magnitude of the influenced by the concentration 15 rate-of-change of discharge, plots were made of the phosphorus concentration (TP) versus discharge (Q) for both the recession and rising limbs. These plots will now be analysed to formulate the relationship between the phosphorus concentration, TP, and and the rate-of-change of discharge, the discharge. O. ∆Q/∆t.

Phosphorus transport Berg River

7

### Recession limb:

A plot of TP versus Q for data taken during the recession limbs of the hydrographs is shown in Fig 7.5. All the data plot in a fairly narrow band increasing linearly at a low rate as the discharge increases. The narrow band of dispersion indicates that on the recession limbs the rate-of-change of discharge has nealigible effect on the phosphorus concentration, and the low slope indicates that the flow has a relatively minor positive effect on TP. Thus in so far as the recession limbs of the hydrographs are concerned, it appears adequate to formulate the phosphorus concentration. TP, in Eq (7.1) as follows:

$$TP = AO + A1 Q$$
 ..... (7.3)

Writing Eq (7.3) in terms of the recession flow

TPr = a1 + b1 Qr ..... (7.4)

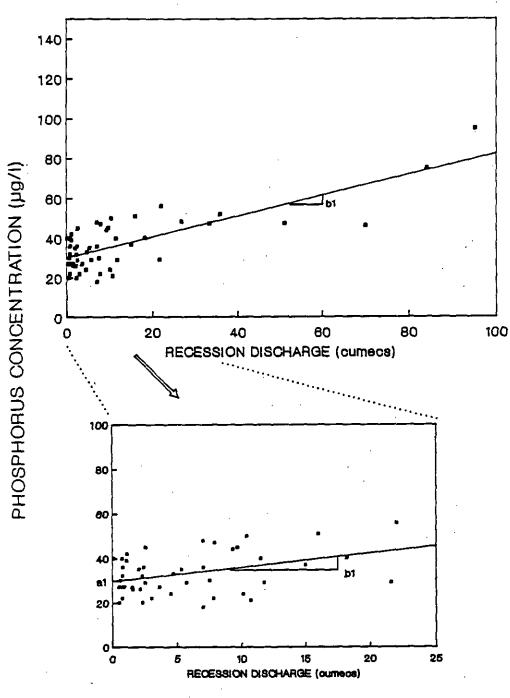
where

- Qr = river discharge (recession flow) in cumecs,
- TPr = phosphorus concentration (recession flow) in
  mg/1.

al 🤿 intercept (at Q=0 on Fig 7.4),

bl = slope constant.

In the (Q,  $\Delta Q/\Delta t$ , TP) diagram, Eq (7.4) (i.e. TP independent of  $\Delta Q/\Delta t$  and linearly dependent on Q) defines a TP plane surface parallel to the  $\Delta Q/\Delta t$  axis, at a slope bl to the Q axis. The plane is defined only for  $\Delta Q/\Delta t$  less than zero, see Fig 7.5(a).



## Fig 7.5.

2.2

Plot of the phosphorus concentration versus discharge for recession flow conditions at Station 9A. The intercept and slope of the regression line, al and bl are shown.

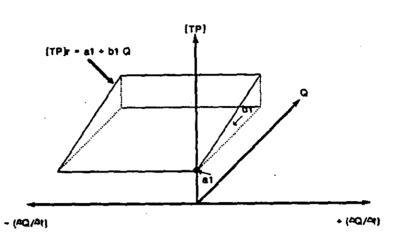


Fig 7.5(a) Phosphorus concentration plane for recession flow independent of  $\Delta Q/\Delta t$  but linearly dependent on Q, i.e. at a slope of bl on the Q axis and parallel to the  $\Delta Q/\Delta t$  axis. The plane is only defined for  $\Delta Q/\Delta t$  less than zero.

Terms al and bl were determined using the phosphorus data in the recession limb of the hydrograph, and under steady flow, using linear least squares regression (Program REGRESS - see Appendix 2). The analysis gave al=0.027 and bl=0.0053; these values formed initial numerical estimates of the constants.

Rising limb:

A plot of TP versus discharge for data taken during the rising limb of the hydrographs is shown in Fig 7.6. The TP values plot in a broad band indicating that either the TP values have a dispersed random content or the rate-of-change of discharge values have an effect on the TP values.

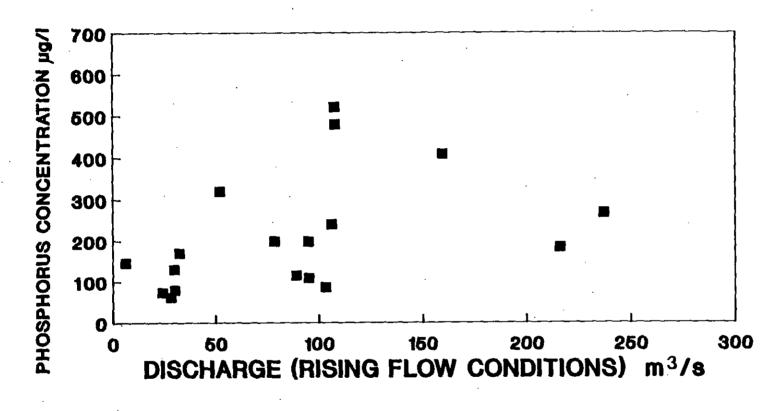


Fig 7.6.

Phosphorus concentration data plotted versus discharge during rising flow conditions.

7.35

To determine if there is any connection between the phosphorus concentration, the rate-of-change of discharge, and discharge, the discharge data were sorted into class intervals from: 20 to 40, 41 to 79, 80 to 110, and 111 to 170 cumecs. For each class, a plot, phosphorus concentration versus the rate-of-change of discharge, was made, shown in Fig 7.7. Clearly not only does TP depend on the  $\Delta Q/\Delta t$  (indicated by the slopes) but TP also depends on the instantaneous discharge, Q (indicated by the shift in the Q-plots). At high discharge the effects of  $\Delta Q/\Delta t$  on TP is relatively small and at low discharge the effect is large.

To formulate the relationship between TP and Q and  $\Delta Q/\Delta t$  for the rising limb it is apparent that when  $\Delta Q/\Delta t=0$  then

$$TPs = TPr \qquad \dots \qquad (7.5)$$

where

For  $\Delta Q/\Delta t$  greater than zero, from the plots in Fig 7.7, it is apparent that not only is TPs a function of  $\Delta Q/\Delta t$  but also of Q. We could write

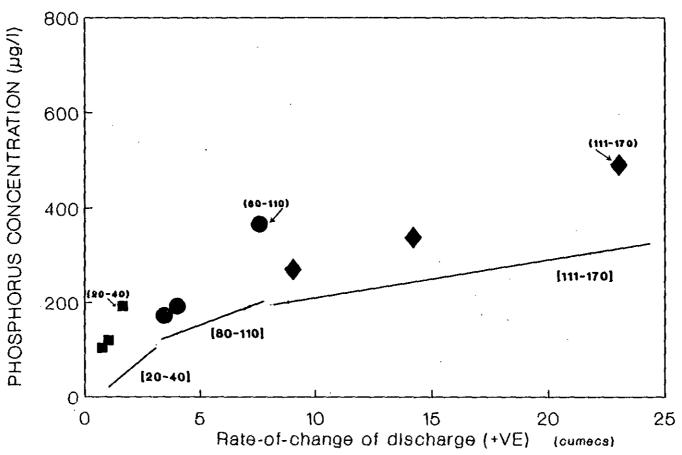
 $TPs = TPr + b2 (\Delta Q/\Delta t)$  (7.5a)

where b2 is a function of discharge, Q.

A number of formulations for b2 were attempted. Initially a linear relationship with Q was suggested i.e.

b2 = a3 + b3 Q ..... (7.6)

TPs = phosphorus concentration for rising flow limb (mg/l).





Measured and predicted phosphorus concentration data plotted versus the rate-of-change of discharge during the ascending limb of flood hydrographs. The data are grouped into class intervals of discharge with the ranges shown in brackets. The solid line shows the theoretical relationship using Eq (7.8) with constant values obtained from an optimization technique using all available data on the ascending limb of the flood hydrograph. .17

However, Eq (7.6) would imply that if b3 is negative the possibility exists that at high discharges b2 could be negative and conflict with the recession flow behaviour. Accordingly an exponential formulation was proposed because with appropriate sign for the constants the value of b2 can not decrease below zero. Accept

b2 = a3 EXP (b3 Q)

..... (7.7)

where a3 and b3 are constants.

Thus for rising flow conditions ( $\Delta Q/\Delta t > 0$ ), from Eqs (7.4, 7.5 and 7.7)

 $TPs = (a1 + b1 Q) + (a3 EXP (b3 Q)) (\Delta Q / \Delta t) ... (7.8)$ 

where

| Q   | = | instantaneous river discharge,          |
|-----|---|---|
| TPs | ⊐ | instantaneous phosphorus concentration. |

In determining the numerical values for al, bl and a3, b3, preliminary values of al and bl would be available from analysis of the data on the recession limbs of the hydrographs (Eq 7.4, see Fig 7.5). Terms a3 and b3 can be determined from data on the rising limbs, such as presented in Figs 7.6 and 7.7, using curvilinear regression analysis (program REGRESS, see Appendix 2).

This analysis gave a3=0.01 and b3=-0.003. These values for al, bl and a3, b3, must be considered as first estimates. To obtain improved estimates, Eqs (7.4 and 7.8) were incorporated in the program NPSM (see Appendix 2) to simulate a time sequence plot of phosphorus data (chemograph) from the observed time sequence of flow data (hydrograph).

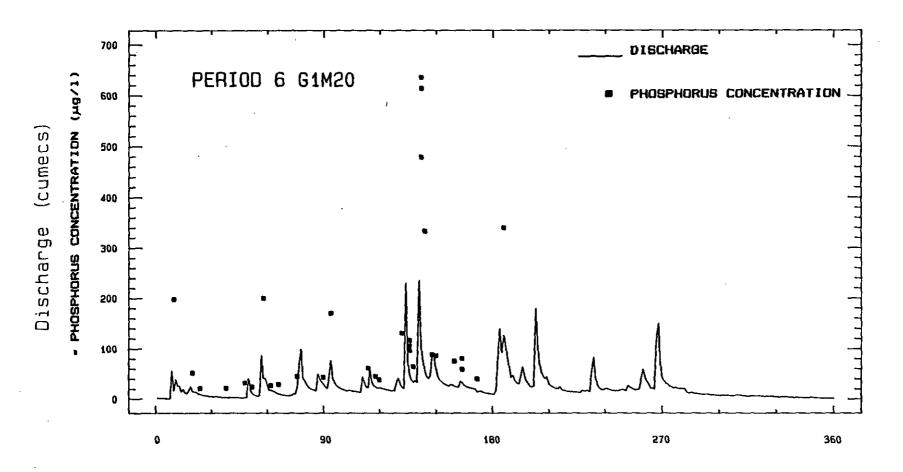
# 1.3 Adequacy of NPS model formulation

Having accepted a mathematical structure it was necessary to check whether the mathematical formulation of the nonpoint source model is adequate. To accomplish this one period of 180-days was selected to cover both high and low river flow, Period 6. The water quality and flow data set for this period is one of the most comprehensive on the Berg River. The hydrograph over the calibration period and measured phosphorus concentration data are shown in Fig 7.8.

Using the hydrograph and program NPSM the phosphorus chemograph was simulated for Period 6, see Fig 7.9. Comparison of the observed discrete phosphorus measurements with the corresponding simulated values showed that the model predicts the same pattern as the measured — the model formulation as expressed by Eqs (7.4 and 7.8) appeared to be acceptable.

The behavioural pattern exhibited by the formulation is best described by the three dimensional plot  $(Q, \Delta Q/\Delta t, TP)$ in Fig. 7.10. Under rising flow conditions, at higher Q the slope of the surface with respect to  $\Delta Q/\Delta t$  is lower and at lower Q the slope is higher. That is, at higher flows the effect of the rate-of-change of flow is much less then at lower flows. Under recession conditions the  $\Delta Q/\Delta t$  has no effect.

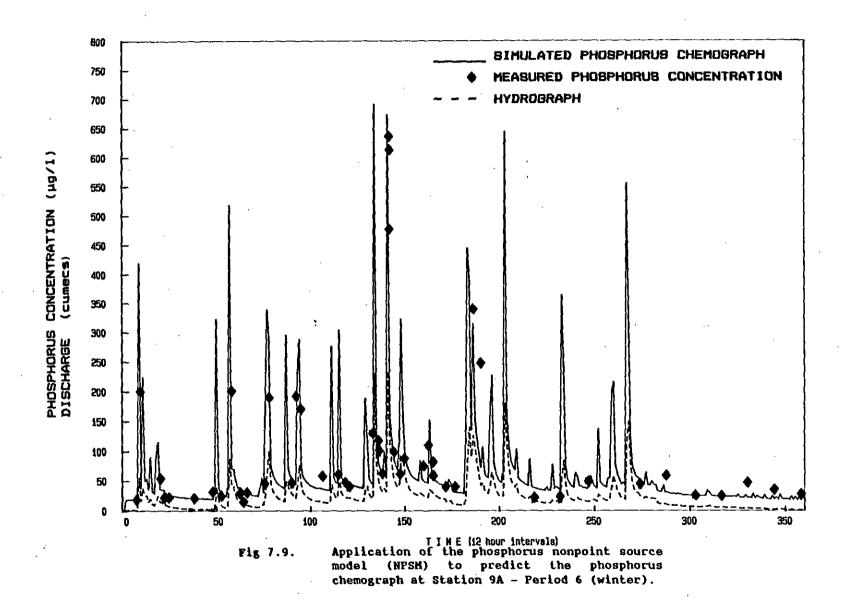
Comparing the behavioural form suggested by Johnson <u>et al</u>. (1976) (Eq 7.1 shown in Fig 7.4(c)) and that proposed here (Eqs 7.4 and 7.8, and Fig 7.10) it would seem that the proposal of Johnson <u>et al</u>. (1976) was a most useful one but the relationships between variables are more complicated then envisaged in their model.



# Time (intervals of 12-hours)

Plot of the hydrograph and associated phosphorus concentration data for Station 9A ~ Period 6.

Fig 7.8.



2

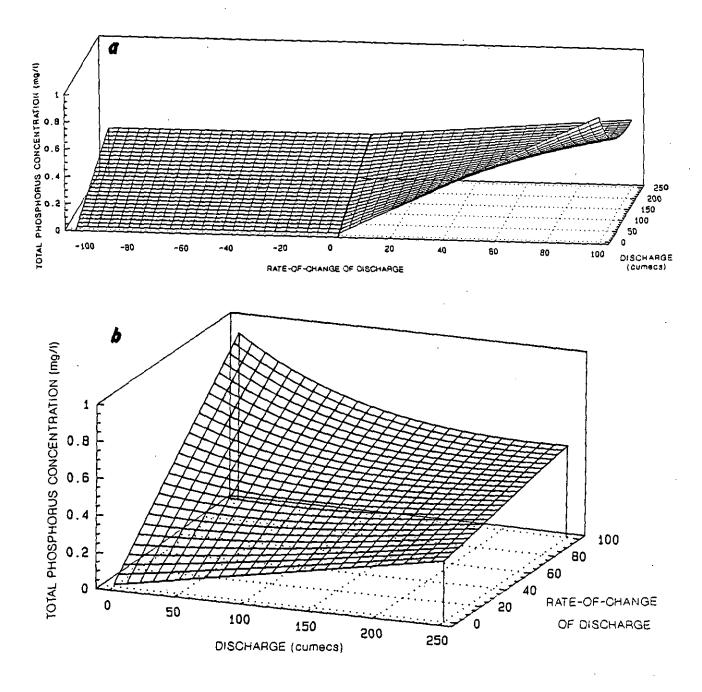


Fig 7.10. (a) Hypothetical three-dimensional surface for the relationship between total phosphorus concentration, river discharge and the rate-of-change of discharge. (b) Example of surface viewed from the discharge/IP plane for positive rate-of-change of discharge.

### 1.4 NPS model optimization

Although we have developed an apparently adequate mathematical model in terms of which the behaviour of total phosphorus export from a nonpoint source can be described, the constants in the formulation had not been determined optimally.

To obtain optimal values for the constants al, bl and a3, b3 over Period 6 the following procedure was used:

- (1) Accepting a3 and b3, a matrix of perturbed values of al and b1 were simulated until the best visual fit between simulated and observed TPs were obtained over the recession and low steady state flow periods. To facilitate comparison, the measured TP and simulated chemograph of TP were plotted on an extended time scale. The matrix of al and b1 values tested are shown in Fig 7.11; the best values were judged to be a1=0.015 (mg/2) and b1=0.0013 (mg/2/cumec).
- Having optimized al and bl, a matrix of perturbed (2) values of a3 and b3 were tested to obtain the best fit between the measured peak and simulated peak TPs values (phosphorus measurements at the peak flows were be critical to calibrating the model found to optimally over a flood event). The optimal values were judged to be a3=0.009 and b3=-0.007. Referring to Fig 7.7 which supplied data for the prelimanary estimates of a3 of b3, the slopes using the optimal values of a3 and b3 are also shown. Although there appears to be a significant difference it must be remembered that the optimal values of a3 and b3 were obtained by using a large number of data minimizing the residual error.

Using program NPSM over the time Period 6 of 180-days (wet period) with the estimated values for al, bl and al, bl, a simulation of the phosphorus chemograph is shown in Fig 7.9, together with the measured TP values and measured hydrograph. In Fig 7.12(a) a number of flood hydrograph peaks are enlarged to show more clearly the correspondence between the simulated

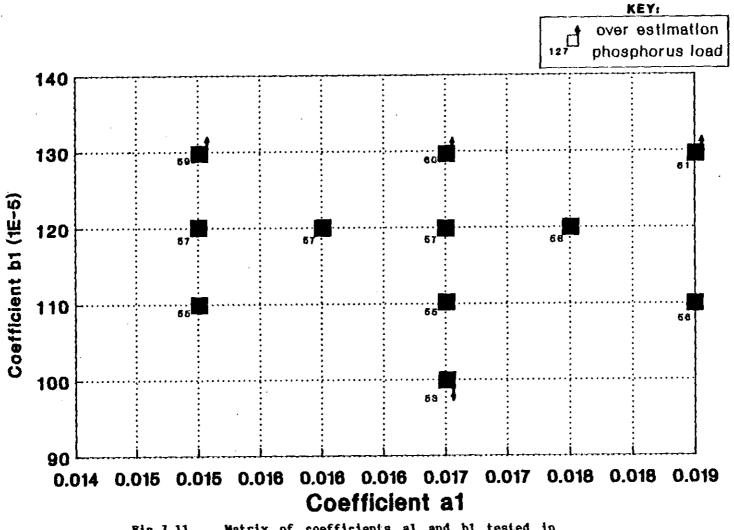
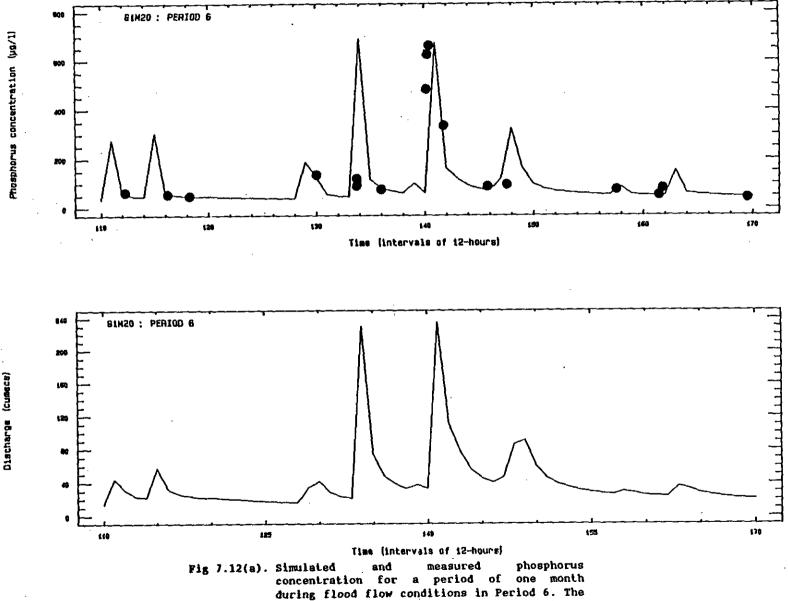


Fig 7.11. Matrix of coefficients al and bl tested in the calibration of the nonpoint source model. The values shown at matrix point indicate the total mass of phosphorus exported during Period 6. Arrows indicate over-estimation or under-estimation by the model.

.24





TR 143 March 1989

. 25

and measured phosphorus concentration. From the plot in Fig 7.12(a), the simulated and measured phosphorus concentrations are in reasonable accord. To check for the whole of Period 6, a correlation plot of measured versus predicted data is shown in Fig 7.12(b).

# 1.5 NPS Model Verification

To obtain some measure of verification of the model the phosphorus chemograph at Paarl (Station 9A) was simulated over the balance of the monitoring period (Periods 1 to 5 - from November 1983 to November 1986) using

- (1) the measured channel hydrograph at G1M20,
- (2) the coefficients pairs: al=0.015, bl=0.0013, and a3=0.009, b3=-0.007 obtained from analysis of Period 6.

Simulated and measured phosphorus concentrations at Paarl are shown in Figs 7.13 to 7.17. These plots are useful in producing an overall assessment of the behaviour of the model.

To obtain a quantitative assessment of the predictive power of the model, a correlation plot for the simulated and measured phosphorus concentrations is shown in Fig 7.18. This plot illustrates the close correspondence between the simulated and measured phosphorus concentrations over the three year period, the concentrations ranging from 20 to 700  $\mu$ g/2.

Having calibrated and verified the model the simulated phosphorus chemograph and measured hydrograph can be used to estimate the phosphorus load over any of the six periods, or indeed any selected period. Program NPSM provides this facility for load estimation. With the final values for al, bl, a3, and b3, the load estimates for Period 1 to 6 are:

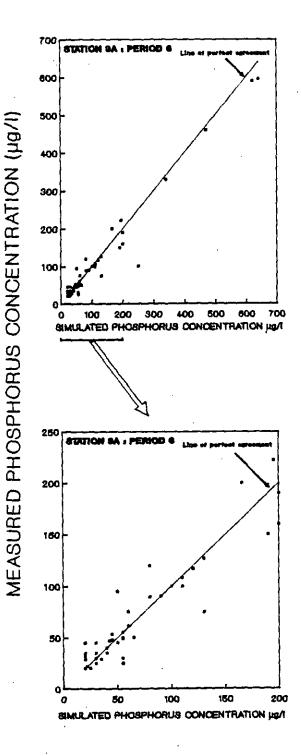
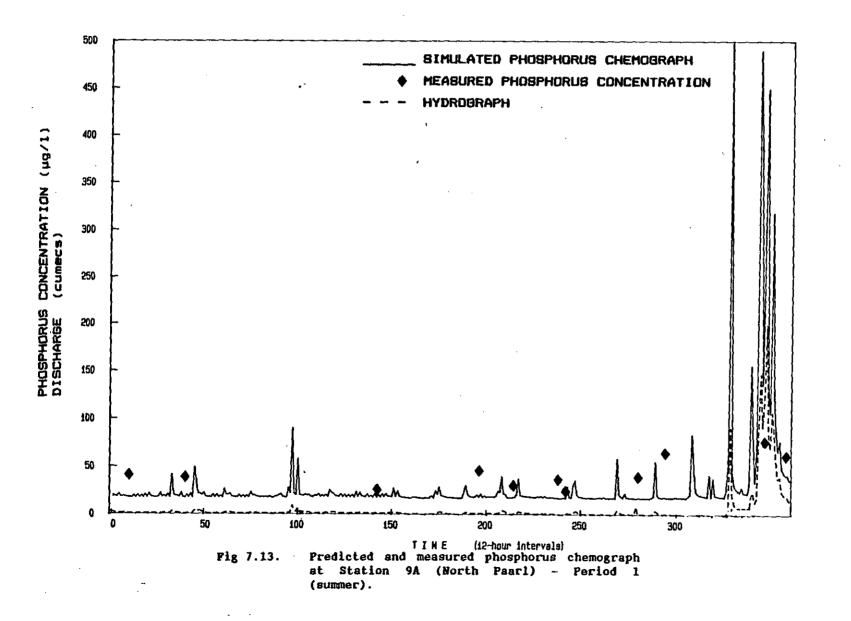


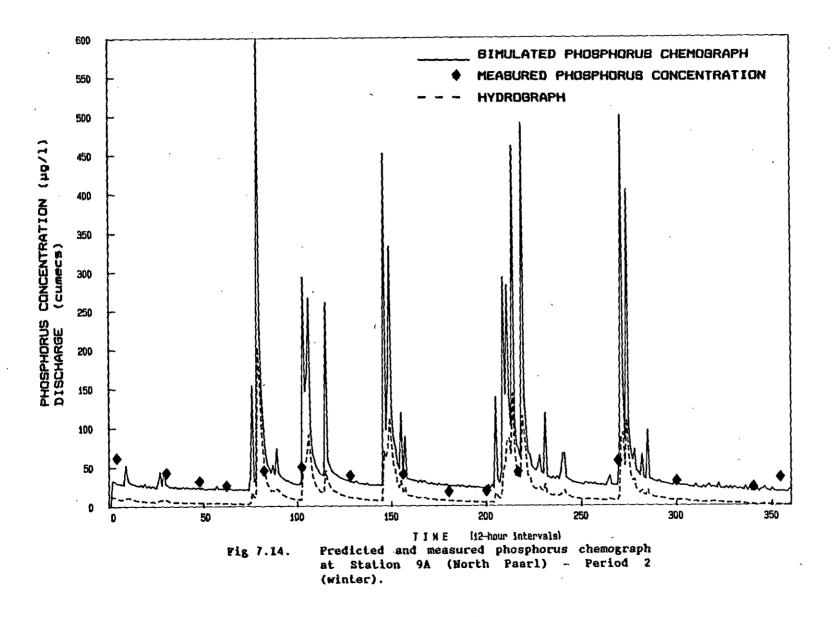
Fig 7.12(b). Plot of the simulated versus measured phosphorus concentration for Station 9A (North Paarl). Simulated values are predicted using the phosphorus nonpoint source model (NPSM) - Period 6.

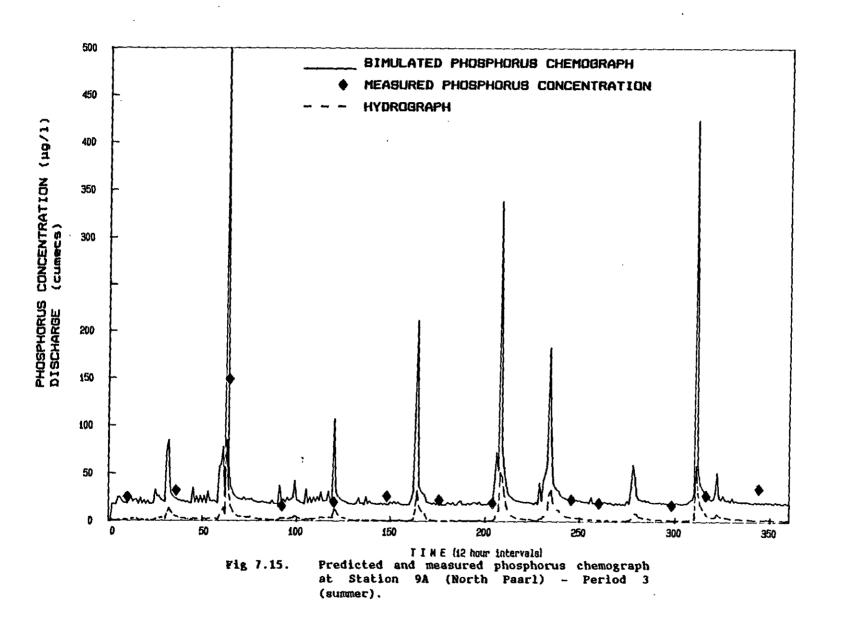


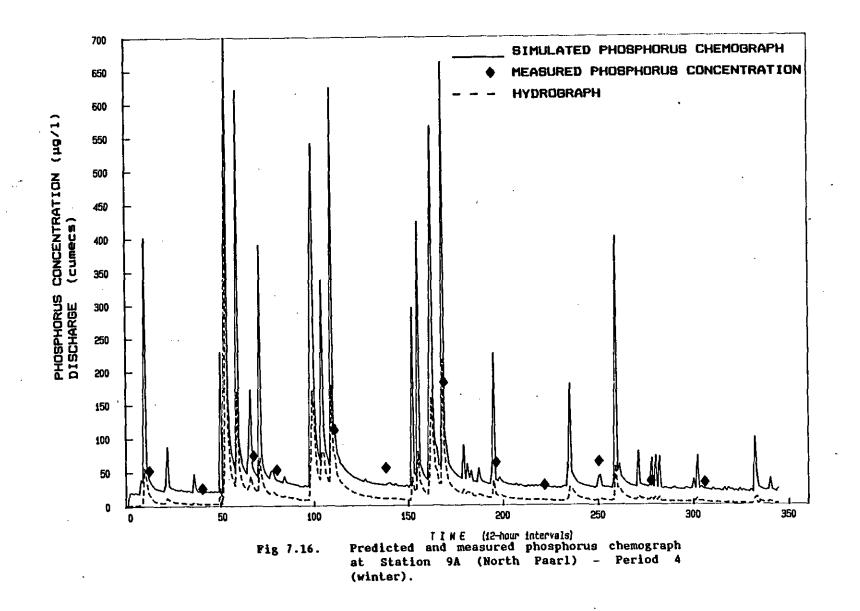
ب در محمد محمد و ا

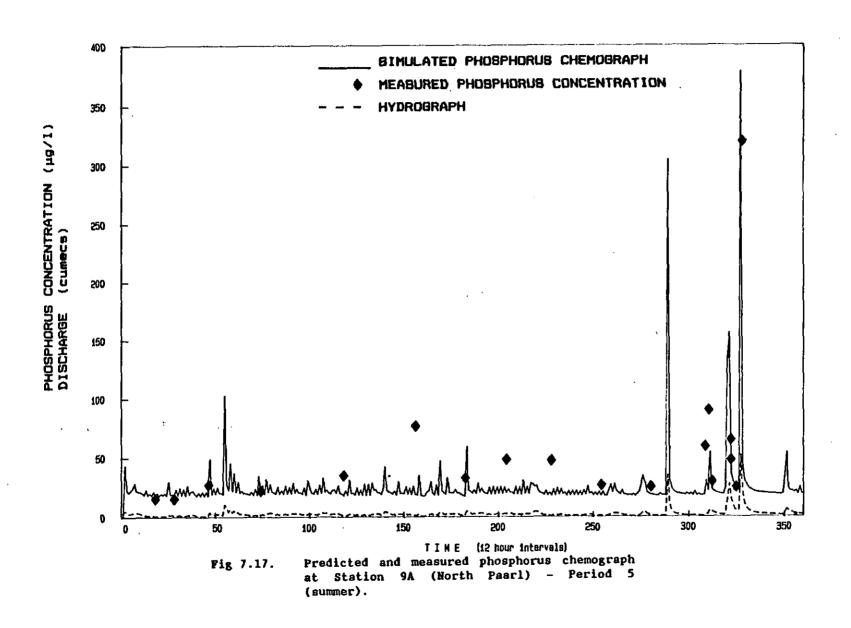
.

. .









1

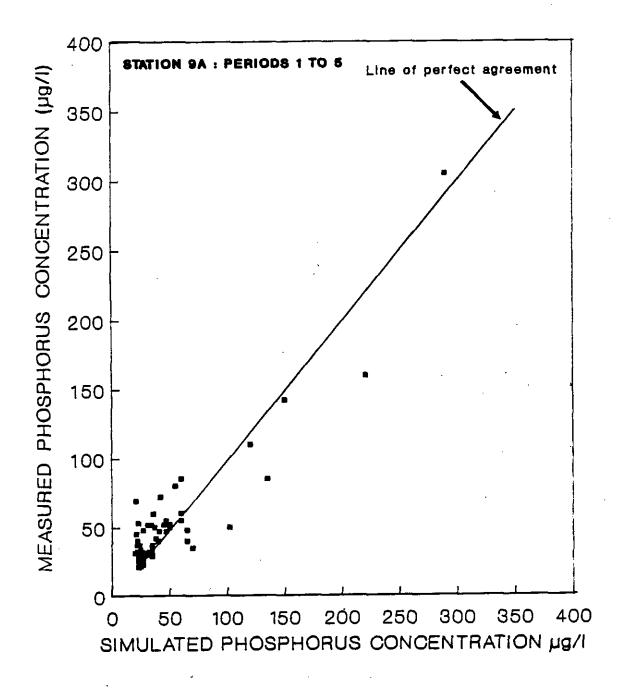


Fig 7.18.

Ś\*,

Plot of the simulated versus measured phosphorus concentration for Station 9A (North Paarl). Simulated values are predicted using the phosphorus nonpoint source model (NPSM) - Periods 1 to 5.

| Period: | TP load estimate:<br>(tons/180 days) |
|---------|--------------------------------------|
| 1       | 17.2                                 |
| 2       | 34.7                                 |
| 3       | 5.6                                  |
| 4       | 57.0                                 |
| 5       | 2.0                                  |
| 6       | 57.8                                 |

The sensitivity of the load estimates to changes in the constants can be seen in Fig 7.11 for Period 6. It is of interest to note that the estimates marked "high" or "low" in the figure corresponded with chemograph simulations, that visually were clearly over- or under-predicting with regard to the measured phosphorus concentrations.

# 1.6 Application to tributaries

The NPS model was applied to the gauged tributaries, the Krom, Kompagnies and Klein Berg Rivers as well as the Sandspruit (Stations 14B, 17B, 23A, 23B respectively). The procedure to determine al, bl and a3, b3 was as follows:

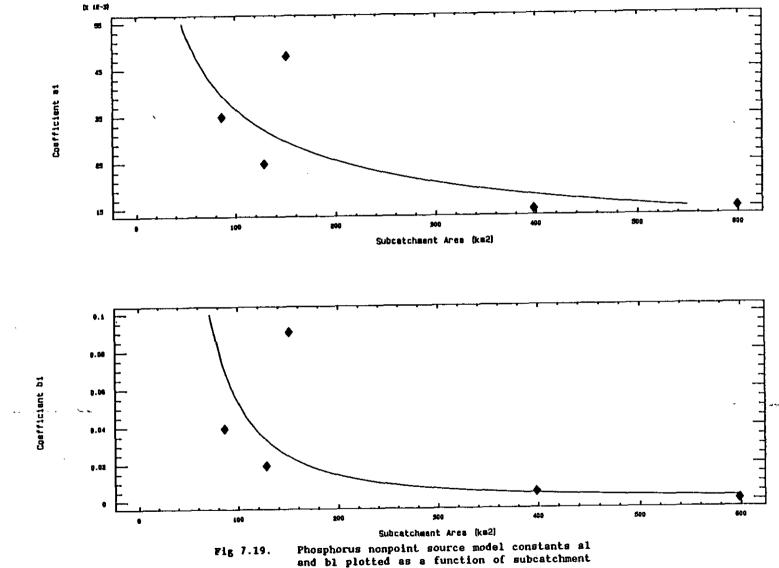
Using Program NPSM, the model was run using the measured hydrograph for the subcatchments and the constant values derived for Station 9A as inputs. Comparing the measured and the simulated TP values, first al and bl were modified until the simulated TP values over the recession and steady flow regions compared as closely as possible to the measured TP. Accepting these values for al and bl, the a3 and b3 values were modified until correspondence was attained between the observed and simulated flood flow TP values.

| Coefficients:<br>Units:<br>River: | a]<br>(mg/l) | b1    | a3<br>(mg/£) | b3  |  |
|-----------------------------------|--------------|-------|--------------|-----|--|
| Krom                              | .035         | .04   | .009         | 007 |  |
| Kompagnies                        | - 025        | .02   | .009         | 007 |  |
| Klein Berg                        | - 015        | .004  | .009         | 007 |  |
| Sandspruit                        | .040         | .09   | .009         | 007 |  |
| Berg at 9A                        | .015         | .0013 | .009         | 007 |  |

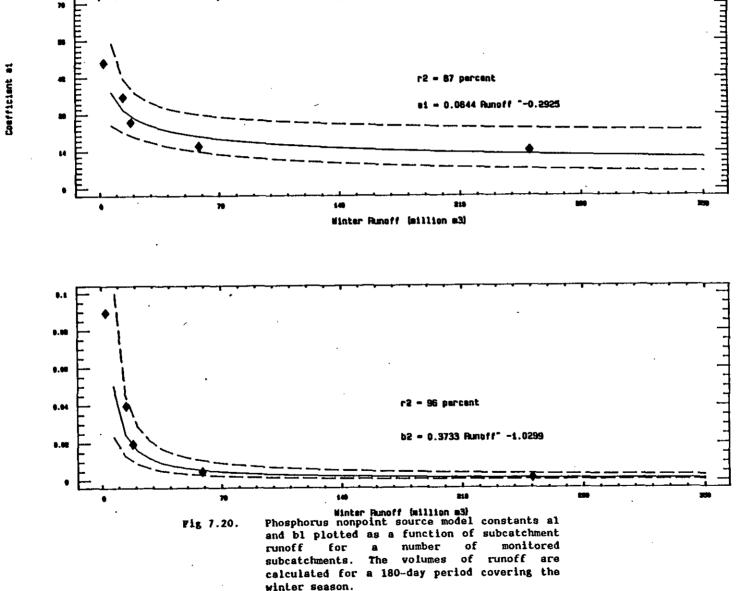
Table 7.1 Optimum values for coefficients al, bl and a3, b3 in the NPS model.

The best values for al, bl and a3, b3 for the four tributaries are shown in Table 7.1. The constants a3 and b3 in Eq (7.8) do not show any marked variation between subcatchments, implying that the processes responsible for the export of phosphorus during the beginning of storm events are similar for the different subcatchments.

The constants al and bl, exhibit different values for each of the subcatchments. The wide ranges of values for al and bl were a matter of concern because it implied that no estimates were possible for an ungauged unmonitored area. However, Prairie and Kalff (1986) reported that the size of catchment and hydrology will directly influence the export of phosphorus. Accordingly, the constants al and bl were plotted versus the total subcatchment area and total subcatchment winter runoff (for 180-day period). The plot with subcatchment area exhibit appreciable scatter (Fig 7.19), whereas the plot with winter runoff indicate a definite relationship, see Fig 7.20.



area for a number of monitored subcatchments.



Coefficient bi

Q: 18-38

Phosphorus transport Berg River

Clearly the constants all and bl which relate to the recession or low flow conditions decrease with total subcatchment runoff. The land use in these subcatchments are similar; it would seem that the relationship between constants

al and bl and winter runoff arises predominately from the hydrology.

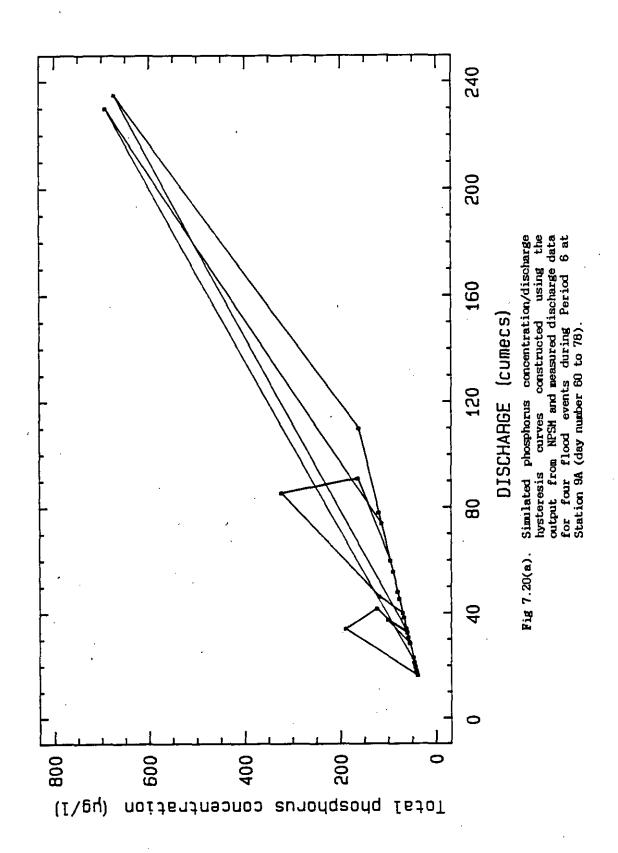
As the constants al and bl are strongly linked to the winter mass runoff and because the procedures for estimating discharge from ungauged areas are well developed (Chapter 6) the equations linking the values of al and bl (given in Fig 7.20) now can be used to calibrate the phosphorus transport model for ungauged subcatchments.

## 1.7 NPS model evaluation

It would seem that the modified looped phosphorus rating approach allows the development of an acceptable method for estimating the phosphorus concentration in both the rising and falling limbs of the flood hydrograph derived from a subcatchment draining nonpoint sources.

The model is largely empirical, yet it reproduces the behavioural patterns observed. By selecting a number of flood waves at station 9A the waves ranged from small to large, the thereotical chemograph could be calculated and the theoretical phosphorus concentration discharge hysteresis curves constructed (see Fig 7.20(a)). Note that the formulated hysteresis curves are functions of discharge and rate-of-change of discharge. The hysteresis effect exhibited by the plot of TP versus Q for a single flood event (Fig 7.3) is closely reproduced, see Fig 7.20 (b) and (c).

Perhaps of greater importance is that by gaining familiarity with the TP responses over a range of conditions it might stimulate the development of mechanistic models that may, in time, provide models of greater power then this one. This is indeed what happened even while developing the model described above, as shall be shown in Section 2 below.



7.39

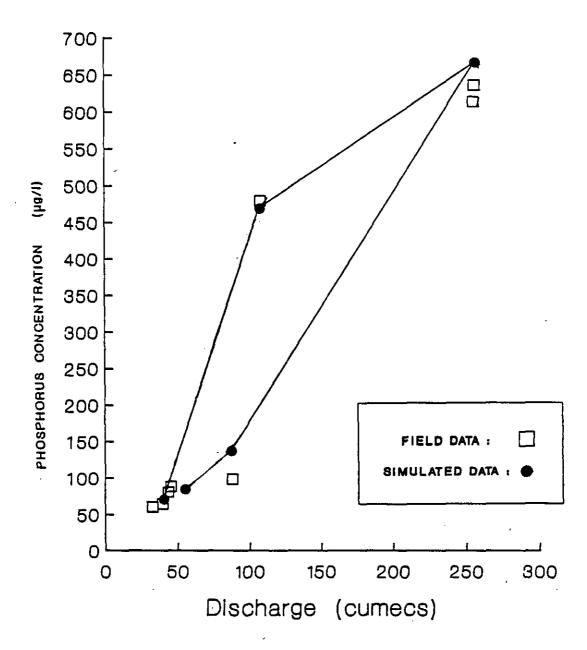
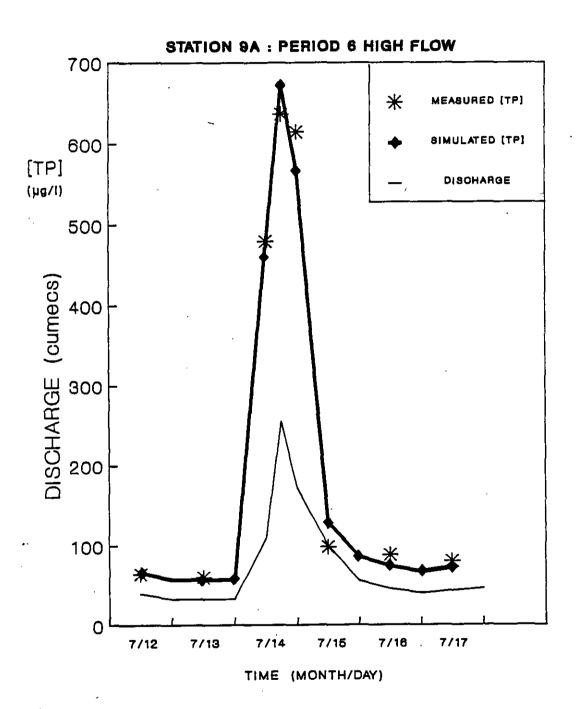


Fig 7.20(b). Measured phosphorus concentration versus discharge showing the hysteresis effect during one flood event. The solid line shows the simulated hysteresis produced by the phosphorus nonpoint source model (NPSM).

7.40



and simulated phosphorus Fig 7.20(c). Measured concentration data for a single flood event with of time, plotted as a function data. simulated The associated discharge phosphorus concentrations are derived from the phosphorus nonpoint source model (NPSH).

### 2 NPS MODELLING USING HYDROGRAPH DECOMPOSITION APPROACH

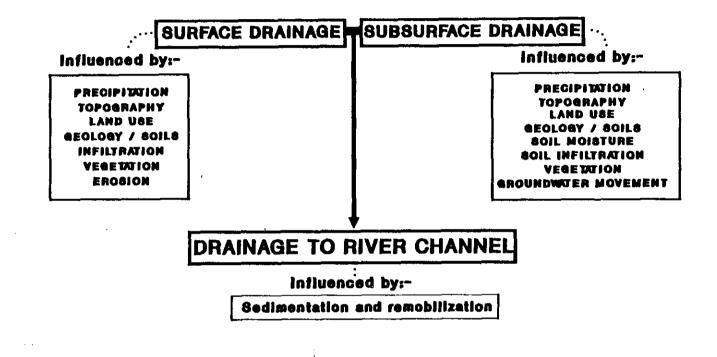
- A TENTATIVE APPROACH -

In the development and application of the looped phosphorus discharge rating nonpoint source model we have seen that the instantaneous phosphorus concentration can be modelled in terms of the instantaneous discharge and the rate-of-change of discharge. By means of the latter parameter, the effect of the flow on the rising or falling limbs of the hydrograph could be separated out - two functional relationships were incorporated to describe the total phosphorus in the rising flow and recession flow conditions. We shall now attempt, subjectively, to explain the variation in phosphorus concentration with discharge on the rising and falling limbs of the hydrograph by decomposing the hydrograph into two components - surface and subsurface drainage.

Depending upon the rate at which rain falls, the water either infiltrates completely into the soil or a fraction remains on the surface to produce surface runoff. If the rainfall intensity (neglecting interception, evaporation and deep infiltration losses) is less than the infiltration capacity, all the water will enter the soil profile, ultimately to reach the river as subsurface drainage. However, if the rainfall intensity is in excess of the soil-infiltration rate, a sequence of events occurs, ultimately producing surface runoff: excess water produced by a high-intensity rain first satisfies the interception requirements. When the surface depressions are filled, the surface water begins to move down the slopes in thin films and tiny streams. During this stage, overland flow is influenced by surface tension and friction forces. The paths of the small streams are tortuous and even small obstructions give rise to the resistance of flow until sufficient head is built up to overcome this resistance. Each time the streams merge, the water accelerates on its downhill path increasing the erosion effect, carrying particulate material. These effects in conjunction with the area, shape and slope of the subcatchment give rise to the resultant shape of the surface runoff hydrograph and chemograph at a selected point in the path of flow. In addition, seepage from subsurface drainage will give rise to a base flow hydrograph and baseflow chemograph.

After the rain ends the surface runoff will continue until the discharge per unit surface area is exceeded by the infiltration rate (Gray, 1962; Kersandt and Marais, 1973).

The surface runoff usually contains a high concentration of suspended soil particles including particulate phosphorus, associated with the detachment of soil particles (Cooke, 1988). Logan (1982) estimates that greater than 75 percent of the phosphorus in surface generated runoff from agricultural land is in the particulate form, that is, a minor fraction of phosphorus in surface runoff is in the soluble form. In contrast, subsurface drainage flow will contain virtually no particulate phosphorus because of the filtering action of the water percolating through the soil horizons (Cooke, 1988). Furthermore the subsurface drainage will contain only a small concentration of soluble phosphorus; this concentration is derived from dissolution and desorption processes within the are relatively slow processes compared to soil. which precipitation and adsorption (Logan, 1982). Thus, there are two principle pathways for phosphorus export from drainage basins: transport of principally particulate phosphorus associated with surface runoff and, transport of soluble phosphorus derived principally from subsurface runoff (Logan, 1982), see Fig 7.21.



# Fig 7.21.

Conceptual framework for the release of phosphorus from nonpoint sources.

TR 143 March 1989

7,44

1 T 17 M

\*\* \*

### 2.1 Hydrograph decomposition

3

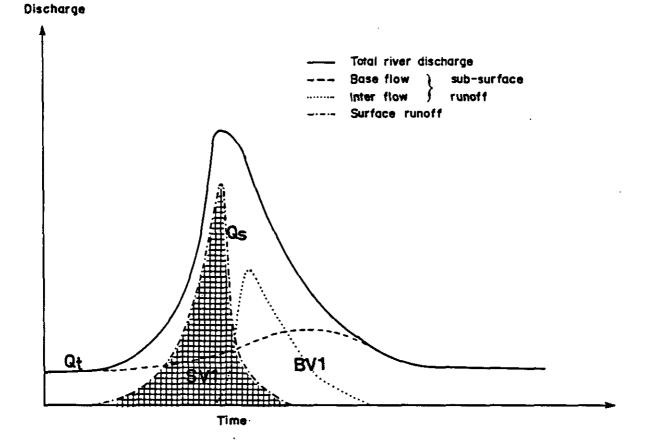
In Fig 7.22, a hypothetical hydrograph is shown composed of three sub-hydrographs: a surface runoff hydrograph, an interflow hydrograph, and a baseflow hydrograph. The summation of these component hydrographs constitutes the discharge hydrograph as measured at the gauging weir.

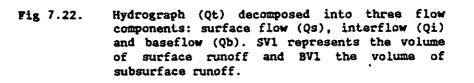
Traditional hydrograph separation procedures (Linsley, Kohler and Paulhus, 1975) are essentially empirical; for example they plot the total hydrograph on semi-logarithmic paper and insert three straight lines to accommodate surface runoff, surface runoff and interflow, and finally groundwater recession.

One rational way of separating the hydrograph into its constituent hydrographs is to make use of water quality parameters. The underlying idea is that water from different sources will possess different chemical characteristics and that the relative constituents of the different sources can be identified by measuring both the stream discharge and the chemical quality of the water in the stream (Kunkle, 1965; Pinder and Jones, 1969; Visocky, 1970).

Using the water quality approach to separate the hydrograph, the following assumptions are made:

(1) The phosphorus species in baseflow and interflow will be similar as the drainage is derived from similar catchment processes e.g. infiltration and percolation. Consequently, for modelling purposes interflow and baseflow can be lumped together giving the total subsurface drainage. The remaining portion of the hydrograph constitutes the surface drainage.





7.46

- (2) To separate the surface runoff hydrograph (SV2 in Fig 7.23) from the subsurface hydrograph (BV2 in Fig 7.23) requires: (1) the determination of the baseflow, Qb, during the beginning of the flood event when the total discharge, Qt, is the product of surface runoff, Qs, and baseflow Qb; (11) the recession curve of the surface runoff hydrograph after peak flow. By satisfying both these requirements it is possible to isolate the surface runoff hydrograph, SV2 in Fig 7.23.
- (3) Baseflow discharge, Qb, is related to the total discharge, Qt, shown in Fig 7.23, by

$$Qb = f(Qt kb)$$
 ..... (7.9)

where kb is a proportionality constant.

Equation (7.9) is formulated on the basis that a fixed relationship exists between the discharge rate of basflow and total river discharge (Linsley <u>et al.</u>, 1975).

(4) Recession of the surface runoff hydrograph, Qs, shown in Fig 7.23, is described by

dQs/dt = -ks Qmax .... (7.10)

where

ks is the surface runoff depletion coefficient, Qmax is the peak surface runoff.

Equation (7.10) is based on the assumption that the depletion rate of the surface runoff hydrograph will closely correspond to the depletion rate of the total runoff (Qt) (Linsley et al., 1975).

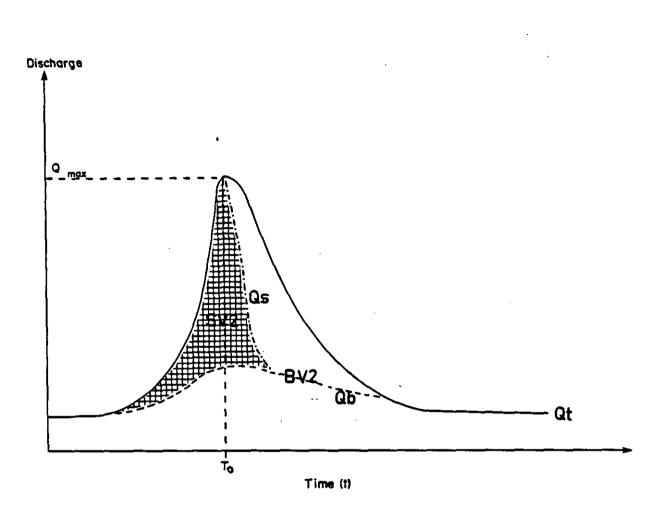


Fig 7.23. Hydrograph divided into component hydrographs (with the same notation as in Fig 7.22). Where SV2 represents the volume of surface runoff and BV2 represents the summation of the interflow and baseflow (subsurface runoff).

- (5) The volume of surface runoff represented by the terms SV1 (in Fig 7.22) and SV2 (in Fig 7.23) are approximately equal.
- (6) During steady flow conditions the baseflow is equal to the total flow in the river.
- (7) The areas BVI (in Fig 7.22) and BV2 (in Fig 7.23) making up the combined drainage from interflow and baseflow are approximately equal in volume.

Equation (7.9 and 7.10) are solved as follows:

F. 6

(1) For Eq (7.9) the following explicit form is proposed

$$Qb = a Qt^{KD}$$
 ..... (7.11)

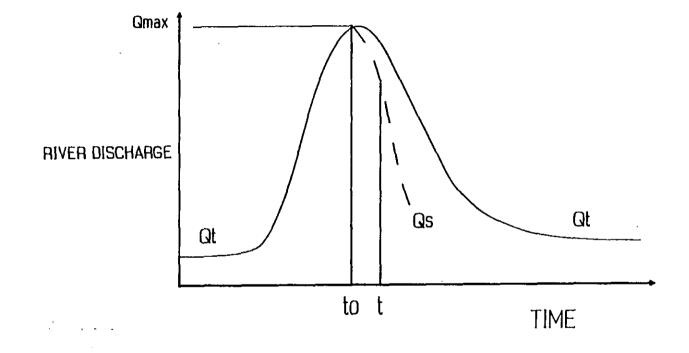
where a and kb are constants and both <1.

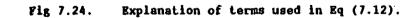
(2) The recession limb of the surface runoff, Qs, is measured from the time elapsed from peak surface runoff, Qmax. The solution is,

Qs = Qmax EXP [ks (to-t)] .... (7.12)

### where

| to,  | = | time of peak flow and                      |
|------|---|--|
| t    | = | time elapsed since peak flow, see Fig 7.24 |
| ks   | = | negative constant,                         |
| Qmax | = | peak surface runoff (at to).               |





Phosphorus transport Berg River

-

ť

For the purposes of the simulation exercise values were selected for the constants ks, and a and kb that essentially were dictated by subjectivity:

The constants kb and a were selected after applying sets of these values to a particular hydrograph and choosing the set that appeared to conform to expectations, giving kb=-0.045 and a=20.

During the collection of the water quality data it was found that the phosphorus concentration diminished to 10 percent of the peak flow concentration within hours after peak flood flow. It was presumed therefore that, the surface runoff hydrograph should show a similar depletion rate; accordingly, constant ks Eq (7.12) was adjusted to give a very rapid reduction in the surface runoff after peak flow, ks=-1.4.

To obtain scientifically based estimates of these constants would require a detailed investigation into the relationships between surface and subsurface flow. This however, was not attempted because the purpose of this simulation exercise was only to illustrate a potentially useful approach to phosphorus export from nonpoint sources, see below.

### 2.2 Chemograph decomposition

Having separated the hydrograph into surface and subsurface runoff, the next stage is to determine an equation which describes the phosphorus concentration of each flow component i.e. chemograph decomposition. The following methods and assumptions were used:

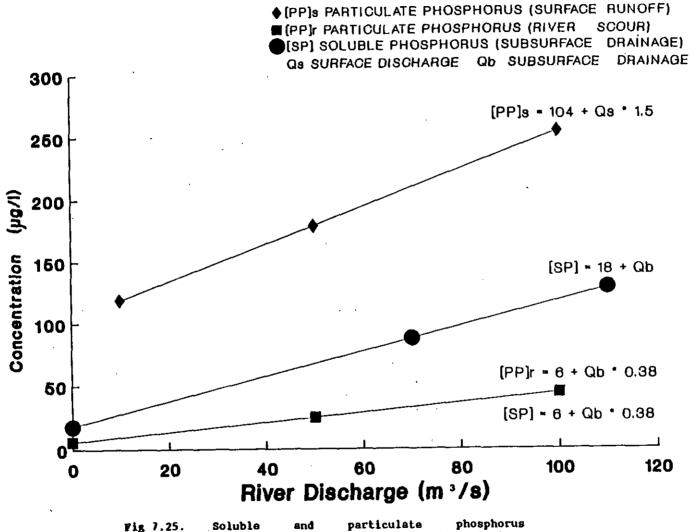
ł

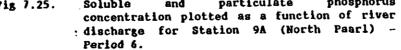
- (1) The phosphorus in drainage basins is in two forms: mobile and fixed. The mobile phase represents the transported 1n the river. either as phosphorus particulate or soluble material; the fixed phase represents the phosphorus in the soils and immobile sediments. riverbed The particulate phosphorus concentration is estimated as the difference between measured total phosphorus concentration the and soluble phosphorus concentration.
- (2) Particulate phosphorus, PP, is principally derived from surface runoff (Logan, 1982), it is assumed that the concentration delivered from this source is proportional to surface discharge, Qs (Cooke, 1988). The differential equation to describe particulate phosphorus export from the catchment surface is given by

$$d[PP]/dQs = ksp [PP]$$
 .... (7.13)

Equation (7.13) is solved by plotting the particulate phosphorus concentration as a function of surface runoff, illustrated in Fig 7.25. The surface runoff is determined using Eqs (7.11 and 7.12). The slope of the line is equal to the constant, ksp, determined using regression analysis (program REGRESS - Appendix 2).

(3) The soluble phosphorus concentration, [SP], is influenced by adsorption, desorption, biotic uptake, dissolution and organic decay (Logan, 1982). It is assumed that these processes can be lumped together as the export rate of soluble phosphorus to the river is proportional to the subsurface flow rate (Qb), see Eq (7.11). The subsurface flow rate is accepted as equal to the sum of the baseflow and interflow.





- (2) To separate the surface runoff hydrograph (SV2 in Fig 7.23) from the subsurface hydrograph (BV2 in Fig 7.23) requires: (1) the determination of the baseflow, Qb, during the beginning of the flood event when the total discharge, Qt, is the product of surface runoff, Qs, and baseflow Qb; (11) the recession curve of the surface runoff hydrograph after peak flow. By satisfying both these requirements it is possible to isolate the surface runoff hydrograph, SV2 in Fig 7.23.
- (3) Baseflow discharge, Qb, is related to the total discharge, Qt, shown in Fig 7.23, by

$$Qb = f(Qt kb)$$
 ..... (7.9)

where kb is a proportionality constant.

Equation (7.9) is formulated on the basis that a fixed relationship exists between the discharge rate of basflow and total river discharge (Linsley <u>et al.</u>, 1975).

(4) Recession of the surface runoff hydrograph, Qs, shown in Fig 7.23, is described by

dQs/dt = -ks Qmax .... (7.10)

where

ks is the surface runoff depletion coefficient, Qmax is the peak surface runoff.

Equation (7.10) is based on the assumption that the depletion rate of the surface runoff hydrograph will closely correspond to the depletion rate of the total runoff (Qt) (Linsley et al., 1975).

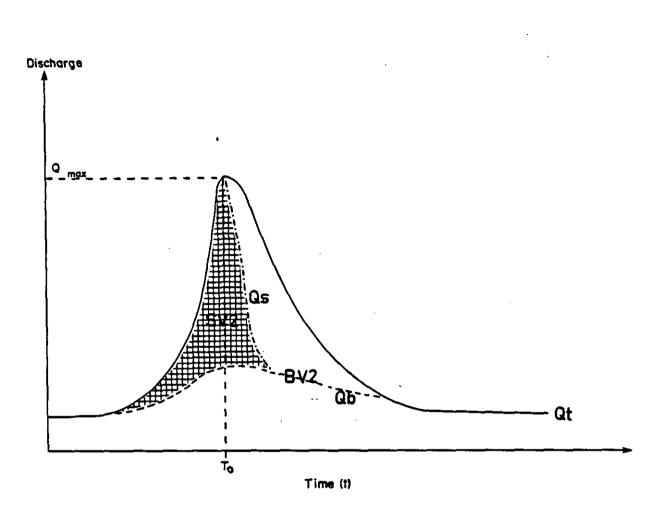


Fig 7.23. Hydrograph divided into component hydrographs (with the same notation as in Fig 7.22). Where SV2 represents the volume of surface runoff and BV2 represents the summation of the interflow and baseflow (subsurface runoff).

- (5) The volume of surface runoff represented by the terms SV1 (in Fig 7.22) and SV2 (in Fig 7.23) are approximately equal.
- (6) During steady flow conditions the baseflow is equal to the total flow in the river.
- (7) The areas BVI (in Fig 7.22) and BV2 (in Fig 7.23) making up the combined drainage from interflow and baseflow are approximately equal in volume.

Equation (7.9 and 7.10) are solved as follows:

F. 6

(1) For Eq (7.9) the following explicit form is proposed

$$Qb = a Qt^{KD}$$
 ..... (7.11)

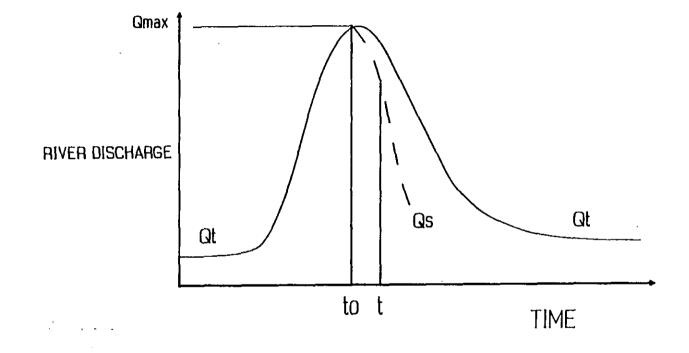
where a and kb are constants and both <1.

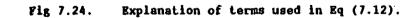
(2) The recession limb of the surface runoff, Qs, is measured from the time elapsed from peak surface runoff, Qmax. The solution is,

Qs = Qmax EXP [ks (to-t)] .... (7.12)

### where

| to,  | = | time of peak flow and                      |
|------|---|--|
| t    | = | time elapsed since peak flow, see Fig 7.24 |
| ks   | = | negative constant,                         |
| Qmax | = | peak surface runoff (at to).               |





Phosphorus transport Berg River

-

ť

For the purposes of the simulation exercise values were selected for the constants ks, and a and kb that essentially were dictated by subjectivity:

The constants kb and a were selected after applying sets of these values to a particular hydrograph and choosing the set that appeared to conform to expectations, giving kb=-0.045 and a=20.

During the collection of the water quality data it was found that the phosphorus concentration diminished to 10 percent of the peak flow concentration within hours after peak flood flow. It was presumed therefore that, the surface runoff hydrograph should show a similar depletion rate; accordingly, constant ks Eq (7.12) was adjusted to give a very rapid reduction in the surface runoff after peak flow, ks=-1.4.

To obtain scientifically based estimates of these constants would require a detailed investigation into the relationships between surface and subsurface flow. This however, was not attempted because the purpose of this simulation exercise was only to illustrate a potentially useful approach to phosphorus export from nonpoint sources, see below.

### 2.2 Chemograph decomposition

Having separated the hydrograph into surface and subsurface runoff, the next stage is to determine an equation which describes the phosphorus concentration of each flow component i.e. chemograph decomposition. The following methods and assumptions were used:

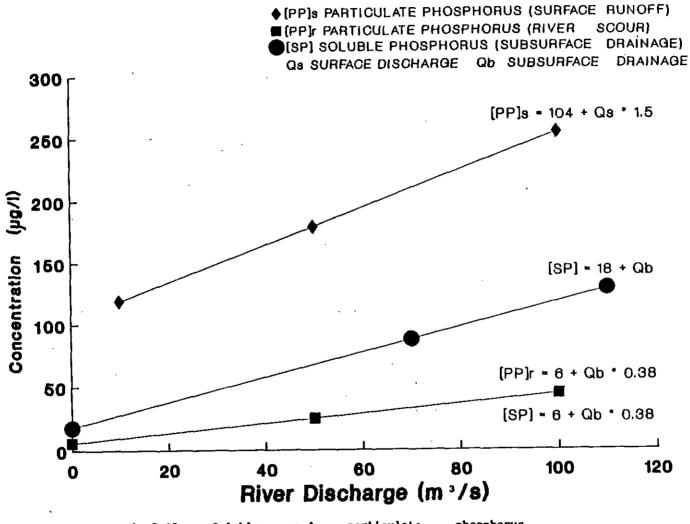
ł

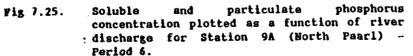
- (1) The phosphorus in drainage basins is in two forms: mobile and fixed. The mobile phase represents the transported 1n the river. either as phosphorus particulate or soluble material; the fixed phase represents the phosphorus in the soils and immobile sediments. riverbed The particulate phosphorus concentration is estimated as the difference between measured total phosphorus concentration the and soluble phosphorus concentration.
- (2) Particulate phosphorus, PP, is principally derived from surface runoff (Logan, 1982), it is assumed that the concentration delivered from this source is proportional to surface discharge, Qs (Cooke, 1988). The differential equation to describe particulate phosphorus export from the catchment surface is given by

$$d[PP]/dQs = ksp [PP]$$
 .... (7.13)

Equation (7.13) is solved by plotting the particulate phosphorus concentration as a function of surface runoff, illustrated in Fig 7.25. The surface runoff is determined using Eqs (7.11 and 7.12). The slope of the line is equal to the constant, ksp, determined using regression analysis (program REGRESS - Appendix 2).

(3) The soluble phosphorus concentration, [SP], is influenced by adsorption, desorption, biotic uptake, dissolution and organic decay (Logan, 1982). It is assumed that these processes can be lumped together as the export rate of soluble phosphorus to the river is proportional to the subsurface flow rate (Qb), see Eq (7.11). The subsurface flow rate is accepted as equal to the sum of the baseflow and interflow.





- The hysteresis effect, which up till now has not been (1)explained, is due to the dual-pathway of phosphorus associated with surface entering the river and subsurface drainage. The surface drainage delivers considerable quantities of particulate phosphorus at the beginning of a storm event. Once the surface runoff has diminished, the ortho-phosphate becomes the species due to the contribution of predominant phosphorus from subsurface drainage. The hysteresis effect therefore is caused by the change in dominance from surface to subsurface discharge, associated with rainfall induced flood events.
- (2) Phosphorus export from nonpoint sources is strongly runoff during storm events. linked to surface Indications are that the mass export is principally a function of the discharge under the rising limb of the affected significantly by not hydrograph and sequential storm events.
- Generally it has been assumed that the ratio between (3) (ortho-phosphate) total phosphorus and soluble (soluble and particulate) concentration is constant, prediction of the total phosphorus the hence the ortho-phosphate concentration bγ multiplying constant. This approach, to concentration by а generate total phosphorus from soluble ortho-phosphate data could lead to estimation errors. From the hydrograph/chemograph decomposition approach the ratio of total phosphorus to soluble phosphorus is not constant. The reason for this is that the particulate phosphorus and soluble ortho-phosphate concentrations are influenced by independent processes (Smith and Stewart, 1977). In Fig 7.28, the relationship between and particulate phosphorus 15 ortho-phosphate presented for Station 9A, showing the non-linear relationship between these chemical species and the wide scatter of data points.

The constant, kad, in Eq (7.14) is evaluated by plotting the soluble phosphorus concentration as a function of the basal runoff, illustrated in Fig 7.25. The slope of the line is equal to the constant, kad, and is determined by linear regression analysis.

(4) The particulate phosphorus transported in a river is also convected by scour of benchic material (Keup, 1962). The following differential equation is used to model the transport of particulate phosphorus as a function of the river discharge rate (Qt)

$$d[PP]/dQt = ks [PP]$$
 .... (7.15)

The constant ks in Eq (7.15) is evaluated by plotting the particulate phosphorus concentration data as a function of the total discharge, Qt, during low flow conditions, see Fig 7.25. The slope of the line is equal to the constant, ks, determined using regression analysis.

The equations described above are presented as a process-component matrix in Table 7.2, and programmed in NPSM-CON (see Appendix 2) to predict the chemograph of soluble and particulate phosphorus. As we are interested only in the mobile phase (export into the river) the mass transfer of phosphorus from the fixed phase is assumed to be unlimited in terms of the rate of supply. This assumption is supported by Johnson <u>et al</u>. (1976); they report that a only 1 percent of the annual phosphorus input via manure and fertilisers to a catchment is transported by rivers. Thus, the export of phosphorus from a catchment into a river channel is principally controlled by the transport processes shown in Table 7.2.

| Table 7.2 Mat<br>app                          | rix approa<br>lication. | ch to no               | inpoint sour             | rce model |
|---|-------------------------|------------------------|--------------------------|-----------|
| <u>Components on w</u>                        | hich the pro            | <u>cesses act</u> :    |                          |           |
| Process:                                      |                         | Part P in<br>in river: | Part P in<br>fixed phase | : Rate:   |
| Surface runoff                                |                         | +1                     | -1                       | Eq (7.13) |
| Net<br>sedimentation<br>and<br>remobilization | }                       | +1                     | -1                       | Eq (7.15) |
| Adsorption<br>Desorption<br>Dissolution       | } +1                    |                        | -1                       | Eq (7.14) |

## 2.3 Model calibration

To calibrate the model the calibration sequence mentioned in Sections 2.1 and 2.2 should be used; the constants ksp, kad, and ks can be expected to show variation between rivers as well as between river sampling stations.

## 2.4 Chemograph simulation

The soluble and particulate phosphorus chemographs at Paarl (G1M2O) were simulated for Period 6 (the only period with reliable soluble phosphorus concentration data) using

(1) the measured hydrograph at Paarl (G1M2O),

(2) the values for the constants shown in Fig 7.25.

- The hysteresis effect, which up till now has not been (1)explained, is due to the dual-pathway of phosphorus associated with surface entering the river and subsurface drainage. The surface drainage delivers considerable quantities of particulate phosphorus at the beginning of a storm event. Once the surface runoff has diminished, the ortho-phosphate becomes the species due to the contribution of predominant phosphorus from subsurface drainage. The hysteresis effect therefore is caused by the change in dominance from surface to subsurface discharge, associated with rainfall induced flood events.
- (2) Phosphorus export from nonpoint sources is strongly runoff during storm events. linked to surface Indications are that the mass export is principally a function of the discharge under the rising limb of the affected significantly by not hydrograph and sequential storm events.
- Generally it has been assumed that the ratio between (3) (ortho-phosphate) total phosphorus and soluble (soluble and particulate) concentration is constant, prediction of the total phosphorus the hence the ortho-phosphate concentration bγ multiplying constant. This approach, to concentration by а generate total phosphorus from soluble ortho-phosphate data could lead to estimation errors. From the hydrograph/chemograph decomposition approach the ratio of total phosphorus to soluble phosphorus is not constant. The reason for this is that the particulate phosphorus and soluble ortho-phosphate concentrations are influenced by independent processes (Smith and Stewart, 1977). In Fig 7.28, the relationship between and particulate phosphorus 15 ortho-phosphate presented for Station 9A, showing the non-linear relationship between these chemical species and the wide scatter of data points.

The constant, kad, in Eq (7.14) is evaluated by plotting the soluble phosphorus concentration as a function of the basal runoff, illustrated in Fig 7.25. The slope of the line is equal to the constant, kad, and is determined by linear regression analysis.

(4) The particulate phosphorus transported in a river is also convected by scour of benchic material (Keup, 1962). The following differential equation is used to model the transport of particulate phosphorus as a function of the river discharge rate (Qt)

$$d[PP]/dQt = ks [PP]$$
 .... (7.15)

The constant ks in Eq (7.15) is evaluated by plotting the particulate phosphorus concentration data as a function of the total discharge, Qt, during low flow conditions, see Fig 7.25. The slope of the line is equal to the constant, ks, determined using regression analysis.

The equations described above are presented as a process-component matrix in Table 7.2, and programmed in NPSM-CON (see Appendix 2) to predict the chemograph of soluble and particulate phosphorus. As we are interested only in the mobile phase (export into the river) the mass transfer of phosphorus from the fixed phase is assumed to be unlimited in terms of the rate of supply. This assumption is supported by Johnson <u>et al</u>. (1976); they report that a only 1 percent of the annual phosphorus input via manure and fertilisers to a catchment is transported by rivers. Thus, the export of phosphorus from a catchment into a river channel is principally controlled by the transport processes shown in Table 7.2.

| Table 7.2 Mat<br>app                          | rix approa<br>lication. | ch to no               | inpoint sour             | rce model |
|---|-------------------------|------------------------|--------------------------|-----------|
| <u>Components on w</u>                        | hich the pro            | <u>cesses act</u> :    |                          |           |
| Process:                                      |                         | Part P in<br>in river: | Part P in<br>fixed phase | : Rate:   |
| Surface runoff                                |                         | +1                     | -1                       | Eq (7.13) |
| Net<br>sedimentation<br>and<br>remobilization | }                       | +1                     | -1                       | Eq (7.15) |
| Adsorption<br>Desorption<br>Dissolution       | } +1                    |                        | -1                       | Eq (7.14) |

## 2.3 Model calibration

To calibrate the model the calibration sequence mentioned in Sections 2.1 and 2.2 should be used; the constants ksp, kad, and ks can be expected to show variation between rivers as well as between river sampling stations.

## 2.4 Chemograph simulation

The soluble and particulate phosphorus chemographs at Paarl (G1M2O) were simulated for Period 6 (the only period with reliable soluble phosphorus concentration data) using

(1) the measured hydrograph at Paarl (G1M2O),

(2) the values for the constants shown in Fig 7.25.

The simulated and measured soluble and particulate phosphorus concentration at Paarl are shown in Figs 7.26 and 7.27, respectively.

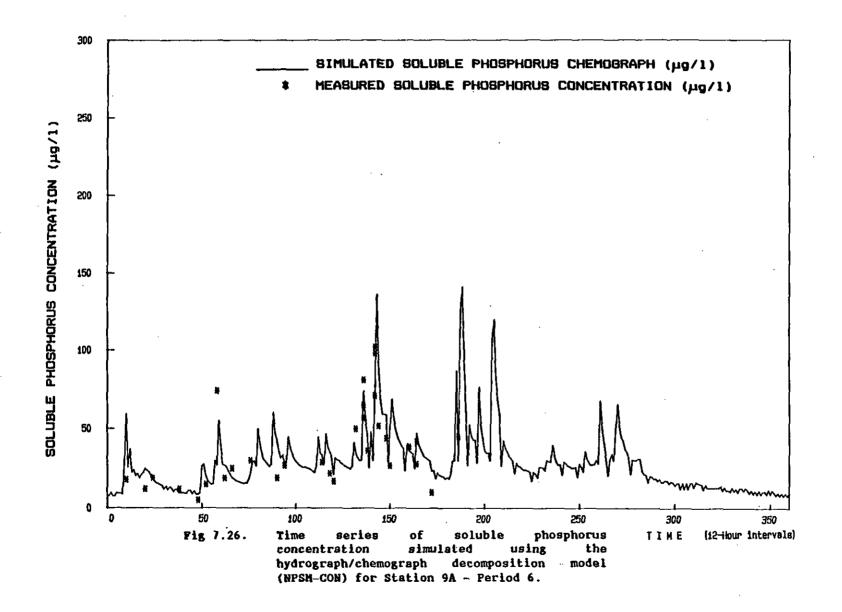
## 2.5 Model evaluation

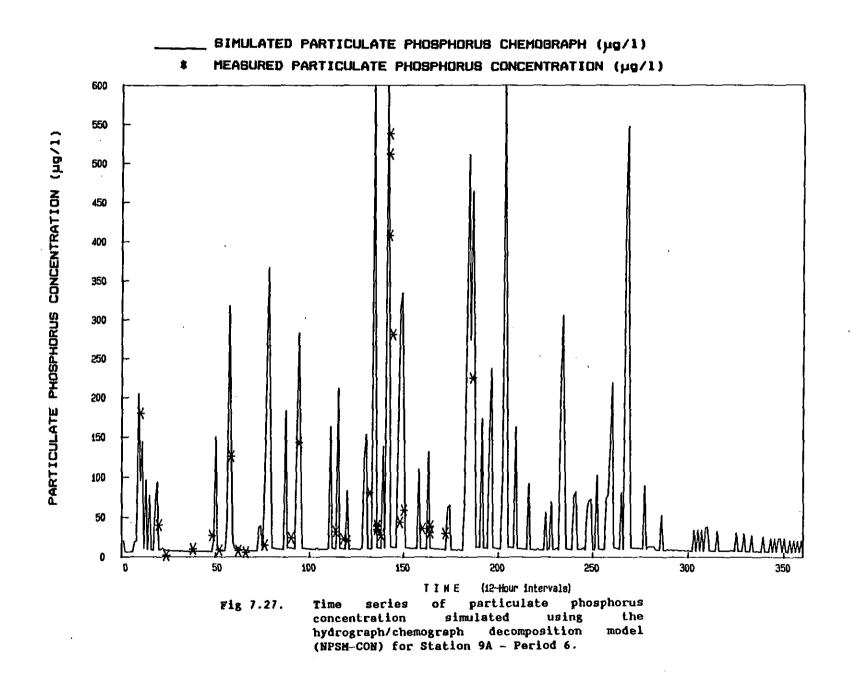
#### Model performance:

In Figs 7.26 and 7.27, the simulated and measured time plot of soluble and particulate phosphorus are shown for Period 6. The close correspondence between simulated and observed values indicates that the soluble and particulate phosphorus species may be modelled using a hydrograph/chemograph decomposition approach. The approach accepts a relatively simple set of processes associated with the export of phosphorus from nonpoint sources but it should be emphasized that a morecomplex model would require more accurate separation of the hydrograph, which is beyond the scope of this investigation. The hydrology of the Berg River system is ideal for such hydrographs simulations because the flood are generally separated by extended periods of dry weather, resulting in well defined rising and recession limbs of the flood hydrograph.

### Understanding of export processes:

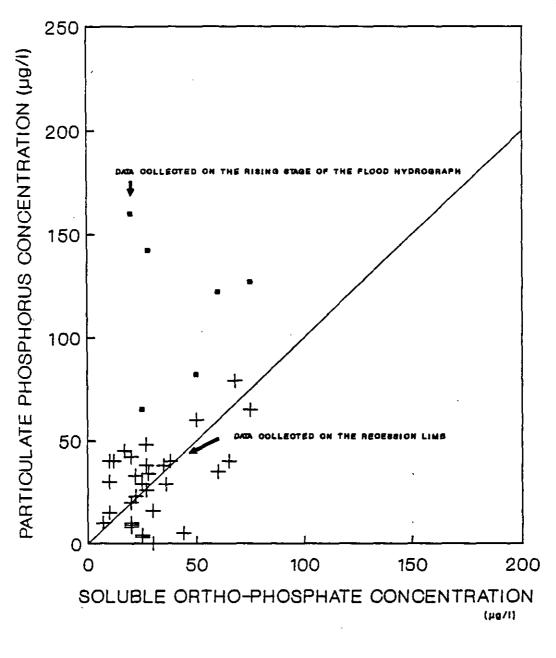
The formulation and manipulation of the approach provides valuable information about the export of phosphorus from nonpoint sources:

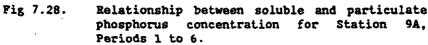




TR 143 March 1989

- The hysteresis effect, which up till now has not been (1)explained, is due to the dual-pathway of phosphorus associated with surface entering the river and subsurface drainage. The surface drainage delivers considerable quantities of particulate phosphorus at the beginning of a storm event. Once the surface runoff has diminished, the ortho-phosphate becomes the species due to the contribution of predominant phosphorus from subsurface drainage. The hysteresis effect therefore is caused by the change in dominance from surface to subsurface discharge, associated with rainfall induced flood events.
- (2) Phosphorus export from nonpoint sources is strongly runoff during storm events. linked to surface Indications are that the mass export is principally a function of the discharge under the rising limb of the affected significantly by not hydrograph and sequential storm events.
- Generally it has been assumed that the ratio between (3) (ortho-phosphate) total phosphorus and soluble (soluble and particulate) concentration is constant, prediction of the total phosphorus the hence the ortho-phosphate concentration bγ multiplying constant. This approach, to concentration by а generate total phosphorus from soluble ortho-phosphate data could lead to estimation errors. From the hydrograph/chemograph decomposition approach the ratio of total phosphorus to soluble phosphorus is not constant. The reason for this is that the particulate phosphorus and soluble ortho-phosphate concentrations are influenced by independent processes (Smith and Stewart, 1977). In Fig 7.28, the relationship between and particulate phosphorus 15 ortho-phosphate presented for Station 9A, showing the non-linear relationship between these chemical species and the wide scatter of data points.





7.60

In Fig 7.28, the data points are plotted in two categories: firstly, the samples collected on the rising limb of the flood hydrograph containing a high proportion of particulate phosphorus giving a high ratio of particulate phosphorus: ortho-phosphate secondly. the points representing concentration: on the recession samples collected limb of the hydrograph containing a high proportion of orthophosphate and hence a relatively low particulate phosphorus : ortho-phosphate ratio. These observations provided bγ the information support the hydrograph/chemograph decomposition approach in that the relative concentration of phosphorus species is related to the relative contributions of surface runoff and subsurface drainage to the river.

In Fig 7.29, the ortho-phosphate and total phosphorus concentration data are graphically presented for Station 23D at Drie Heuwels Weir, collected using an automatic sampling device during two flood events (shown by lines a and b). On the rising limb of the flood hydrograph the river contains high particulate phosphorus concentration, on the falling limb the river contains a high ortho-phosphate concentration. This information further supports the results of the hydrograph/chemograph decomposition approach in that the ratio between particulate and soluble phosphorus is transient, coinciding with the changes in the hydrograph composition.

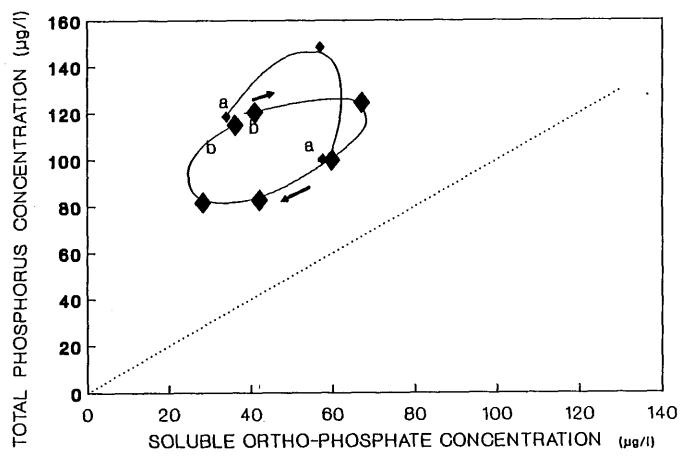


Fig 7.29. Relationship between soluble and total phosphorus concentration for Station 23D (Drie Heuwels Weir), Period 6. The lines represent samples collected sequentially during two flood events (a and b).

TR 143 March 1989

#### Model status:

202

separation approach provides useful The hydrograph information about the export of phosphorus from nonpoint sources. This approach however can be applied effectively only at sampling stations with an extensive data set of soluble and particulate phosphorus. Compared with the looped phosphorus discharge rating approach, the hydrograph decomposition approach is a step nearer to a basic description then the completely empirical looped rating approach. Future enquiries into modelling phosphorus discharge from nonpoint sources should give serious attention to the hydrograph decomposition hydrograph decomposition approach 15 model. Until the sufficiently developed, the looped rating approach appears to be the only practical one available for estimating phosphorus export from nonpoint sources.

### 3 PHOSPHORUS TRANSPORT MODEL

#### 3.1 Introduction

A phosphorus transport model describes the mass movement of phosphorus along the main river channel. Such a model is complex due to the interaction of many processes associated with the transport (Bella and Dobbins, 1968; Keup, 1968; Verhoff and Melfi, 1978; Koussis, 1983; McBride and Rutherford, 1984). Conceptually, the model must take account of the following processes:

- <u>Advection</u> (transfer of phosphorus in the flow along the main river channel, also called the wash load).
- <u>Bed load</u> (transfer of phosphorus in the material moving on the riverbed).
- <u>Sedimentation</u> (transfer of phosphorus from the wash load to the riverbed).
- <u>Remobilization</u> (transfer of phosphorus from bed load to the wash load), and
- <u>Benthic biotic phosphorus assimilation and release</u>.

It is quite a problem defining the processes precisely because such a definition will depend on the measurements being employed. For example, in advection, phosphorus measurements will be taken in the flow above the riverbed (the wash load) but this measurement probably would include material that strictly should be allocated to the bed load. In this fashion virtually every measurement will reflect the effect of one or more processes. In consequence we will lump together the processes biotic release, remobilization and scour (all of which yield phosphorus to the water column) as an in-channel phosphorus source with respect to the water column. Similarly, instead of sedimentation and biotic assimilation we will substitute an in-channel phosphorus sink with respect to the water column. Thus we have two lumped parameters with respect to the water column in the channel, a source of phosphorus and a sink of phosphorus.

We will not concern ourselves with the magnitude of the phosphorus stored on the riverbed by removal from the water column, only with the rate of addition to the water column and rate of abstraction from the water column. Furthermore these two rates can be combined to give a net rate which may be positive (adding phosphorus to the water column) or negative (removing phosphorus from the water column). How can this be quantified? - By linking it to some parameter that appears to be associated with this rate - the main channel discharge. When the discharge is high, the rate is likely to be positive i.e. there will be a gain of phosphorus in the water column (in the wash load) due to scour action; when the discharge is low, the likely to be negative, i.e. there will be an rate is from the water the abstraction of phosphorus column to biotic abstraction and other riverbed. settlement, by – processes. This simplistic approach can be readily criticised. For example, phosphorus leaving the water column must be stored on the bed; with the first flood some of the stored phosphorus will be scoured so that in the rainy season, when the next flood comes the scour action is likely to be less effective. that is, the rate, for the same discharge will change over the high flow season. Our approach, however will demand a specific rate at a specific discharge. Whether this seasonal effect is significant or not can be evaluated only from observation.

## 3.2 Model formulation

The basic equation around which the model is constructed is the phosphorus mass continuity equation, Bedford <u>et al</u>. (1983), with terms added to accommodate lateral phosphorus discharge and phosphorus source/sink effects,

 $a(AC)/at + a(QC)/ax = C1 q + S^*$  ..... (7.16)

where

| C   | = | concentration in main river channel,                    |
|-----|---|---|
| C1  | = | concentration of lateral inflow,                        |
| q   | = | discharge of lateral inflow per unit length of channel, |
| A   | = | flow cross sectional area,                              |
| Q   | = | discharge of main river channel,                        |
| t,x | = | increments of time and river distance,                  |
| S*  | = | source/sink term.                                       |

Use of Eq (7.16), to obtain a solution of the phosphorus concentration, C, at the downstream boundary of a river reach, at any time, requires the following information:

- Discharge, Q, and phosphorus concentration, C, at the upstream boundary of the reach, at time t,
- (2) Flow cross sectional area of the channel, A,
- (3) Lateral discharge, q, with associated phosphorus concentration, C1, per unit length of reach per unit time,
- (4) Remobilization of phosphorus into, and removal of phosphorus out of, the water column per unit channel length per unit time, designated by S\* in Eq (7.16).

Examining Eq (7.16), the information listed above is not implicit in the solution for C, but explicit, that is the information can be obtained by independent procedures, and then inserted in Eq (7.16) to obtain a solution for the phosphorus concentration C, for example

- (1) The temporal and spatial variation of discharge, Q, in the main river channel and lateral discharge, q, and the flow cross sectional area of the main channel, A, are available from the hydrodynamic flow model, described in Chapter 6, program QMODEL.
- (2) The phosphorus concentration in the lateral flows, Cl, from nonpoint sources can be determined from the NPS model, described in Section 2 of this chapter, program NPSM. For point sources the discharge and phosphorus concentration must be measured directly.

(3) The source and sink concepts, to be applied in remobilization and removal of phosphorus in the water column, as proposed conceptually in Section 3, need to be developed, see Section 3.3 below.

# 3.3 Modelling sources and sinks in the main river channel

This modelling exercise refers to the quantification of S\* in Eq (7.16). Simons and Cheng (1985) report that removal of phosphorus from the water column in river they studied, conformed to a two-stage process: a rapid removal according to a first order reaction (with a high rate constant) over the first 10 km below the sewage outfall, followed by a slower removal also according to a first order type reaction (with a low rate constant) in the lower reaches, see Eq (7.17).

Ct Qt = a Co Qo EXP (-k1 t) + (1-a) Co Qo EXP (-k2 t) ..... (7.17)

where

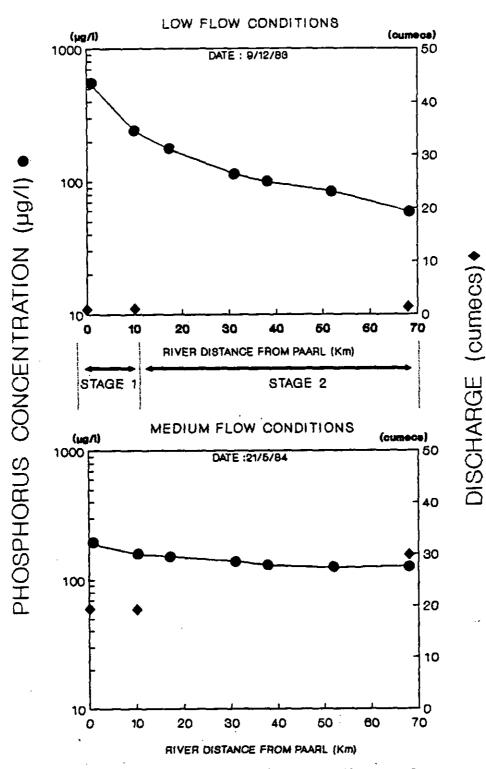
| Ct    | = | phosphoru's concentration at time t, |
|-------|---|--------------------------------------|
| Co    | = | initial phosphorus concentration,    |
| Qt    | = | discharge at time t,                 |
| Qo    | 2 | initial discharge,                   |
| k1,k2 | = | rate constants,                      |
| a     | = | constant.                            |

To check if this behaviour is also present in the Berg River, profiles of phosphorus concentration were constructed as follows:

During the low flow season, when the inputs from the small. the phosphorus tributaries were zero or very concentration of samples in the water column at all the sampling stations, taken on the same day, were plotted against channel length. The associated discharges, where these were available, were also plotted. The same procedure was repeated at higher steady state discharges during which small lateral discharges were present. To check if the removal followed first order kinetics log phosphorus concentration was plotted versus river distance. Two plots are shown in Fig 7.30 for low and medium discharges. The following observations are pertinent:

- Two stage removal is present, as observed by Simons and Cheng (1985).
- (2) No conclusion regarding the first stage could be made as the reaction apparently was complete within a 11 km reach and no intermediate phosphorus measurements were made in that reach.
- (3) The second stage (slow removal) exhibits first order behaviour, the plots lying on a straight line on the semi-log plot.
- (4) The first order rate constant in the second stage appears to decrease as the discharge increases.

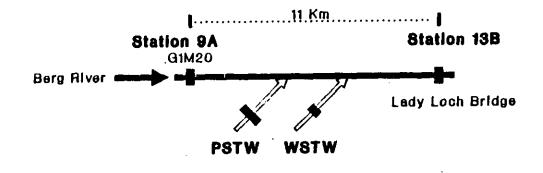
The stage with the rapid removal rate (called Stage 1) is the reach of the main river channel that extends from the gauging weir at Paarl (Station 9A) to a point downstream of the sewage outfalls for Paarl and Wellington, at Lady Loch Bridge (Station 13B), a reach of approximately 11 km. The sampling station layout is shown in Fig 7.31. The principal sources of phosphorus entering this reach are in,





Phosphorus concentration profiles for stations along the main river channel between North Paarl and Drie Heuwels Weir for low and medium flow conditions.





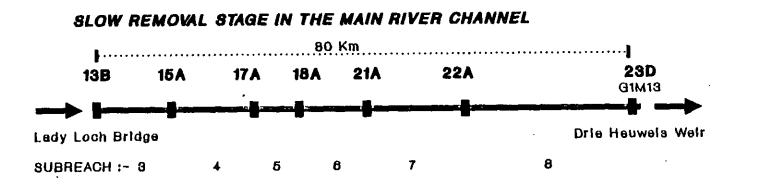


Fig 7.31. Schematic diagram showing the rapid and slow removal stages in the main river channel of the Berg River.

Phosphorus transport Berg River

٠

TR 143 March 1989

- point sources, consisting of Paarl and Wellington sewage works discharges; both the phosphorus concentration and discharge are measured,
- nonpoint sources from the subcatchment draining into this reach from an area of approximately 89 km<sup>2</sup>; the lateral flow is estimated by the ungauged lateral flow approach (see Chapter 6), and the phosphorus concentration by the NPS model described in Section 1 of this chapter.

The stage with the slow rate (called Stage 2) extends from Lady Loch Bridge to the gauging weir at Drie Heuwels (Station 23D), a river distance of 89 km. The layout of sampling stations along this reach is shown in Fig 7.31. In this reach the inputs of phosphorus are in,

- the discharge of the Berg River at Lady Loch Bridge; the phosphorus concentration is measured but the discharge is simulated using the hydrodynamic flow model (see Chapter 6),
- draining sources from tributaries nonpoint areas. with а total agricultural principally catchment area of about 2 000 km<sup>2</sup>). The lateral discharges are either measured or estimated by the ungauged lateral approach (see Chapter 6), and the the phosphorus concentrations in a11 lateral discharges are estimated by the NPS model. see Section 1 of this chapter.

In attempting to model the transport of phosphorus through the total river distance of 100 km, it became clear that Stage 1 with the high rate of phosphorus removal, requires to be dealt with in a different manner from Stage 2 with the lower rate of phosphorus removal.

In Stage 1 although one may have expected removal of phosphorus from the water column to be of the first order type, the reach in which the rapid removal takes place is very short, 5 km, and no intermediate values within this distance were available. Furthermore it was not certain whether the rapid removal stage had terminated at Lady Loch Bridge. If intermediate values for the phosphorus concentration below the points of discharge of the wastewater treatment plants had been available then the distance over which the rapid stage acts could have been defined and formulated in a similar manner as for the slow removal reach (Stage 2).

The situation with regard to the short rapid removal stage, encountered in this investigation, is likely to be encountered elsewhere, not necessarily in the same form as encountered here. For example, the channel flow may pass through a stretch of wetlands and one may be limited to having measurements only at the influent and effluent boundaries of the wetland. It is worthwhile therefore to set out in detail the procedures developed to model this type of situation.

## 3.4 Model for rapid removal stage (Stage 1)

Based on the information derived from the analysis of data (Chapter 5), during low flow, phosphorus is removed by sedimentation, biological assimilation, etc from the water column onto the riverbed; during high flow remobilization causes phosphorus to be removed from the riverbed into the water column. However, it is not clear which independent 7.73

1.8**1** 1

variable best allows a description of the removal and remobilization of the phosphorus. To obtain information on this aspect a mass balance model was set up over the reach Paarl to Lady Loch Bridge. From this mass balance (see Eqs 7.18 and 7.19) it is possible to calculate the theoretical phosphorus concentration at Lady Loch Bridge from the mass inputs of phosphorus in the main river channel at Paarl and from point and nonpoint sources within the reach, excluding sources and sinks effective in the channel reach.

Loadout = 
$$\sum$$
 Loadin ..... (7.18)

where

Loadout = phosphorus load at Lady Loch Bridge, Loadin = phosphorus input to river reach, Paarl to Lady Loch Bridge.

Which in terms of the phosphorus concentration gives

$$[TP]sim = \frac{(C1 Q1) + (C2 Q2) + (C3 Q3) + (C4 Q4)}{Q1 + Q2 + Q3 + Q4}$$
(7.19)

where

| [TP]sim | 2 | simulated or calculated phosphorus          |
|---------|---|---|
|         |   | concentration at Lady Loch Bridge,          |
| C1      | = | concentration at Station 9A,                |
| Q1      | 2 | river discharge at 9A,                      |
| C2      | 2 | concentration of effluent from Paarl        |
|         |   | wastewater treatment works,                 |
| Q2      | = | effluent discharge - Paarl works,           |
| C3      | 3 | concentration of effluent from Wellington   |
|         |   | wastewater treatment works,                 |
| Q3      | × | effluent discharge - Wellington works,      |
| C4      | = | concentration of nonpoint source input from |
|         |   | the surrounding catchment of Section 1,     |
| Q4      | 2 | discharge of nonpoint source runoff.        |

Using the mass balance equation with the measured inputs one obtains a set of calculated phosphorus concentration values at Lady Loch Bridge.

In Fig 7.32 the calculated phosphorus concentrations at Lady Loch Bridge are plotted versus the measured values obtained at Lady Loch Bridge. The following observations can be made:

- Grouping data associated with medium high flows, shown in Fig 7.32 as Group 1, there is close correspondence between simulated and measured phosphorus concentrations indicating that either removal and remobilization of phosphorus is minimal during these flow conditions, or more likely, the rates cancel each other out.
- Grouping data associated with low flows, shown in Fig 7.32 as Group 2. the measured phosphorus concentrations are substantially lower than the calculated values indicating that there is a net phosphorus removal.
- Grouping data associated with high flow (flood events), shown in Fig 7.32 as Group 3, the measured values are greater than the calculated indicating that phosphorus is remobilized from the riverbed during flood events.

From these observations it would appear that the <u>discharge</u> is a reasonable parameter in terms of which the removal and remobilization of phosphorus can be described. One may write



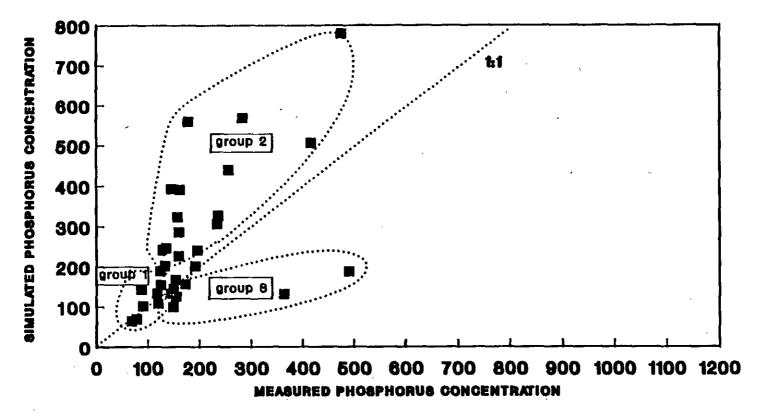


Fig 7.32.

Scatter plot of measured versus simulated phosphorus concentration values at Lady Loch Bridge (Station 13B). Group 1 includes data collected during high flow, Group 2 includes data collected during low flow, and Group 3 includes data collected during flood events. 7.75

| [TP]mes = D [TP]sim |  | (7.20) |
|---------------------|--|--------|
|---------------------|--|--------|

where

- [TP]mes = phosphorus concentration measured at the outflow of Stage 1 at Lady Loch Bridge,
- [TP]sim = simulated phosphorus concentration at Lady Loch Bridge, using Eq (7.19),
  - D = source/sink term.

solving for the source/sink term gives

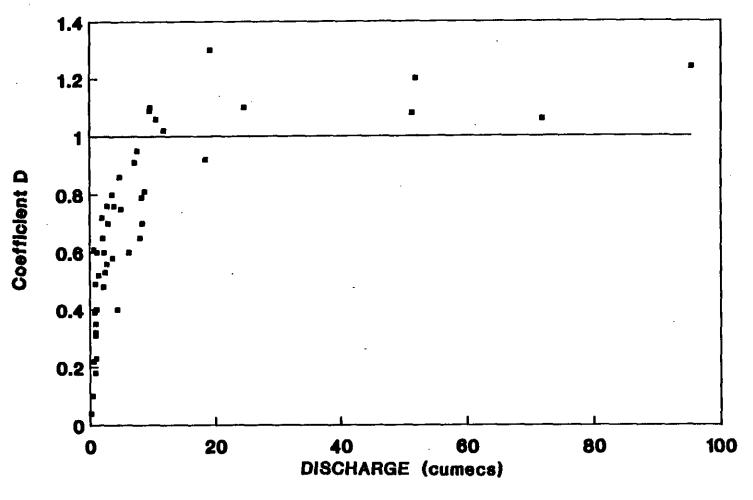
D = [TP]mes/[TP]stm ..... (7.21)

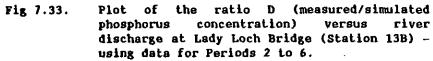
The value of D was determined as follows. For each of the pairs of data, in Fig 7.32, the value of D was calculated and plotted versus discharge, see Fig 7.33. Evidently, the phosphorus source/sink term, D, is dependent on the river discharge. Consequently, by establishing the relationship between D and the river discharge Q it would be possible to simulate the phosphorus concentration at Lady Loch Bridge using a modified mass balance equation of the form

$$[TP]sim = 0 \left[ \frac{(C1 \ Q1) + (C2 \ Q2) + (C3 \ Q3) + (C4 \ Q4)}{Q1 + Q2 + Q3 + Q4} \right]$$
(7.22)

The best relationship between D and discharge, Q, was found by checking different mathematical formulations. The one that gave the best fit was Eq (7.23),

D = kl ln (Q) + cl ..... (7.23)





7.77

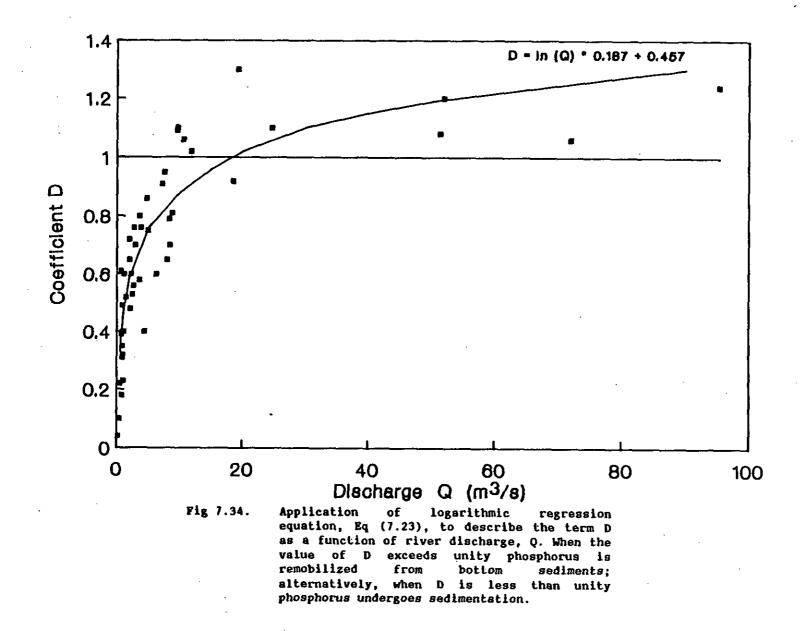
The constants, k1 and c1, were determined using curvilinear regression analysis (program REGRESS) on the data set shown in Fig 7.33; the analysis gave values k1=0.187 and c1=0.45. The plot of Eq (7.23) together with the experimental values are shown in Fig 7.34. From Fig 7.34 one may note that when river discharge exceeds about 17 cumecs, the term. D, exceeds unity the phosphorus load at Lady Loch Bridge is greater than that determined from the input loads, indicating remobilization of phosphorus to the wash load. When river discharge is less than about 17 cumecs the term. D. is less than unity - the at Lady Loch Bridge is less phosphorus load than that input loads indicating determined from the removal of phosphorus from the wash load.

In Fig 7.34, there is scatter of the data. To determine a possible cause for the scatter, the data were sorted into three groups:

- Data associated with the rising limb of a flood hydrograph, D1,
- (2) data associated with the recession limb, D2, and
- (3) data associated with approximately steady flow conditions, D3.

It would seem that for discharges greater than 20 cumecs D1>D3>D2. Reasons for this may arise from the following:

balance equation. Eq The modified mass (7.22).requires the same steady flow at the entrance and exit of the reach. When the flow (or phosphorus concentration) is subject to transients, as may occur with flood events, the mass balance equation does not



7.79

strictly apply; for calibration of this type of model, water samples must be collected from the same parcel of water at Stations 9A and 13B. However, during a storm event different parcels of water inevitably will be sampled.

- Greater scour taking place on the rising limb of the flood hydrograph, compared with the falling limb. Possibly for reason that by the time the falling limb flow passes through the reach less of the stored material will remain to be scoured.

The scouring effect can be compensated for empirically by incorporating a looped-rating function, DQ, in Eq (7.24). With this function, on the rising stage, the equation gives a higher value of D compared with the same discharge for steady and recession flow conditions.

$$D = \ln (Q4) (DQ^{Z} k1) + c1$$
 ..... (7.24)

where

| D | 2 | sedimentation/remobilization | term | used | in |
|---|---|------------------------------|------|------|----|
|   |   | Eq (7.22),                   |      |      |    |

Q4 = discharge at Lady Loch Bridge,

k1 = constant (0.187),

- $DQ = discharge quotient (instantaneous/antecedent discharge) (Q_+/Q_{+-1}),$
- Z = constant (0.09),

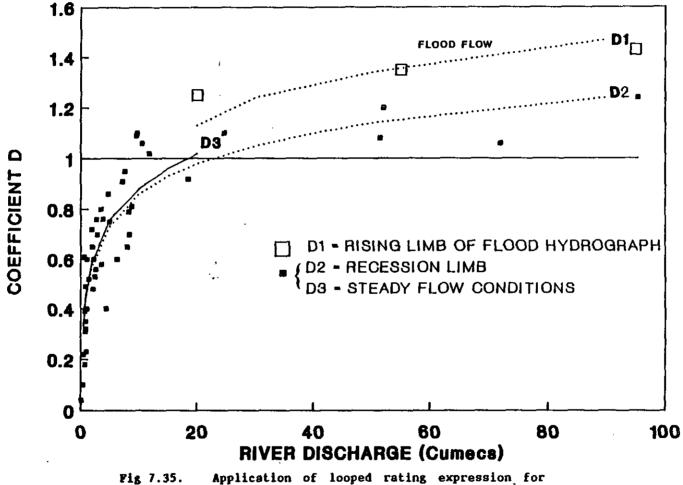
c1 = constant (0.45).

The effect different values of DQ have on the coefficient D, using Eq (7.24), is illustrated in Fig 7.35. For a sharply rising flood, DQ can attain a value as high as 8, with steady flow DQ=O and with recession flow DQ=0.5; the respective effects are shown by lines D1, D2, and D3. Equation (7.24) intimates that there is a marginal increase or decrease in the coefficient D depending on the rate-of-change of flow.

<u>Ungauged nonpoint sources</u>: Solution of Eq (7.19) requires the estimation of ungauged nonpoint source loading to the river reach between Paarl and Lady Loch Bridge (terms C4 and Q4 in Eq (7.19)). The following assumptions were used as a basis for estimating the nonpoint source loading to the main river channel between Paarl and Lady Loch Bridge:

- (1) The specific areal runoff is the same as for the adjacent gauged subcatchment (Krom River, gauged at weir G1M37); this approach is a generalised one for estimating runoff from ungauged areas and is dealt with in detail in Chapter 6.
- (2) The phosphorus concentration in the runoff is determined from the NPS model using the flow related model constants, see Section 1.5 of this chapter.

With this approach the phosphorus loading from the subcatchment discharged to the Berg River between Station 9A and Lady Loch Bridge was calculated. During flood events, the nonpoint source loading entering this reach comprises between 2 to 5 percent of the total load passing along the main river channel, indicating that the contribution of nonpoint sources was relatively small during flood events. However, it is included for the sake of completeness.



7.35. Application of looped rating expression for coefficient D to simulate the hysteresis effect observed in the data. Line D1 represents rising limb conditions, Line D2 recession limb, and D3 steady flow.

L 3

A transport model based on the discussion above, to simulate the phosphorus chemograph at Lady Loch Bridge is available as program SECTION1.

## Model calibration for rapid removal section (Stage 1)

The calibration procedure of the phosphorus transport model for the river reach between Paarl and Lady Loch bridge will now be set out in detail.

(1) Calibration period:

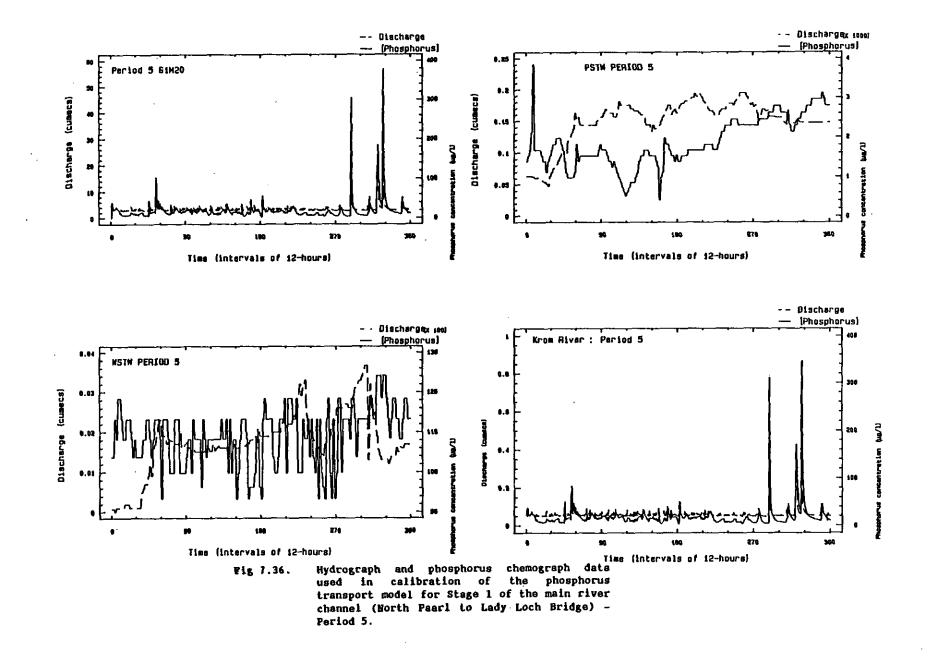
One period of 180-days (Period 5) covering both high and low river flow was used to calibrate the model. The water quality and flow data for Period 5 is one of the most comprehensive for this reach of the river.

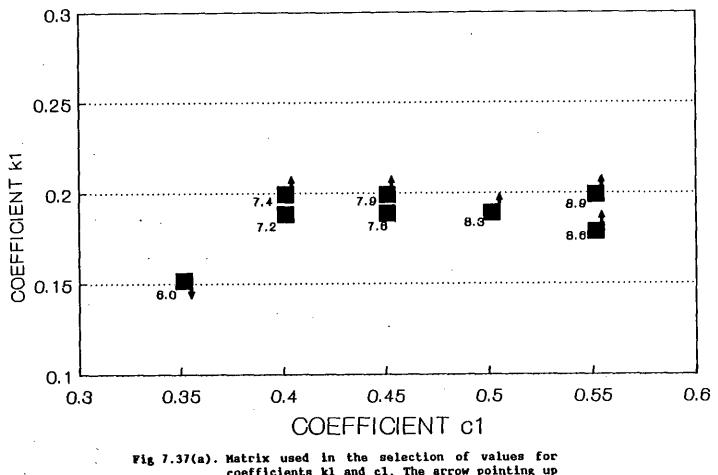
(2) Hydrographs and associated water quality data:

Fig 7.36 shows the hydrographs and phosphorus chemographs over the calibration period (Period 5) for the gauging weirs on the main river channel at Station 9A (weir GlM20), the Paarl and Wellington effluent discharge points, and the Krom River (weir GlM37).

(3) Estimation of coefficients Z, k1 and c1 in Eq (7.24):

The most appropriate values for these coefficients were found only after the model was in operation. Initially rough estimates for these coefficients were determined as set out in Section 3.4 above. Afterwards a matrix of perturbed values was tested to determine the influence of these terms on the simulations (see Fig 7.37(a)). The values of: 0.009 for Z, 0.187 for k1, and 0.45 for c1, appeared to provide the most favourable simulation results, see Fig 7.37(b).





g 7.37(a). Matrix used in the selection of values for coefficients kl and cl. The arrow pointing up indicates model over-estimation and the arrow pointing down indicates model underestimation. 7.85

TR 143 March 1989

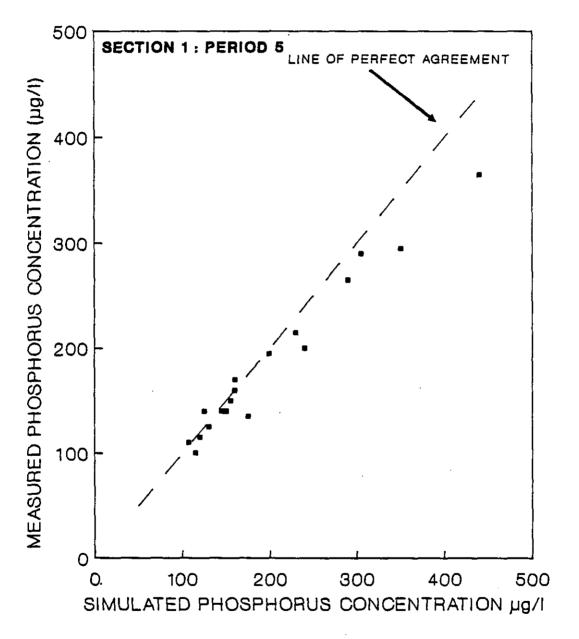


Fig 7.37(b). Plot of the simulated Versus measured phosphorus concentration for Station 13B (Lady Loch Bridge). Simulated values are predicted using the phosphorus transport model for Stage 1 of the main river channel (program SECTION1) - Period 5.

Accepting:

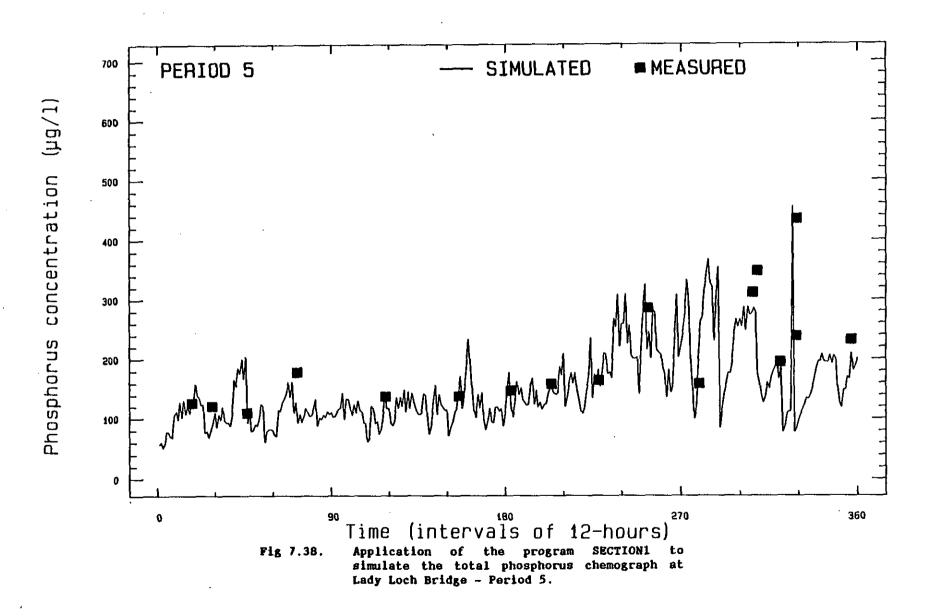
1

- (1) the value for the constants given above;
- (2) the accuracy of the gauging weirs involved in the mass balance calculation;

a trial simulation was run over the time period of 180-days to determine the phosphorus chemograph at Lady Loch Bridge. In Fig 7.38 the measured and simulated phosphorus concentrations are shown for Lady Loch Bridge.

It is at once apparent that the simulated and measured phosphorus concentrations are in reasonable accord; with the model adequately describing the steep gradients in phosphorus concentration associated with flood events.

During the low flow in Period 5, the measured phosphorus concentrations show some scatter around the simulated values (see Fig 7.38). Such scatter is attributed to quantification errors of the input data as well as sporadic discharges from agricultural and urban areas. These discharges occur at random intervals and hence are impossible to simulate. Fortunately such discharges occur only during low flow and have negligible effect on the total load of phosphorus exported over a period of 180-days.



#### Model verification

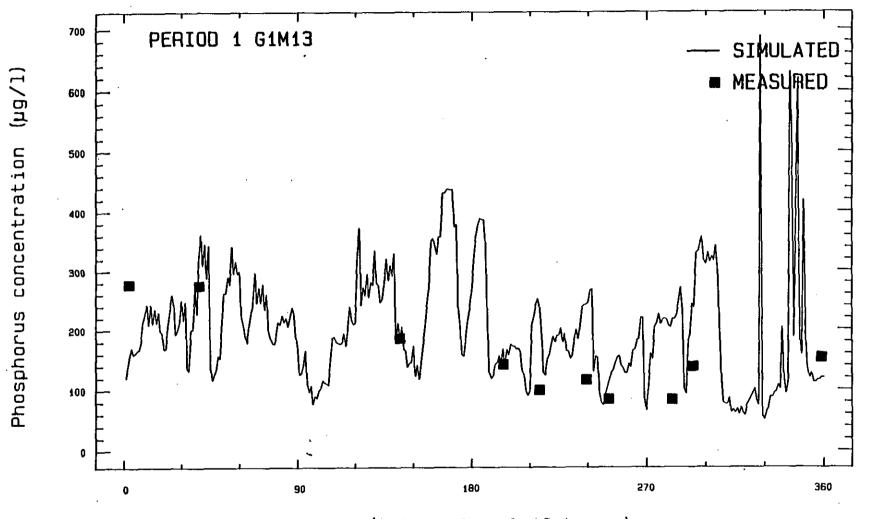
Having calibrated the model using the data for Period 5, the phosphorus chemographs at Lady Loch Bridge were simulated for Periods 1, 2, 3, 4 and 6. The simulated and measured phosphorus concentrations at Lady Loch Bridge are shown in Figs 7.39 to 7.43. A correlation plot of simulated versus measured phosphorus concentration for Periods 1 to 6 is shown in Fig 7.43(a). Evidently the transport model for Stage 1, SECTION1, provides an adequate description of the phosphorus chemograph at Lady Loch Bridge.

The chemograph at Lady Loch Bridge will now serve as the upstream boundary condition for the transport model describing the movement of phosphorus along the main river channel from Lady Loch Bridge to Drie Heuwels Weir, given below.

## 3.5 Model for the slow removal section (Stage 2)

In the previous section a transport model was developed to deal with the rapid phase of phosphorus removal in a river. The rapid phase appears to be specific to the reaches below the discharge points of municipal and industrial wastes. The reason for the rapid removal of phosphorus is not clear; possibly the form in which the phosphorus is discharged makes it more readily, available for biotic assimilation, or the reach has very heavy marginal vegetation so that it acts as a form of wetland.

To simulate the transport of phosphorus along the river channel we have seen that cognizance must be taken of the following aspects (see Fig 7.44).

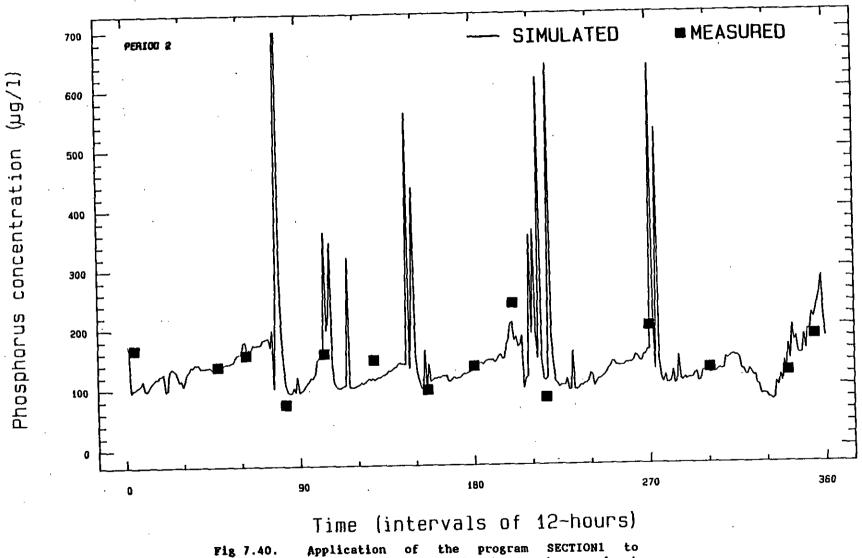


## Time (intervals of 12-hours)

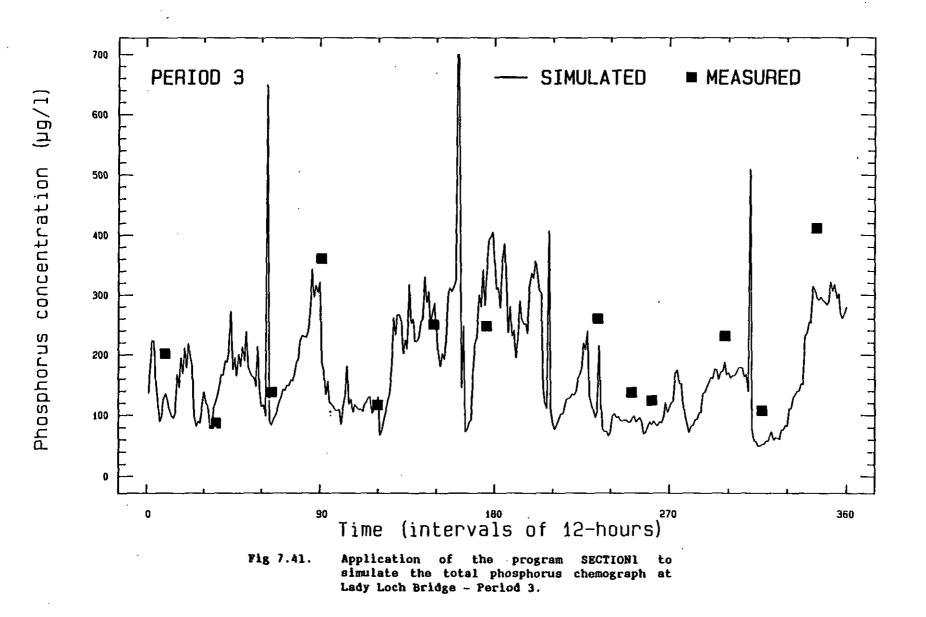
## Fig 7.39.

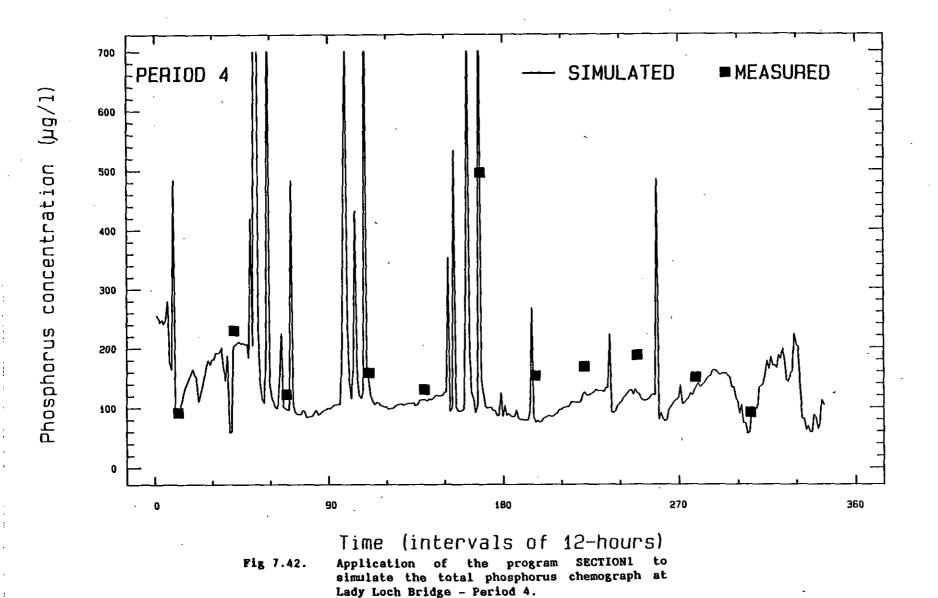
Application of the program SECTION1 to simulate the total phosphorus chemograph at Lady Loch Bridge - Period 1.

7.90



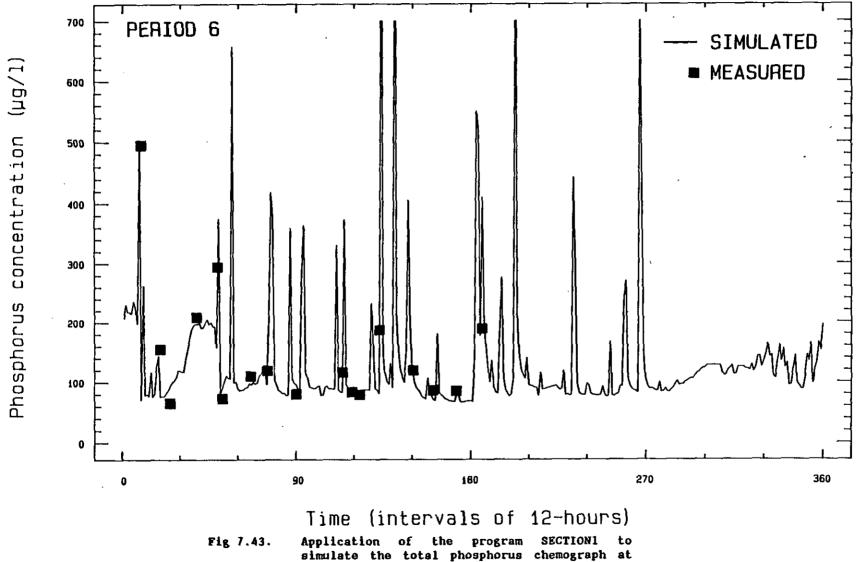
. Application of the program SECTION1 to simulate the total phosphorus chemograph at Lady Loch Bridge - Period 2.



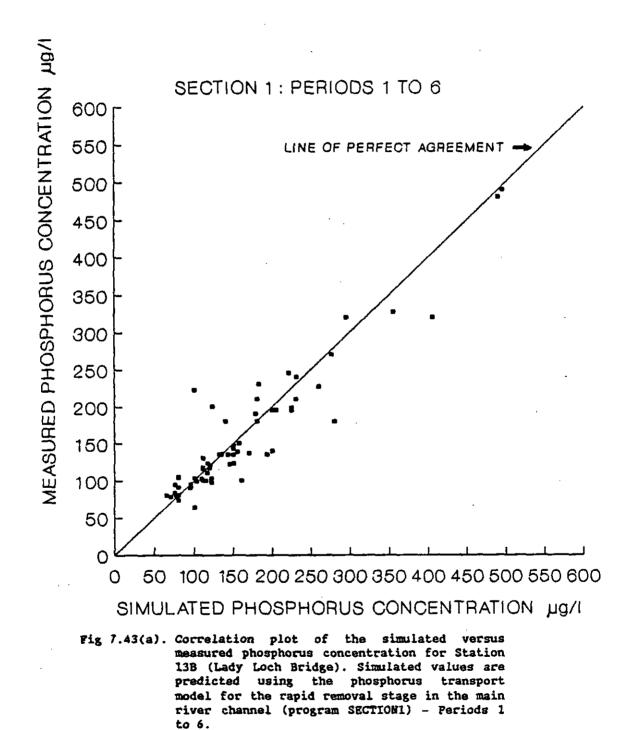


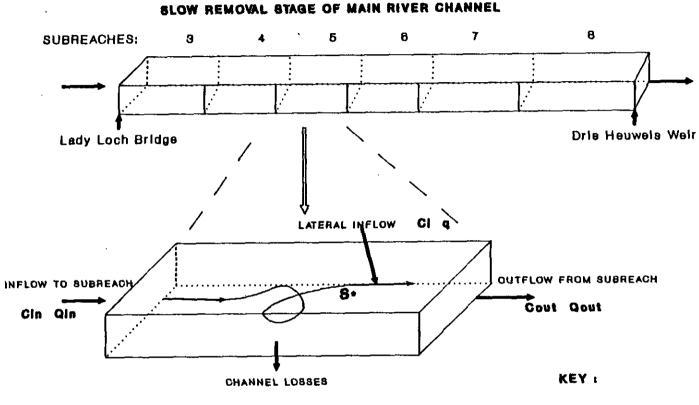
#### Phosphorus transport Berg River

TR 143 March 1989



Lady Loch Bridge - Period 6.





QIn, Qout, q : DISCHARGE CIn, Cout, CI : PHOSPHORUS CONCENTRATION S\* : IN-CHANNEL PHOSPHORUS SOURCE/SINK

Fig 7.44. Graphical presentation of the sources, sinks and processes influencing the transport of phosphorus along a river channel. One sub-reach is enlarged showing the terms used in the mass continuity equation, Eq (7.16).

- (1) Removal and remobilization of TP from and to the water column.
- (2) Lateral input of flow and phosphorus from gauged point sources and gauged and ungauged nonpoint sources.
- (3) Flow losses due to abstraction and seepage.

For the slow phosphorus removal stage in the Berg River, the removal and remobilization aspects have not been considered yet and need to be resolved.

### Modelling of slow phosphorus removal stage

To model the removal and remobilization of phosphorus from and to the water column, accept that the removal is a first order process but that the rate constant decreases as the flow increases. To develop this model, data sets of the phosphorus concentration were collected within 6 hours at discrete points along the river channel. Each data set was plotted against channel distance from Lady Loch Bridge. Data sets were selected which did not show transient flood effects. The selected sets were replotted (log phosphorus concentration versus channe) distance). These showed reasonable linearity verifying that the removal rate is approximately first order (the difficulty with this conclusion is that during high steady flows there is disturbance of phosphorus in the channel associated with lateral inflows). Nevertheless, accepting a first order process each set of data was fitted to the following equation using the Program REGRESS.

[TP]x = [TP]o EXP (D2 x) .... (7.25)
where
{TP1x = phosphorus concentration at distance x.

| F T   |   |                                  |
|-------|---|----------------------------------|
| [TP]o | = | phosphorus concentration at x=0, |
| D2    | ⇒ | source/sink term, and            |
| x     | = | river distance (km).             |

This analysis was applied to 37 sets of phosphorus data giving 37 values for D2. A plot of D2 versus the associated discharge at Lady Loch Bridge for the day the set of phosphorus data were collected is shown in Fig 7.45. The numerical values of D2 increases as the discharge, Q, increases. To model this effect the following equation was fitted to the data in the D2 versus Q plot:

 $D2 = \ln (Q) k2 + c2$  ..... (7.26)

where k2 and c2 are constants.

Using curvilinear regression analysis (program REGRESS) the values of  $k^2$  and  $c^2$  were determined in Eq (7.26) from the 37 data points shown in Fig 7.45.

Modelling the transportation of phosphorus along a river reach requires the following steps:

 Divide the river reach into convenient sub-reaches. In the Berg River these sub-reach divisions are given by the phosphorus monitoring stations, see Fig 4.8, Chapter 4.

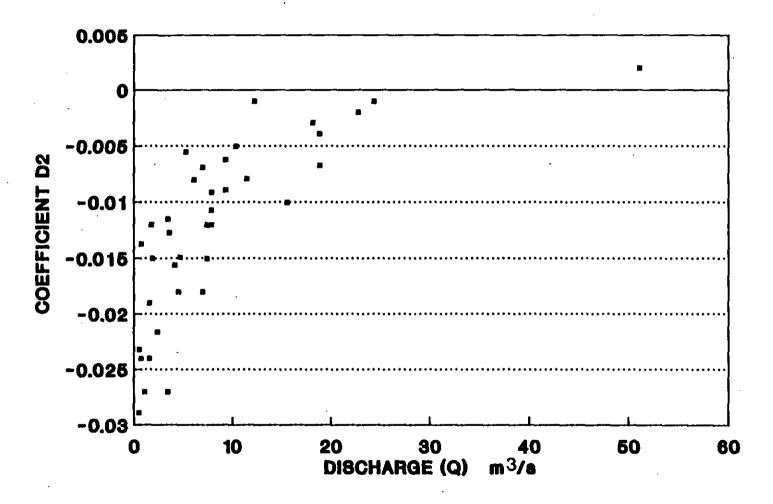


Fig 7.45. Coefficient D2 plotted versus river discharge.

TR 143 March 1989

- (2) Calculate the hydrograph at every one of the sub-reach divisions. Input data required are the discharge hydrograph at the upper boundary of the upstream sub-reach, in this case the Lady Loch Bridge. In each sub-reach input is required of the gauged and ungauged nonpoint discharge flows. The hydrodynamic solution is set out in Chapter 6, using program QMODEL.
- (3) Determine the lateral phosphorus input to each (1)sub-reach: the measured input phosphorus chemograph from point sources, and (ii) the lateral nonpoint phosphorus chemographs from gauged and ungauged areas using the NPS model with the measured or estimated subcatchment hydrographs. These aspects have been dealt with in Section 1 of this chapter.
- Determine the phosphorus chemograph at the downstream (4) boundary of each sub-reach along the main river channel using the mass continuity equation, Eq (7.16) (Program SECTION2, Appendix 2). For each sub-reach the input data requirements are the channel hydrograph and chemograph at the upstream boundary of the sub-reach and the hydrographs and chemograph of the lateral discharges to the reach, and the net removal/remobilization of phosphorus from/to the water column The solution 15 completed using Ea (7.26).sequentially for the sub-reaches along the river channel. the solution of the upstream sub-reach channel input the becoming the to downstream sub-reach. The input data for the first sub-reach, at Lady Loch Bridge is the simulated solution for the reach Paarl to Lady Loch Bridge described in Section 3 of this chapter.

(5) A flow period is selected (in this case Period 6) and the hydrographs and chemographs simulated for every division of the sub-reach. In this fashion the simulated solution is obtained at Drie Heuwels Weir. Comparison of the measured phosphorus data at Drie Heuwels Weir with the simulated allows judgement on the predictive power of the set of models making up the generation and transport of phosphorus along a river channel.

There is little leeway available to calibrate the phosphorus transport model as only k2 and c2 values can be readily modified. If this does not suffice, a major re-examination of every aspect of the sub-models and their calibration is indicated.

The sequence to model the transport of phosphorus along the Berg River can be summarized as follows:

In Chapter 6 the hydrodynamic model is developed, calibrated and verified using the flow data for the Berg River between Paarl and Drie Heuwels Weir. The model simulates the hydrograph at discrete points along the main river channel and accommodates for river channel losses as well as gauged and ungauged lateral runoff. As a consequence we are in a position to predict the hydrograph at each sub-reach boundary (term Qin and Qout in Fig 7.44). The output data files for the channel hydrographs and lateral inflow hydrographs form the input flow data files to the phosphorus transport model, program SECTION2.

The lateral inflow of phosphorus to each sub-reach (term Cl in Fig 7.44) is simulated using the nonpoint source model (program NPSM) described in Section 1 of this Chapter. The values of the coefficients al and bl in the model for each sub-reach are determined using the rating equation shown in Fig 7.20, giving the values shown in Table 7.3. The values for the coefficients a3 and b3 were the same as those given in Section 1 because they do not appear to change with sub-reach (see Table 7.1). These constants are inserted into the source code of Program SECTION2.

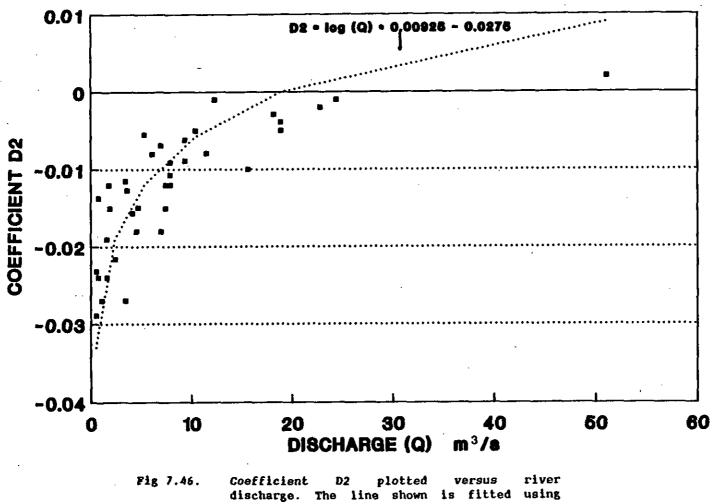
The phosphorus transport model includes the removal and remobilization of phosphorus from and to the channel water column. This aspect requires the term D2 in Eq (7.25), determined from 37 phosphorus concentration profiles and plotted as a function of channel discharge, see Fig 7.45. The value of D2 is a function of the discharge and the terms k2 and c2 are determined using curvilinear regression analysis of the data shown in Fig 7.46.

With the information described above we are now in a position to use the Program SECTION2 to predict the phosphorus chemograph at each sub-reach boundary along the main river channel between Lady Loch Bridge and Drie Heuwels Weir. A detailed description of the mode of operation of the program is given in Appendix 2.

| Table 7.3 | Determination of values for coefficients al and bl |
|-----------|--|
|           | in the NPS model for each sub-reach of the main    |
|           | river channel using the volume of lateral runoff   |
|           | and the rating equation shown in Fig 7.20.         |

| Sub-reach<br>number: | Volume of runoff<br>(Period 6 million m <sup>3</sup> ): | al<br>(from Fi | b1<br>g 7.20): |
|----------------------|---|----------------|----------------|
| 3                    | 55.2  | 0.022          | 0.015          |
| <b>4</b> .           | 21.0  | 0.026          | 0.035          |
| 5                    | 32.9  | 0.025          | 0.020          |
| б                    | 25.4  | 0.025          | 0.025          |
| 7                    | 24.3  | 0.025          | 0.020          |
| 8                    | 130.0   | 0.015          | 0.003          |

4



values of D2 determined from Eq (7.26).

# 7.103

#### Phosphorus transport Berg River

TR 143 March 1989

## 7.104

## Calibration of the transport model (Stage 2):

In order to calibrate the phosphorus transport model the following sequence was followed:

(1) Calibration period:

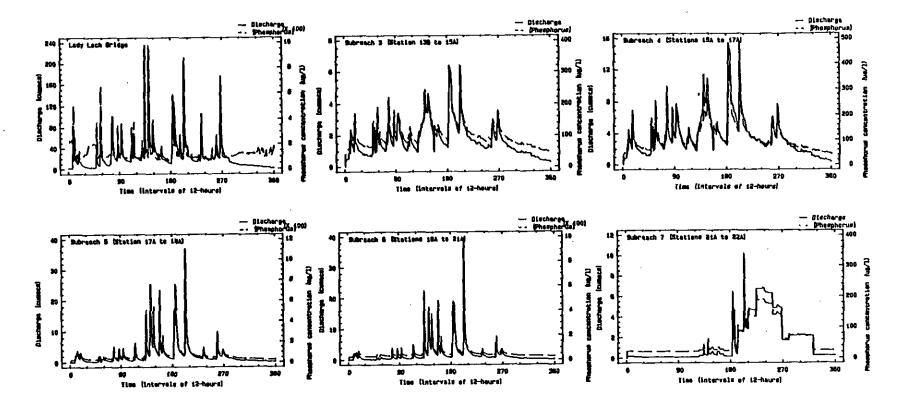
One period of 180-days was used to calibrate the model covering both high and low river flow. The water quality and flow data set for this period (Period 6) is one of the most comprehensive.

(2) Hydrographs and associated water quality data:

The hydrographs over the calibration period for all the gauging weirs and simulated phosphorus concentration data are shown in Fig 7.47.

(3) Estimation of coefficients  $k^2$  and  $c^2$  in Eq (7.26):

The most appropriate values for these coefficients were found only after the model was in operation. Initially rough estimates for these coefficients were determined as described earlier, afterwards a range of values were tested to determine the influence of these terms on the simulations (see Figs 7.48(a) and 7.48(b)). The value of: 0.0038 for k2, and -0.012 for c2, appeared to provide the most favourable simulation results.



f

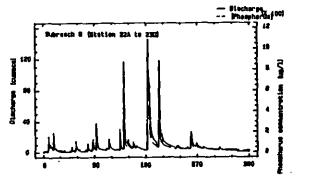
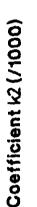
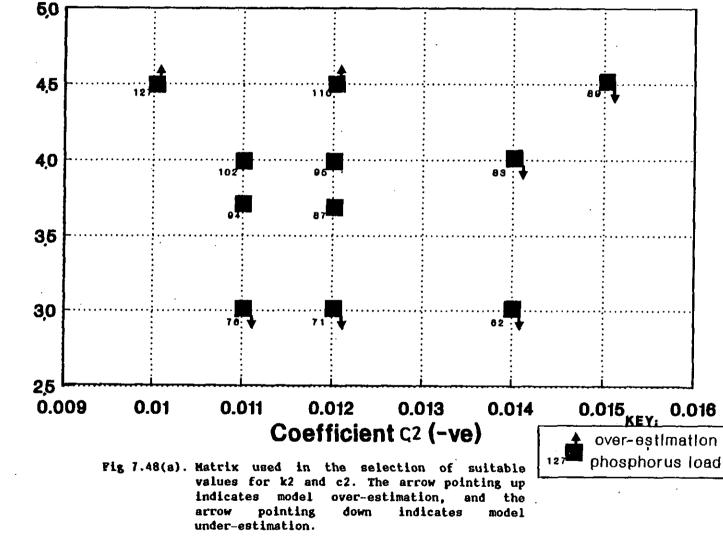


Fig 7.47. Phosphorus concentration and discharge data used in the calibration of the model SECTION 2 simulating the transport of phosphorus along the main river channel between Lady Loch Bridge and Drie Heuwels Weir (slow removal stage). 7.105

Phosphorus transport Berg River





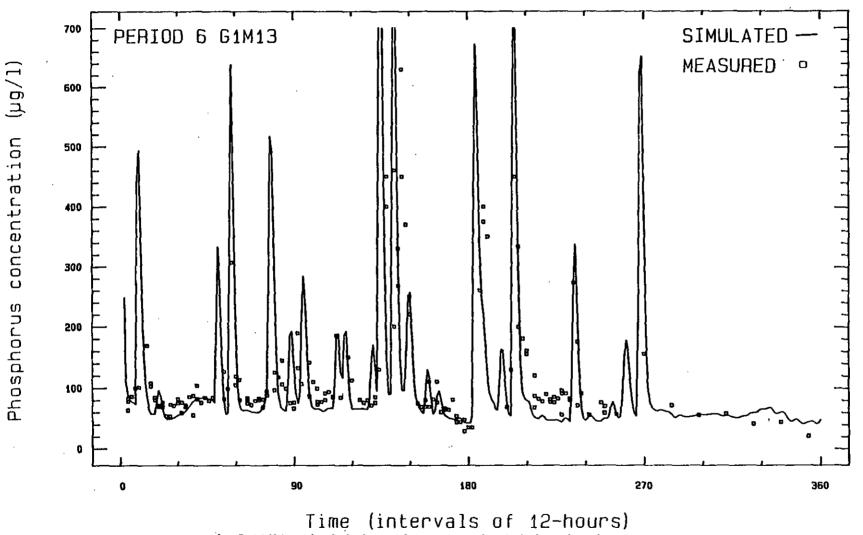


Fig 7.48(b). Simulated and measured total phosphorus concentration data at Drie Heuwels Weir -Period 6.

TR 143 March 1989

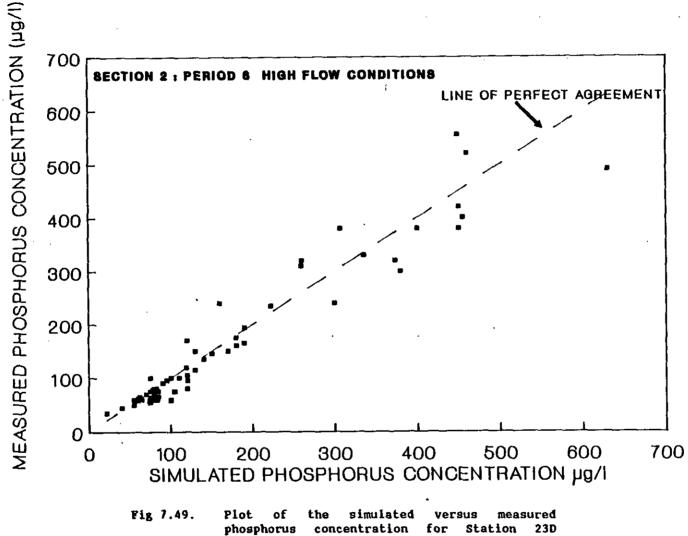
7.107

- eg

The input hydrographs and chemographs for Period 6, a wet period (May 1986 to November 1986) are shown in Fig 7.47. Accepting (1) the final values for the constants k2 and c2 given above, and (2) the accuracy of the gauging weirs involved in the mass balance calculations, the simulation of the chemograph at Drie Heuwels Weir for the 180-days of Period 6 was undertaken. In Fig 7.48(b) the measured and simulated phosphorus concentrations are shown, and the correlation plot in Fig 7.49.

It is at once apparent that the simulated and measured phosphorus concentrations are in reasonable accord; and thus it is unfortunate however that the peak phosphorus concentrations were sampled only on a small number of occasions.

During the low flow in Period 6 the measured phosphorus concentrations show some scatter around the simulated values (see Figs 7.48(b)). Such scatter probably arises from a number of causes; one of these would be the sporadic discharges from agricultural and urban areas. Such discharge are virtually impossible to model because of the randomness in occurrence. Fortunately, these are responsible for a relatively small load of phosphorus and occur only during low flow. Consequently, they have only a small influence on the total load of phosphorus for the specific period.



(Drie Heuwels Weir). Simulated values are predicted using the phosphorus transport model SECTION 2 - Period 6.

#### Phosphorus transport Berg River

TR 143 March 1989

## 3.6 Model verification

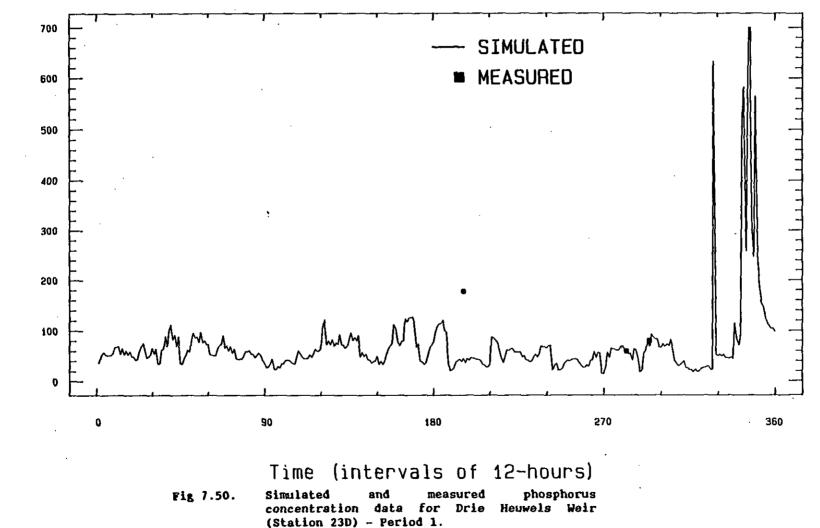
The model was verified by simulating the phosphorus chemograph at Drie Heuwels Weir over the monitoring period (Periods 1 to 5), from November 1983 to May 1986 using the program SECTION2 with the values for coefficients: k2=0.0038, c2=-0.012 in Eq (7.26). To solve for the slow reaction stage the following inputs are required

- The hydrograph at each sampling station along the main river channel - produced by the hydrodynamic flow model, described in Chapter 6 (program QMODEL).
- (2) The chemograph at Lady Loch Bridge simulated using the program SECTION1, described in Section 3 of this chapter
- (3) The influx of phosphorus from nonpoint sources in the reach Lady Loch Bridge to Drie Heuwels Weir simulated using the nonpoint source model, see Section 1 of this chapter, program NPSM.

The simulated phosphorus chemograph and measured phosphorus concentrations at Drie Heuwels Weir are shown in Figs 7.50 to 7.54; a correlation plot of the simulated versus measured total phosphorus concentration is shown in Fig 7.54(a).

## 3.7 Model evaluation

Comparing the measured and simulated phosphorus concentrations, the model predicts the concentration during low and intermediate flow conditions very reliably; during flood events unfortunately there are insufficient water quality data for accurate calibration and verification of the model.



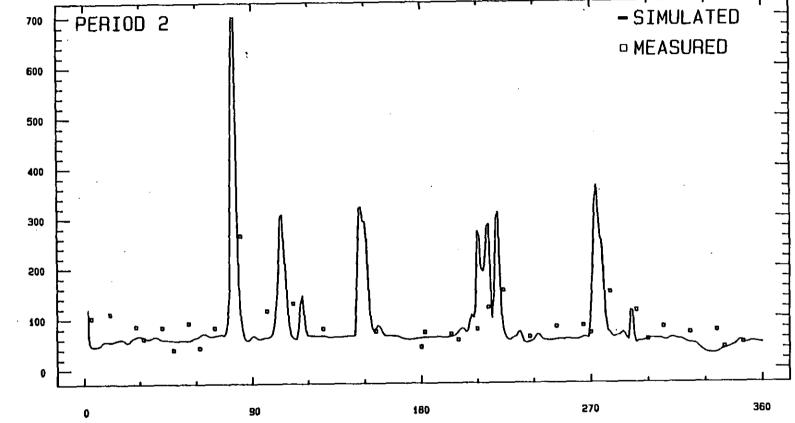
Phosphorus concentration (µg/l)

Phosphorus transport Berg River

TR 143 March 1989

. \_\_\_\_





#### (intervals of 12-hours) Time

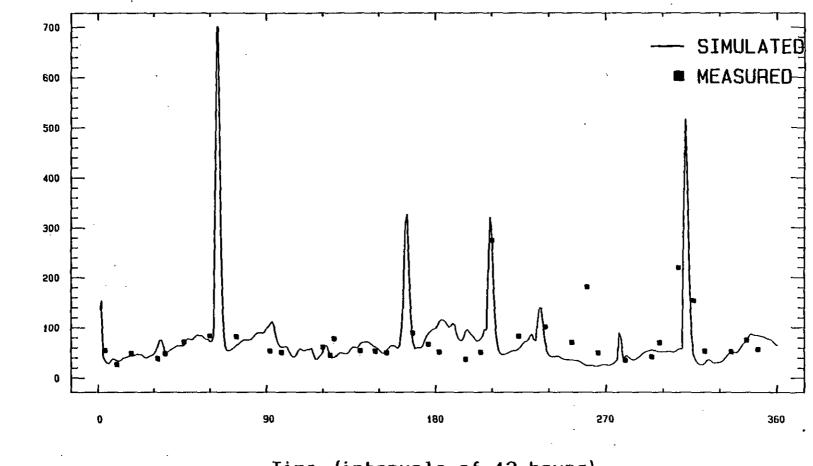
## Fig 7.51.

Simulated

phosphorus measured and concentration dats for Drie Heuwels Weir (Station 23D) - Period 2.

Phosphorus transport Berg River

TR 143 March 1989





Time (intervals of 12-hours) Simulated and measured phosphorus

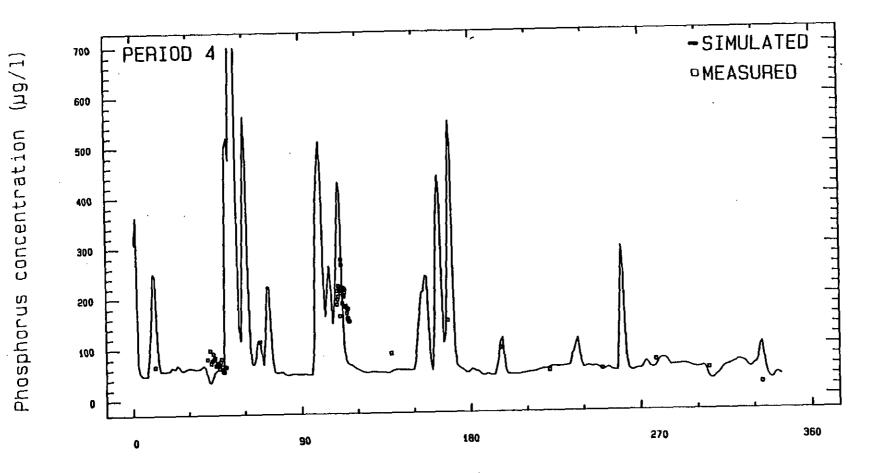
Simulated and measured phosphorus concentration data for Drie Heuwels Weir (Station 23D) ~ Period 3.

(I/6r()

concentration

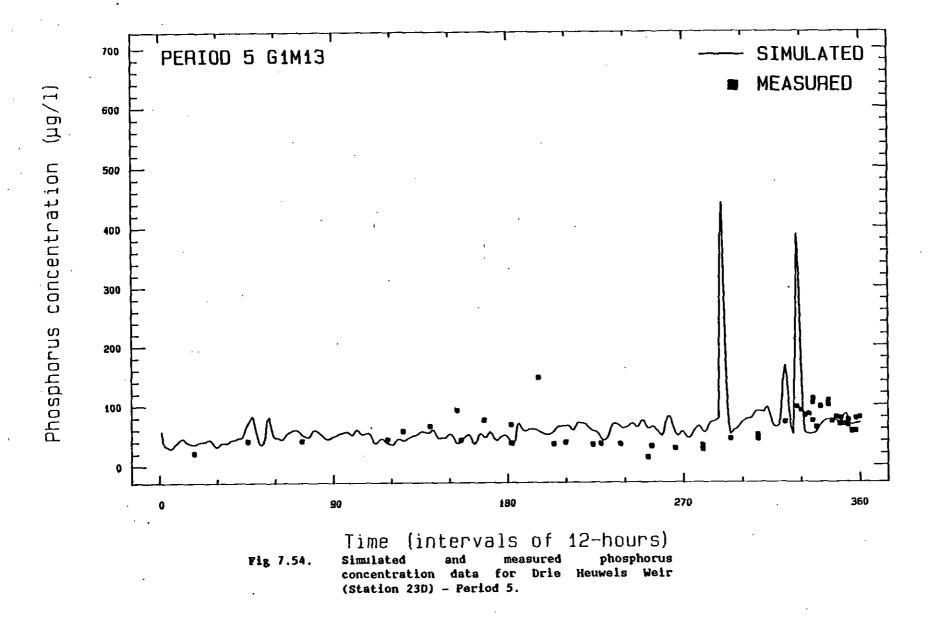
Phosphorus

TR 143 March 1989



# Time (intervals of 12-hours)

- Fig 7.53.
- Simulated and measured phosphorus concentration data for Drie Heuwels Weir (Station 23D) - Period 4.



TR 143 March 1989

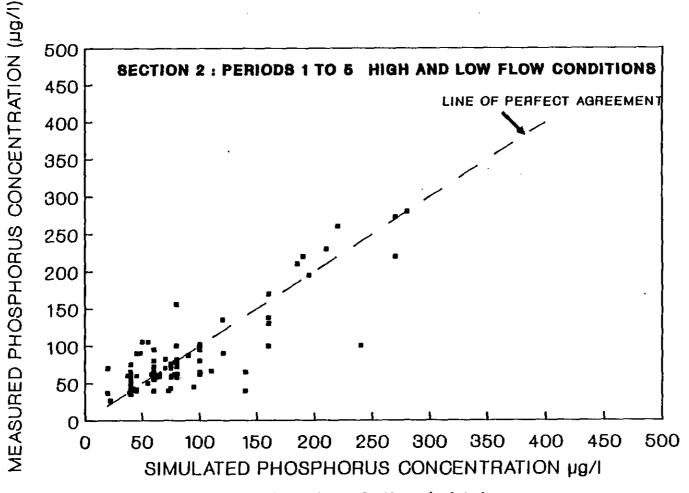


Fig 7.54(a). Correlation plot of the simulated versus measured phosphorus concentration data for Station 23D (Drie Heuwels Weir). Simulated values are predicted using the phosphorus transport model for the slow removal stage of the main river channel (program SECTION2) -Periods 1 to 5.

TR 143 March 1989

The plot of the values of D2 versus discharge indicate that a change-over from sedimentation to remobilization takes place at a threshold discharge of around 17 cumecs (Fig 7.46). This critical discharge value is approximately the same as for Stage 1 (see Fig 7.34). Thus, the remobilization of phosphorus in both Stages 1 and 2, is characterised by river discharges in excess of 17 cumecs. At river discharges less than 17 cumecs the flow apparently is insufficient to scour sediments and there is a net removal of phosphorus from the water column to the riverbed.

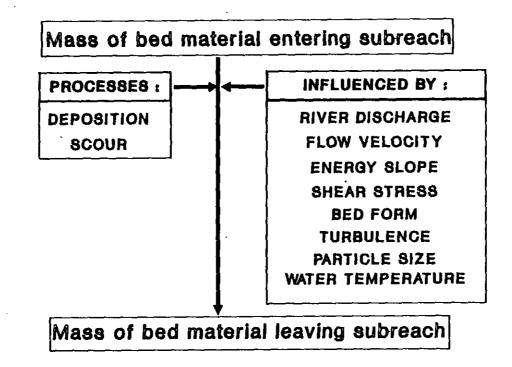
## 4 PHOSPHORUS BED LOAD MODEL

The phosphorus transport model (program SECTION2) predicts the phosphorus transportation in the water column of a river channel. However, the phosphorus adsorbed onto river sediments will be transported as bed load. To estimate the mass transport of phosphorus laden bed material, a bed load model must be developed. Such a model is complex and conceptually should take into account the processes shown in Fig 7.55.

Analysis of the experimental data (Chapter 5) shows us that the culmination of the processes in Fig 7.55 result in sharp gradients of wash and bed material during flood events and stable concentrations during steady flow conditions.

To quantify the mass transport of bed material along a series of river sub-reaches we could follow one of two approaches:

- Measure the bed load at the inflow of each sub-reach and quantify each of the processes shown in Fig 7.55,
- (2) using a lumped parameter approach, quantify the upstream and downstream boundary conditions of each sub-reach.



| Fig 7.55. | Conceptual    |             |        | the pro  |       |
|-----------|---------------|-------------|--------|----------|-------|
| -         | governing the | e transport | of bed | material | along |
|           | a river chann | nel.        |        |          |       |

TR 143 March 1989

By following the first approach we would require an intensive investigation into the transport of bed material along the river channel, which is beyond the scope of this investigation. Alternatively, the second approach provides a more practical solution to the problem. Numerous equations are proposed by different authors to calculate the rate of sediment alluvial channels. Prominent among these transport in approaches are those of Einstein (1950) and modifications by Colby and Hembree (1955), Bagnold (1956, 1966) method based on stream power, and the studies of Engelund and Hansen (1967) using tractive force. Most of these equations are derived under the assumption that the rate of sediment transport depends on one independent variable, such as water discharge, average flow velocity, energy slope, or shear stress.

## 4.1 Model development

More recently, success in predicting total bed material concentration has been claimed by Yang and Stall (1976). After reviewing the literature they concluded that "the rate of bed material transport in an alluvial channel is dominated by the rate of potential energy expenditure per unit weight of water" i.e. the unit stream power. Using this principle, they formulated an equation of the form

$$Ct = J (WW/vf - WWC/vf)^{K}$$
 ..... (7.27)

#### where

| Ct   | ₽          | concentration of bed material in the flow,       |
|------|------------|--|
| Ww   | <b>=</b> . | unit stream power, determined as the product of  |
|      |            | the river velocity and bed slope,                |
| Wwc  | ۰.<br>۲    | a critical, or threshold value of Ww below which |
|      |            | there is no transport,                           |
| vf - | ₽          | median fall velocity of the sediment particles,  |
| J,K  | #          | dimensionless empirical factors dependent on the |
|      |            | characteristics of the flow and sediments.       |

Dingman (1985) states that Eq (7.27) is made dimensionless by the division of the fall velocity, vf, which seems physically reasonable since vf can be considered an index of a particle's "reluctance" to be transported. Yang and Stall (1976) found empirically that the critical velocity for erosion, vc. was related to fall velocity, vf, by

vc = 2.05 vf ..... (7.28)

This relationship can then be expressed non-dimensionally and put in terms of the unit stream power simply by multiplying by the slope So and rearrangement (if the erosive Reynolds number Re>70) then

$$Wwc/vf = 2.05 So$$
 ..... (7.29)

For flows not fully turbulent, the relation between vc and vf should be a function of Re. From experimental data, Yang and Stall (1976) found that this relation could be expressed as

$$vc = ((2.5/(0.434 \ln Re - 0.06)) + 0.66) vf \dots (7.30)$$

Making the same transformation as before gave the expression for critical stream power in flows that are not fully turbulent (if Re < 70) then

 $Wwc/vf = ((2.5/(0.434 \ln Re - 0.06)) + 0.66)$  So ... (7.31)

To complete their analysis, Yang and Stall (1976) used dimensional considerations to reason that J and K in Eq (7.27)should depend only on the particle Reynolds number, Rp, and the ratio of friction velocity, v\*, to fall velocity vf. Multiple regression analysis using over 450 individual measurements from flumes and natural rivers resulted in the following empirical relations

$$J = 27 \ 2000/(Rp^{0.286}(v^*/vf)^{0.457}) \qquad \dots \qquad (7.32)$$

7.121

Eqs (7.32 to 7.33) used in Eq (7.27) give the predicted bed concentration (Ct) in parts per million. To compute the total sediment discharge or capacity Qs, the following equation is used

$$Q_{s} = 10^{D} Ct Y_{s} Q$$
 .... (7.34)

where Qs is in units of weight per unit time. Ys is the weight density of the sediment and Q is the water discharge.

Figure 7.56 compares the measured sediment discharges with those computed by using Eq (7.27) indicating that this approach provides very satisfactory predictions over a wide range of conditions (Yang and Stall, 1976; Dingman, 1985).

Yang and Stall (1976) state that the measurement of the sediment concentration is attained at a contracted tota] section or at a section with man-made construction such that all sediment could be measured. Under ordinary conditions, only the suspended sediment concentration (wash load) can be measured easily in a river. The sediment transported in suspension includes those with particle sizes within the range of the channel bed composition, and those sediments of finer size. Wash load is defined as that part of the sediment load that consists of grain sizes finer than those of the bed. Bed material discharge equals the product of water discharge and the difference between total suspended concentration and the suspended concentration with particle size in the range of wash load.

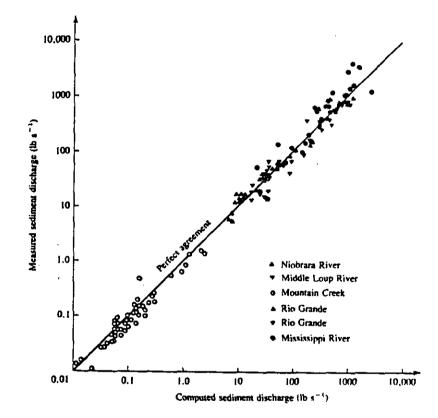


Fig 7.56.

Comparison between measured and computed sediment discharge at six river stations using the Unit Stream Power Equation (from Yang and Stall, 1976). Equations (7.27, 7.29 to 7.34) were used in the program BEDLOAD (see Appendix 2) to predict the total sediment discharge at Station 23D, Drie Heuwels Weir. The mass of phosphorus transported as bed load is estimated from

$$Qp = (Q . Ct) Sp$$
 ..... (7.35)

where

| Qp | = | mass of phosphorus transported (g/s),                   |
|----|---|---|
| •  |   | instantaneous river discharge (cumecs),                 |
| Ct | = | concentration of bed load material (g/m <sup>3</sup> ), |
| Sp | = | ratio, mass of phosphorus/mass of bed load              |
|    |   | material (g/g).   |

In Eq (7.35) the term Sp, is estimated at discrete points along the main river channel by collecting bed sediment samples and determining the proportion of phosphorus per unit mass of sediment. The data for these samples are shown in Table 7.4.

The most important feature in the data, shown in Table 7.4, is that the phosphorus concentration exhibits little spatial variability for samples collected at stations upstream and downstream of the municipal sewage outfalls, Stations 9A and 13B respectively.

| Table 7.4 River bed sediment samples collected at a numbe<br>of sampling points along the main river channel<br>with mass of phosphorus given per unit mass o<br>sediment. Median sieve size is calculated usin<br>granulometric methods. |                    |  |                            |  |
|---|--------------------|--|----------------------------|--|
| Date of co  | llection: Station: | Mass of P in<br>sediments<br>(g P/g sediment): | Median sieve<br>size (mm): |  |
| 2/5/1986  | 9A                 | 0.074  | 0.60                       |  |
|   | 13B                | 0.056  | 0.60                       |  |
|   | 21A                | 0.059  | 0.47                       |  |
|   | 22A                | 0.068  | 0.35                       |  |

## 4.2 Model calibration

.

(1) Hydrograph and associated water quality data:

Of the greatest importance is the availability of accurate hydrographs with the associated water quality data for discrete points along the main river channel between Lady Loch Bridge and Drie Heuwels Weir. This requirement is definitive, without it no reliable calibration is possible. It is essential therefore the gauging weirs are accurate over the full range of flows expected and the water quality data are representative of the conditions in the river at the time of sampling.

(2) Estimation of model coefficients in Eq (7.27):

These coefficients in the numerical scheme can be estimated accurately only through trial simulations using a range of values. Due to a lack of available bed load data the model was calibrated using the values for the coefficients given by Yang and Stall (1976), given in Eqs (7.27 to 7.33) as well as data shown in Table 7.4.

## 4.3 Model simulation

In Table 7.5, the results of the model application are presented for Periods 1 to 6, giving the total mass of bed material transported, as well as the estimated mass of phosphorus transported in both the water column and bed load.

| Table 7.5 | Predicted mass of<br>material and in the w<br>Weir. Expressed as to | ater column, | for Drie Heuwel                            |
|-----------|---|--------------|--|
| Period:   | Mass of bed load<br>material:                                       | phos         | ted mass of<br>phorus in:<br>water column: |
| ]         | 5.0   | 0.00038      | 36.3                                       |
| 2         | 13.7  | 0.00104      | 70.4                                       |
| 3         | 2.2   | 0.00017      | 10.4                                       |
| 4         | 19.5  | 0.00150      | 125.0                                      |
| 5         | 1.0   | 0.00007      | 4.3  |
| 6         | 19.1  | 0.00147      | 107.7                                      |

## 4.4 Model evaluation

Yang and Stall (1976) state that the calibration of a bed load model is difficult because of the problems obtaining representative sediment samples from the riverbed. The total solids samples collected during the monitoring suspended exercise provide an estimate of the magnitude of the wash load transport and not the concentration of bed material. It must be emphasised therefore that the bed load model is calibrated using the coefficients reported by Yang and Stall (1976) and the results will be considered in this light. However, the output from the model shown in Table 7.5 reveals that in terms of the mass of phosphorus transported in the water column the mass of phosphorus in the bed load is relatively insignificant. the accuracy of the model provides Consequently, an approximation of the mass transport of bed material and a comparison between the phosphorus transported in the water column with the phosphorus transported as bed material.

Due to the mean sediment phosphorus concentration being 0.077 mg/g, the resultant mass of phosphorus transported as bed load is relatively low compared with the transport as wash load. Consequently, bed load transport will be ignored from further calculations due to the bed load only making-up less than 1 percent of the total phosphorus load transported by the river (see Table 7.5).

## 5 CONCLUSIONS

In this chapter a lumped parameter model was developed to simulate the transport of phosphorus along a river channel. It required the development of a number of sub-models:

(1) Phosphorus nonpoint source model,

- (2) Phosphorus channel transport model which required the development of:
  - (i) hydrodynamic flow model,
  - (ii) phosphorus removal and remobilization model,

(jij) phosphorus bed load model.

The inter-relationships between models is shown in Fig 7.57. The phosphorus bed load model (2(ii)) eventually appears to be relatively unimportant in this model context, and possibly could be omitted. All the other sub-models serve vital functions in the channel phosphorus transport model. The phosphorus nonpoint source and hydrodynamic flow model however can be used independently of the channel phosphorus transport model.

In the next chapter the various sub-models of the phosphorus transport model will be used to show the range of problems which can be addressed by such a model.

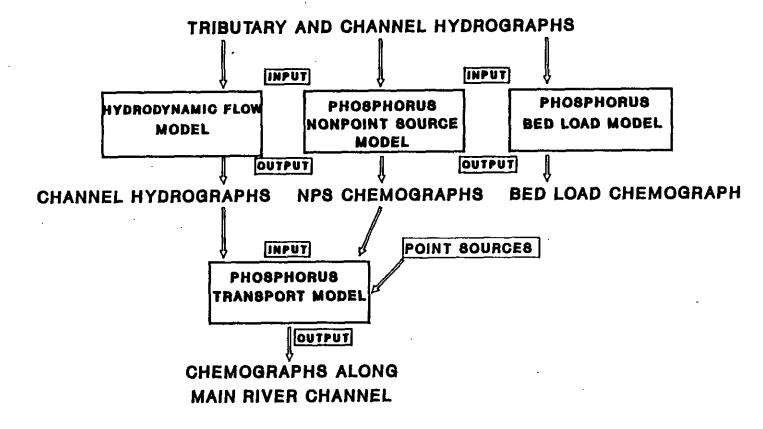


Fig 7.57. Schematic diagram showing the interrelationships between the various components of the phosphorus transport model.

#### Phosphorus transport Berg River

TR 143 March 1989

6 REFERENCES

Bagnold, R. A. (1956)

"The flow of cohesionless grains in fluids", Phil. Trans. Roy. Soc. Lond., <u>249</u>.

7.129

Bagnold, R. A. (1960)

"An approach to the sediment transport problem from general physics", US Geological Survey Professional Paper 422-1, p.3<u>7.</u>

Bedford, K.W., Sykes, R.M. and Libicki, C. (1983)

\*Dynamic advective water quality model for rivers", Am. Soc. Civ. Eng. Proc. J. Environ. Eng., <u>109</u>, no.3, 535~553.

Bella, D.A. and Dobbins, W.E. (1968)

"Difference modeling of stream pollution", Am. Soc. Civ. Eng. Proc. J. Sanitary Eng. Div., <u>94</u>, no. SA5, 995-1016.

Betson, R.P. and McMaster, W.M. (1975) "Nonpoint source mineral water quality model", J. Water P.C., <u>47</u>, no.10, 2461-2473.

Casey, H. and Farr, S. (1982)

"The influence of within-stream disturbance on dissolved nutrient levels during spates", Hydrobiol., 92, 447-462.

Cooke, J.G. (1988)

"Sources and sinks of nutrients in a New Zealand hill pasture catchment II. Phosphorus", Hydrological Processes, <u>2</u>, 123-133. Colby, B. R. and Hembree, C. H. (1955)

"Computation of total sediment discharge Niobrara River near Cody, Nebraska", US Geological survey water-supply paper 1357, p.187.

Dingman, S.L. (1985)

"Fluvial hydrology", First edition, USA: W.H. Freeman & Co., p.383.

Engelund, F. and Hansen, E. (1967)

"A monograph on sediment transport in alluvial streams", Technical University of Denmark, Hydraulic Laboratory, Copenhagen, p.121.

Einstein, H.A. (1955)

"The bed load function for sediment transportation in open channel flows", Technical Bulletin no. 1026 US Department of Agriculture, Soil conservation service, Washington, D.C.

Gray, D.M. (1962)

"Derivation of hydrographs for small watersheds from measurable physical characteristics", Research Bulletin no. 506, Department of Agricultural Engineering, Iowa State University, p.515-570.

Johnson, A.H., Bouldin, D.R., Goyette, E.A. and Hedges, A.M. (1976)

"Phosphorus loss by stream transport from a rural watershed: quantities, processes and sources" J. Environ. Qual., 5, no.2, 148-157.

Kersandt, U. and Marais, G.v.R. (1973)

"A mathematical model for the hydro-salinity flow systems of the Upper Berg River basin", University of Cape Town, Department of Civil Engineering, Research Report no. W.6.

Keup, L.E. (1968)

"Phosphorus in flowing streams", Water Res., <u>2</u>, 373-386.

Koussis, A.D. (1983)

"Unified theory for flood and pollution routing", Am. Soc. Civ. Eng. Proc. J. Hydraul. Eng., <u>109</u>, no.12, 1652-1664.

Kunkle, G.R. (1965)

"Computation of ground-water discharge to streams during floods, or to individual reaches during base flow by use of specific conductance", US Geol. Survey Prof. paper 525-D, D207-D210.

Linsley, R.K., Kohler, M.A. and Paulhus, J.L.H. (1975) "Hydrology for engineers", McGraw-Hill Book Co., London.

Logan, T.J. (1982)

"Mechanisms for the release of sediment bound phosphate to water and the effects of agricultural land management on fluvial transport of particulate and dissolved phosphate", Hydrobiol., <u>92</u>, 519-530.

McBride, G.B, and Rutherford, J.C. (1984)

"Accurate modelling of river pollutant transport", Am. Soc. Civ. Eng. Proc. J. Environ. Eng. Div., <u>110</u>, no.4, 808-827.

- McCalister, D.L. and Logan. T.J.(1978) "Phosphate adsorption-desorption characteristics of soils and bottom sediments in the Maumee River basin of Ohio", J. Environ. Qual., <u>7</u>, no.1, 87-92.
- Novotny, V., Tran,H., Simsiman, G.V. and Chesters, G. (1978) "Mathematical modeling of land runoff contaminated by phosphorus". J. Water P.C., 1, 101-112.
- Pinder, G.F. and Jones, J.F. (1969)

"Determination of the ground-water component of peak discharge from the chemistry of total runoff", Wat. Resour. Res., <u>5</u>, no.2, 438-445.

Prairie, Y. T. and Kalff, J. (1985) "Effect of catchment size on phosphorus export", Wat. Resour. Bull., <u>22</u>, no.3, 465-470.

Simons, B.L. and Cheng, D.M.H. (1985) "Rate and pathways of phosphorus assimilation in the Nepean River at Camden, New South Wales", Water Res., 19, no.9, 1089-1095.

Smith, R.V. and Stewart, D.A. (1977)
"Statistical models of river loadings of nitrogen and
phosphorus in the Lough Neagh system", Water Res., <u>11</u>,
631-636.

Taylor, A.W. and Kunishi, H.M. (1971) "Phosphate equilibria on stream sediment and soil in a watershed draining and agricultural region", J. Agric. Food Chem., <u>19</u>, no.5, 827-831. Verhoff, F.H. and Melfi, D.A. (1978)

"Total phosphorus transport during storm events", Am. Soc. Civ. Eng. Proc. J. Environ. Eng. Div., <u>104</u>, no. EE5, 1021-1026.

Visocky, A.P. (1969)

"Estimating the ground-water contribution to storm runoff by the electrical conductance method", Technical Division, National Water Well Association, 5-10.

Wang, W. and Evans, R.L. (1970)

"Dynamics of nutrient concentration in the Illinois River", J. Water P.C., <u>42</u>, no.12, 2117-2123.

Wendt, R.C. and Alberts, E.E. (1984)

"Estimating labile and dissolved inorganic phosphate concentration in surface runoff", J. Environ. Qual., 13, no.4, 613-618.

Yang, C.T. and Stall, J.B. (1976)

"Applicability of unit stream power equation", Am. Soc. Civ. Eng. Proc. J. Hydraul. Div., <u>102</u>, no. HY5, 559-568.

Zingales, F., Marani, A., Rinaldo, A. and Bendoricchio, G. (1984)

"A conceptual model of unit-mass response function for nonpoint source pollutant runoff", Ecol. Model., <u>26</u>, 285-311. 7. NOTATION USED IN CHAPTER 7

Phosphorus nonpoint source model:

| Ρ                | <pre>= ortho-phosphate concentration (mg/l)</pre>          |
|------------------|--|
| A0,A1,A2         | = regression coefficients in Eq (7.1)                      |
| ∆Q∕∆t            | <pre>= rate-of-change of discharge (cumecs/12 hours)</pre> |
| Q                | = instantaneous discharge (cumec)                          |
| Q <sub>to</sub>  | <pre>= discharge at time of sampling (cumec)</pre>         |
| Q <sub>t-1</sub> | <pre>= discharge 12-hours previously (cumec)</pre>         |
| to               | = time of sampling (second)                                |
| t-1              | = time 12-hours previously (second)                        |
| TPr              | = phosphorus concentration during recession flow           |
|                  | (ug/l)   |
| al,bl            | = regression coefficients in Eq (7.4)                      |
|                  | (mg/l,mg/l,cumec)  |
| Qr               | = discharge during recession flow (cumec)                  |
| TPs              | = phosphorus concentration during rising limb              |
|                  | (mg/l)   |
| b2               | = regression coefficients in Eq (7.5a)                     |
|                  | (mg/l/cumec)   |
| a3,b3            | = regression coefficients in Eq (7.6)(mg/2,                |
|                  | mg/l/cumec/12-hours)                                       |

7.134

## Hydrograph decomposition approach:

| Qb      | = | baseflow discharge (cumec)                         |
|---------|---|--|
| Qt      | = | total discharge (cumec)                            |
| Qs      | = | surface runoff discharge (cumec)                   |
| kb,ks   | = | regression coefficients in Eqs (7.9 and 7.10)      |
|         |   | (cumec/cumec, cumec/cumec)                         |
| SV1,SV2 | = | volume of surface runoff (m <sup>3</sup> )         |
| BV1,BV2 | = | volume of baseflow (m <sup>3</sup> )               |
| Qmax    | Ξ | peak discharge (cumec)                             |
| [PP]    | = | particulate phosphorus concentration ( $\mu g/2$ ) |
| ksp     | = | regression coefficient in Eq. (7.13)               |
|         |   | (µg/l/cumec)                                       |
| [SP]    | = | soluble phosphorus concentration ( $\mu$ g/L)      |
| kad,ks  | = | regression coefficients in Eqs (7.14 and 7.15)     |
|         |   |  |

(µg/l/cumec)

7.135

## Phosphorus transport model:

| С            | = | concentration in main river channel ( $\mu$ g/L) |
|--------------|---|--|
| C1           | = | concentration of lateral inflow ( $\mu g/2$ )    |
| q            | a | lateral inflow per unit length of channel        |
|              |   | (cumec/metre)                                    |
| A            | = | flow cross sectional area $(m^2)$                |
| Q            | = | discharge in main river channel (cumec)          |
| x,t          | = | increments of time and space                     |
| S*           | = | source/sink term                                 |
| Ct           | = | phosphorus concentration at time t ( $\mu$ g/l)  |
| Co           | 3 | phosphorus concentration at time O ( $\mu$ g/L)  |
| k1,k2        | = | rate constants                                   |
| Qt           | = | discharge at time t (cumec)                      |
| Qo           | = | discharge at time O (cumec)                      |
| a            | = | constant   |
| Loadout      | = | phosphorus load at Lady Loch Bridge (g/s)        |
| Loadin       | 7 | phosphorus load input from upstream and          |
|              |   | lateral sources (g/s)                            |
| .01,02,03,04 | 2 | phosphorus concentrations in Eq (7.19)           |
|              |   | (µg/l)   |
| 01,02,03,04  | = | discharge values in Eq (7.19) (cumec)            |
| [TP]sim      | = | simulated phosphorus concentration ( $\mu g/2$ ) |
| [TP]mes      | = | measured phosphorus concentration ( $\mu g/$ )   |
| D            | = | phosphorus source/sink coefficient in Eq (7.22)  |

| k],c] | 3          | regression coefficients in Eq (7.23)            |  |  |
|-------|------------|---|--|--|
| DQ    | =          | discharge quotient                              |  |  |
| Z     | =          | constant in Eq (7.24)                           |  |  |
| [TP]0 | z          | phosphorus concentration at distance O          |  |  |
|       |            | (µg/L)  |  |  |
| [TP]x | , <b>=</b> | phosphorus concentration at distance x          |  |  |
|       |            | (µg/L)  |  |  |
| D2    | 3          | phosphorus source/sink coefficient in Eq (7.26) |  |  |
| k2,c2 | =          | regression coefficients in Eq (7.26)            |  |  |
|       |            |   |  |  |

Phosphorus bed load model:

| Ct    | =    | bed load concentration (mg/l)              |
|-------|------|--|
| Ww    | =    | unit stream power                          |
| Wwc   | =    | critical value of Ww                       |
| vf    | =    | median`fall velocity (m/s)                 |
| J,K   | 3    | regression coefficients in Eq (7.27)       |
| VC    | =    | critical velocity (m/s)                    |
| So    | =    | bed slope                                  |
| Re,Rp | =    | Reynolds Number                            |
| Qs    | ≓,   | sediment discharge (g/s)                   |
| Ys    | , ti | density of sediment                        |
| Qp    | ₽    | phosphorus discharge on bed material (g/s) |

## Phosphorus transport Berg River

## TR 143 March 1989

. .. .

## 7.137

## CHAPTER 8

## MODEL APPLICATION

### 1 INTRODUCTION

In this chapter the phosphorus coupled hydrodynamic advective transport model for the Berg River will be used to examine a selection of phosphorus related problems. It must be emphasised that these problems are for the purpose of illustrating the use of the model; it should not be construed that these are issues under consideration by any agency controlling water resource development of the Berg River.

The problems can be stated briefly as follows:

- <u>Misverstand Dam</u>: What would be the phosphorus mass loading on a proposed impoundment at Misverstand?
  - <u>Phosphorus point source control</u>: What reduction will be achieved in phosphorus exported by the Berg River to the proposed Misverstand Dam if the 1 mg/L phosphate standard is implemented at the Paarl and Wellington wastewater treatment plants?

<u>Phosphorus nonpoint source control</u>: What reduction in nonpoint source export to the main river channel can be achieved by constructing short residence time impoundments on the tributaries?

- <u>Pre-impoundments</u>: What reduction and control of the mass of phosphorus transported along the main river channel to the proposed Misverstand Dam can be achieved by construction of a pre-impoundment upstream of Misverstand?
- <u>Inter-catchment transfer</u>: What is the effect of a number of inter-catchment strategies on the phosphorus budget of the Berg River system?
- <u>Voëlvlei Dam</u>: If the Berg River should be utilized to augment the water supply to Voëlvlei - What strategy must be followed to minimize the phosphorus load to Voëlvlei Dam from the Berg River supply?
- 2 PROGRAMS USED IN MODEL SIMULATIONS

A menu driven program called PCHAT (Phosphorus Coupled Hydrodynamic Advective Transport) incorporates all the models developed in this investigation, and some others. These are:

- QMODEL The hydrodynamic flow model, to simulate the hydrographs at discrete points (stations) along the main river channel between Paarl and Drie Heuwels Weir.
- (2) NPSM Phosphorus nonpoint source model, to simulate the phosphorus chemograph associated with the hydrograph of each of the nonpoint sources along the main river channel.
- (3) SECTION1 Phosphorus channel transport model, simulating the rapid removal stage between Paarl and Lady Loch Bridge; the output is a phosphorus chemograph at Lady Loch Bridge.

- (4) SECTION2 Phosphorus channel transport model, simulating the slow removal stage between Lady Loch Bridge and Drie Heuwels Weir; the output are phosphorus chemographs at discrete points (stations) along the main river channel.
- (5) LOADCALC To calculate the phosphorus load from a phosphorus chemograph and its associated hydrograph at stations along the main river channel.
- DAMP To simulate the influence of a pre-impoundment (6) the downstream river channel. on the main OR budget. The input js. the phosphorus phosphorus hydrograph for the station just chemograph and upstream of the pre-impoundment site.
- (7) ABSTRACT To simulate the effect of abstraction from the headwaters of the Berg River (for inter-catchment transfer) on the hydrograph at Paarl (Station 9A).
- (8) DURACV1 To produce a duration/exceedance plot from a time series of phosphorus concentration, flow data or phosphorus load.

In using PCHAT it is assumed that the models 1 to 4 are calibrated for the Berg River (calibration of the flow model (1) is described in Chapter 6 and the transport models (2, 3, and 4) in Chapter 7). Description, documentation and listing of these programs are given in Appendix 2.

#### **3 PHOSPHORUS LOAD ON MISVERSTAND DAM**

To meet the anticipated demand for potable water in the Atlantis-Saldanha region, a dam site may be considered on the main river channel of the Berg River at, or near, Misverstand weir. For such a dam, to assess its eutrophication potential, it is necessary to know the (1) mass of phosphorus that would enter the impoundment, (2) the influence of the 1 mg/L phosphorus effluent standard on the mass of phosphorus that would enter the impoundment. It is assumed that the mass of phosphorus exported at Drie Heuwels Weir, just upstream of the Misverstand site will be adequate to make such an assessment (it omits the influence of the Matjies River).

## 3.1 Quantification of point and nonpoint sources

To quantify the sources of phosphorus entering the main river channel, upstream of Drie Heuwels Weir, the following simulation sequence was followed:

- (1) Program NPSM simulates the mass of phosphorus exported from nonpoint sources entering the main river channel upstream of Drie Heuwels Weir; this includes the phosphorus in the Berg River at Station 9A as this phosphorus load also is derived from a nonpoint source.
- (2) Program LDADCALC calculates the mass of phosphorus from Paarl and Wellington Sewage works. Inputs are a chemograph and hydrograph established manually from the measured flow and discrete phosphorus measurements.

These two programs will give the nonpoint source contributions for each 180-day period to each of the sub-reaches shown in Fig 7.31, as well as the contribution from Paarl and Wellington wastewater treatment plants for each 180-day period. The simulated annual total input above Drie Heuwels Weir for the point and nonpoint sources are shown in Tables 8.1.

In Table 8.2 the annual mass contributions are split into two periods of 180-days, comprising the respective dry and wet periods.

From Table 8.1, over the period 1983 to 1986, nonpoint sources contribute 322 tons of phosphorus and point sources 68 tons a total of 390 tons; point sources made-up only 18 percent of the phosphorus input.

| Table 8.1 | Annual mass inputs of phosphorus from point and    |
|-----------|--|
|           | nonpoint sources to the main river channel above   |
|           | Drie Heuwels Weir, for Periods 1 to 6 (loads given |
|           | in tons of phosphorus).                            |

| Sources:                   | Mass of phosphorus: |        |               |               |            |
|----------------------------|---------------------|--------|---------------|---------------|------------|
|                            | Periods:-           |        |               |               |            |
| Point- Paarl<br>Wellington |                     |        | 17.93<br>5.79 | 12.69<br>7.67 |            |
| Total point input:         |                     | 23.65  | 23.74         | 20.36         | 68         |
| Total nonpoint input:      |                     | 95.04  | <u>129.45</u> | <u>98.34</u>  | <u>322</u> |
| Total:                     |                     | 118.69 | 153.19        | 118.70        | 390        |

From Table 8.2, during the dry summer periods (Periods 1, 3 and 5) there are minimal nonpoint contributions and the contribution of phosphorus from point sources ranges up to 77 percent of the total mass input to the river (Table 8.2). However, during the wet winter periods (Periods 2, 4 and 6), point sources contribute between 12 and 21 percent of the total input to the river channel, the balance being contributed by nonpoint source runoff, 79 to 88 percent.

Table 8.2 Determination of the phosphorus input loading to the main river channel upstream of Drie Heuwels Weir during summer (low flow) periods (1, 3 and 5) and winter (high flow) periods (2, 4 and 6).

| Period :       | Nonpoint<br>source:<br>A | Point<br>source<br>B | Percentage input<br>from point sources<br>(B/A+B)*100 |
|----------------|--------------------------|----------------------|---|
| Summer periods | :                        |                      |   |
| 1              | 37.23                    | 7.85                 | 17%   |
| 3              | 6.61                     | 9.57                 | 59%   |
| 5              | 2.26                     | 7.66                 | 77%   |
| Winter periods | •                        |                      |   |
| 2              | 57.81                    | 15.80                | 21%   |
| 4              | 122.84                   | 14.17                | 12%   |
| 6              | 96.07                    | 12.70                | 12%   |

Mass loading of phosphorus (tons):

8.7

3.2 <u>Removal and remobilization of phosphorus</u>

It is now of interest to enquire what fraction of the phosphorus input to the main river channel is exported at Drie Heuwels Weir. The mass of phosphorus retained in the river channel is given by

MR = MI - MO

... (8.1)

where

| MR | = | ma s s               | of | phosphorus | retained | between | North | Paarl |  |
|----|---|----------------------|----|------------|----------|---------|-------|-------|--|
|    |   | and Drie Heuwels Wei |    |            | r,       |         |       |       |  |

MI = total mass of phosphorus input to the river channel.

MO = total mass of phosphorus output from the river channel at Drie Heuwels weir

Values for MI in Eq (8.1) are shown in Table 8.2. To calculate the term MO at Drie Heuwels Weir, the hydrographs first must be simulated at each station along the main river channel; this requires the model QMODEL (details of this model have already been given in Chapter 6). Having simulated the hydrograph, the model SECTION1 will simulate the chemograph at Lady Loch Bridge, and model SECTION2 the chemographs at all stations along the main river channel from Lady Loch Bridge to Drie Heuwels Weir. These two models inter alia incorporate the nonpoint source model.

From Eq (8.1), the mass of phosphorus retained within the river channel between Paarl and Drie Heuwels Weir is calculated and shown in Table 8.3.

| lable 8.3 | and Drie Heuwels Weir (mass of phosphorus give<br>in tons per 180 day period) |  |       |   |  |  |  |  |
|-----------|---|--|-------|---|--|--|--|--|
|           | Mass of P<br>input to<br>the river<br>(MI)                                    | Mass of P<br>exported at<br>Drie Heuwels<br>(MO) |       | Percentage<br>of input<br>retained<br>MR/MI*100 |  |  |  |  |
| Period:   |   |  |       |   |  |  |  |  |
| 1         | 45.08   | 37.94  | 7.14  | 16%   |  |  |  |  |
| 2         | 73.61   | 70.40  | 3.21  | 4%  |  |  |  |  |
| 3         | 16.18   | 10.51  | 5.67  | 35%   |  |  |  |  |
| 4         | 137.01  | 125.00   | 12.01 | 8%  |  |  |  |  |
| 5         | 9.94  | 4.40   | 5.54  | 55%   |  |  |  |  |
| 6         | 108.77  | 97.50  | 11.27 | 10%   |  |  |  |  |
| Total     | 390.59  | 345.75   | 44.84 | 11%   |  |  |  |  |

Quantification of phoenhorus Table 0 2 مناهلات 

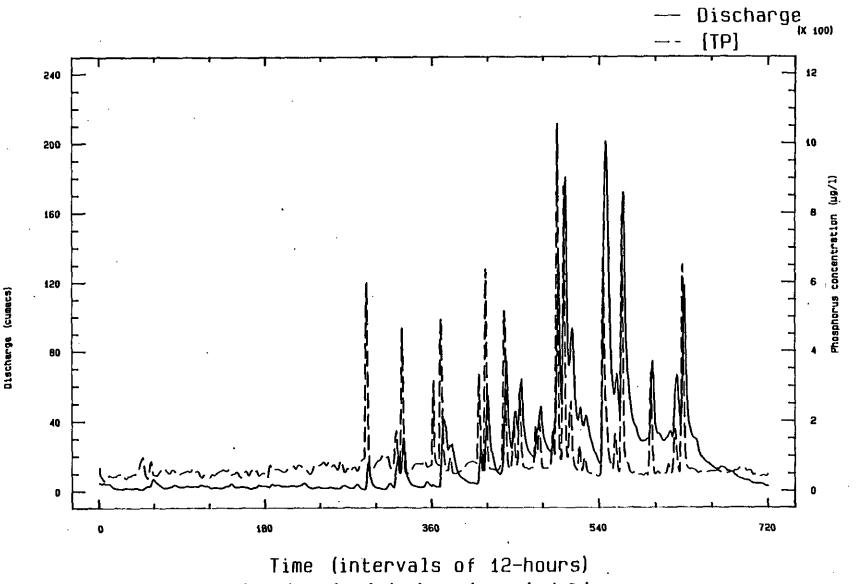
From the data in Table 8.3, we can derive the following information:

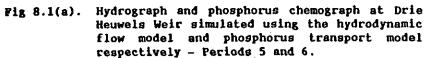
- (1)During the summer low flow conditions (Periods 1, 3 and 5) phosphorus removal processes are dominant in the main river channel: between 5 and 7 tons of phosphorus appear to be retained within the river channel sediments, comprising 16 to 55 percent of the phosphorus load input to the main river channel.
- (2) During the winter flow conditions (Periods 2, 4 and 6) the model still predicts a net removal of phosphorus of between 7 and 12 tons but this only constitutes between 4 and 10 percent of the mass input load.

- (3) Over a period of three years, 390 tons of phosphorus were input to the river channel between Paarl and Drie Heuwels Weir, and 345 tons exported at Drie Heuwels i.e. a loss of 45 tons, or 11 percent of the mass input. The following comments are relevant:
  - (1) Keup (1968) concluded that there is no long term loss of phosphorus during transport along the river channel, only a distribution associated with retention and remobilization of phosphorus, dependent on the flow regime.
  - (ii) The net loss of 10 percent determined via the simulation is probably within the range of accuracy of the model so that no definitive statement as to the losses in the channel can be made. However it would seem that, in the Berg River, virtually all the phosphorus entering the channel will be exported. During the low flow summer period there is positive evidence of removal but this is temporary during winter high flow and storm events, remobilization of the stored material takes place.

## 3.3 Phosphorus Export pattern

To illustrate the phosphorus export pattern, the phosphorus loadograph can be calculated from the hydrograph and chemograph at Drie Heuwels Weir, and the cumulative loadograph plotted. In Fig 8.1(a) the hydrograph and chemograph are shown for the dry and wet sequence, Periods 5 and 6. In Fig 8.1(b) the loadograph is shown, and in Fig 8.1(c) the cumulative loadograph. Clearly the loadograph shows extreme spikiness. This is reflected in





TR 143 March 1989

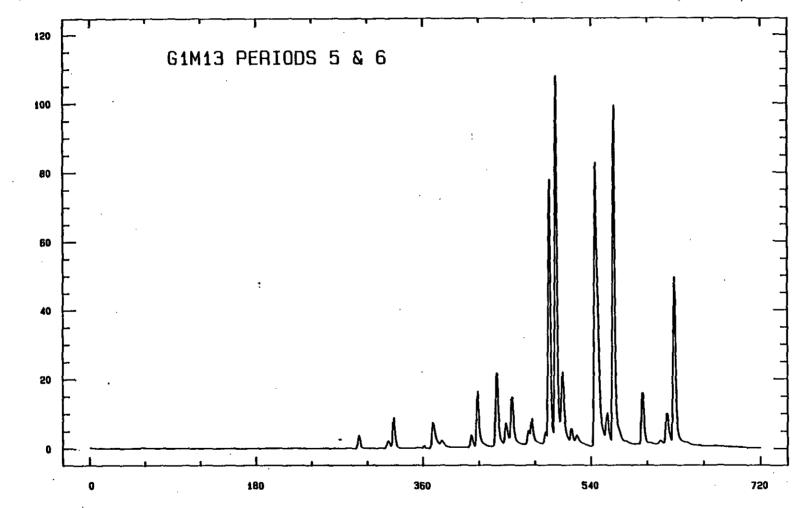
8.30



(mg/s)

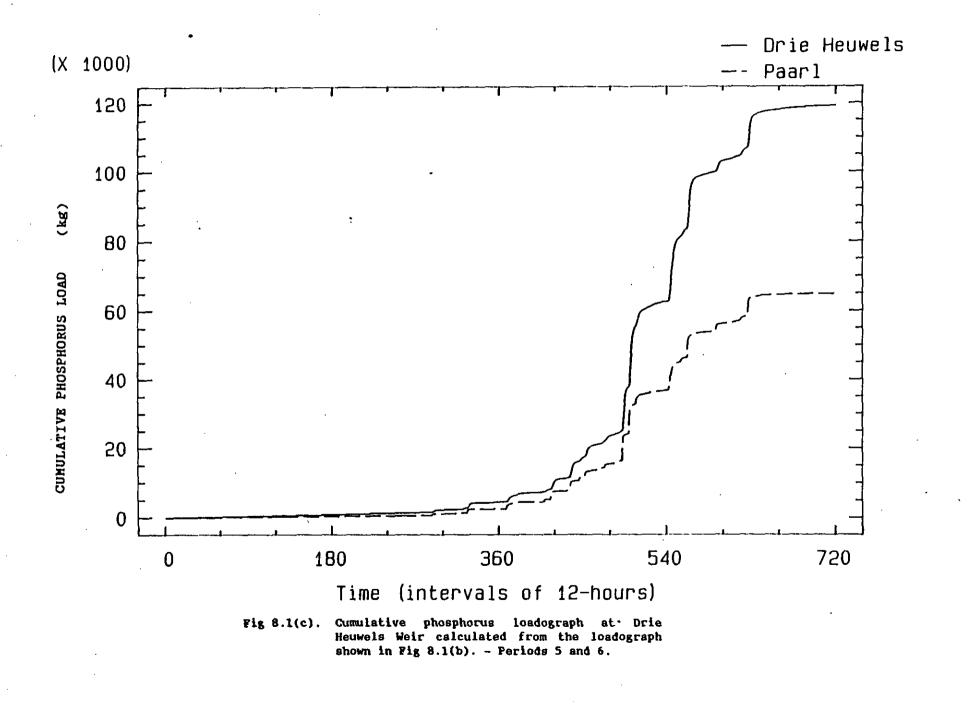
load

Phosphorus



# Time (intervals of 12-hours)

Fig 8.1(b). Phosphorus loadograph at Drie Heuwels Weir calculated from the chemograph and hydrograph shown in Fig 8.1(a) - Periods 5 and 6.



8.12

the cumulative loadograph by sharp vertical rises over each flood event with relatively flat horizontal regions between the flood times. A rough calculation of the mass of phosphorus transport during the flood events indicated that over the 3 year period about 80 percent of the phosphorus was exported during floods, yet the flood events occupied only about 3 percent of the total period. Indeed one is forced to the conclusion that the phosphorus mass export by the Berg River is, (1) completely dominated by flood events which, (2) has its origins totally from nonpoint sources with, (3) point source inputs of relatively minor importance.

## 3.4 Implementation of T mg/l Point Source Control

We will now estimate the influence that compliance with the 1 mg/2 phosphate standard would have on the phosphorus budget of the Berg River. The following estimation sequence was followed:

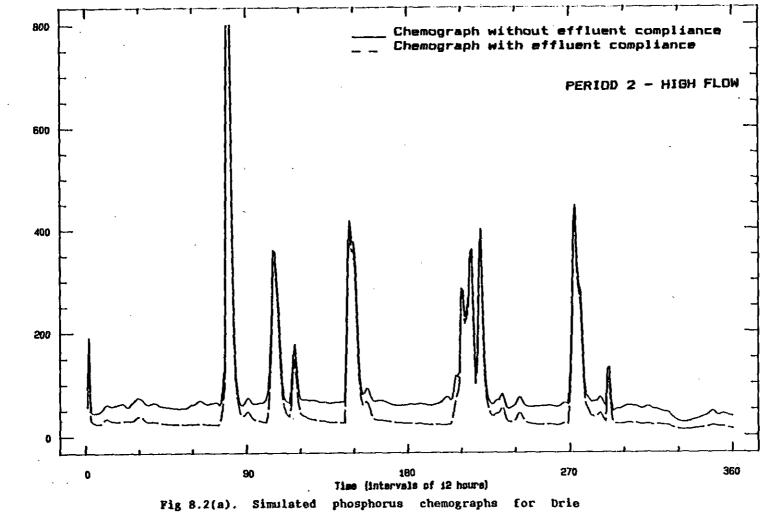
- (1) The flow model (QMODEL) predicts the river discharge at each station on the main river channel, for Periods 1 to 6;
- (2) The program SECTION1 predicts the phosphorus chemograph at Lady Loch Bridge, assuming the phosphorus concentration of the effluent complies with the 1 mg/2 ortho-phosphate standard for 100 percent of the time.

To predict the total phosphorus concentration of the effluent when the works discharge an effluent containing 1 mg/2 of ortho-phosphate the following method was used:

Phosphorus transport Berg River

- With both sewage works effluents, the total phosphorus concentration was determined from the ratio ortho-phosphate : total phosphorus when the complies effluent with the 1 mg/l orthophosphate (as P) standard. For the Paar] effluent, the ortho/total phosphorus ratio ranges from 1:1.16 to 1:1.47, with a median value of 1:1.33. Consequently, compliance with the standard will result in the effluent having a median total phosphorus concentration of 1.3 mg/L. For Wellington sewage effluent, the ortho/total phosphorus ratio lies in the range 1:1.01 to 1:1.25, with a median value of 1:1.12. Compliance will result in a predicted total phosphorus effluent concentration of 1.12 mg/%.
- (3) The program SECTIONI uses the effluent concentrations specified above in the mass balance model to generate the phosphorus chemograph at Lady Loch Bridge.
- (4) The program SECTION2 uses the upstream chemograph for Lady Loch Bridge to predict the phosphorus chemograph at Drie Heuwels Weir.

In Fig 8.2(a), two simulated chemographs for Drie Heuwels Weir are shown for high flow Period 2, one chemograph represents river conditions without effluent compliance and the second represents the river conditions with effluent compliance. In Fig 8.2(b) is shown the associated phosphorus loadographs.



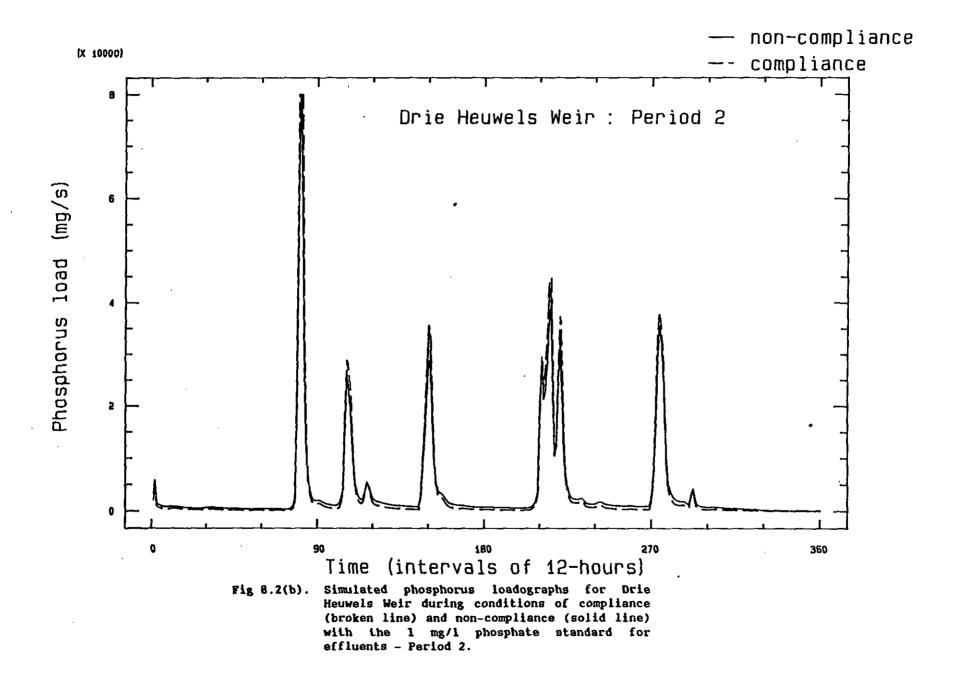
ig 8.2(a). Simulated phosphorus chemographs for Drie Heuwels Weir during conditions of compliance (broken line) and non-compliance (solid line) with the 1 mg/l phosphate standard for effluents - Period 2. 8.15

etton (yu/1)

B

B

TR 143 March 1989

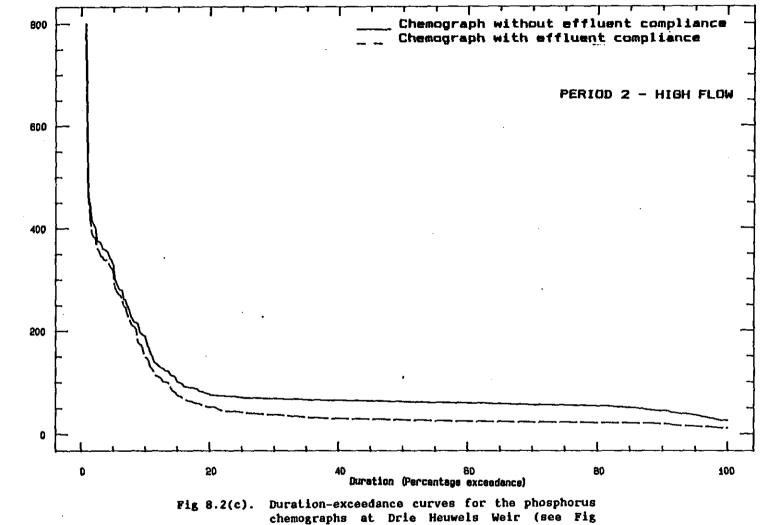


The loadographs provide little information, however, a concentration duration-exceedance diagram (Fig 8.2(c)) allows perhaps a better assessment of the effect of the implementation of the 1 mg/2 P standard than the chemographs shown in 8.2(c), it Fig is predicted that Fig 8.2(a). From implementation of the 1 mg/L P effluent standard will reduce the total phosphorus concentration at Drie Heuwels Weir by a factor of 50 percent for 75 percent of the time (during Period during flood events the standard will have 2). However, negligible influence on the chemograph at Drie Heuwels Weir.

In Figs 8.3 to 8.6 the concentration duration curves are presented for Periods 3, 4, 5 and 6, respectively. During winter high flow periods, it is predicted that the phosphate standard will cause a 50 percent reduction in the phosphorus concentration at Drie Heuwels weir for 70 percent of the time, shifting to 90 percent during the summer low flow conditions, that is, the standard has greatest influence on the phosphorus load at Drie Heuwels Weir during periods of low flow, when nonpoint sources have been shown to have a minimal input to the river channel.

In Table 8.4 the phosphorus loads for point and nonpoint sources entering the main river channel are shown for the 6 data periods for compliance and non-compliance with the 1 mg/2 phosphate standard. It is predicted that the compliance will have the following effects:

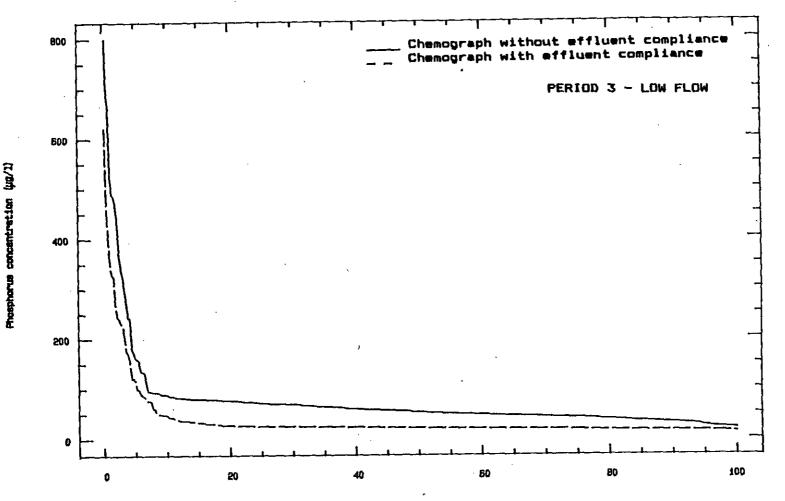
- (1) Over a three year period the input phosphorus load on the Berg River will be reduced by 46 tons, a 12 percent reduction of the total phosphorus load.
- (2) During the three year summer periods the phosphorus point source load will be reduced from 25 to 9 tons, a reduction of 16 tons, or 65 percent. During the winter periods, the phosphorus point source load will be reduced from 42 to 13 tons, a reduction 29 tons, or 68 percent.



(c). Duration-exceedance curves for the phosphorus chemographs at Drie Heuwels Weir (see Fig 8.2a) with and without compliance with the 1 mg/l phosphate standard for effluents -Period 2. The non-compliance conditions are shown with the solid line and the compliance conditions with the broken line. 8.18

concentration (µg/1)

1040 1040



Ouration (Percentage exceedance)

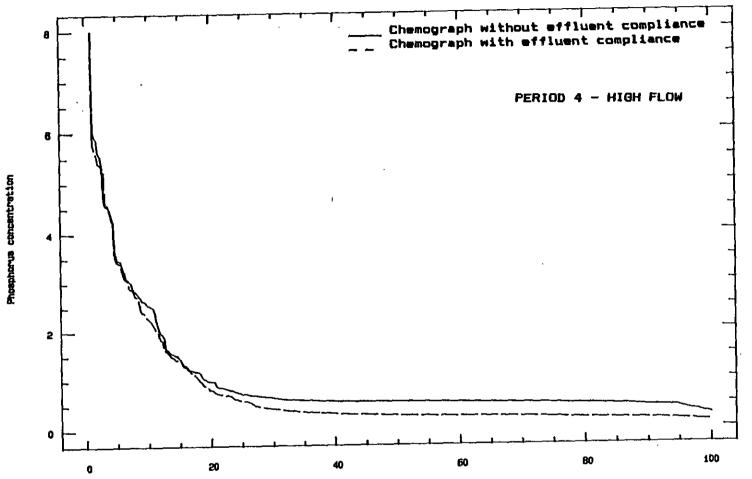
Fig 8.3.

Duration-exceedance curves for the phosphorus chemographs at Drie Heuwels Weir (Period 3) with and without compliance with the 1 mg/1 phosphate standard for effluents. The non-compliance conditions are shown with the solid line and the compliance conditions with the broken line.

TR 143 March 1989

8.19



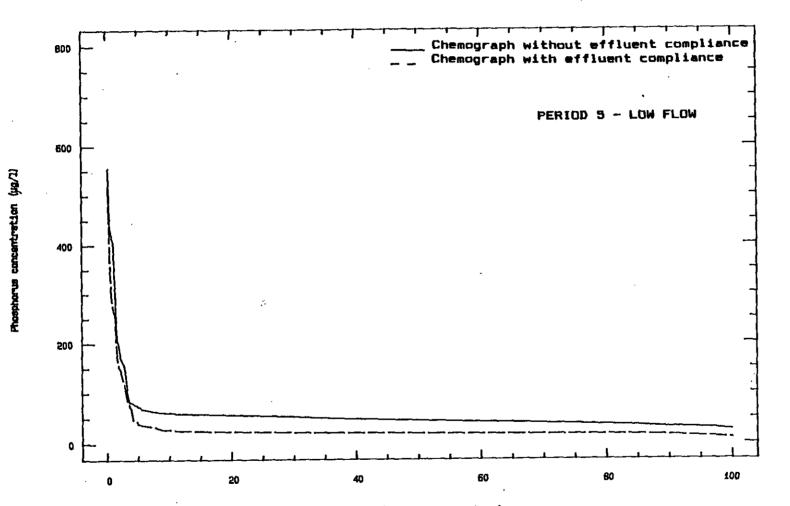


#### Duration (percentage)

Fig 8.4. Duration chemographic with a

the broken line.

Duration-exceedance curves for the phosphorus chemographs at Drie Heuwels Weir (Period 4) with and without compliance with the 1 mg/l phosphate standard for effluents. The non-compliance conditions are shown with the solid line and the compliance conditions with

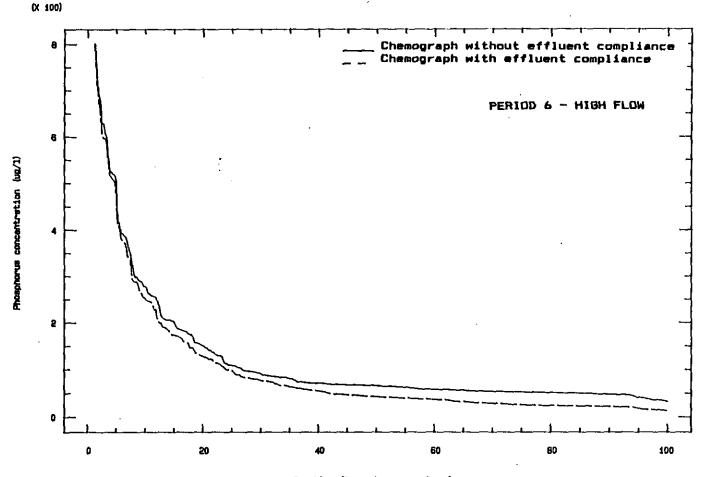


#### Duration (Percentage exceedence)



Duration-exceedance curves for the phosphorus chemographs at Drie Heuwels Weir (Period 5) with and without compliance with the 1 mg/l phosphate standard for effluents. The non-compliance conditions are shown with the solid line and the compliance conditions with the broken line.

# 8.21



.

#### Duration (Percentage exceedence)

Fig 8.6. Duration-exceedance curves for the phosphorus chemographs at Drie Heuwels Weir (Period 6) with and without compliance with the 1 mg/l phosphate standard for effluents. The non-compliance conditions are shown with the solid line and the compliance conditions with the broken line.

TR 143 March 1989

8.22

The total annual phosphorus export data (shown in Table 8.4) could be used to estimate the trophic status of a proposed impoundment at Misverstand by means of existing phosphorus load-eutrophication response models (Grobler and Silberbauer, 1984; Grobler, 1985). To determine the seasonal implications of the phosphorus loads as demonstrated above, a dynamic impoundment model would be required. No such model is available, yet one can appreciate that the seasonal phosphorus input must emphasize the need for estimating the dynamic changes in algal biomass from the dynamic input phosphorus loads.

| Table 8.4 | Determination of   |      |              |     |       |         |
|-----------|--------------------|------|--------------|-----|-------|---------|
|           | phosphate standard | on   | the phosphor | 'US | input | load to |
|           | the main river cha | nnel | •            |     |       |         |

|         | source | Point<br>source | Point<br>source<br>(compliance) | Percentage<br>reduction in<br>point source<br>loading | Percentage<br>reduction<br>in total<br>loading |
|---------|--------|-----------------|---------------------------------|---|--|
| Period: | A      | B               | C                               | (B-C)/B<br>(%)  | (B-C)/(A+B)<br>(%)                             |
| ]       | 37.23  | 7.85            | 2.86                            | 64%   | 11%  |
| 2       | 57.81  | 15.80           | 4.41                            | 72%   | 16%  |
| 3       | 6.61   | 9.57            | 3.08                            | 68%   | 40%  |
| 4       | 122.84 | 14.17           | 4.07                            | 71%   | 7%   |
| 5       | 2.27   | 7.66            | 2.90                            | 62%   | 48%  |
| 6       | 96.07  | 12.67           | 4.50                            | 65%   | 8%   |
| Total:  | 322.83 | 67.72           | 21.82                           | 68%   | 12%  |

Phosphorus transport Berg River

4 PHOSPHORUS NONPOINT SOURCE CONTROL

From a previous section it has been estimated that approximately 80 percent of the total phosphorus load input to the Berg River is derived from nonpoint sources. Consequently, control of nonpoint sources could result in a substantial reduction in the phosphorus input to the Berg River — if a suitable method could be developed.

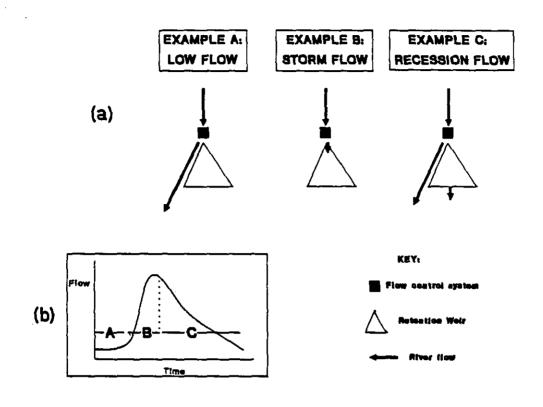
The findings of this investigation would indicate that nonpoint source phosphorus is primarily due to surface runoff, with interflow and baseflow delivering only a relatively small proportion of the total nonpoint phosphorus load (see Chapter 7 - Section 2). Consequently, reduction of the total load entering the main river channel from nonpoint sources would be achieved by (1) reducing the phosphorus concentration in the surface runoff itself, and (2) removing some of the phosphorus from the runoff before it reaches the main river channel.

- Indirectly, in the Berg River 'catchment, there are (1) schemes that contribute to controlling phosphorus in surface runoff - incentive schemes for farmers to improve and upgrade agricultural land use, see Chapter 2. In what measure these are, or can be, successful would in itself form the basis for a full scale investigation: it certainly merits Berg consideration. particularly in the River with. extensive and catchment its intensive agricultural land use.
- removed in some (2) Phosphorus can be measure by separating out the surface runoff component of the suitably flood hydrograph. by operating short retention time storage structures constructed in the flow path of tributaries - termed retention weirs. A retention weir operates by:

- (1) Storing the surface runoff for sufficient time to allow particulate phosphorus to settle-out of the water column onto the base of the weir (Maret, Parker and Fannin, 1987; Benndorf and Putz, 1987).
- (11) During baseflow, the tributary flow by-passes the retention weir and enters the river (represented by Example "A" in Fig 8.7).
- (iii) During a storm flow, the beginning of the storm water (surface runoff) is contained in the retention-weir (represented by Example "B" in Fig 8.7). Once the weir is full the flow is diverted around the weir to the river (represented by Example "C" in Fig 8.7).

To assess the effect of retention weirs on the nonpoint source contribution in the tributaries entering the main river model SECTION2. The simulation 15 given by channel sedimentation rate for particulate phosphorus in the pond behind the retention weir is unknown; it is dependent on the mean depth, residence time, biotic assimilation, deposition rate of particulate material, wind stress and the precipitation chemistry of the water (Maret, Parker and Fannin, 1987; Benndorf and Putz, 1987). These processes are not quantifiable with the existing data set; for our purposes we have to make an assumption: the rate of change of phosphorus concentration in the retention weir is equal to the product of a coefficient and the input phosphorus concentration (Chen and Wells, 1976). The following modifications required to be made to the program SECTION2:

(1) The nonpoint source model subroutines are modified so that a proportion of the phosphorus in the runoff is retained at the retention weir. It is assumed that the retention weirs retain between 30 and 50 percent of the inflowing phosphorus load. The model is run twice, using sedimentation retention of 30 and 50 percent.



**RETENTION WEIR** 

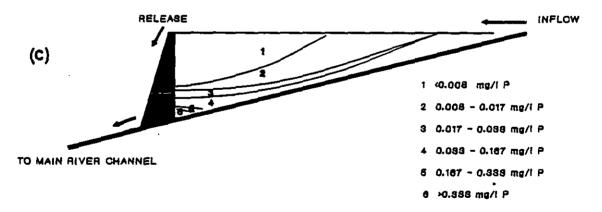


Fig 8.7. Schematic diagram showing the structure and function of retention weirs. (a) Example of the operation of the weirs during a single flood event. (b) Typical flood hydrograph showing the diversion of river water into the weir depending on the flow conditions. (c) Typical resultant ortho-phosphate distribution in the retention weir (from Bendorf and Putz, 1987, slightly altered).

- (2) It is assumed that the sedimentation remains constant throughout the simulation exercise.
- (3) For modelling purposes it is assumed that a retention weir is constructed in the flow path of each tributary joining the main river channel between Paarl and Drie Heuwels Weir.

In the first simulation, the sedimentation rate of the retention weir is set at 30 percent and the results shown in Table 8.5. The retention weirs cause between 4 and 16 percent reduction in the phosphorus loading at Drie Heuwels Weir, which amounts to a total load reduction, over the three year period, of 43 tons of phosphorus, that is, 11 percent.

| Table 8.5 | Influence of ret<br>phosphorus export<br>sedimentation set<br>retention weir. | ted from | nonpoint          |       | s, fo          |
|-----------|---|----------|-------------------|-------|----------------|
| Period    | Mass of P from<br>nonpoint source   |          | of P<br>from weir | Perce | entage<br>tion |
|           | <b>-</b>  | (30%)    | ( 50%)            | (30%) | (50%)          |
| 1         | 37.23   | 31.17    | 27.13             | 16%   | 27%            |
| 2         | 57.81   | 50.83    | 46.17             | 12%   | 20%            |
| 3         | 6.67  | 6.31     | 6.12              | 5%    | 7%             |
| 4         | 122.84  | 103.72   | 90.98             | 15%   | 26%            |
| 5         | 2.27  | 2.19     | 2.13              | 4%    | 6 <b>%</b>     |
| б         | 96.07   | 85.14    | 77.86             | 11%   | 19%            |
| Total:    | 322.83  | 279.36   | 250.39            | 13%   | 22%            |

8.27

In the second simulation exercise, the sedimentation rate is set at 50 percent resulting in a total load reduction of 72 tons, that is 18 percent.

From the calculations above it would seem that the installation of retention weirs on the tributaries in the reach Paarl to Drie Heuwels Weir result in a relatively small reduction in the total phosphorus load. The reason for this is that about 55 percent of the phosphorus derived from nonpoint sources is exported from the upper catchment of the Berg River upstream of Station 9A). (south of Paarl. The mass of phosphorus exported from this area is derived from a number of tributaries, each of which also should have a retention weir installed. Should this be done, a substantial reduction in the nonpoint source load can be expected.

In hindsight it is now apparent that the water quality and hydrology of the Berg River upstream of Paarl also should have been monitored to the same intensity as the reach between Paarl and Drie Heuwels Weir. However, at the time the monitoring program was devised, the opinion was well established that point sources (in this case Paarl and Wellington wastewater discharges) were the prime contributors of phosphorus. As a result the reach upstream of Paarl was discounted as of little importance. The investigation now has shown that it is of major account. However, with the knowledge gained on monitoring strategy, this omission can be rectified readily in the future. 8.29

#### 5 PRE-IMPOUNDMENTS

Short residence time storage structures (pre-impoundments) constructed on the river channel upstream of a large storage impoundment are reported to retain nitrogen and phosphorus (Benndorf and Putz, 1987). Twinch and Grobler (1986) studied a number of mathematical models to investigate the feasibility of a pre-impoundment to reduce the phosphorus loading to the hypertrophic Hartbeespoort Dam, located in the Transvaal (South They concluded that the construction of а Africa). pre-impoundment of 12.8 million cubic metres would reduce the phosphorus input load by between 24 to 55 percent. However, they were of the opinion that even with pre-impoundment and reduction in the phosphorus concentration of the effluents due to the imposition of the standard, the increases in future flow will be such that the phosphorus level will again rise to its present level.

Using the approach of Twinch and Grobler (1986) a simulation exercise was conducted to predict the effect of a pre-impoundment at Drie Heuwels Weir in controlling the phosphorus load on the dam at Misverstand, see Fig 8.8.

Twinch and Grobler (1986) report that the mean phosphorus concentration of water in the impoundment may be determined from

P = W / (Q + s V) ..... (8.2)

where

| Ρ | =          | mean phosphorus concentration in impoundment  |
|---|------------|---|
|   |            | (mg/l),                                       |
| Q | =          | inflow (million cubic metres per unit time),  |
| 5 | <b>⇒</b> . | sedimentation rate (per unit time),           |
| ۷ | ⇒          | volume of impoundment (million cubic metres), |
| W | =          | phosphorus input load (kg per unit time).     |

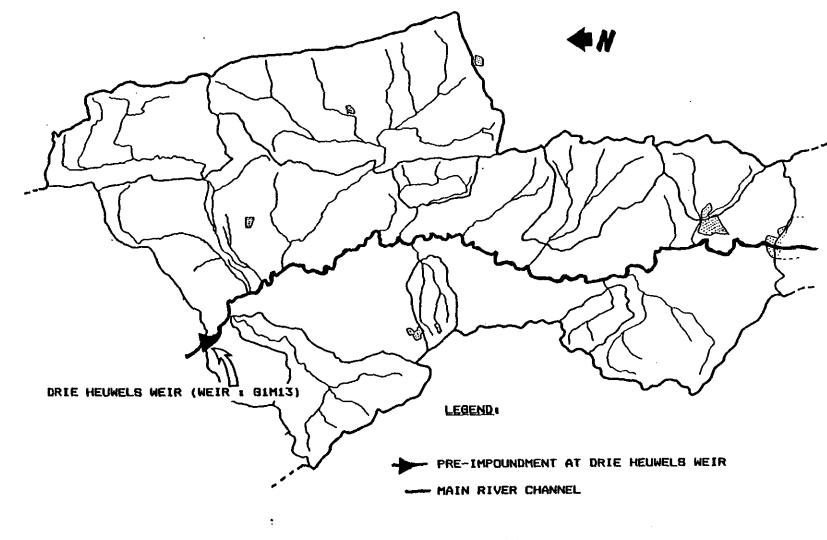


Fig 8.8.

Location of hypothetical pre-impoundment at Drie Heuwels Weir. 8.30

Grobler (1985) proposes that the in-lake phosphorus sedimentation rate is a function of the phosphorus concentration,

 $s = K P^2$  ..... (8.3)

where

K is the parameter calibrated for Hartbeespoort Dam as 0.000023 (phosphorus concentration is given as  $\mu g/2$ ).

Assuming the inflow and outflow rates are equal and the water level in the pre-impoundment remains constant, the phosphorus load leaving the pre-impoundment is given by PQ. The proportion retained in the pre-impoundment is calculated from (W-PQ).

Twinch and Grobler (1986) state that Eqs (8.2 and 8.3) have not been validated for short residence-time waterbodies but provide first estimates of the phosphorus retention in pre-impoundments.

Equations (8.2 and 8.3) were used in the program DAMP (see Appendix 2), to estimate the influence of a pre-impoundment at Drie Heuwels Weir on the downstream phosphorus budget (see Fig 8.8). In the simulation exercise two volumes of pre-impoundment were investigated, namely 10 and 30 million cubic metre. The following method was used:

- Programs QMODEL and SECTION2 generate a time series of river discharge and phosphorus concentration for Drie Heuweis Weir extending from 1983 to 1986.
- (2) The time series generated in (1) are input to the program DAMP, to simulate the sedimentation of phosphorus within the pre-impoundment.

8.32

In Table 8.6 the results of the simulation exercises are shown. It is predicted that a pre-impoundment at Drie Heuwels Weir will cause a phosphorus load reduction of between 5 and 19 percent for a 10 million cubic meter waterbody and by 12 and 34 percent for a 30 million cubic meter waterbody.

It was shown earlier that implementation of the phosphorus standard causes a reduction in the chemograph at Drie Heuwels Weir (see Fig 8.1); the hydrographs and chemographs were used in the model DAMP to predict the effect of pre-impoundments on phosphorus during the period of effluent compliance, see Table 8.7. The pre-impoundment removes 61 tons of phosphorus in 3 years. Comparing the simulated loads in Tables 8.6 and 8.7 it is evident that the pre-impoundment is less efficient at retaining phosphorus when the input phosphorus concentration is reduced, a situation that arises with phosphorus removal at the wastewater treatment works.

Due to the high suspended total solids concentration of the lower Berg River (which may exceed 1000 mg/2 during flood events) the construction of a pre-impoundment at Drie Heuwels Weir would retain substantial quantities of silt, resulting in the rapid decrease in volume and residence time of the waterbody. Unlike retention weirs, which could be drained and dredged every dry season, dredging of a pre-impoundment would be impractical.

Based on the information above, a preliminary assessment is that a pre-impoundment, to reduce the mass of phosphorus entering an impoundment at Misverstand, is unlikely to provide sufficient reduction in the phosphorus budget of the river. A more practical strategy appears to be the control of phosphorus before it enters the main river channel. This strategy requires improved agricultural practises and the treatment of smaller volumes of water in the tributaries.

| Table 8.6 | Implications of input loading Misverstand. |             |            |             |                 |
|-----------|--|-------------|------------|-------------|-----------------|
| Period    | Input load:<br>at 23D                      | Output<br>A | load:<br>B | % load<br>A | reduction:<br>B |
| ]         | 36.3                                       | 32.0        | 25.3       | 13%         | 31%             |
| 2         | 70.4                                       | 66.9        | 61.6       | 5%          | 12%             |
| 3         | 10.6                                       | 9,1         | 7.1        | 14%         | 33%             |
| 4         | 125.0                                      | 100.2       | 83.5       | 19%         | 33%             |
| 5         | 4.3  | 3.7         | 2.9        | 15%         | 34%             |
| 6         | 98.3                                       | 93.0        | 84.1       | 5%          | 3 4%            |

8 : pre-impoundment capacity of 30 million cubic metres

| Table 8.7 | Implications of a pre-impoundment (capacity = 30 million cubic metres) on the nutrient input loading to an impoundment located at Misverstand, |
|-----------|--|
|           | under conditions of phosphorus removal at the wastewater treatment plants.   |

| Period | Input load: | Output load: | % load reduction: |
|--------|-------------|--------------|-------------------|
| · 1    | 32.9        | 24.0         | 27%               |
| · 2·   | 59.4        | 53.7         | 9%                |
| 3      | 6.7         | 5.4          | 18%               |
| 4      | 109.4       | 77.2         | 29%               |
| 5      | 2.7         | 2.1          | 21%               |
| 6      | 90.8        | 79.1         | 13%               |

Phosphorus transport Berg River

# 8.34

## **6** INTER-CATCHMENT TRANSFER

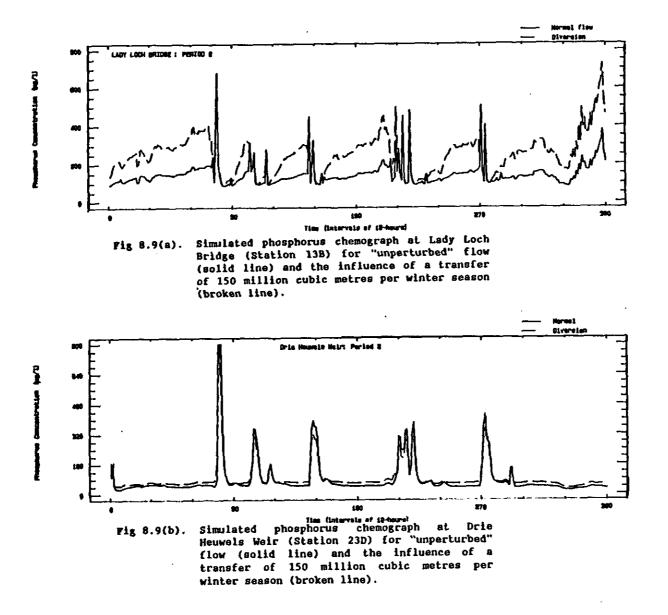
The Theewaterskloof tunnel scheme was designed to transfer water between the upper Berg River, the Theewaterskloof Dam and Eerste River. Increased demand elsewhere in the system may require that a portion of the flow in the upper Berg River be diverted through the tunnel scheme. The phosphorus transport model will be used to estimate the implications of such inter-catchment transfer on the phosphorus dynamics of the lower Berg River. In this simulation exercise two abstraction volumes of approximately 50 and 150 million cubic metres during the wet season are investigated. The following method was used:

- (1) Transfer of water from the Berg River at the upper reaches by Robertsvlei, will result in a concurrent reduction in the flow at Station 9A, North Paarl. The program ABSTRACT (see appendix 2) was developed to simulate the effect of inter-catchment transfer on the hydrograph at Paarl, on the basis that firstly, the rate of transfer will never exceed 50 percent of the discharge rate of the Berg River, and secondly, the instantaneous transfer rate will not exceed 10 cumecs. Due to the low flow experienced in the Berg River during the dry summer months, it was assumed that transfer would be carried-out only during periods of high flow (e.g. Periods 2, 4 and 6).
- The phosphorus chemograph at Station 9A was assumed to (2) This probably remain before. assumption as underestimates the phosphorus concentration because diversion at Robertsvlei would remove water the containing very little phosphorus, the input of phosphorus to the upper Berg River very likely comes from agricultural activity between Robertsvlei and Paarl. However, having no detailed information on the Berg River one was forced to the accept upper chemograph at Paarl.

- (3) The modified hydrograph for Station 9A created using ABSTRACT, was used in the hydrodynamic model (QMODEL) to predict the temporal and spatial variability of flow in the main river channel.
- (4) The modified hydrograph also was used in the programs SECTION1 and SECTION2 to generate the chemograph at Lady Loch Bridge and Drie Heuwels Weir, respectively.
- (5) The program DURACV1 was used to convert the time series into a duration curve assisting in the visual interpretation of the chemographs predicted for each transfer scenario.

To examine the implications of inter-catchment transfer on the nutrient budget of the river the data set for Period 2 (May 1984 to November 1984) was used. The runoff during Period 2 is the lowest of the winter periods and manipulation of this series will result in a more extreme set of water quality conditions in the main river channel compared with the higher runoff recorded during the winter periods 1985 and 1986 (Periods 4 and 6).

In Figs 8.9(a) and (b), the chemographs and hydrographs at Lady Loch Bridge and Drie Heuwels Weir are shown. In Fig 8.10 (a) and (b) two phosphorus duration curves are shown for Lady Loch Bridge (Station 13B) and Drie Heuwels Weir (Station 23D) representing the chemograph for an "unperturbed" flow regime and the influence of a transfer of 150 million cubic metres. Using these figures it is possible to derive the following information:



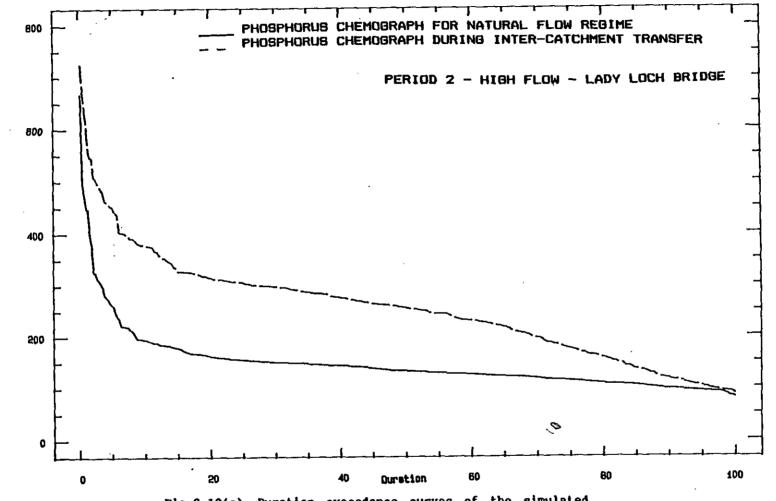
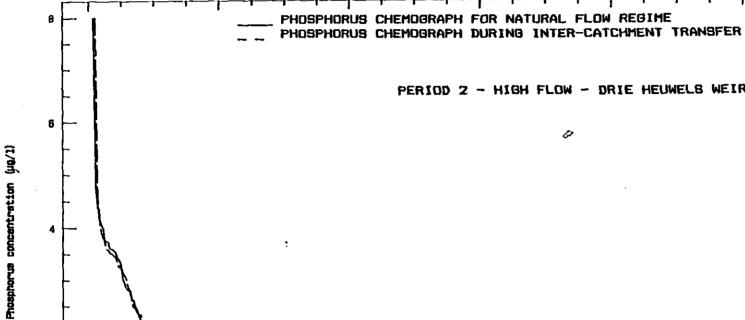


Fig 8.10(a). Duration exceedance curves of the simulated phosphorus chemograph at Lady Loch Bridge (Station 13B) for "unperturbed" flow (solid line) and the influence of a transfer of 150 million cubic metres per winter season (broken line). See Fig 8.9(a) for time series plot.

hosphorus concentratio

TR 143 March 1989

8.37



PERIOD 2 - HIGH FLOW - DRIE HEUWELS WEIR Ø 40 60 Duration (Percentage exceedence) 100 60 20 Fig 8.10(b). Duration exceedance curves of the simulated

phosphorus chemograph at Drie Heuwels Weir (Station 23D) for "unperturbed" flow (solid line) and the influence of a transfer of 150 million cubic metres per winter season (broken line). See Fig 8.9(b) for time series plot.

2

0

(X 100)

- During the recession flow, the headwaters provide an important source of dilution for the inputs to the Berg River (from point and nonpoint sources).
- (2) Abstraction from the headwaters causes the greatest influence on river quality downstream of the discharges from the wastewater treatment plants (Fig 8.9(a)), but this influence is reduced somewhat at Drie Heuwels Weir (Fig 8.9(b)).

As phosphorus transport along river channels is dependent on the concentration and flow, the effect of reducing the river flow causes a reduction in the dilution capacity of the river, but the effect is partially offset by the increased sedimentation due to the reduced flow velocity in the main river channel.

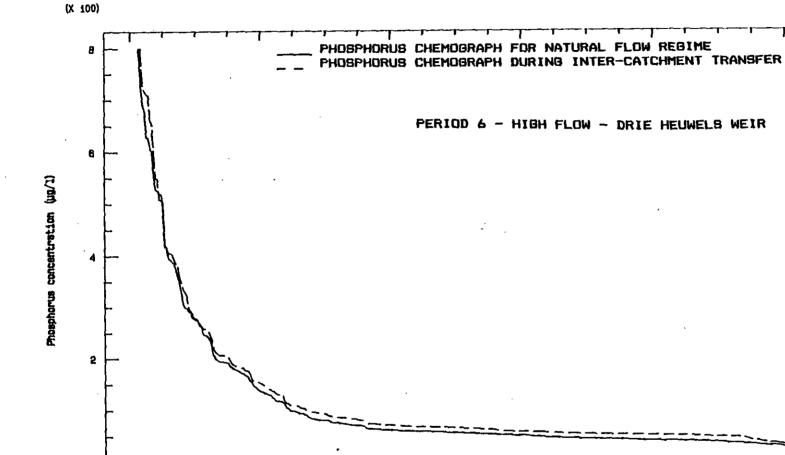
Based on this information it is evident that transfer of approximately 150 million cubic metres per 180-days (10 cumecs) from the headwaters will have an influence on phosphorus dynamics in the middle and lower reaches, due to the reduction in dilution capacity of the river. As a result, inter-catchment transfer will cause an increase on the phosphorus concentration in the main river channel which may influence:

(1) Riparian users of Berg River water, who abstract downstream of the point source discharges, and impound river water in numerous off-channel irrigation dams. The increased phosphorus concentration entering these dams (which have long residence times) will put these at greater risk of becoming eutrophic, in turn causing blockage of pumps, filters and pipes. (2) The water treatment works at Withoogte abstracts water from the Berg River at Misverstand for distribution to Saldanha region. At present, the phosphorus the concentration is sufficient to support an algal biomass and necessitates pre-chlorination at the Withoogte Works. It is predicted that an abstraction of 150 million cubic metres of water from the upper catchment will cause an increase in the ambient phosphorus concentration at Misverstand, which is in increased expected to result algal problems experienced at the Withoogte water treatment works.

The model was re-run using the data set for Period 6, which represents one of the highest winter runoff periods in the three year sampling period (1984 - 1986). In Fig 8.11, two phosphorus chemograph duration curves are shown, one curve representing the chemograph for "unperturbed" flow conditions at Drie Heuwels Weir, and one curve representing the chemograph during abstraction of 150 million cubic metres. It is evident from Fig 8.11 that inter-catchment transfer will have minimal influence on the phosphorus chemograph at Drie Heuwels Weir due to the high river flows experienced during Period 6.

The preliminary findings above illustrate how the model can be used to achieve an optimization between transfer from the upper catchment and nutrient increases in the lower Berg River. Clearly more intensive analyses are required before a real life decision can be made but the results indicate that the abstraction of 150 million cubic metres of the winter flow (over a period of 180-days) will cause an elevation in the phosphorus concentration at Drie Heuwels Weir. However, the deterioration in water quality in the lower reaches associated with inter-catchment transfer is related to the magnitude of point and nonpoint source release, as well as the total volume

Ş



4

100

60

## Duration (Percentage exceedance)

40

60

Fig 8.11.

20

1. Phosphorus concentration duration curves for Drie Heuwels Weir with unperturbed flow regime, solid line, and with river abstraction (150 million cubic metres), broken line - Period 6.

#### Phosphorus transport Berg River

n

0

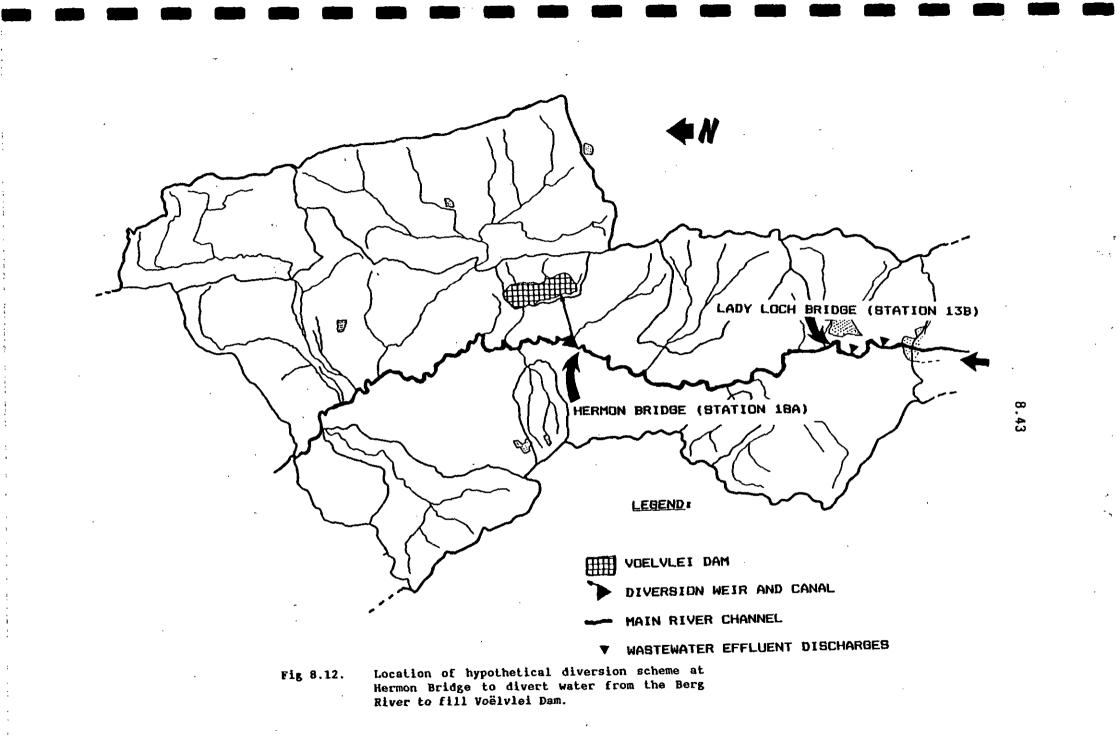
of "natural" runoff from the upper catchment. Should such a plan be considered, one modification that should be tested is that water be transferred from the upper reaches of the Berg River during periods of very high flow to minimise the influence on the phosphorus budget of the lower river reaches.

#### 7 VOËLVLEI DAM

Voëlvlei Dam is an off-channel storage reservoir providing water to the Swartland District and Cape Town. The reservoir is fed by two input canals, diverting water from the Twenty-Four and the Klein Berg Rivers. The increasing demand for water may necessitate the enlargement of the reservoir, requiring modifications to the canals feeding the reservoir. To meet the extra reservoir storage requirements it might be necessary to divert water from the Berg River at Hermon Bridge into the reservoir via an inlet canal (see Fig 8.12). There is no indication at present as to the quantity to be abstracted so that there is little merit in calculating the effect such abstraction will have on the phosphorus concentration in Voëlvlei Dam, Rather attention will be focused on the quality of the Berg River water that will be delivered to Voëlvlei Dam. It can be assumed also that abstraction will take place only during the high flow winter periods.

We will now apply the phosphorus transport model to investigate the following situations

- The chemograph expected at Hermon Bridge if 150 million cubic metres is diverted out of the upper Berg River (inter-catchment transfer).
- (2) The phosphorus chemograph expected at Hermon Bridge under natural flow conditions.



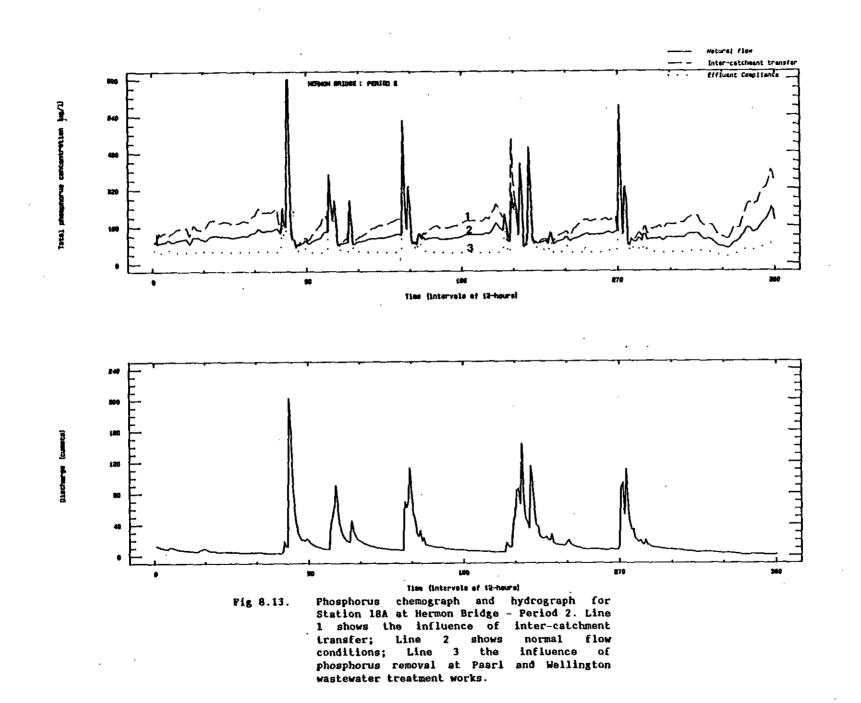
(3) The chemograph expected at Hermon Bridge if the 1 mg/L phosphorus effluent standard is implemented at Paarl and Wellington.

To predict the phosphorus concentration of the diverted water the chemograph at Hermon Bridge was simulated, using the following method

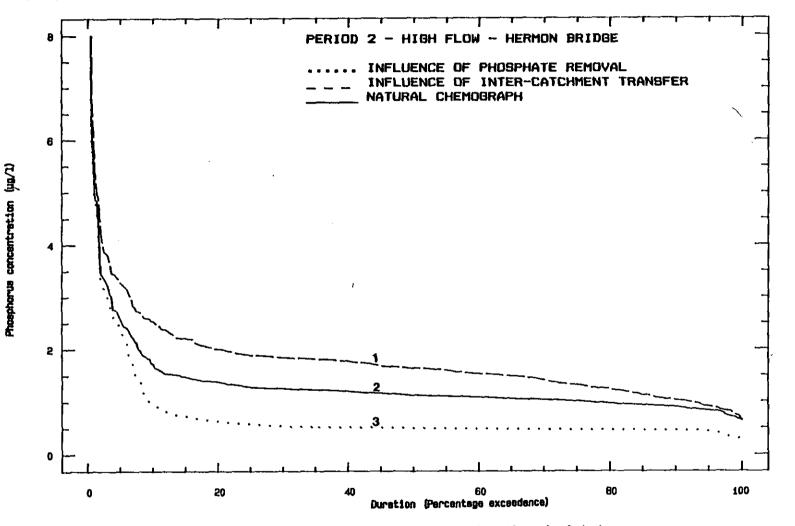
- (1) Program SECTION1, to predict the chemograph at Lady Loch Bridge for the appropriate inputs to the main river channel at Paarl and the wastewater flows from the two sewage plants.
- (2) Program SECTION2, to predict the chemograph at Hermon Bridge (Fig 8.13), and
- (3) Program DURACV1, to convert the phosphorus concentration time series plots (Fig 8.13) into a duration curve (Fig 8.14).
- (4) The simulated chemographs and hydrographs at Hermon Bridge are shown in Fig 8.13 and duration curves in Fig 8.14.

The following comments are in order:

Abstraction during the recession periods only, will give a flow with median phosphorus concentrations of approximately 170, 120 and 50 ( $\mu$ g/ $\mu$ ) for the three situations (1), (2) and (3). Abstraction over the flood periods will give concentrations well in excess of these respective values. These concentrations are to be compared with the water quality of the Klein Berg and Twenty Four Rivers presently being diverted into Voëlvlei Dam (ranging from 20 to 45  $\mu$ g P/ $\mu$ ). Clearly under



(X 100)



#### Fig 8.14. Duration exceedance curves for the simulated phosphorus chemographs at Hermon Bridge (Station 18A) - Period 2. Line 1 shows the influence of inter-catchment transfer; Line 2 normal flow conditions; Line 3 the influence of phosphorus removal at Paarl and Wellington wastewater treatment works.

the most favourable conditions the quality of the water from the Berg River is 3 to 7 times poorer. Irrespective of the relative diversion from the Berg River and the Klein Berg and Twenty Four Rivers, the eutrophication potential of Voëlvlet Dam will increase should abstraction from the Berg River be instituted.

Recent trihalomethane (THM) surveys of the drinking water in the Berg River catchment report a median THM concentration of 4.1 µg/% for Voëlvlet Dam water and 82.0 µg/% for Berg River water abstracted at Misverstand, see Table 8.8. diversion of Berg River water feeding Voëlvlei is Thus. expected to increase (1) the phosphorus loading to Voëlvlei Dam, (2) the trophic status of the impoundment and (3) the THM concentration of the water.

| Table 8.8    | Trihalomethane (THM) concentr<br>and the water abstracted<br>(Badenhorst and van Vliet, 198 | at Misverstand Weir       |
|--------------|---|---------------------------|
| Source:      | THM median concentration<br>(µg/%)  | n 90 percentile<br>(µg/l) |
| Voëlvlei Dar | m 4.1   | 13                        |
| Misverstand  | Weir 82.0   | 134                       |

TR 143 March 1989

0

#### 8 SUMMARY

The objective of this chapter was to illustrate applications of the phosphorus coupled hydrodynamic advective transport model (PCHAT). A number of hypothetical problem situations, that required solution, were suggested; related to the control and transport of phosphorus along the Berg River and catchment-orientated management strategies.

The solutions were developed in outline only, to illustrate the usefulness of the model, not to serve as definitive solutions. Some problems demanded inputs from other disciplines. for example. the settlement of particulate phosphorus in retention weirs on tributaries, in which event crude assumptions had to be made to obtain the phosphorus related solutions. With each problem the model simulation(s) contributed positively and sometimes significantly to finding a relevant solution.

#### 9 REFERENCES

Badenhorst, J.H. and van Vliet, H.R. (1988)

"Trihalomethane concentration of potable water at Government Water Schemes", Internal report of the Department of Water Affairs, Pretoria, South Africa, in press.

#### Benndorf, J. and Putz, K. (1987)

"Control of eutrophication of lakes and reservoirs by means of pre-dams - I. Mode of operation and calculation of the nutrient elimination capacity", Water Res., <u>21</u>, No. 7, 829-838.

Chen, C.W. and Wells, J.T. (1976)

"Boise River ecological modelling", Chapter 7 in Modelling Biochemical Processes in Aquatic ecosystems, Ed. R.P. Canale, Ann Arbor Science, p.171-205.

# Government Gazette (1984)

Requirements for the purification of wastewater or effluent", Government Gazette, <u>227</u>, (991), 12-17.

#### Grobler, D.C. and Silberbauer, M.J. (1984)

"Impact of eutrophication control measures on the trophic status of South African impoundments", Water Research Commission Rep. No. 130/1/84, Pretoria.

Grobler, D.C. (1985)

"Phosphorus budget models for simulating the fate of phosphorus in South African reservoirs", Water SA, <u>11</u>, no.4, 219-230.

Maret, T.J., Parker, M. and Fannin, T.E. (1987)

"The effect of beaver ponds on the nonpoint source water quality of a stream in south western Wyoming", Water Res., <u>21</u>, no.3, 263-268.

Taylor, R., Best, H.J. and Wiechers, H.N.S. (1984) "The effluent phosphate standard in perspective" Institute of Municipal Engineers of Southern Africa, October 1984, 43-56.

Twinch, A.J. and Grobler, D.C. (1986)

"Pre-impoundment as a eutrophication management option: a simulation study at Hartbeespoort Dam", Water SA, <u>12</u>, no.1, 19-26. 10 NOTATION USED IN CHAPTER 8

| MR | =          | Mass of phosphorus retained in the main river     |
|----|------------|---|
|    |            | channel between Paarl (station 9A) and Drie       |
|    |            | Heuwels Weir (tons per 180-day period).           |
| MI | =          | Mass of phosphorus input to the main river        |
|    |            | channel between Paarl and Drie Heuwels Weir (tons |
|    |            | per 180-day period).                              |
| MO | =          | Total mass of phosphorus retained in the main     |
|    |            | river channel between Paarl and Drie Heuwels Weir |
|    |            | (tons per 180-day period).                        |
| P  | <b>=</b> ' | Mean phosphorus concentration in impoundment      |
|    |            | (µg/l)  |
| Ŵ  | =          | Phosphorus input load (kg per unit time)          |
| Q  | ±          | Inflow to impoundment (million cubic metre)       |
| s  | =          | Sedimentation rate of phosphorus (per unit time)  |
| ν  | =          | Volume of pre-impoundment (million cubic metre)   |
| ĸ  | =          | Coefficient in Eq (8.3).                          |

чр

Phosphorus transport Berg River

#### CHAPTER 9

#### DISCUSSION

#### **1 OBJECTIVE**

The objective of this investigation was to develop a that describes export mode] the dynamic phosphorus transportation of phosphorus through the Berg River drainage of Such a model had to consider (1) generation basin. phosphorus from diffuse (nonpoint) sources via surface and subsurface drainage and from point sources such as wastewater treatment discharges, (2) transportation of phosphorus in the water column along the river channel, (3) removal and remobilization of phosphorus from and to the water column, and (4) transportation of phosphorus in the bed load.

#### 2 . MODEL DEVELOPMENT

In seeking a structure within which a solution could be developed, the following proviso was constantly kept in mind: the model must be practical, in the sense that information to calibrate and run the model must be readily obtainable.

the generation and involved 10 Many processes are transportation of phosphorus. Although research has been conducted on some of the important processes, it was soon evident that a mechanistic approach, in which the model is composed of various processes, was not feasible because the mathematical descriptions of the processes either were not available, or were inadequate - an empirical or semi-empirical lumped parameter approach appeared to be the only practical one. This approach dominated the development of the different models.

# 2.1 Nonpoint Source Phosphorus Export Model

In the lumped parameter approach the objective is to seek a parameter, or parameters, in terms of which some or all of the required components can be modelled. In developing the nonpoint source model for phosphorus export, two parameters were identified, the discharge and the rate-of-change of discharge. In any river or catchment monitoring system, discharge would be the parameter most commonly measured. Analysis of sets of showed phosphorus/discharge data pairs that phosphorus concentration exhibits a behaviour pattern apparently related to discharge. For this reason alone selection of discharge as an independent parameter, in terms of which to model the phosphorus component, was not an unreasonable choice. With regard to the use of the rate-of-change of discharge, as an independent parameter, this was not as readily justified. The principal reason for its incorporation is that in a hydrograph from a nonpoint source area, it provides a mathematical allows separation of the structure that phosphorus concentration in the rising and falling limb of the hydrograph.

With the lumped parameters, discharge and rate-of-change of discharge, it was found to be possible to give an adequate description of the phosphorus concentrations in discharges from nonpoint sources - called the looped phosphorus discharge rating method. This method mathematically describes the looped or hysteresis effect in which, for the same discharge, the total phosphorus concentration is higher during the rising limb of a flood hydrograph than during the falling limb. An aspect of practical importance here was that the calibration constants in the looped discharge equation (for subcatchments in the Berg River basin) were found to be related functionally to the magnitude of the total subcatchment winter discharge; this allowed the phosphorus export to be estimated for subcatchments in which no phosphorus measurements had been collected. The looped rating method also could be applied to subcatchments which were ungauged: in the Berg River basin only about 40 percent of the catchment area between Paarl and Drie Heuwels Weir is gauged. However for ungauged subcatchments between gauged subcatchments, it was found, by interpolating procedures, that the discharge hydrograph for the ungauged subcatchment could be synthesized with reasonable accuracy from the hydrograph of the gauged subcatchments on either side of the ungauged subcatchment. Once the hydrograph for such a subcatchment was available, the chemograph could be synthesized by applying the looped rating method using the functionally related constants, as described in the paragraph above.

In calibrating the looped phosphorus-discharge rating model it was soon evident that phosphorus concentrations at low and medium flows, as well as on the rising and falling limbs of Importantly, monitoring of flood flows, were necessary. phosphorus at regular time intervals provided completely inadequate information to calibrate the model or to estimate the mass of phosphorus exported from a nonpoint source. Flood waves on average lasted only a few days, yet within this period massive changes in phosphorus concentration and discharge (and hence phosphorus load) took place. During steady and low flow conditions monitoring could be at extended intervals, but during flood events monitoring intervals needed to be as low as 4 to 6 hours. From data taken over flood events on the Berg" River (appropriately simulated by the model), nearly 80 percent of the phosphorus exported from the basin took place during events flood events even though the total time of such constituted less than 3 percent of the total time period monitored. In the South African region, where sharp transient flood flows are common, associated extreme transient phosphorus concentrations are to be expected - data acquisition strategies always will need to take this behaviour into account. Such a strategy will have to be developed taking due cognisance of the time period over which the flood takes place.

. .

#### 2.2 Phosphorus channel transport model

Advective transport of phosphorus along a river channel implicitly requires solution of the time varying discharge at any point in the length of the channel. During flood events there is a time varying discharge to the channel at different points along the channel. The velocity of flow in the channel at any point will depend on a number of parameters, such as the bed slope, discharge, bed friction forces, channel cross section and others.

Theoretically the flow could be modelled using the momentum and continuity equations of St. Venant. However, the amount of information required to describe the boundary conditions for such a solution has made these equations guite unsuitable for flow routing. As a consequence the literature records various simplifications to the momentum equation, e.g. neglecting some terms in the momentum equation or replacing this equation completely by an empirical one that indirectly includes the energy effects. With the simplified models the boundary effects could be accommodated to a greater or lesser degree, by calibration. Amongst the large number of simplified models, that of Li (1979) proved to be the most practical, for the purposes of this investigation. Li accepted discharge as the independent parameter in terms of which to formulate the energy/velocity effects, an approach also used in other models. The factor that determined the selection of Li's model was that calibration of his model was readily achievable by measurements in the field.

The flow model was calibrated by doing field measurements on the discharge, depth of flow and cross section at a number of points along the flow path. The discharge was determined in each sub-reach as follows: discharge at the upstream end of the sub-reach and hydrographs of the lateral gauged and ungauged inputs (ungauged sub-reach served as tributaries in the tributaries were synthesized by appropriate interpolation of the hydrographs from gauged tributaries to either side of the ungauged tributary). Solving the mass continuity and simplified energy equation, the discharge at the downstream end of the factors. incorporated calculated. Minor was sub-reach empirically, were seepage losses and abstractions.

The performance of the hydrodynamic model was assessed by comparing the simulated channel hydrograph at the downstream boundary of the catchment, with the measured hydrograph — the two hydrographs compared remarkably well over three years of hydrograph data.

Having a reliable flow routing method, the model describing the phosphorus transport along the channel could be developed. The mass of phosphorus transported along the river channel is affected by two processes, removal of phosphorus from the water column by settlement, biotic assimilation and possibly other processes, and remobilization of phosphorus into the water column when the discharge is sufficiently high.

removal/remobilization the phosphorus То model the behaviour along the channel was monitored under steady flow conditions, at different discharges. These showed that the removal conformed to an exponential type formulation with respect to channel distance, but that the exponential constant was a function of discharge. From a number of phosphorus concentration profile plots at different discharges, an empirical relationship between the constant and discharge was established, the constant having high negative values at discharges less then about 17 cumecs and positive values at higher discharges.

The phosphorus transport model was formulated as follows: over a sub-reach the input of phosphorus and discharge is known at the upstream boundary. Along the sub-reach the input of phosphorus and discharge is available from the tributaries hydrographs and chemographs. In the sub-reach the discharge is governed by the hydrodynamic model. Knowing the discharge, the removal/remobilization of phosphorus from/to the water column in the sub-reach is determined. In this fashion the discharge and phosphorus concentration at the downstream end of the sub-reach is determined.

The performance of the transport model also was assessed by comparing the simulated phosphorus chemograph at the downstream boundary of the channel, with the measured chemograph — the correspondence was good. The performance of the phosphorus transport model was all the more acceptable when one considers that there was virtually no calibration leeway available. If the correlation should have been poor it would have required a review of the nonpoint phosphorus export and the removal/remobilization models. The good correspondence indicated that the structure of the model and the calibration procedures were acceptable.

The modelling approach adopted for the removal or remobilization of phosphorus, in effect ignores the mass of phosphorus stored on the riverbed. Initially it was attempted to model the storage of phosphorus on the bed of the river in order to trace the mass movement in and out of the bed due to removal and remobilization. This attempt was unsuccessful; the model was elaborate and difficulties arose in accommodating the mass stored and the interaction effects of sequential flood flows. Also no meaningful field data on the phosphorus stored on the bed could be obtained. As it was felt that the bed load problem could not be abandoned, an attempt was made to model the bed load transport guite independently of the interaction with the water column above. From the literature a bed load transport model was used virtually unmodified, with the assumption that the bed load contains a proportion of phosphorus material. This model indicated that very little phosphorus would be exported with the bed load. Interpretation of the findings of this bed model is not yet clear.

## 3 MODEL EVALUATION

{

Having reviewed the development of the hydro-phosphorus transport model it is necessary now to assess in what degree the endeavour was successful. Clearly the model gives a reasonable description of the phosphorus generation into the aqueous phase and phosphorus movement along the river channel. The model has a large empirical content in it, but even the empirical parts usually have directive aspects in them that attempt to mimic, after a fashion, the perceived mechanisms acting on the phenomena. The model therefore has two effects, (1) it resolves the problem set as its objective - the transportation through the Berg River hydro-phosphorus catchment, and (2) it contributes in an indirect fashion to the understanding of the mechanisms that are active in the phenomena, and provides measures for assessment of their relative importance. In this manner the model provides directives and incentives for future research.

The nonpoint source phosphorus export model using the looped phosphorus discharge rating approach, is an example of the two points put forward above. The looped approach provided a reasonable description of nonpoint phosphorus export; with readily simulated solutions thus available, by repeated trial application, familiarity with the response opened the way to reviewing the phenomena in a more basic semi-mechanistic fashion - decomposing the discharge hydrograph into three hydrographs, surface, interflow and baseflow, and allocating a degree of relative importance to these (with flood flows the baseflow hydrograph is not likely to be of as immediate importance as the surface flow hydrograph). With regard to the river water/riverbed phosphorus interaction, by attempting to quantify the mass of phosphorus stored in the bed, although the model attempt was not successful, it does however raise the point that this issue perhaps has not the same importance as others in the transport of phosphorus.

## 4 MODEL PREDICTIONS

The calibrated model has provided information of significant importance on the behavioural characteristics of phosphorus in the Berg River catchment and the implications of various operational and management strategies:

- (1) Of the phosphorus exported at Drie Heuwels, 80 percent is derived from nonpoint sources, the remaining 20 percent from point sources (the municipal effluents from Paarl and Wellington). This finding provides information for the first time in South Africa that nonpoint phosphorus sources may be of much greater importance than realized before.
- (2) Phosphorus transportation from a nonpoint source is strongly linked to surface runoff during storm events. The present indications are that the mass exported is principally a function of the discharge under the rising limb of the hydrograph and not significantly affected by sequential storm events.

- (3) The major mass of phosphorus exported from nonpoint sources takes place during storm events. In the Berg River 70 to 80 percent of the phosphorus is exported during storm events which take place in less than 3 percent of the yearly hydrologic cycle.
- (4) In the main river channel, removal of phosphorus from the water column takes place under low flow conditions and remobilization of phosphorus into the water column under high flows. The indications are that in the long term there is no, or only very little, net removal of phosphorus in the channel. Thus, all phosphorus that discharges to the main river channel eventually will be exported at the lower catchment boundary phosphorus removal (storage) in the channel is of a temporary nature only.
  - (5) The indications are that the present inter-catchment diversion facility with regard to export out of the Berg River catchment could feasibly be operated only during the high flow periods, and then only with stringent operational control. Abstraction under low and medium flow conditions will lead to a significant increase in the phosphorus concentration in the lower Berg River which may in turn affect adversely the water treatment facility at the Withoogte Works.
  - Augmentation of Voëlvlei Dam from the Berg River, by (6) abstraction at Hermon, can be implemented only during high flow periods, but not during storm events. Even during high flow periods (outside storm events) the phosphorus concentration in the river still can be 3 to 7 times that in the Twenty Four and Klein Berg During а storm event, the phosphorus Rivers. to 700 µg/1, up to concentration could rise 14 times more than in the Twenty Four and Klein Berg Rivers.

- Should an impoundment be constructed at Misverstand (7) the water quality will be dominated by nonpoint source Implementation of the 1 mg/2 effluent drainage. standard at Paarl and Wellington will reduce the total phosphorus load at the dam by only 10 percent. Retention weirs on the tributaries in the reach Paarl to Drie Heuwels Weir, should these be 50 percent effective, will reduce the total phosphorus by about 20 percent. If retention weirs are installed also in the tributaries upstream of Paarl it is roughly estimated (insufficient data on the upper Berg River system are available) that the phosphorus will be reduced by about 50 percent. However, there are no definitive performance data available to verify whether these retention weirs in fact will function effectively.
- (8) The high fraction of the phosphorus load delivered from nonpoint sources points to enquiry into methods to reduce phosphorus export from agricultural areas, inter alia, by improved agricultural practices.

#### 5 FUTURE RESEARCH

Research into the following areas may produce results that enhance our capability to improve the model or assist in developing improved control and management strategies.

 Origins of phosphorus in the subcatchment, whether from fertilizer application or weathering of base material; rates of input or rates of weathering.

- into the aqueous phosphorus (2) Mobilization of environment - phosphorus content of soils and soil structure, effect of rainfall intensity, infiltration runoff components, in different etc.; phosphorus catchment interflow and baseflow; overland flow. configuration.
- (3) Role of physical, biological and chemical processes in removing/remobilizing phosphorus from/to the channel flow.
- (4) Control of phosphorus in nonpoint source runoff by
   (1) building retention weirs, and (11) appropriate agricultural practices.
- (5) Application of the model to other catchments, subject to different hydrological regimes, topographies, agricultural activities, soil conditions, etc., to check whether the same empirical approaches developed here, are still appropriate.
- (6) From (2) above, to develop the method of decomposition of the flood hydrograph as a viable alternative to the looped phosphorus discharge rating method in phosphorus export from nonpoint sources. Efforts in this regard may be assisted by monitoring both the soluble and particulate phosphorus components.
- (7) Application of the model to describe the transportation of dissolved salts in a catchment. Such a study also may assist in developing a method for decomposing the flood hydrograph in (6) above.

6 CONCLUSIONS

From this investigation one may form the following conclusions:

- (1) The hydrodynamic phosphorus transportation model, developed in this investigation, provides a reasonably reliable description of the phosphorus generation and phosphorus transportation in the aqueous phase of the Berg River catchment within the Paarl - Drie Heuwels Weir reach.
- (2) The model is largely empirical, but in describing the various phosphorus behavioural patterns it indirectly addresses the mechanisms and processes affecting the behaviour; this may provide material for future research.
- (3) The model serves as a powerful instrument in assessing the implications of a variety of proposed operational and phosphorus management strategies.
- The model provides reliable temporal information on (4) the phosphorus input to any proposed impoundment in the Berg River in the Paarl - Misverstand reach. In this respect the information 15 probably more extensive and more complete than for any other catchment in South Africa. Evaluation of the trophic status of such an impoundment no longer will be limited by inadequate phosphorus input information, rather by deficiencies in the existing models for assessing the trophic status. It is to be hoped that the availability of a reliable model, to describe the input phosphorus mass-time behaviour to the impoundment, may simulate development of a dynamic eutrophic impoundment model.

(5) The model in its present form is site specific. The model should be applied in other catchments, under different hydrologic regimes, topography, catchment size and configuration, in order to improve or modify it for general application.

#### APPENDIX 1

## DESIGN OF DATA BASE

During data collection a number of requirements were identified concerning the structure of the data base, these were:

- (1) The data base must be capable of providing rapid retrieval and storage of data.
- (2) The data files must be structured to enable the editing, splitting and merging of files.
- (3) The data base should be capable of expanding with data storage needs.
- (4) The data files must be accessible by other statistical and graphics programs.

To meet these requirements a data base was developed using sequential formatted ASCII data files. In the following sections the structure and design of the data base will be described.

#### 1 FORMAT OF DATA FILES

The sequential data files used in the data base consist of two components:

- A matrix of data values arranged in rows (records) and columns (fields). Figure Al.1 shows a typical data matrix comprising three records and three fields.
- (2) To enable the application program to load data files of different numbers of fields and rows three file identifiers are inserted into the data file, consisting of the filename, number of records and number of fields. The file identifiers are read by the application program to set the control loops for data input and verify the correct file has been accessed from disk. In Fig Al.2 a schematic representation of a flow data file is shown containing three file identifiers and 360 data values.

In the following sections a description will be given of the water quality and flow data files used in this investigation.

1.1 Flow Data files

The flow data files for stations along the main river channel and tributaries contain one field and 363 records, consisting of three file identifiers and 360 data values (one value for each 12-hour flow measurement over a period of 180-days), see Fig Al.2.

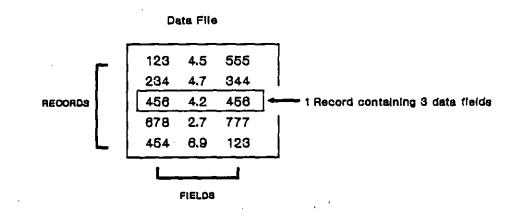
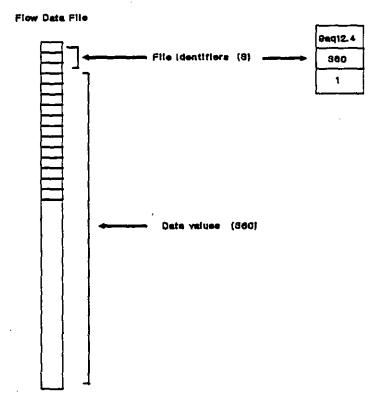


Fig Al.1.

Matrix of values in file showing records (rows) and fields (columns) of data.



( · ·

# Fig A1.2. Schematic diagram of flow data file showing file identifiers and data values.

#### 1.2 Water Quality\_data\_files

The water quality data files differ in format from the flow data files described above in that they contain three fields of data. The first field contains the sequential day number (date code), the second field contains the water quality constituent concentration and the third contains the river discharge measured at the time of sample collection. An example of a water quality data file is shown in Fig A1.3.

## 1.3 Composite Files

To minimize data access time in programs which require a large number of water quality and flow data files, composite data files were designed. Composite files contain water quality and flow data for specific sampling stations, for example

- (1) In the hydrodynamic flow model (QMODEL), the lateral inflow hydrographs are grouped into a single file. The format of the lateral inflow composite file is shown in Fig Al.4.
- (2) In the program SECTION1 a composite water quality data file is used, containing both phosphorus concentration and discharge data for Stage 1 of the main river channel, see Fig A1.5.
- (3) In the program SECTION2 a composite water quality data file is used to supply measured phosphorus concentration data at sampling stations along the main river channel, see Fig Al.6.

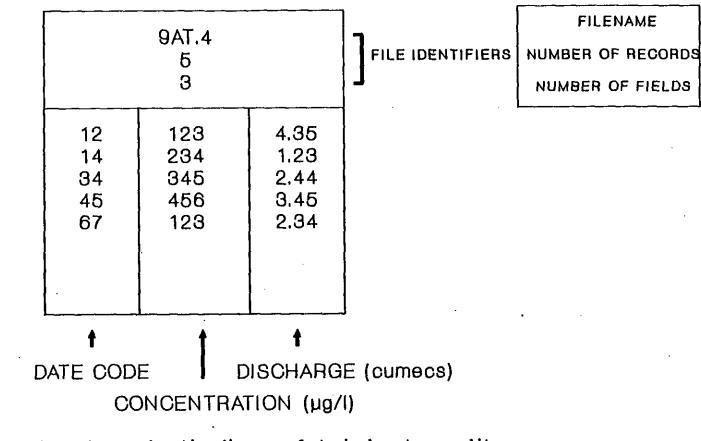


Fig A1.3. Schematic diagram of typical water quality data file showing file identifiers and the data matrix containing three fields of data.

Phosphorus transport Berg River

Al.5

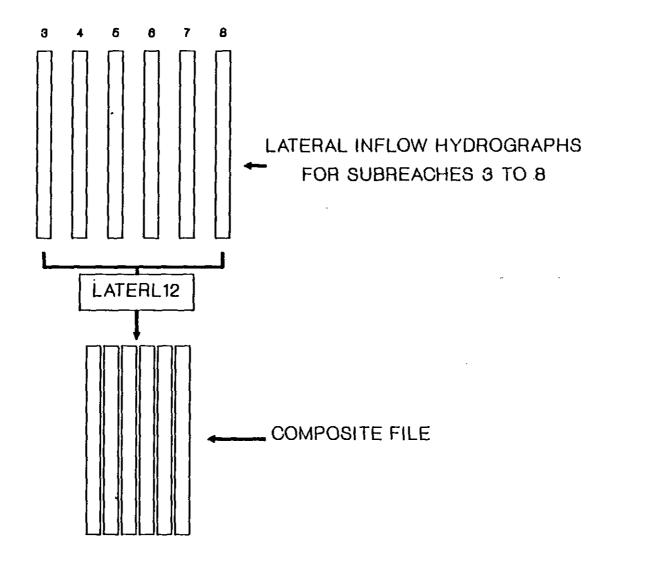


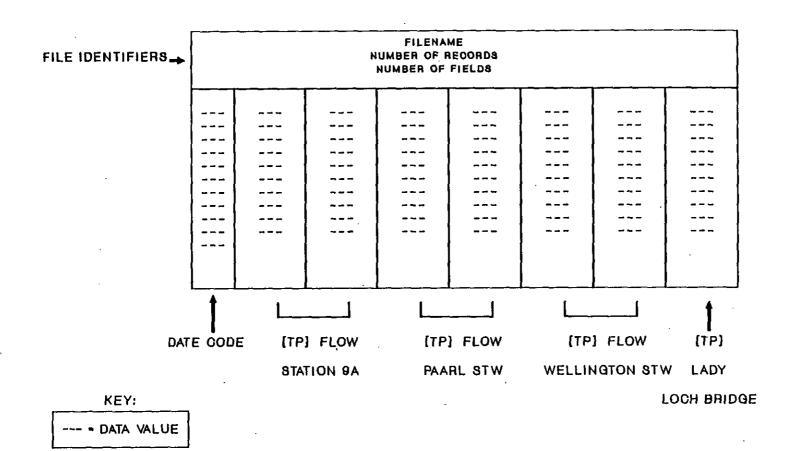
Fig A1.4. Schematic diagram showing the conversion of lateral inflow hydrographs into a composite file using the program LATERL12.

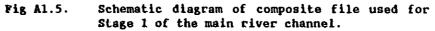
#### Phosphorus transport Berg River

•

TR 143 March 1989

A].6





Phosphorus transport Berg River

TR 143 March 1989

A1.7

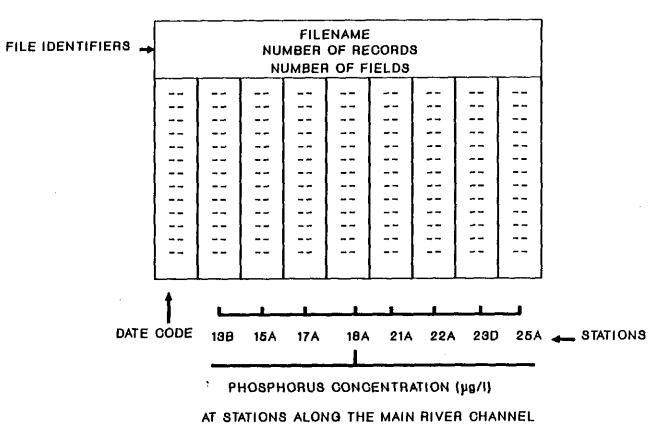


Fig A1.6. Schematic diagram of composite file used for Stage 2 of the main river channel.

Ĩ

TR 143 March 1989

2 DATA FILE NOMENCLATURE

Filenames used in this investigation contain the following information about the file:

(1) the station code,

(2) contents of file (flow or water quality data),

(3) time increment of data (12-hourly or daily data),

(4) period of data.

This information is combined in the filename using the template

x y . z

.... (A1.1)

where

x = station code,
y = type of data,
z = period of data.

Examples of the codes used in the template given above are shown in Tables Al.1 and Al.2.

Phosphorus transport Berg River

| Α | 1 | 1 | 0 |
|---|---|---|---|
|   |   |   |   |

| Table Al.1 Examples of the station codes, data-types and<br>Period numbers as used in filenames. |         |  |  |  |  |
|--|---------|--|--|--|--|
| Station codes (x): 9A, PSTW, WSTW, 14B, 23A, 25A   |         |  |  |  |  |
| Type of Dat  | :a (y): |  |  |  |  |
| Q12  | -       | measured hydrograph data (12-hour).          |  |  |  |
| QP   | -       | simulated hydrograph (model output).         |  |  |  |
| Q1 50  | -       | simulated hydrograph with inter-catchment    |  |  |  |
|  |         | transfer of 150 million cubic metres         |  |  |  |
|  |         | abstracted during period.                    |  |  |  |
| T  | -       | measured phosphorus concentration data.      |  |  |  |
| TP12   | -       | simulated phosphorus chemograph 12-hour.     |  |  |  |
| SS   | -       | measured suspended solids concentration      |  |  |  |
|  |         | data.  |  |  |  |
| 0  | -       | measured ortho-phosphate concentration data. |  |  |  |
| TPR  | -       | simulated phosphorus chemograph during P     |  |  |  |
|  |         | removal at wastewater treatment works.       |  |  |  |
| TP12C  | -       | simulated phosphorus chemograph during       |  |  |  |
|  |         | abstraction from headwaters,                 |  |  |  |
| A  | =       | abstraction of 50 million cubic metres,      |  |  |  |
| 8  | =       | abstraction of 100 million cubic metres      |  |  |  |
| С  | =       | abstraction of 150 million cubic metres.     |  |  |  |
|  |         | ·  |  |  |  |

Data Period numbers (z): 1 to 6

Phosphorus transport Berg River

.

.

.

t

Table Al.2. Examples of filenames.

| Filename: | Description:   |
|-----------|--|
| 9AQ12.4   | 12-hourly flow data for Station 9A, Period 4.                                    |
| 9AT.6     | Phosphorus concentration data for Station<br>9A, Period 6.                       |
| 23DTP12.5 | Simulated phosphorus chemograph at Station 23D, Period 5.                        |
| STITQ.4   | Phosphorus concentration data for Section 1 of the main river channel, Period 4. |

TR 143 March 1989

(

#### A2.1

#### **APPENDIX 2**

## SOFTWARE DOCUMENTATION

The programs written for this investigation use GW-BASIC and HPGI(Hewlett-Packard Graphics Language) under the MS-DOS operating system (version 2.11). To obtain minimum run time, all programs were compiled into machine code.

To simplify debugging, and make each subroutine more understandable, each BASIC program was formatted using a template shown in Table A2.1.

Table A2.1 Structure of programs.

Each subroutine has a specific function and overall program control is carried-out by the main subroutine. The first subroutine involves program initialization involving input of information by the user (i.e. numeric values, character strings or boolean) and enables the program to: load the correct datafile, use the correct algorithms and direct the output to the specified device. During initialization the user must enter the necessary data then press the return key. In some programs the default value is given in square brackets, to accept the default value the user must press the return key.

Some attempt was made to maintain a standard use of terms in computer program listings. In Table A2.2 the most frequently used terms are shown, with a description of their function. Table A2.2 Notation used in programs.

| Term:               | Description:                    |  |
|---------------------|---------------------------------|--|
| MX. M1X             | number of rows in data file     |  |
| K%, K1%             | number of columns in data file  |  |
| N%                  | number of rows in data file 2   |  |
| C%                  | number of column in data file 2 |  |
| I                   | row counter                     |  |
| J                   | column counter                  |  |
| N\$, NN\$, F\$, P\$ | filename                        |  |
| A(,), B(,), Q(,)    | data arrays                     |  |
| ₩(.), ∀(.), 1(.)    | data arrays                     |  |
| MQ. MX. XP. YP      | screen plotting delimiters      |  |

In the following sections a description will be given of each program, with a worked example, and finally a listing of the BASIC source code. For convenience the programs will be presented under the following headings:

- ()) Data management and system utilities,
- (2) Plotting and descriptive functions,
- (3) Model development, and
- (4) Model application.

#### 1 DATA MANAGEMENT AND SYSTEM UTILITIES

This section introduces the programs responsible for the management of data, including all "housekeeping" tasks associated with creating, storing and manipulating data files. The procedures are summarized below and described in detail in the following sections: Procedure

## Description

File Editor

File Merger

Allows data files to be created and edited in a suitable format for use by all other programs.

Allows merging of lateral inflow hydrograph files for use by the hydrodynamic flow model.

Allows the splitting of composite data files produced by the transport model and hydrodynamic flow model.

File modifier

File splitter .

Load integrator

Allows the modification of flow data files to compensate for inter-catchment transfer.

Allows the calculation of instantaneous and total loads for a given chemograph and hydrograph. A2.4

Data File Editor

Command : DISKID.EXE

Definition:

DISKIO (disk input / output program) stores, retrieves and edits sequential ASCII data files. The general features of the program are:

- The program is fully interactive, enabling the user to read, write, edit and present data files.
- (2) The program outputs the data file to the monitor and/or printer.
- (3) Error handling subroutine is included to prevent accidental loss of data during transfer to disk.

Data Entry:

The program is initiated from the operating system prompt and requests the following input

Expected Input Promot Enter "r" to read a file from Read or Write Mode ? Disk or "w" to create a data file. Enter the name of the file to name of file be read from disk. If you wish to test the test disk ? read/write operation of the disk and drive. If you want to edit a specific individual changes ? record in the file. If you want to change a series string of changes ? of data values in the file. If you want to re-run the Re-run ? program enter "y", or quit the program type "n".

> Enter the number of rows of the data matrix. . Enter the number of fields of the data matrix to be created. Enter the data value.

value -

Reading data from disk file:

Writing data to disk file: number of rows of data -

number of column of data-

Example:

In the example given below a data file is read from disk and edited, then saved back to disk.

| Prompt             | ,<br>Reply                    | Program Response             |
|--------------------|-------------------------------|------------------------------|
| Read or Write ?    | <b>n ç.</b> H                 |                              |
| name of file -     | *9aq12.2*                     |                              |
|                    | <i>,</i>                      | - the file will be read from |
|                    |                               | disk                         |
| test disk ?        | "n"                           |                              |
|                    | • •                           | - the file will be displayed |
| individual changes | ? <sup>*</sup> y <sup>#</sup> |                              |
| row number -       | •12*                          |                              |
| column number -    | <b>*</b> ]*                   |                              |
|                    |                               | - the existing record will   |
|                    |                               | be displayed                 |
| new value -        | *3.78*                        |                              |
|                    |                               | - the new value will be      |
|                    |                               | inserted                     |
| more changes ?     | *n*                           | - to save edited file. or:   |
|                    | "y"                           | - to make more changes to    |
|                    | -                             | the records.                 |
| Re-run ?           | "n"                           | - to guit or                 |
|                    | "y"                           | - to re-run the program.     |
|                    | -                             | · -                          |

A2.6

•• -

In the following example the program is used to create a data file ("test") which is saved on disk

PromptReplyProgram Responseread or write ?"w"file name -"test"number of rows of data -"2"number of columns of data -"1"value -Enter a numeric value for each component in the data matrix

saved on disk.

individual changes ? "n" - the file will be

Phosphorus transport Berg River

TR 143 March 1989

A2.7

A2.8

Listing of source code: 1 CLEAR : DIM A\$(400,10) 2 +++++++ DISKIO ++++++++ 5 COLOR 3,12 10 GOSUB 100 10 GOSUB 100 10 GOSUB 100 10 IF OS="w"THEN 40 10 GOSUB 1010 10 IF OS="r"THEN 70 10 GOSUB 2210 10 ISPLAY DATA 10 GOSUB 2910 10 CHANGE VALUES 10 GOSUB 2910 10 WRITE TO FILE 10 GOSUB 4930 10 CHANGE VALUES 10 COSUB 4930 10 CHANGE VALUES 10 COSUB 2910 10 CHANGE VALUES 10 GOSUB 2910 10 CHANGE VALUES 10 CHANGE VALUES 10 GOSUB 2910 10 CHANGE VALUES 10 COSUB 2910 10 COSUB 2910 10 CHANGE VALUES 10 COSUB 20 CO --- main routine:-----Initialization -----INITIALIZATION ----- data input ----- DATA INPUT: "NN\$"-----iNPUT "number of rows of data";M% INPUT "number of columns of data";K% dimensioned array in line 1 FOR J=1 TO K% FOR I=1 TO M% PRINT ""I""J INPUT "value";X\$:A\$(I,J)=X\$ 1070 1080 1090 1100 1200 NEXT:NEXT 1202 PRINT 1205 RETURN end of data input " 2210 2410 2420 2500 ----- display data 🕚 2410 FOR J= 1 TO KX 2420 FOR J= 1 TO KX 2500 PRINT A\$(I,J), display values in array 2600 NEXT:NEXT display identifiers 2610 PRINT"# rows="MX" # cols="KX" name of file="NN\$ 2700 RETURN ----- change values in array 2910 '\_\_\_\_\_ change values in 2990 PRINT"" 3000 INPUT " individual changes???? (y/n)";CH\$ 3010 IF CH\$="y" THEN 3100 3012 IF CH\$<>"n" THEN 3000 3015 INPUT " string of changes???? (y/n)";CX\$ 3020 IF CX\$="y" THEN 7000 3025 IF CX\$<>"n" THEN 3015 3030 RETURN 2910 3100 INPUT "row number"; RW: INPUT "column number"; CL 3200 IF RW>M% OR CL >K% THEN 3100 3210 PRINT " value=" A\$(RW,CL) 3220 INPUT " new value =";V\$ 3230 A\$(RW,CL)=V\$ 3240 INPUT "more changes ? y/n"; MC\$ 3250 IF MC\$="y" THEN 3100 3255 IF MC\$

TR 143 March 1989

: ON ERROR GOTO 4910 : OPEN "O",1,NN\$ : ON ERROR GOTO 0 3910 4000 4010 4020 4050 PRINT#1,NN\$ 4100 PRINT#1,M% 4200 PRINT#1,K% 4210 FOR J= 1 TO K% 4210 FOR J= 1 TO K% 4220 FOR I=1 TO M% PRINT#1, A\$(I,J) 4000 4300 CLOSE#1 4310 RETURN 4910 INPUT " check drive / disk <<< RETURN >>>";CH\$ 4920 RESUME 4010 4925 : : ON ERROR GOTO 5730 : OPEN "i",1,NN\$ 4930 5000 5000 5010 5020 ON ERROR GOTO 0 5050 INPUT#1,N\$ 5100 INPUT#1,M% read file identifiers 5200 INPUT#1,K% 5300 IF 0\$="w" THEN 5410 5350 'array dimensioned in line1 5410 FOR J=1 TO K% 5420 FOR I=1 TO M% 5430 INPUT#1,A\$(I,J) ' read values into array INPUT#1,A\$(I,J) 5440 NEXT:NEXT 5480 PRINT" name of file ="N\$ 5500 PRINT " number of rows="M% 5600 PRINT" number of columns="K% 5610 CLOSE#1 5620 RETURN \_ print identifiers on screen 5700 : 5715 : 5730 INPUT " check drive/disk 5740 IF ERR=53 THEN 5745 ELSE 5745 INPUT "name of file";NN\$ 5750 RESUME 5010 error handling - drive error <<< RETURN >>>";CH\$ 5750 ----- routine for string changes 7000 7000 \_\_\_\_\_ routine for string c. 7010 PRINT 7020 INPUT" row number at start of sequence "; STAR 7030 INPUT" row number at end of sequence "; DNE 7040 INPUT" col number 7050 IF DNE > M% THEN 7030 : IF CL > K% THEN 7040 START 7060 : 7070 7080 FOR RW= START TO DNE PRINT" ("RW","CL") :" INPUT" ";∀\$ 'ngn ĂŠ(R₩,CL)=V\$ NEXT\_RW 120 RETURN 200 300 500 --- disk verification 3000 8000 8100 ON ERROR GOTO 8500 8150 OPEN "o", 1, "TEST" 8170 ON ERROR GOTO 0 8200 PRINT#1, TEST 8300 CLOSE#1 : PR 8330 KILL"test" 8350 FOR PAUSE=1 TO 2000:NEXT 8400 RETURN 8450 : PRINT" - ok ----" 8450 8499 - error handling routine <<< RETURN >>>";CH\$ 8500 INPUT "drive or drive error 8550 RESUME 8150 8600

Data File Merger

Command : LATERL12

#### Definition

LATERL12 (lateral inflow data file creation- 12 hourly) creates a composite lateral inflow data file using tributary flow data (see Appendix 1). The program uses an areal weighting system to predict the ungauged lateral runoff (for further details see Chapter 6). The output data file containing the lateral inflow is used by the hydrodynamic flow model (QMODEL).

Data Entry

The program is initiated from the operating system prompt and requests the following input

Prompt

Expected Input

Period of data required -

Enter the numeric for the Data Period required (value between 1 and 6).

Name of new file -

Enter a name for the file to be created (see Appendix 1).

Example

In the following example a lateral inflow data file is created for Period 2.

Prompt

Reply

Program Response

Period of data required - \*2\*

Name of new file - "latinfl2.2"

The lateral inflow data files are loaded from drive A, processed and the lateral flow data file is saved on drive B.

## Listing of source code

2 COLOR 0,3 : CLEAR : THIS PROGRAMME COLLECTS LATERAL INFLOW DATA AND LOADS IT INTO 1 ARRAY THIS PROGRAMME ALSO FEATURES THE COMPENSATION OF UNGAUGED LATERAL INFLOW THIS PROGRAMME USES THE 12 HOURLY DATA FILES .\_\_\_\_\_ ĭo '<sup>==</sup> 15 1 17 ′ 20 CLS 25 PRINT" 30 PRINT" LATERAL INFLOW DATA COLLECTION (12HR) slot in array. this is the compensation factor used .

A2.13

390 GOSUB 2000 500 GOSUB 3000 550 PRINT END----" : END 550 PRINT END 800 : 900 : 1000 REM INPUT DATA TO ARRAY L 1005 INPUT#1,NN\$,M%,K% 1030 FOR I = 1 TO M% 1040 INPUT#1,L\$ : L(I 1050 NEXT I 1060 CLOSE#1 1070 RETURN 1080 : : L(I,NX)=VAL(L\$)\*IN 1090 1090 : 2000 REM INPUT DATA TO ARRAY A ( BUFFER ) 2005 INPUT#1,NN\$,M%,K%2030 FOR I = 1 TO M%2040 INPUT#1,A\$:A(I,1)=VAL(A\$)\*IN: L(I,NX)=L(I,NX)+A(I,1) 2050 NEXT I 2060 CLOSE#1 2070 RETURN 3110 NEXT 3110 CLOSE#1 3120 RETURN 3333 : 1444 : 5555 ----

## Data File Splitter

#### Command: CHANDATA.EXE

#### Definition

The program CHANDATA (channel flow data file) is used to split the output composite data file from the hydrodynamic flow model and obtain individual hydrographs for stations along the main river channel.

Data Entry

The program is initiated from the operating system promptand the following input must be entered

Prompt Expected Input State Period of data required - Enter a numeric between 1 and 6 for the period of data required.

Specify the station number - Enter a numeric between 1 and 8 corresponding to the Station on the main river channel.

Specify name of input file - Enter the name of the file to be split.

Specify name of output file - Enter the name of the file to be created (see Appendix 1). Example

In the example given below the flow data for Drie Heuwels Weir is split from the output data file from the hydrodynamic flow model.

Prompt Reply Program Response

State period of data required- "2"

Specify station number required- "8"

Specify name of input file - "changl2.2"

Specify name of output file - "23dqp12.2"

The data file "chanq]2.2" will be read from the disk and split up to give the predicted hydrograph at Drie Heuwels Weir, which is saved on disk.

Listing of source code 5 ---- chandata · 10 CLS : CLEAR : 20 PRINT"THIS PROGRAM IS DESIGNED TO OPEN-UP chang. FILES AND ENABLE TO SAVE SPECIFIC ARRAY COMPONENTS 40 FOR I=1 TO 3000 : NEXT I 45 CLS 50 PRINT 60 PRINT"----- CHANNEL FLOW 70 PRINT í pause, loop --- CHANNEL FLOW DATA OUTPUT -80 MAIN ROUTINE GOSUB 1000 GOSUB 2000 GOSUB 3000 END 9Õ OPTIONS/MENU LOAD DATA CALCULATE / SAVE DATA 100 110 120 150 ഹ 1000 ' OPTIONS/MENU -1010 PRINT" 1020 PRINT ----- MENU -----130 INPUT " 030 STATE PERIOD OF DATA REQUIRED ( 1 TO 6 )";P\$ The data files are divided into 8 columns, as ollows റററ 98 13b' 15a **#**2 == #3 -----17a 18a == #5 53 21a 22a ÜRN loading data-----OPEN "i",1,I\$ INPUT#1,NN\$,M%,K% DIM Q(360,8) : PRINT" FOR J= 1 TO K% FOR I= 1 TO M% INPUT #1,Q(I,J) 2000 2020 2030 " NN\$" " M%" "K% 2040 റട്ട 080 2090 CLOSE#1 2100 PRINT 2110 PRINT loading\_complete..... 2120 RETURN 3000 (output to disk of selected flow data from array  $Q(\_,\_)$ 3010 3015INPUT " Disk drive ready ";QUEST\$ prompt 3017 : "o",1,F\$ '#1,F\$ '#1,M% '#1,K1% saving:"F\$" m%="M%" } FOR I = 1 TO M% PRINT #1, Q(I,SC%) PRINT PRINT PRINT m%="M%" k%="K1% 1060 CLOSE#1 PRINT" RETURN 00 data transfer now complete.....

## Data File Modifier

Command : ABSTRACT.EXE

Definition

To determine the influence of inter-catchment transfer from the headwaters on the nutrient status of the lower Berg River, it is necessary to estimate the influence of the abstraction on the hydrograph at Station 9A (North Paarl). The program ABSTRACT simulates the influence of inter-catchment on the hydrograph at Paarl using the following assumptions:

- The abstraction would be undertaken during winter periods.

- The maximum instantaneous abstraction would be limited by pumping and diversion facilities which would range from between 8 and 12 cumecs.
- The abstraction rate never exceeds 50 percent of the natural river discharge.
- The maximum total volume of water abstracted during the data period is input by the user.

The modified hydrograph is saved on disk and is used by SECTIONI to predict the influence of inter-catchment transfer on the chemograph at Lady Loch Bridge.

Data Entry

The program is initiated from the operating system prompt and the following input is requested

Expected Input Prompt Input file name which Enter the filename of requires adjustment the hydrograph at Paarl. Maximum abstraction Enter a value for the maximum from headwaters abstraction rate from the . headwaters of the Berg River (units: cumecs). Enter a name for the file Output filename modified containing the hydrograph (see Appendix 1). Enter the value for the Maximum volume abstractedmaximum abstraction rate from the headwaters of the Berg River (units: million cubic metres).

ţ

Example

In the following example the hydrograph at Paarl for Period 6 is used to simulate a modified hydrograph representing the total abstraction of 150 million cubic metres, with a maximum abstraction rate of 8 cumecs.

Prompt

Rep1y

"9ag150.6"

Name of flow data file which requires adjustment- "9aq12.6" Maximum abstraction from river - "8"

Output filename -

Maximum volume abstracted during period - "150"

The hydrograph for Station 9A (Period 6) is loaded from disk, processed and saved on disk under the new filename.

Listing of source code

10 '-------Abstract-30 <sup>(+++++</sup> 35 CLEAR: 40 GOSUB 1000 50 GOSUB 2000 60 GOSUB 3000 70 GOSUB 4000 initialization of program load hydrograph for modification processes of file save data file to disk 80 INPUT" re-run (y/n)"; RR\$ : IF RR\$="y" OR RR\$="Y" THEN 35 ELSE END +++ initialize +++" B(360,1) 1000 PRINT" 1050 CLS:SCREEN 0,0,0: DIM A(360,8), B 1070 PRINT 1080 PRINT 1000 FRIM 1100 INPUT " Input name of flow data file which requires adjustment";N\$ 1200 INPUT " Maximum abstraction from river (8 to 15 cumecs) ";MAX 1300 INPUT " Output filename (eg ...Q50...)";NO\$ 1400 INPUT " Maximum volume abstracted during period (million m3)";ABSMAX 1450 PRINT 1500 RETURN T" "i", 1,N\$ INPUT#1,NN\$ INPUT#1,MX INPUT#1,KX FOR J=1 TO KX FOR I= 1 TO MX INPUT#1, A(I,J) 2000 PRINT" 2100 OPEN "i" 2200 INPU 2210 INPU 2220 INPU 2220 FO +++ load data file" 240 250 2260 270 280 CLOSE#1 PRINT" the data file contains "K% " fields" ' display and select a specific fie select a specific field 2300 INPUT "select field number required";FD 2350 PRINT 2400 RETURN 3000 PRINT" 3005 PRINT 3010 TOTALFLOW=0 : IF M%>=344 THEN TIME=43200! ELSE TIME=86400! 3020 FOR I=1 TO M% 3030 G=A(I,FD) 3040 TOTALFLOW=TOTALFLOW+(Q\*TIME) ' calculate total discharge 3050 NEXT I 3060 PRINT"total flow ="TOTALFLOW 3070 PRINT 3080 abstraction- flow adjustment calculate percentage reduction (AA) 3090 AA=(ABSMAX\*1000000!)/TOTALFLOW 3100 PRINT" flow reduction factor ="AA 3110 FOR I =1 TO M% 3120 G=A(I,FD) 3130 IF (Q\*AA)>MAX THEN B(I,1)=Q-MAX 3140 IF (Q\*AA)<MAX THEN B(I,1)=Q\*(1-AA) calculate flow values 3150 NEXT I TOTAL FLOWD-0 3160 TOTALFLOWB=0 3150 : TOTALFLOWB=0 3170 FOR I= 1 TO M% 3180 TOTALFLOWB=TOTALFLOWB+(B(I,1)\*TIME) 3190 NEXT I 3200 PRINT"total flow minus abstraction=" TOTALFLOWB 3210 PRINT"difference between flows="TOTALFLOW-TOTALFLOWB 3215 PRINT 3220 RETURN 4000 PRINT" 4010 : 4020 OPEN "0 +++ saving new data file +++" OPEN "0",1,NO\$ PRINT#1,NO\$ PRINT#1,M% PRINT#1,K% FOR J= 1 TO K% 4030 4040 4050 4060

•

ł

| 4070 | FOR $I = 1$ TO M%<br>PRINT#1,B(I,1) |  |
|------|-------------------------------------|--|
| 4080 | $\underline{PRINT#1,B(1,1)}$        |  |
| 4090 | NEXT                                |  |
| 4100 | NEXT                                |  |
|      | CLOSE#1                             |  |
| 4120 | PRINT                               |  |
| 4130 | RETURN                              |  |
|      |                                     |  |

Phosphorus transport Berg River

TR 143 March 1989

Load integration

Command: LDADCALC

Definition

LOADCALC is used to determine the total load of phosphorus exported for a specific station by integrating the chemograph and hydrograph using Simpson's Approximation.

Data Entry

The program is initiated from the operating system prompt and the following data must be entered

Prompt

filename of chemograph -

Enter the name of the file which contains the chemograph used in the calculation (see Appendix 1).

Expected Input

filename of hydrograph -

Enter the name of the file which contains the hydrograph data used in the calculation (see Appendix 1).

Do you wish to save file ?

Enter "y" to save loadograph and "n" to give the total load displayed on the screen.

re-run program ? Enter "y" to rerun program or "n" to quit. Example

In the following example the program is used to determine the total load exported via Drie Heuwels Weir for Period 6.

Prompt

Reply

Program Response

filename of chemograph - "23dtpl2.6"

filename of hydrograph - "23dq12.6"

Do you wish to save the data ? "n"

The program will now load the data files from disk and tabulate the calculated load of phosphorus, volume of runoff and mean phosphorus concentration

(calculated from the total load divided by the total runoff). Listing of source code

10 PRINT"----------load calculation ----40 <sup>-</sup> ----main routine-45 CLEAR 50 GOSUB 1000 60 GOSUB 2000 70 GOSUB 2000 80 GOSUB 3000 80 GOSUB 4000 clear variables initialization load data files calculations and screen output save data files 90 INPUT "re-run program (y/n)"; RR\$ : IF RR\$="y" THEN 45 ELSE END 100 1000 CLS: SCREEN 0,0,0 : DIM A(360,8), B(360,8), C(360,1) 1001 PRINT"----- loadograph generation -----1010 PRINT"----- initialization ----- -" 1050 PRINT" 1050 PRINT 1060 PRINT 1000 INPUT" filename of chemograph "; NC\$ 1200 INPUT" filename of hydrograph "; NH\$ 1250 INPUT" filename of hydrograph "; NH\$ 1250 INPUT" filename of hydrograph "; NH\$ 1260 IF SVE\$="y" THEN 1300 ELSE 1400 1300 INPUT" filename of output file "; NL\$ 1400 PRINT 1500 PRINT 1600 RETURN saving data file - - -

| 4125                 | PRINT#1,M%   |
|----------------------|--|
| 4130                 | PRINT#1,1  |
| 4135<br>4200<br>4210 | FOR J= 1 TO 1  |
| 4230<br>4240         | PRINT#1,1<br>FOR J= 1 TO 1<br>FOR I= 1 TO M%<br>PRINT#1,C(I,1)<br>NEXT<br>NEXT |
| 4250                 | NEXT   |
| 4300                 | CLOSE#1  |
| 4310                 | PRINT: PRINT: PRINT  |
| 4320                 | PRINT" finished saving "   |
| 4330                 | RETURN   |

١

TR 143 March 1989

# 2 PLOTTING AND DESCRIPTIVE FUNCTIONS

Four plotting procedures are used in this investigation which are summarized below (see Fig A2.1), and described in detail in the following sections.

A2.26

| Procedure       | Number of variables | Description   |
|-----------------|---------------------|---|
| Scatter plot    | 2                   | Produces scatter<br>plots of<br>concentration<br>versus discharge.<br>Options include<br>scaling in both<br>axes. Output is<br>direct to the<br>graphics display.   |
| Hydrograph plot | <b>]</b><br>,       | Produces a time<br>series plot of the<br>hydrograph data.<br>Options include<br>scaling of the<br>y-axis and<br>additional<br>hydrographs can be<br>plotted on the<br>screen. The total<br>runoff is<br>calculated for the<br>period. |

Ŧ

Duration curve

Produces a duration exceedance curve of hydrographs, chemographs or loadographs. Options include scaling of y-axis as well as the use of more than one time series.

Produces a time series plot of hydrograph and chemograph as well as measured data values. Options include scaling of both axes and insertion of text. Output is directed to a graphics plotter.

Time series plot

.---

3

TR 143 March 1989

Scatter plot

Command WQ-PLOT

Definition

This program produces a scatter plot of water quality versus discharge on the graphics screen. The graphics screen may be printed by pressing the Print-Screen key combination.

Data Entry

Prompt

## Expected Input

Enter the number of data files

which must be read from disk

number of data periods -

filename

maximum flow plotted -

max. conc. plotted -

Enter the name of the file which has the relevant data.

(maximum is 9).

Enter the highest discharge value to be plotted on the x-axis (units: cumecs).

Enter the highest concentration to be plotted on the y-axis (units: µg/%). Example

In the following example the program is used to plot the measured phosphorus concentration versus the discharge for Station 9A during periods 2 and 4.

PromptReplyProgram Responsenumber of data periods -"2"filename -"9AT.2"filename -"9AT.4"max.flow plotted -"125"max.conc.plotted -"345"

 The program loads the data files and plots the phosphorus concentration values versus discharge on the graphics screen. J. SILBERBAUER

Listing of source code

- WQ-PLOT -----5 CLS :CLEAR :SCREEN 0,0,0 10 DIM A(360,23) Dimensions array used for storage of data 50 PRINT"------ WQ DATA PLOT -----55 PRINT 56 PRINT" <<<< place wg data in drive A >>>>" 60 INPUT " number of data-periods ";N% : DIM CN\$(9) 65 IF N%=0 THEN 60 70 FOR H = 1 TO N% 80 INPUT "File number ie: stltq.2 ";CN\$(H) 90 NEXT H 100 INPUT " max.flow plotted (m3/s)";MX 110 INPUT " max.conc.plotted (ug/1)";MQ 140 PRINT 170 GOSUB 1000 180 FOR H= 1 TO N% 190 GOSUB 2000 200 GOSUB 3000 210 NEXT H ´ graphics screen / load data files / process and plot data 260 INPUT "re-run [\_\n]";AZ\$ : IF AZ\$="" THEN 1 ELSE END 270 END 1055 1040 FOR I = 180 TO 0 STEP -(1800/MQ) ' tick marks x-axis 1050 PSET(2,I),1 1060 NEXT I 1070 : 1080 FOR I= 0 TO 630 STEP (630/MX) 1090 PSET(I,181),1 ' tick marks y-axis 1100 NEXT I 1150 1160 PRINT"[TP] [TP] PLOTTED AS A FUNCTION OF DISCHARGE" 1200 RETURN 3010 3020 Q=630/MX\*Q : IF T<0 THEN T=0 max : IF Q>630 THEN Q=630 CIRCLE (Q,T),2 plot screen coordinates 3040 3050 3060 ' maximum values 3070 3080 RETURN 3100

. 1. 2.,

Hydrograph plot

Command : FLOWPLOT

Definition

This program plots up to nine hydrographs on the graphics screen and using Simpson's Approximation integrates each hydrograph to calculate the total volume of water discharged.

Data Entry

The program is initiated from the operating system prompt and requests the following input

| Prompt                | Expected Input   |  |  |
|-----------------------|--|--|--|
| Number of datafiles - | Enter the number of hydrographs<br>to be presented on the graphics |  |  |
|                       | screen.  |  |  |
| File number -         | The file name of each<br>hydrograph.                               |  |  |
| max.flow plotted -    | The maximum value plotted on the y-axis.                           |  |  |

Example

In the following example the program is used to plot the hydrographs for Stations 9A and 23D, during Period 2.

| Prompt                     | Reply        | Program Response   |  |
|----------------------------|--------------|--|--|
| Number of data files - "2" |              |  |  |
| File number -              | "9AQ12.2"    |  |  |
| File number -              | "23DQ12.2"   |  |  |
| max.flow plotted -         | <b>*350*</b> | <ul> <li>The program will now<br/>plot the hydrographs on<br/>the screen and<br/>integrate the total<br/>discharge for each</li> </ul> |  |

hydrograph.

TR 143 March 1989

Listing of source code

---- FLOWPLOT ----1 2 3 2 SCREEN 0.0.0 3 COLOR 12.0 5 CLS : CLEAR 10 DIM A(360,1) 'Dimensions array used for storage of data 140FRINT170GOSUB 1000preparation of graphics s180FOR H= 1 TO NXinput data190GOSUB 2000input data200GOSUB 3000calculate and plot data205GOSUB 5000flow integration210NEXT H260260INPUT re-run [\_/n]";AZ\$ : IF AZ\$="" THEN 1 ELSE END270END ' preparation of graphics screen 1000 '+++++++++++++ graphics screen 1010 SCREEN 2,0,0,0 1020 LINE (0,0)-(0,180),1 1030 LINE (0,180)-(630,180),1 1040 FOR I = 180 TO 0 STEP -(1800/MX) ' tick marks on y-axis 1050 PSET(1,I),1 1060 NEXT I 1070 ' 070 1080 FOR I= 0 TO 630 STEP 3.444445 ' tick marks on x-axis 1100 NEXT I 1200 RETURN 2060 NEXT : NEXT 2070 CLOSE#1 2080 RETURN 3000 '&&&&&&&&& calculate and plot 3010 FOR I= 1 TO M% 3020 Q=A(I,1) 3030 Q=180-(180/MX\*Q) G=A(1,1) G=180-(180/MX\*Q) T=(I\*(630/M%)) : IF Q<0 THEN Q=0 : IF I=1 THEN 3075 LINE(T,Q)-(TT,QQ),1 : TT=T:QQ=Q 3040 3075 3080 NEXT I RETURN 3100 4000 4000 ; Total Flow Calculation ----S: 5100 ; 5150 TGE=0 : TGO=0 5200 FOR I= 2 TO M%-2 STEP 2 5250 GE=A(I,1)\*4 :TGE=TGE+GE 5500 GO=A(I,1)\*2 :TGO=TGO+GO 5600 NEXT Total Flow Calculation -----Simpson's approx. 5650 5700 5800 5700 Q=(TQE+TQO+A(1,1)+A(M%,1))\*28800\*180/M% 5800 PRINT" TOTAL FLOW = : "Q"m3 FILE NO:"C\$(H) 5900 RETURN

Duration curve

••

Command : DURACV1

Definition

Duration exceedance plots are used to present and compare time series. This program uses a "Monkey Puzzle Sort" routine to sort the data file which is plotted as the percentage exceedance on the graphics screen.

Data Entry

The program is initiated from the operating system prompt and the following data must be entered

PromptExpected InputInput number of files -Enter the number of time<br/>series to be plotted on<br/>the screen.Input file name to be presented - Enter the files to be<br/>plotted-Maximum data plotted on screen -Enter the maximum value to<br/>be plotted on the y-axis<br/>of the duration curve plotDo you wish to save sorted data -Enter "y" to save sorted<br/>file.

Example

In the following example the program is used to plot the hydrograph measured at Station 9A during Period 2.

A2.35

PromptReplyProgram ResponseInput number of files -"]"Input file name to be presented - "9aq12.2"Maximum data plotted on screen -"200"<br/>- The data file is

1

The data file is loaded, sorted and plotted in the form of a duration curve.

Listing of source code 10 'this PROGRAM sorts and displays data in the form of a duration curve 50 ----- routine-----60 65 CLEAR:SCREEN 0,0,0 :DIM F\$(9), A(360,8), A2(360,1), L(360), R(360) 70 GOSUB 1000initialization75 FOR B = 1 TO NUMFILESioad data80 GOSUB 2000iload data90 GOSUB 3000sort data100 GOSUB 4000calculate and plot112 NEXT Binstruction115 INPUT "",FDFD117 INPUT "Re-run (y/n)", RR\$ : IF RR\$="y" OR RR\$="Y"THEN 65 ELSE END 120 END 160 ----1000 1010 1020 CLS 1030 PRINT 1040 PRINT 1050 PRINT 1055 INPUT " Input number of files ";NUMFII 1058 FOR I= 1 TO NUMFILES 1060 INPUT " Input file name to be presented ";F\$(I) 1062 NEXT I 1062 Maximum data plotted on screen ";MX 1000 ;------initialization-----";NUMFILES 1062 1065 INPUT 1100 PRINT 1110 PRINT"--1200 RETURN 2000 2100 2200 OPEN "i", 1, F\$(B) 2300 INPUT#1, NN\$, H2, K2 2450 FOR J=1 TO K2 2460 FOR I=1 TO M2 2470 INPUT#1, A( I , J ) 2470 NEXT :NEXT 2470 NEXT :NEXT 2500 ELSE 2492 "K2" ----loading data-----2460 2470 2480 NEXT :NEXT 2480 NEXT :NEXT 2490 CLOSE#1 2491 IF B>1 THEN 2500 ELSE 2492 2492 PRINT" file contains: "K%" fields": INPUT " Select a field ";FD 3120 3130 NEXT I 3150 J=1 : K=1 3160 J=L(J) 3170 IF L(J)>0 THEN 3180 A2(K,1)=A(J,FD) 3190 IF R(J)=0 THEN 3200 IF R(J)<0 THEN 3210 J=R(J) : 3220 J=-R(J) : 3230GOTO 3170 : 3160 K=K+1 3230 3220 GOTO 3170 GOTO 3180

3240 IF MX=0 THEN MX=A2(M%,1) 3250 RETURN

....

| 000 (data presentation  |
|---|
| 100 ' graphics screen<br>150 SCREEN 2,0,0,0                           |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                  |
| 220   |
| 257 FOR I-MX TO O STEP-100 : PSET (9,180/MX*I),1: NEXT I              |
| 260 XP=630 : YP=180<br>270 FOR I=1 TO M%                              |
| 300 A=A2(I,1) sorted array<br>350 EXC=(M%-I)/M%*100                   |
| $360 \qquad Y = (180 - (180 / MX + A))$                               |
| $\frac{1}{390} \qquad \frac{1}{100} (X, \underline{Y}) - (XP, YP), 1$ |
| 400 XP=X : YP=Y<br>450 NEXT I   |
| 470 RETURN  |
| 490   |

# TR 143 March 1989

)

Time series plots

Commands: PLOTFLO2 and PLOTWQ2

Definition

To obtain high quality hardcopies of time series, two programs are used which send the output to a graphics plotter. The program PLOTFLO2 plots two hydrographs or chemographs, and PLOTWQ2 plots a predicted chemograph and hydrograph as well as the corresponding water quality data.

### Data Entry

When the programs are initiated from the operating system prompt the following data must be entered

Expected Input Prompt xmin -Enter the minimum and maximum xmax values ymtn for the x and y axes. ymax x axis title Enter the text to be placed on the x and y axes, as well as on the main y axis title legend. y axis title2 main title Enter the interval between tick interval x tick marks tick interval y on the x and y axes. Name of data file 1 Enter the file name of the ----time series to be plotted. Name of data file 2 -

Example

In the following example the program is used to plot the time series plots for Station 9A and 23D.

Prompt

Reply

Is the plotter loaded with paper ? This prompt is cleared by pressing return.

 xmin
 "0"

 xmax
 "360" y

 min
 "0" y

 max
 "700"

 x axis title
 "Time"

 y axis title
 "Discharge (m3/s)"

 y axis title2
 ""

 main title
 "Hydrographs Stations 9A & 23D"

tick interval x tick interval y -

Name of data file 1 -"9aq12.4"Name of data file 2 -"23dq12.4"

are you happy with configuration ? Enter "y" to continue and "n" to re-initialize.

"50"

\*50\*

The data are loaded from disk, processed and the time series plotted on the graphics plotter.

The procedure PLOTWQ2 is similar to the example given above except that the user must specify the name of the water quality files to be plotted. Default values are also included in the initialization procedure.

Listing of source code ; PLOTFLO2 1 'THIS PROGRAM PLOTS TWO HYDROGRAPHS (i.e. PREDICTED & MEASURED DATA) 3 . 5 CLS -----plotflo2-----15 PRINT" THIS PROGRAM PLOTS TWO TIME SERIES: ONE DOTTED & ONE SOLID LINE":PRINT 16 INPUT " Is the plotter loaded with paper and set-up";UI\$ 17 CLS 21 PRINT"------ Initialization -----" 22 INPUT" xmin=";XMIN specify the world plotting coordinates 23 INPUT" xmax=";XMAX 24 INPUT" ymin=";YMIN 25 INPUT" ymax=";YMAX 40 50 INPUT " x axis title ";X\$ titles of axes 70 INPUT " y axis title";Y\$ 72 INPUT " y axis title2";Y2\$ 88 INPUT " main title "; TITLE\$ 89 90 INPUT " space interval x "; SPACEX tick mark interval 93 INPUT " space interval y "; SPACEY ; INPUT " space interval x "; SPACEX ' tick mark interval INPUT " space interval y "; SPACEY : PRINT" The first series is plotted in dotted lines the second as a solid line" INPUT " NAME OF DATA FILE 1 ";F1\$ :INPUT " field number:";FD1 INPUT " NAME OF DATA FILE 2 ";F2\$ :INPUT " field number:";FD2 INPUT " are you happy with the configuration ? (y/n)";CF\$ : IF CF\$="y" THEN 97 ELSE 17 94 95 ' loading data file ----> 97 GOSUB 1000 100 '-----plotter routine 105 OPEN "com1:9600,n,8,1,rs,ds,cd"AS#1 110 NPAPER =1 120 PRINT#1, "IN;SP1;IP1250,750,9250,6250;" 130 PRINT#1, "SC";XMIN;XMAX;YMIN;YMAX; +CHR\$(3) 140 PRINT#1, "PU";XMIN;YMIN;";pd"; XMAX;YMIN;XMAX;YMAX;XMIN;YMAX;XMIN;YMIN;";PU" 

 130
 FRINT#1, FOU; FININ; FDU, FINAX; FOU

 160
 FRINT#1, "SI.1,.2;TL 1,0"

 170
 FOR DUMMY = 1 TO 1000
 :NEXT DUMMY '<</td>

 180
 FOR X= XMIN TO XMAX STEP SPACEX
 - 

 190
 FOR X= XMIN TO XMAX STEP SPACEX
 - 

 200
 PRINT#1, "Pa";X;YMIN;"xt;"
 - 

 210
 PRINT#1, "CP -1.5, -1;LB";USING "###";X

 220
 PRINT#1, +CHR\$(3)
 FOR DUMMY=1 TO 1

 '---mark ticks on x axis FOR DUMMY=1 TO 1000 :NEXT DUMMY 225 FOR DUMMY = 1 TO 1000 :NEXT DUMMY 280 290 FOR Y= YMIN TO YMAX STEP SPACEY 300 PRINT#1, "PA"; XMIN; Y; "; YT;" 310 PRINT#1, "CP -6, -.25; LB"; USING "###"; Y 320 PRINT#1, +CHR\$(3) FOR DUMMY = 1 7 --mark ticks on y axis 325 330 335 FOR DUMMY = 1 TO 1000: NEXT DUMMY NEXT Y FOR DUMMY =1 TO 10000 :NEXT DUMMY 350 360 PRINT#1, "PA";((XMAX-XMIN)/2+XMIN);YMIN;"CP -7,-2.5; LB";X\$; +CHR\$(3) 370 PRINT#1, "PA";XMIN;YMAX;";CP -5,2.5;LB";Y\$; +CHR\$(3) 375 PRINT#1, "CP -11,-1;LB"Y2\$; +CHR\$(3) 380 PRINT#1, "PA";((XMAX-XMIN)/2.5+XMIN);YMAX;";SI .2,.4; CP -12.5,2.0 390 PRINT#1, "Ib";TITLE\$; +CHR\$(3) 400 PRINT#1, "SI .1,.2"; +CHR\$(3) 405 FOR DUMMY=1 TO 10000:NEXT DUMMY 420 - --plot time series--422 PRINT#1, "LT2,1;" Phosphores transport Berg River KX

FOR I=1 TO M% IF Q(I,FD1)>YMAX THEN Q(I,FD1)=YMAX PRINT#1, "PA";I;Q(I,FD1);"PD;" FOR DUMMY=1 TO 666 :NEXT DUMMY 450 NEXT 452 PRINT#1, 455 : 462 PRINT#1, NEXT "PU ;" PRINT#1, "LT;" FOR J=1 TO K1% FOR I=1 TO IF Q2(I,FD2)> IF Q2(I,FD2)> IU A12 I=1 TO M1% FD2)>YMAX THEN Q2(I,FD2)=YMAX PRINT#1, "PA";I;Q2(I,FD2);"PD;" FOR DUMMY=1 TO 666 :NEXT DUMMY 480482 NEXT : N PRINT#1, CLOSE#1 PRINT"---END NEXT PU;" **192** 525 ---- END -+++++ LOADING FLOW DATA FILE++++++++++ NEXT :NEXT 2070 CLOSE#1 2080 RETURN Listing of source code ; PLOTWQ2 ' this program plots one chemograph and one hydrograph 1 3 CLS -plotwq2-PRINT PRINT " 13 14 PRINT " 15 PRINT 16 INPUT " 17 CLS Is the "MODE" statement correct????" Is the plotter loaded with paper and set-up";UI\$ 21 PRINT"----- plotter routine 22 INPUT" xmin=[0]";XMIN : IF XMIN=0 THEN XMIN=0 23 INPUT" xmax=[360]";XMAX : IF XMAX=0 THEN XMAX=360 24 INPUT" ymin=[0]";YMIN : IF YMIN=0 THEN YMIN=0 25 INPUT" ymax=[700]";YMAX : IF YMAX=0 THEN YMAX=700 27 PRINT 40 INPUT " Do you require a rough plot (y/n)";QUICK\$ Do you require a rough plot (y/n)";QUICK\$ : IF QUICK\$="y"THEN 90 45 PRINT 47 PRINT" NB:- the hydrograph is plotted as a broken line while chemograph is represented as a solid line, measured data are plotted as asteri" PRINT INPUT " x axis title [TIME (12-Hour intervals)] ";X\$ IF X\$="" THEN X\$="T I M E (12-Hour intervals)" INPUT " y axis title [Total phosphorus conc.]";Y\$ IF Y\$="" THEN Y\$="Total phosphorus concentration (ug/1 INPUT " y axis title2 [Discharge (m3/s) - - -]";Y2\$ IF Y2\$="" THEN Y2\$="Discharge (m3/s) - - -" INPUT " main title "; TITLE\$ 49 555 70 71 72 74 88 89 90 89 PRINT 90 INPUT " Space interval x [50] "; SPACEX : 1F SPACEX =0 THEN SPACEX=50 91 INPUT " Space interval y [50] "; SPACEY : Phosphorus transport Berg River

TR 143 March 1989

IF SPACEY =0 THEN SPACEY=50: PRINT"Do not type file paths:-" INPUT " NAME OF DATA FILE 1 drive A ";F1\$ INPUT " NAME OF WQ FILE 2 drive B ";F2\$ INPUT " NAME OF WQ FILE 3 drive B ";WQ\$ INPUT " WQ DATA FIELD ALLOCATION #(1-8)";AL% <u>93</u> Low Data FILE LZU PRINT#1, "IN;SP1:IP1250,750,9250,6250;" I30 PRINT#1, "SC";XMIN;XMAX;YMIN;YMAX; +CHR\$(3) I40 PRINT#1, "PU";XMIN;YMIN;";PU";XMAX;YMIN;XMAX;YMAX;XMIN 'YMAX;XMIN;";PU" 150 PRINT#1, "PUO";YMIN;"PDO,";YMAX;";PU" 160 PRINT#1, "SI 1, 2;TL 1,0" 165 IF QUICK\$="y" THEN 410 170 FOR DUMMY = 1 TO 1000 :NEXT DUMMY 180 190 FOR X= XMIN "YO """" 96 GOSUB 1000 

 180
 FOR X= XMIN TO XMAX STEP SPACEX
 plot tick marks (x)

 200
 PRINT#1, "pa ";X;YMIN;"xt;"
 plot tick marks (x)

 210
 PRINT#1, "CP -1.5, -1;LB";USING "###";X

 220
 PRINT#1, +CHR\$(3)

 225
 FOR DUMMY=1 TO 2500 :NEXT DUMMY

 220 225 230 NEXT X 240 270 FOR DUMMY = 1 TO 3000:NEXT DUMMY 280 280 290 FOR Y= YMIN TO YMAX STEP SPACEY 'plot 300 PRINT#1, "PA"; XMIN; Y; "; YT; " 310 PRINT#1, "CP -6, -.25; LB"; USING "###"; Y 320 PRINT#1, +CHE\$(3) 2000: NET f plot tick marks (Y) FOR DUMMY = 1 TO 2000: NEXT DUMMY NEXT Y 330 335 FOR DUMMY =1 10 12000 ..... 350 text360 PRINT#1, "PA";((XMAX-XMIN)/2+XMIN);YMIN ;"CP -7, -2.5;LB";X\$; +CHr\$(3) 365 FOR DUMMY=1 TO 12000:NEXT DUMMY 370 PRINT#1, "PA";XMIN;YMAX; ";CP -5,2.5;LB";Y\$; +CHR\$(3) 375 FOR DUMMY=1 TO 12000:NEXT DUMMY 376 PRINT#1, "cp-11, -1;1b";Y2\$; +CHR\$(3) 379 FOR DUMMY=1 TO 17000:NEXT DUMMY 380 PRINT#1, "PA";((XMAX-XMIN)/2.5+XMIN);YMAX;";SI .2,.4 ;CP -12.5,2.0" 390 PRINT#1, "Ib";TITLE\$; +CHR\$(3) 400 PRINT#1, "SI .1,.2"; +CHR\$(3) 405 FOR DUMMY=1 TO 17000:NEXT DUMMY <u>340</u> FOR DUMMY =1 TO 12500 :NEXT DUMMY 420 422 425 430 437 PRINT#1, "LT2.1;" FOR J=1 TO K% FOR I=1 TO M% IF Q(I,J)>YMAX THEN Q(I,J)=YMAX PRINT#1, "PA";I;Q(I,J);"PD;" FOR DUMMY=1 TO 750 :NEXT DUMMY  $\bar{4}\bar{4}0$  $\frac{1}{4}$ NEXT PRINT#1 PRINT#1 UNT#1, "PU UNT#1, "LT; FOR J=1 TO K1% FOR I=1 TO M1% : Q2=Q2(I,J) IF Q2>YMAX THEN Q2=YMAX PRINT#1, "PA";I;Q2;"PD;" FOR DUMMY=1 TO 500 :NEXT DUMMY 452 462 465  $\bar{4}\bar{7}\bar{0}$ 480482 NEXT : NEXT PRINT#1, "PU ;" :FOR DUMMY=1 TO 10000 :NEXT DUMMY 490 493 494 495 496 498 499 NEXT I 500 501 PRINT#1, 510 CLOSE#1 "PU ;"

教会でも

| 525 PRINT" END "<br>555 END  |
|--|
| 1000 '++++++++++ LOADING FLOW DATA FILE++++++++++++++++++++++++++++++++++++  |
| 2000 '++++++++ LOADING FILE 2 +++++++++<br>2010 OPEN "I",1,"b:"+F2\$<br>2020 INPUT#1,NN\$,M1%,K1%<br>2025 DIM G2(M1%,K1%)<br>2030 FOR J= 1 TO K1%<br>2040 FOR I=1 TO M1%<br>2050 INPUT#1,G2(I,J)<br>2060 NEXT : NEXT<br>2070 CLOSE#1   |
| 3000 '+++++++++ LOADING WQ DATA FILE ++++++++++<br>3010 OPEN "I",1"B:"+WQ\$<br>3020 INPUT#1,NN\$,M2%,K2%<br>3025 DIM WQ(M2%,K2%)<br>3030 FOR J= 1 TO K2%<br>3040 FOR I=1 TO M2%<br>3040 FOR I=1 TO M2%<br>3050 INPUT#1,WQ(I,J)<br>3060 NEXT :NEXT<br>3070 CLOSE#1<br>3080 RETURN |

••••

TR 143 March 1989

3 MODEL DEVELOPMENT

Procedure

Seven modelling procedures are described in this section which are summarized below and described in detail in the following sections.

Description

Regression Analysis Performs a least squares regression using one independent variable. Estimates linear or selected non-linear models.

Phosphorus nonpoint source model

Using a regression equation, simulates the phosphorus chemograph using the hydrograph for a specific station. Options include interactive model calibration, scaling of axes and saving of simulated data.

Hydrodynamic flow model

This procedure simulates the hydrographs at sampling stations along the main river channel, using upstream hydrograph and lateral inflow data.

# Transport model: SECTION)

This procedure simulates the phosphorus chemograph at Lady Loch Bridge. Options include interactive model calibration, scaling of axes and saving of simulated data.

Transport model: SECTION2

This procedure simulates the phosphorus chemograph at sampling stations along the main river channel between Lady Loch Bridge (Station 13B) and Drie Heuwels Weir (Station 23D).

Phosphorus bed load model

This procedure simulates the mass of phosphorus transported as bed material.

Pre-impoundment model

This procedure simulates the mass of phosphorus retained within a pre-impoundment located at Drie Heuwels Weir. Options include interactive model calibration. Regression analysis

Command : REGRESS

#### Definition

The procedure fits a model relating one dependent variable to one independent variable by minimizing the sum of the squares of the residuals for the fitted line. Any four models can be fitted

```
linear y = a + b x
power y = a x^{b}
exponential y = a EXP (x b)
logarithmic y = \log x b + a
```

In the power, logarithmic and exponential regression models "linearization" is achieved through logarithmic transformation. Once calculated the fitted line and data values are plotted on the graphics screen.

The procedure also performs the following calculations on the data set:

- mean of x and y,
  - standard deviation of x and y,
  - regression coefficients (a and b),
  - correlation coefficient (r).

Data Entry

When the program is initiated from the operating system prompt the following data must be entered

Field Expected Input

what type of regression do you require ? Enter 1 for linear, 2 for logarithmic, 3 for exponential and 4 for

power regression.

number of data pairs to be input -

-Enter the number of pairs of data to be entered via the keyboard.

name of data set -

Enter the name of the data set.

At this point the data are entered and the specified regression calculations are done with the statistics given in tabular form and plotted on the graphics screen.

- <u>\*</u>

Example

In the following example a linear regression equation is done on a data set containing three pairs of data.

Prompt Reply

what type of regression do you require ? "1"

number of data pairs to be input ? "3"

name of data set ? "test"

- At this point the program will ask for the data to be entered.

1
x ?
y ? Enter a data value for
each x and y prompt.

- The statistics of the data set are calculated, and presented in a tabular form. To continue to the graphics output press the return key.

input max. x plotted - Enter numeric for maximum
value to be plotted on
the x-axis.

input max. y plotted - Enter numeric for maximum value to be plotted on the y-axis.

The program plots the input data and regression line within the screen plotting limits specified above.

Listing of source code

5 PRINT " loaded fix ?????" émulation for Hercules card : FOR I=1 TO 5000: NEXT é pause loop 10 CLEAR :CLS : SCREEN 0,0,0 20 PRINT" LINEAR AND CURVI-LINEAR STATS 40 ----main routine-50 60 GOSUB 1000 70 GOSUB 2000 80 GOSUB 3000 90 COSUB 3000 GOSUB 1000 initialisation GOSUB 2000 data input GOSUB 3000 calculation and output GOSUB 4000 graphics INPUT "re-run ? (y/n)";QU\$ : IF QU\$="n" THEN 110 ELSE 10 SCREEN 0,0,0 : END 9Ö 100 110 120 1000 PRINT" 1100 PRINT 1200 PRINT" ----- INITIALISATION ---what type of regression do you require ? 1" 2" 3" 1220 PRINT 1220 PRINT 1230 PRINT 1230 PRINT 1240 PRINT 1250 PRINT linear : log exp : 4 power 1260 1270 ";TYPE INPUT " INPUT (1-4), IIIE IF TYPE <1 OR TYPE >4 THEN 1270 INPUT "number of data pairs to be input (MAX = 150)";N% IF N%>150 THEN 1290 ELSE 1320 **1280** 1290 1300 INPUT "name of data set RETURN ":NAMS 1320 1340 2000 CLS : PRINT"----- Data input via keyboard ----2100 2200 DIM XI(150),X(150),YI(150),Y(150) 2220 FOR I=1 TO N% 2230 PRINT I : INPUT " x "; XI(I) 2240 : INPUT " y "; YI(I) 2250 NEXT I 2260 PPINT" crd of data input " NEXT I PRINT 2260 2265 2270 end of data input RETURN 3000 PRINT "-----3010 GOSUB 3500 3020 GOSUB 3100 3030 GOSUB 3200 3040 GOSUB 3300 - CALCULATIONS data format mean standard deviation (sample) regression coefficients 3050 30503060PRINT"name of data-set: "NAM\$" regress3070PRINT"number of samples "N%"3072PRINT"nean x "MX" mean y "MY3074PRINT"sd x "SDX" sd y "SDY3076PRINT"lra "LRA" lrb "LRB3078PRINT"cor "R" r^2 "RS3080INPUT "<<<</td>3090PRTURN regression code: "TYPE 3090 rêtûrn 3100 3110 3120 3125 3130 -mean FOR I=1 TO N% SX=SX+X(I) : SY=SY+Y(I) NEXT I K : MY=SY/N% MX=SX/NX RETURN ------standard deviation FOR I=1 TO N% SDX=SDX+((X(I)-MX)^2) SDY=SDY+((Y(I)-MY)^2) NEXT I DX= (SDX/(N%-1))^.5 DY= (SDY/(N%-1))^.5 RETURN **3**140 3200 3210 3220 3225 3Ō 3240 -regression and correlation coefficients:-FOR I=1 TO N% 3300 3310

| $\begin{array}{llllllllllllllllllllllllllllllllllll$  |  |
|---|--|
| 3500 (  |  |
| 3550<br>3600 FOR I=1 TO N% : X(I)=XI(I) : Y(I)=YI(I) : NEXT I : RETURN<br>3610 FOR I=1 TO N% : X(I)=LOG(XI(I)): Y(I)=YI(I) : NEXT I:RETURN<br>3620 FOR I=1 TO N% : X(I)= XI(I) : Y(I)=LOG(YI(I)):NEXT I:RETURN<br>3630 FOR I=1 TO N% : X(I)=LOG(XI(I)): Y(I)=LOG(YI(I)): NEXT I :<br>RETURN   |  |
| 4000 CLS : PRINT"graphix<br>4100 INPUT " input max x plotted ";MAXX<br>4110 INPUT " input max y plotted ";MAXY<br>4120 SCREEN 2,0,0,0<br>4130 PRINT" name of data-set :"NAM\$ " max. Y "MAXY<br>4140 LINE (10,0)-(10,180),1 : LINE (10,180)-(830,180),1<br>4150<br>4160 FOR I=1 TO N%<br>4170 XP=(630/MAXX*XI(I))+10<br>4180 YP=180-(180/MAXY*YI(I))<br>4190 CIRCLE (XP,YP),2<br>4200 NEXT I<br>4210<br>4220 FOR X=1 TO MAXX STEP .5 'plot best fit<br>4230 ON TYPE GOSUB 4300,4400,4500,4600<br>4240 YP=180-(180/MAXY*Y)<br>4250 YP=(630/MAXX*X)+10<br>4260 PSET (XP,YP),1 |  |
| 4260 PSET (XP,YP),1<br>4270 NEXT X<br>4280 RETURN<br>4300 Y=(LRB*X)+LRA : RETURN<br>4400 Y=(LRB*LOG(X))+LRA : RETURN<br>4500 Y=(EXP(LRB*X))*LRA : RETURN<br>4500 Y=(Y)(LRB*X))*LRA : RETURN<br>4500 Y=(Y)(LRB*X)  |  |
| 4600 Y= (X^LRB)*LRA : RETURN  |  |

.

Command : NPSM

#### Definition

NPSM (Nonpoint Source Model) is a fully interactive graphics program used to calibrate and verify the nonpoint source model for stations receiving phosphorus export from nonpoint sources. The total phosphorus load for the period is calculated using Simpson's approximation. The output from this program is directed to the graphics screen where the chemograph, hydrograph and measured data are displayed. A description of the formulation of the model is given in Chapter 7, Section 1 and presented in Fig A2.2.

Data Entry

Prompt

The program is initiated from the operating system and the following data must be entered

Expected Input

Station number - Enter the station code number.
Period of data - Enter the numeric corresponding to the period of data required (value between 1 and 6).
Max.flow data plotted- Enter the maximum discharge value plotted on the graphics screen (units: cumecs).
Max.wg data plotted - Enter the maximum value of the

Max.wq data plotted - Enter the maximum value of the concentration data plotted on the graphics screen (units: µg/%).

. . .. .....

#### Phosphorus transport Berg River

TR 143 March 1989

. . . . . . . . . . . . .

Bo you wish to save data ? The predicted chemograph for the station may be saved on disk using this option.

- Is there a wq data file ? The program uses the measured phosphorus concentration values to calibrate the model. However, the program may still be used if no data is available for a specific station.
- values for B From the table presented in the menu, A - enter values for each of the model coefficients B2 -A2 -

Name of flow data file - Enter the filename of the flow data file containg the hydrograph.

Example

In the following example the nonpoint source model is used to predict the phosphorus chemograph at Station 9A, during Period 6.

Prompt

Reply

Program Response

Station number -"9a"Period of data -"6"Max.flow data plotted - [300]"250"Max.wq data plotted -[700]"550"Do you wish to save data ?"n"Is there a wq data file ?"y"

value for B value for A - [0.017] value for 82 - [-.007] A2 -[0.009] "0.0013" value for "0.017" value for "-.007" value for "0.009"

Name of flow data file -

\*9aq12\*

Are you happy with the initialization ?

- The program reads the files from disk, processes the data and displays the hydrograph, simulated phosphorus chemograph and measured phosphorus data for Station 9A.

Listing of source code

23 -- NPSM --. <<<<>>>>>> CLEAR : SCREEN 0,0,0 : CLS 4 1.LINEAR LRC APPROACH 2.MODIFICATION FOR LOW FLOW FX 3.CALCULATES TOTAL LOAD AND FLOW 10 THIS PROGRAM FEATURES: 11 15 30 32 33 35 40 PRINT"----- NPS MODEL ------50 PRINT : 55 PRINT" << Place flow data in drive A & wq data in drive B >>" 55 FRINT 56 PRINT 58 PRINT 59 TG\$="y" 60 INPUT 75 INPUT S8 FRINT 59 TG\$="y" 60 INPUT " Station number (ie 9a 23d 14b 17b) : ";ST\$ 75 INPUT " Period of data (ie 1 to 6) 80 INPUT " Max.flow data plotted (m3/s) [300] : ";MX 80 INPUT " Max.flow data plotted (mg/l) [700] : ";MQ 91 INPUT " Max.wq data plotted (ug/l) [700] : ";MQ 92 INPUT " Jo you wish to save data(y/n) : ";GGG\$ 92 INPUT " Js there a wq data file (y/n) : ";ZZ\$ 93 PRINT"" 94 PRINT" 95 PRINT" STATIONS : \_-9A ----14B----17B---23A----23D--23b---" 95 PRINT" values for LRB .0013; .040 ; .020 ; .004 ; .0005; .09" 99 INPUT " LRB : ";LRB 100 PRINT 101 PRINT" STATIONS : \_-9A ----14B----17B---23A----23D--23b---" 102 PRINT" values for LRA.017 ; .035 ; .025 ; .015 ; .035 ; .045" 104 INPUT " LRB : ";LRA 105 INPUT " LR2 [-.007] : ";LRB2 : IF LRB2=0 THEN LRB2=-.007 106 INPUT " LRA2 [ .009] : ";LRA2: 107 INPUT " Name of flow data file (excluding extension i.e. 9aq12)";G\$ 108 G\$=C\$+" "+P\$ flow data file name 109 WG\$=ST\$+"t."+P\$ wq data file name 111 / 111 119 142 145 150 PRINT" 150 PRINT"------" 160 PRINT : 165 INPUT"Are you HAPPY with the initialisation above? (\_/n) INIT\$: 170 IF INIT\$="n" OR INIT\$="N" THEN 4 ELSE 200 177 PRINT 180 190 

 Internation routine
 Internation routine

 GOSUB 400
 Icad data

 GOSUB 300
 graphics screen

 GOSUB 500
 plot q data

 GOSUB 600
 plot wq data

 GOSUB 2000
 calculation

 GOSUB 5000
 save data (chemograph)

 200 220 220 230 240 242 242 joan data graphics screen plot q data plot wq data calculation save data (chemograph) residual calculation GOSUB 2000 GOSUB 5000 GOSUB 6000 INPUT "+", PROMPT IF PROMPT=0 THEN 246 247 248 IF 4 250 END <del>╶╺╺╺╺╺╺╺╺╺╺╺╺╺╺╺╺</del> -----graphics screen SCREEN 2,0,0,0 LINE (10,0)-(10,180),1 LINE (10,180)-(630,180),1 OR I= 180 TO 0 STEP -(1800/MQ) : PSET (9,I),1 : NEXT I OR I= 1 TO 630 STEP (630/180) : PSET (1+10,181),1 : NEXT I 300 310 320 325 327 LINE FOR 329 FOR

333 RETURN · \_\_. -- Load data-----loading flow data 400PRINT " 402 403 404 405 ON ERROR GOTO 7010 OPEN "i", 1, 05 ON ERROR GOTO 0 407UN ERROR GOID C INPUT#1, NN\$, M%, K% DIM Q(360, 1) FOR J= 1 TO K% FOR I=1 TO M% INPUT#1,Q(I,J) NEXT :NEXT LOSE#1 IF ZZ\$="y" THEN 442 ELSE RETURN PRINT WQ\$="b:"+WQ\$ ON ERROR GOTO 7020 442 450 452 loading wo data" 455 457 OPEN "i", 1, WQ UN ERROR 301 INPUT#1, NN\$, N%, C% DIM WQ(360,3) FOR J= 1 TO C% FOR I=1 TO N% INPUT#1, WQ(I,J) ON ERROR GOTO O 46<u>0</u>  $\bar{4}\bar{6}\bar{5}$ 470 480 NEXT :NEXT **485** 490 CLOSE#1 498 RETURN --- plot ... FOR I= 1 TO MX Q=Q(I,1) : X=(I\*o..., Q=(180-(180/MX\*Q)) IF I=1 THEN 537 LINE(X,Q)-(XP,QP),1 QP=Q:XP=X 500 ----- plot hydrograph----510 520 525 530 535 537 540 (1\*630/1%)+10 542 venetian blind 543 FOR I=1 TO 177 STEP 3: LINE (11,I)-(629,I),0 : NEXT I 546 '---- plot wg data-----IF ZZ\$="y" THEN 555 ELSE RETURN FOR I= 1 TO N% T=WQ(I,2) : Z=WQ(I,1) T=(180-(180/MQ\*T)) CIRCLE (X,T),4 555 560 X=(2\*3.4445)+11 IF T<0 THEN T=1 565 570 575 : NEXT I **580 RETÜRN** 620 : L 630 FOR 640 645 655 660 IE : LOUT=0 : DIM LP(360),SD(360,1) OR I=1 TO M% Q=Q(I,1) IF I=1 THEN 690 Equation 6.40-DQ=ABS THEN SLOPE=(LRA \*EXP(LRB2\*Q)) (Q-QQ) : SLOPE=(L TP=((LRB \*Q)+LRA)+(SL TP=(LRB \*Q)+LRA \*DQ) IF Q>QQ --Equation 6.41--**ELSE** 670 672 LOUT=TP\*Q\*86400!\*180/M2\*.001:LP(I)=TP\*Q: SD(I,1)=TP\*1000 30/M%)+10 (180-(180/MQ\*TP\*1000)) =2 THEN 690 LINE(X,T)-(XX,TT),1 QQ≈Q :XX=X:TT≂T 675 680 X=(I\*630, IF 685 ē9Ō NEXT I RETURN Ğ95 7ŎŎ calculation of the total load of TP using Simpson's approximation 2000 TLE=0 :TLO=0 FOR I= 2 TO M%-2 STEP 2 LE=LP(I)\*4 : TLE=TLE+LE LO=LP(I+1)\*2 : TLO=TLO+ 2200 2400 2500 TLO=TLO+LO Ō**O** TOTALLOAD=(LP(1)+TLE+TLO+LP(M%))\*28800\*(180/M%) 2700

2750 PRINT" TOTAL LOAD="TOTALLOAD" STATION: "ST\$" --- PERIOD: "P\$ g --calculation of the total flow---: Tqe=tqe+qe : Tqo=tq0+q0 3500 WEXT I 3600 NEXT I 3700 TOTALFLOW=(Q(1,1)+TQE+TQO+ Q(M%,1))\*28800\*(180/M%) 3750 PRINT" TOTAL flow="TOTALFLOW" m3 [TP]="TOTALLOAD/TOTALFLOW" m3 [TP]="TOTALLOAD/TOTALFLOW" 5000 '-- save data from model prediction at the specific station , and period- 

 5200
 , and period

 5300
 JF QQQ\$="y" THEN 5400 ELSE RETURN

 5400
 5500 SDF\$=ST\$+"tp12."+P\$

 5550
 SDF\$=ST\$+"tp12."+P\$

 5550
 ON ERR

 5600
 OPEN "o", 1, "b:"+SDF\$

 ON ERROR GOTO 7030 +SDF\$ ON ERROR GOTO O PRINT #1,SDF\$ PRINT #1,K% PRINT #1,K% FOR J=1 TO K% FOR I=1 TO M% PRINT #1,SD(I,J) 5650 5700 5740 5750 NEXT : NEXT 760 770 780 CLOSE#1 RETURN 6000 '----- residual stat. analysis ----6100 SS=0 : MS=0 : T12=0 : T11=0 : T21=0 6200 FOR I=1 TO N% 6300 Z= WQ(I,1)\*2-1 6350 OBS= WQ(I,2) 6400 PRED= SD(2,1) 6500 EI= (OBS-PRED) 6550 SS=SS+(EI^2) 6600 T21=T21+(EI^2\*PRED) 6620 T11=T11+(EI \*PRED) 6650 T12=T12+(EI\*PRED^2) 6700 NEXT I 6700 NEXT I 800 MS= SS/(NX-2) 900 PRINT 6800 sum of squar="SS" 999 RETURN mean square="MS" t21="T21" t11="T11 " t12="T12 6999 INPUT "ERROR- CHECK DRIVE/DISK <<return>> ",ER\$ :RESUME 405 INPUT "ERROR- CHECK DRIVE/DISK <<return>> ",ER\$ :RESUME 455 INPUT "ERROR- CHECK DRIVE/DISK <<return>> ",ER\$ :RESUME 5600 7000 7010 7020 7030 7050

.... ۰.

| Listing of source code in NPSM CON: Hydrograph/chemograph<br>decomposition model, see Chapter 7, Section 2.  |
|--|
| The same procedures and intialization are used in this model as shown above. The calculation procedure is as follows:  |
| 600 '+++++++++++++++++++++++++++++++++++   |
| 620 : LOUT=0 : DIM LP(360),SD(360,1)<br>625 COUNT=0  |
| 630 FOR I=STRT TO FIN part of the time sequence may be specified by the user   |
| 635 COUNT=COUNT+1<br>640 $Q=Q(I,1)$ ; $QP=Q(I-1,1)$ ; $QF=Q(I+1,1)$<br>QP = antecedant flow $QF$ = next flow value.  |
| 842 IF Q>QP AND Q>QF THEN 645 ELSE 650 is peak flow<br>645 GOSUB 800 : QSURF=Q-QBASAL : QSUBSURF=0 : T=0 :QPEAK=Q  |
| 648 ' Q = instantaneous flow QBASAL = basal flow QPEAK = peak flow   |
| 650 IF Q <qp 'recession="" 655="" 660="" else="" flow<br="" then="">655 T=T+1:GOSUB 800: QSURF=QPEAK*EXP(-1.4*T) 'recession of<br/>surface runoff<br/>(QSURF)</qp>     |
| 656 IF QSURF <qbasal qsurf="0&lt;br" then="">657 QSUBSURF=Q-(QSURF+QBASAL)</qbasal>  |
| 658<br>680 IF A=AP THEN 685 ELSE 670 'steady flow conditions   |
| 665 GBASAL=Q :QSURF=0 :QSUBSURF=0<br>667<br>670 IF Q>QP AND Q <qf 675="" 677="" conditions<br="" else="" flow="" rising="" then="">675 GOSUB 800 : QSURF=Q-QBASAL</qf> |
| 877 'phosphorus load for surface (LOADSURF) and subsurface<br>(LOADSUBSURF) drainage   |
| 680 LOADSURF=(.104+(.0035*Q))*QSURF pp from surface runoff<br>682 LOADSUBSURF=(.025+(.0025*QSUBSURF))*QSUBSURF   |
| 682 LOADSUBSURF=(.U25+(.U025+QSUBSURF))+QSUBSURF<br>683 LOADBASAL1=(.006+(.0012+QBASAL))+QBASAL<br>sp from basal flow  |
| 684 LOADBASAL2=(.006+(.00035*QBASAL))*QBASAL<br>pp from basal flow scour   |
| 685 ON SPECIES GOSUB 687, 688, 689<br>686 IF TP=>0 THEN 690 ELSE PRINT"error in loadings"<br>687 TP=(LOADSURF+LOADSUBSURF+LOADBASAL1+LOADBASAL2)/Q*1000!               |
| :RETURN:<br>688TP=((LOADSUBSURF+LOADBASAL1)/(QSUBSURF+QBASAL))*1000  |
| 689 TP=((IOADSURF+IOADBASAL2)/(OSURF+OBASAL))*1000   |
| :RETURN:<br>690 SD(I,1)≈TP : LP(I)=TP*Q*.001 : X=COUNT*(630/RANGE)+10:<br>Y=180-(180/MQ*TP)  |
| 691 IF I=STRT THEN 694<br>692 LINE(X,Y)-(XP,YP),1<br>694XP=X : YP=Y  |
| 695 NEXT I<br>700 RETURN   |
| 800 routine for estimating the basal flow  |
| 810 (BASAL=20 *(1-(EXP(045*Q))) :<br>IF GBASAL>Q THEN GBASAL=Q<br>820 RETURN   |
|  |

. . .

.

£

Hydrodynamic flow model

Command QMODEL

# Definition

QMODEL is an interactive graphics program predicting the river hydrograph at eight discrete points along the main river channel using a finite difference solution of the mass continuity equation. The model plots the measured and predicted hydrographs at Drie Heuwels Weir on the graphics screen, and integrates the hydrograph to calculate the total volume discharged. A detailed description of model formulation is given in Chapter 6. Figure A2.3 illustrates the data files and utility programs used in conjunction with the flow model. Data Entry

The procedure is initiated and calls for the following input (see Chapter 6 for more details on the coefficients and input to the model).

Prompt

# Expected Input

Time weighting factor

Do you require both linear and nonlinear scheme ?

Do you require 12-hourly flow data ?

Non-linear tolerance (%)

Period of data required

Enter the space and time weighting factor coefficients.

The linear scheme may be run independently of the nonlinear scheme showing the initiation values produced by the linear scheme.

The model is designed to use daily and 12-hourly input data.

Iteration in the nonlinear scheme will continue until the specified level of tolerance is achieved.

Enter the period of data required in the model simulation (integer from 1 to 6). Maximum flow plotted (m<sup>3</sup>/s) Enter the maximum flow plotted on the graphics screen.

File name for lateral inflow Enter the name of file containing the lateral inflow hydrographs (see Appendix 1).

File name for flow at 9a

Enter the name of the file containing the hydrograph at Paarl.

Quantity of lateral abstraction Enter a numeric value for

the rate of losses from the main river channel associated with in-channel losses and abstraction during the summer periods (1,3 and 5).

Do you wish to save simulated data ?

Enter a character (y or n) if you wish to save the predicted hydrographs for the main river channel.

Phosphorus transport Berg River

# Example

In the following example the hydrodynamic flow model is used to simulate the hydrographs at sampling stations along the main river channel for Period 3.

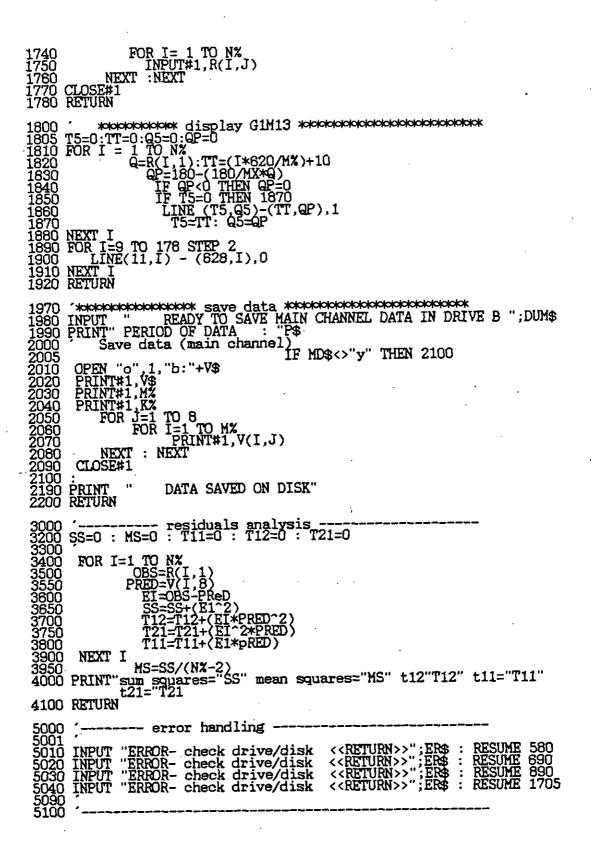
| Prompt                              | Default            | Reply                       |
|-------------------------------------|--------------------|-----------------------------|
| Time weighting factor (0<=a<=0.5)   | [.4]               | 41 ps                       |
| Space weighting factor (0<=a<=0.5)  | [.4]               | <b>H B</b> .                |
| Do you require both linear and nonl | inear scheme (y/n) | "y"                         |
| Do you require 12-hourly flow data  | (y/n)              | <sup>в</sup> у <sup>в</sup> |
| Non-linear tolerance (%)            | [1]                |                             |
| Period of data required             |                    | "3"                         |
| Maximum flow plotted (m3/s)         | [300]              |                             |
| File name for lateral inflow        | [latinfl2]         | N 16                        |
| File name for flow at 9a            | [9aq12] ·          |                             |
| Quantity of lateral abstrac         | tion (0.0-0.04)    | *0.04*                      |
| Do you wish to save predicted data  |                    | *y*                         |

The data file are loaded from disk and processed. Once the procedure is complete, the simulated and measured hydrographs for Drie Heuwels Weir are plotted on the graphics screen, the simulated channel flow is saved on disk. Listing of source code

10 20 30 QMODEL ::::---------40 50 ' This PROGRAM uses the method described by Li 1979 to route flow with adjusted lateral inflow data.. 65 PRINT" FOR HERCULES GRAPHICS- LOAD FIX": 'use emulation FOR I=1 TO 1800:NEXT I:CLS 'pause loop 70 SCREEN 0,0,0 : CLS read data G1M13 (observed) graphics output (observed) graphics output (calculated) residual analysis "", PL\$ ="y" THEN 170 ELSE 175 "Stream flow Routing - 4 Point Implicit Finite Difference Method 255 PRINT" [Dont give extensions in filenames] Time weighting factor (0<=a<=0.5) [.4] IF AA=0 THEN AA=.4 Space weighting factor (0<=b<=0.5) [.3] IF BB=0 THEN BB=.3 270 INPUT ";AA 280 INPUT " ":BB 280 INPUT "Space weighting factor (U<=b<=0.5) [.3] ";BB IF BB=0 THEN BB=.3 285 INPUT "Do you require both the linear & non-linear models(y/n)";MD\$ 287 INPUT "Do you require 12 hourly flow data (y/n)";TW\$ 288 IF MD\$="y" THEN 290 ELSE 300 290 INPUT "Non-linear scheme tolerance (%) [1%] ";E3 : IF E3=0 THEN E3=1 295 IF RERUN\$="y" THEN 310 300 INPUT "Period of data required ";P\$ 310 INPUT " Maximum flow plotted [300] ";MX : IF MA=0 THEN MX=300 320 INPUT "File name for LATERALINFLOW [latinf12] ";LA\$ 322 INPUT "File name for flow at 9a [9aq12] ";NA\$: IF NA\$="" THEN NA\$="9aq12" 323 NA\$=NA\$+"."+P\$ 324 INPUT " Guantity of lateral abstraction (0.0-0.03) ";LAT 325 INPUT " Do you wish to save data (y/n)";PO\$ 326 INPUT "File name for flow data - non-lin.[chanq12] ";V\$: IF MD\$<>"y" THEN 340 ELSE 330 330 INPUT "File name for channel flow data - non-lin.[chanq12] ";V\$: ";LA\$ : "File name for channel flow data - non-lin.[chang12] ";V\$: IF V\$="" THEN V\$="chang12" 335 V\$=V\$+"."+P\$ 380 RETURN 400 'xoooookook graphics screen xooooooooooooooooooooooo 410 420 SCREEN 2,0,0,0

(10,0)-(10,180),1 : (10,180)-(630,180),1: FOR I = 1 TO MX STEP Y=180-(180/MX\*I) PSET (9,Y),1 (629,180)-(629,0),1 (629,0) -(10,0),1 LINE  $\frac{430}{440}$ 10 450 460 470 NEXT I FOR I  $\bar{4}80$ <sup>1</sup> = 1 TO 180 X=10+(I\*620/180) \_ PSET (X,181),1 **490** 500 PSET ( NEXT I PRINT"Q (m3/s) "MX" RETURN 520 530 DRIE HEUWELS HYDROGRAPH PERIOD "P\$ 540 560 565 570 573 575 580 585 590 600 FOR J=1 TO K% FOR I=1 TO M% INPUT#1,W(I,J) 610 620 630 NEXT CLOSE#1 :NEXT 640 650 õðð 670 68Q 685 ĕ9Ŏ <u>695</u> 700 710 720 720 730 740 750 FOR J=1 TO KX FOR I=1 TO M% INPUT#1,L(I,J) NEXT : 1 CLOSE#1 RETURN NEXT 760 770 790 set constants (time and space) 800 810 820 830 840 oundary, or initial flow conditions in main river channel at the beginning of the period boundary, DIM V(360,8) FOR X=1 TO MX V(X,1)=W(X,1) : NEXT X 850 860 870 880 885 ON ERROR GOTO 5030 OPEN "i",1,"b:bound."+P\$ ON ERROR GOTO 0 INPUT #1,NN\$,MB%,KB% INPUT #1,W(1,J) 890 895 900 OR J= 2 TO 8 NEXT J FOR 910 920 CLOSE#1 930 940 950 FOR J = 2 TO 8 : V(1,J) = W(1,J) :NEXT J 960 970 DIM D(9),A(9),B(9) PSET (320,395),2 980 D(2)=11000:D(3)=7000:D(4)=14000:D(5)=7000:D(6)=14000:D(7)=16000: D(8)=20000 river distance between stations on main channel 990 A(2)=1.8:A(3)=1.85:A(4)=1.65:A(5)=1.75:A(6)=1.85:A(7)=2.47: A(8)=2.2 channel geometry constants (alpha) 1000 B(2)=.85:B(3)=.87:B(4)=.95:B(5)=.86:B(6)=.65:B(7)=.95: B(8)=.99 channel geometry constants (beta) 1010 FOR I=2 TO M% beginning of linear scheme FOR J= 2 TO 8 see Equations 6.21 to 6.23 D=D(J) D = length of specific subreach K5=B(J)-1 : K1=(1-AA)/D K6=A(J)\*B(J)\*(((W(I,J-1)+W(I-1,J))/2)^K5) - main calculations FOR I=2 TO MX FOR J= 2 TO 8 D=D(J) K5=B(J)-1 : K 1<u>0</u>20 1030 1040 1050 1060

using iterative me
1150 :
1160 S1=86400!\*180/M%/D ----Equati
1170 S2=(V(I,J-1)\*K3-(V(I-1,J)-V(I-1,J-1))\*AA)\*S1
1180 S3=A(J)\*((V(I-1,J)\*B(J))\*K4-((A(J)\*V(I,J-1)\*B(J))(A(J)\*V(I-1,J-1)\*B(J)))\*BB)
1190 S4=(K4\*(L(I,J)+L(I-1,J))+BB\*(L(I,J-1)+L(I-1,J-1)))
\*86400!\*180/M%/2
1200 S5=S2+S3+(S4/D)
1210 '----Equation 8.8:-1200 S5=S2+S3+(S4/D) 1210 : 1220 FR=S1\*K3\*R0+(A(J)\*K4\*(R0^B(J))) 1230 FR1=S1\*K3+(A(J)\*B(J)\*K4\*(R0^(B(J)-1))) 1240 FR2=A(J)\*B(J)\*(B(J)-1)\*K4\*(R0^(B(J)-2)) 1250 : 1260 FD=((FR1/FR2)^2)-(2\*(FR-S5)/FR2)) 1270 IF FD<0 THEN FD=0 1280 : 1290 R1=R0-(FR1/FR2)+(FD^.5) 1300 R2=R0-(FR1/FR2)-(FD^.5) ----Eq.6.15 ----Eq.6.16 ----Eq.6.17 '----Eq.6.14 :----Eq.6.14 1310 : 1320 IF R1<0 THEN R1=0 1330 IF R2<0 THEN R2=0 1340 : 1350 FRA=S1\*K3\*R1+(A(J)\*K4\*(R1^B(J))) 1360 FRB=S1\*K3\*R2+(A(J)\*K4\*(R2^B(J))) 1370 : 1380 E1=ABS(FRA-S5) 1390 E2=ABS(FRB-S5) 1400 IF (E1-E2)<=0 THEN 1410 ELSE 1440 1410 E=E1 1420 R0=R1 1430 GOTO 1460 1440 E=E2 1450 R0=R2 iteration repeat tolerance level at iteration repeated until tolerance level is achieved (See Chapter 6) 1450 ROTAL 1460 E4=E3\*S5\*.01 1470 IF E<=E4 THEN 1480 ELSE 1210 1480 V(I,J)=R0 1490 NEXT J 1500 PSET (I+140,195),1 ' plot marker on screen to show progress in calculations 1510 NEXT I '-----end of non-linear scheme------workersteiner load data G1M13 workersteinersteinersteiner IF TW\$="y" THEN I\$="23dq12."+P\$ ELSE I\$="23dq."+P\$ IF TW\$="y" THEN I\$="23dq12."+P\$ ELSE I\$="23dq."+P\$ ON ERROR GOTO 5040 1690 1695 1700 1703 1705 1707 OPEN "i", 1, IS ON ERROR GOTO 0 1710 INPUT#1,NN\$,N%,C% 1720 DIM R(360,1) 1730 FOR J= 1 TO C%



Transport model : Section )

Command : SECTION1

Definition

SECTIONI is an interactive graphics program designed to predict the phosphorus chemograph at Lady Loch Bridge. The output from this program is used by SECTION2 to predict the chemograph at stations along the main river channel (see Fig A3).

SECTIONI uses the chemograph from NPSM, in addition to the chemographs and hydrographs for Paarl and Wellington sewage treatment works to predict the chemograph at Lady Loch Bridge, using a modified mass balance model (see Chapter 7, Section 3).

Data Entry

The procedure is initiated and requires the following input Expected Input Prompt Coefficient a in sed/rem model [0.45] - Enter coefficient Coefficient b in sed/rem model [.187] - used in model calibration Coefficient z in sed/rem model [0.009]-Enter the maximum [700] -Max [TP] plotted phosphorus concentration Max flow plotted [300] plotted on the display. Do you wish to have effluent compliance (y/n) ? Enter a character if you wish to simulate the influence of the phosphate standard. Do you require a print out of totals loads (y/n) ? Enter a character if you wish to print-out the total loads exported during the period. Do you wish to save data file (y/n)? Enter a character if you wish to save the simulated chemograph at Lady Loch Bridge on disk. State file for model output to drive B -Enter the file name for the data to saved on disk.

A2.67

TR 143 March 1989

## Example

In the following example the phosphorus nonpoint source model is used to simulate the phosphorus chemograph at Lady Loch Bridge.

Prompt

Reply

| Enter Period of data Required | -           | "2"        |
|-------------------------------|-------------|------------|
| Coefficient a in sed/rem mode | 1 [0.45] -  | **         |
| Coefficient b in sed/rem mode | 1 [.187] -  | H 11       |
| Coefficient z in sed/rem mode | 1 [0.009] - | <b>n a</b> |

Max [TP] plotted [700] - "" Max flow plotted [300] - ""

Do you wish to have effluent compliance (y/n) ? "n" Do you require a print out of totals (y/n) ? "n" Do you wish to save data file (y/n) ? "y" State file for model output to drive B (ie 13btp)- "13btp12"

The data files are read from disk, processed, and the simulated chemograph plotted on the display. The measured phosphorus concentrations are also plotted.

Listing of source code 2 3 CLEAR: LEAR: DIM TB(360,1),LT1(360), LT2(380),LT3(360),LTL(360),LT4(360),LT5(360) SCREEN 0,0,0 : COLOR 10,9 ----- SECTION 1 MODEL 10 12 13 15 ZO 'THIS PROG. RUNS THE DISCHARGE-RATING CURVES FOR STATION 9A IN ADDITION TO THE MODIFIED MASS-BALANCE FOR SECTION1, THEN COMPARES OBSERVED/MEASURED DATA 25 27 28 30 40 50 80 --- main routine -70 75 80 90 GOSUB 100 : options IF RERUN\$="y" THEN 90 GOSUB 200 : 'loading data GOSUB 600 : 'hires screen GOSUB 700 : 'calculation and plot GOSUB 950 : 'plot IF GP\$="y" THEN GOSUB 7000 ' save data IF GP\$="y" THEN GOSUB 7000 ' printout data to printer GOSUB 9000 : 'residuals analysis INPUT "rerun (y/n)";RERUN\$ : IF RERUN\$="y" THEN 5 ELSE 94 95 96 97 98 99 3 >>>>>>> 105 PRINT 110 PRINT" ----- SECTION 1 MODEL EVALUATION -Default values given as: [..] 110 FRINT" 111 PRINT" <<12-Hour>> 112 PRINT 115 120 INPUT 121 DETY IF RERUN\$="y" THEN 122 Period of data required :";P\$ 121 PRINT 121 PRINT 122 INPUT " Coefficient a in sed/rem model [0.45]";LRAK 124 INPUT " Coefficient b in sed/rem model [.187]";LRBK 124 INPUT " Coefficient b in sed/rem model [.187]";LRBK 126 INPUT " Coefficient z in sed/rem model [.0009]";ZX 126 INPUT " Coefficient z in sed/rem model [.0009]";ZX 127 IF ZX=0 THEN ZX=9.000001E-04 127 PRINT 128 129 PRINT 130 INPUT " Max [tp] plotted [700]"; MX IF MX=0 THEN MX=700 Max flow plotted [300]"; MQ IF MQ=0 THEN MQ=300 : 131 INPUT " PRINT 132 INPUT " Do you wish to have effluent compliance (y/n) ";EF\$ 141 INPUT " Do you require a print out of totals (y/n) ";QG\$ 142 INPUT " Do you wish to save data file (y/n) ";QG\$ 143 INPUT " Do you wish to save data file (y/n) ";QF\$ 143 INPUT " State file for model output to drive B (ie 13BTP.\_) 144 INPUT "State file for model output to drive B (ie 13BTP.\_) 145 PRINT : IF EF\$="y" OR EF\$="Y" THEN 146 ELSE 145 145 PRINT : IF EF\$="y" OR EF\$="Y" THEN 148 ELSE 148 146 INPUT "State [TP] of Paarl STW effluent @ 1mg/l PO4 [1.3] ":PSTWEFF: 147 INPUT "State [TP] of Wel'gton STW effluent @ 1mg/l PO4 [1.14]";WSTWEFF: 148 PRINT 149 PRINT 150 PRINT" 150 PRINT" 150 PRINT" 150 PRINT" 150 PRINT" 150 PRINT" 160 200 205 <u>loading</u> data INPUT

210 INFO. F1\$="9aq12" 211 F1\$=F1\$+"."+P\$ 212 ON ERROR GOTO 10 213 OPEN "i",1,F1\$ 214 ON ERROR GOTO 0 215 INPUT#1,NN\$,M1%,K1%: PRINT NN\$ 220 DIM G1(360,1) 225 FOR J= 1 TO K1% 230 FOR I =1 TO M1% INPUT#1,Q1(I,J) 210 INPUT " Name of file for 9A [9aq12]";F1\$ IF F1\$="" THEN ON ERROR GOTO 10010 rUR . 240 NEXT :NEXT 245 CLOSE#1 250 260 F7\$="14bg12 " 265 INPUT#\* F7\$="14ba12."+P\$ : OPEN "i",1,F7\$ INPUT#1,NN\$,M7%,K7%: PRINT NN\$ DIM QL(360,1) FOR J= 1 TO K7% FOR I =1 TO M7% INPUT#1,QL(I,J) 270 280 285 90 NEXT CLOSE#1 NEXT 295 97 ŝõb 300 310 F2\$="pstwq12."+P\$ : OPEN "i",1,F2\$ 320 INPUT#1,NN\$,M2%,K2%:PRINT NN\$ 325 DIM Q2(360,1) 330 FOR J= 1 TO K2% 340 FOR I =1 TO M2% 350 INPUT#1,Q2(I,J) 360 NEXT :NEXT 370 CLOSE#1 ŠŚĎ 

 360

 410
 F3\$="wstwg12."+P\$ : OPEN "i",1,F3\$

 420
 INPUT#1,NN\$,M3%,K3%: PRINT NN\$

 425
 DIM Q3(360,1)

 430
 FOR J= 1 TO K3%

 440
 FOR I =1 TO M3%

 450
 INPUT#1,Q3(I,J)

 460 NEXT :NEXT 470 CLOSE#1 480 480 490 INPUT "Place wg data in drive.....",PROMT 510 F4\$="b:stltq."+P\$ 512 ON ERROR GOTO 10020 515 OPEN "i",1,F4\$ 517 ON ERROR GOTO 0 520 INPUT#1,NN\$,M4%,K4% : PRINT NN\$ 525 DIM T(45,10) 530 FOR J = 1 TO K4% 540 FOR J = 1 TO K4% 550 INPUT#1,T(I,J) 560 NEXT :NEXT 570 CLOSE#1 573 IF EF\$="y" OR EF\$="Y" THEN 599 ELSE 575 575 F5\$="b:pstwt."+P\$ : OPEN "i",1,F5\$ 576 INPUT#1,NN\$,M5%,K5% : PRINT NN\$ 577 DIM PT(180,1) 578 FOR J = 1 TO K5% 579 FOR I =1 TO M5% 580 INPUT#1,PT(I,J) 581 NEXT :NEXT **4**80 NEXT :NEXT CLOSE#1 F6\$="b:wstwt."+P\$ : OPEN "i",1,F6\$ INPUT#1,NN\$,M6%,K6% : PRINT NN\$ DIM WT(180,1) FOR J= 1 TO K6% FOR I =1 TO M6% INPUT#1,WT(I,J) 596 597 NEXT CLOSE#1 RETURN :NEXT 598 599 ----- graphics screen 600 SCREEN 2,0,0,0 LINE (10,0)-(10,180),1 : LINE(10,0)-(640,0),1 LINE (10,180)-(640,180),1 : LINE(639,0)-(639,180),1 FOR I= 1 TO M1% : P=(I\*3.4445)+10 : PSET(P,181),1 : NEXT I FOR I= 0 TO MX STEP 10 : PSET(9,180-(180/MX\*I)),1 : NEXT I 610 620 630

638 PRINT"[TP] "MX" ug/1 ---- SECTION 1 PERIOD "P\$ 640 RETURN 550 700 705 GOSUB 660 710 FOR I =1 TO M2% Q1=Q1(I,1) ----calculations : IF QQ1=0 THEN QQ1=Q1 

 725
 DQ=ABS(Q1-QQ1) : DQK=Q1/QQ1 : LRZ=(8.9999998-03\*EXP(-.007\*Q1))

 726
 V=INT((1+I)/2)

 727
 IF Q1>QQ1 THEN

 727
 IF Q1>QQ1 THEN

 728
 T1=((.0012\*Q1)+.015)+(LRZ\*DQ)

 729
 T1=((.0012\*Q1)+.015)

 729 740 Q2=Q2(I,1) : IF EF\$="y" THEN T2=PSTWEFF ELSE T2=PT(V,1)/1000 
 742
 IF
 QL(I,1)=0
 THEN
 750

 745
 QL=QL(I,1)
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0 : IF QQL=0 THEN QQL=QL 748 749 750 Q3=Q3(I,1): IF EF\$="y" THEN T3=WSTWEFF ELSE T3=WT(V,1)/1000 755 760 LT1(I)= L1 LT2(I)=L2 LT3(I)=L3 LTL(I)=LL LT5(I)=L1+L2+L3+LL 770 780 785 DG(G4)\*(LRBK\*(DGK^ZX)))+LRAK L1+L2+L3+LL)/Q4 5\*Q4\*43200! : TIMETRAVEL=11000/(Q4/(1.8\*Q4^.85)) 850 IF I=1 THEN 865 LINE (X,T4)-(XP,TV),1 : QQ1=Q1 TV=T4 : XP=X : 855 860 QQL=QL 865 NEXT I RETURN 870 875 877 FOR I= 1 TO M1% Q=Q1(I,1) Q=(180-IF I ++++++++++++++++++ plot of flow data 9a 880 <u>890</u> X=(I\*630/M2%)+10 D-(180/MQ\*Q)) I=1 THEN LINE (X,Q)-(XP,QP),1 QP=Q:XP=X 895 ann 915 905 910 920 NEXT RETURN 925 TURN plot of measured Gata 10-FOR I =1 TO M4% Z=(T(I,1)\*3.4445)+8 : T=T(I,8) T=(180-(180/MX\*T)) CIRCLE (Z,T),3 of measured data for 13b (lady loch bridge) 965 NEXT I RETURN 980 990 700( 010 J=1 TO K2% FOR I=1 TO M2% \_\_\_\_\_PRINT #1,TB(I,J) NEXT : NI CLOSE#1 :NEXT RETURN print out routine 9a g1m20 north paarl FOR I=1 TO M2%-2 STEP LE=LT1(I)\*4 :T ₽<sup>1</sup>2 :TLE=TLE+LE 8020 8031

Phosphorus transport Berg River

8033 8035 NEXT 8045 TYTAL=, 8050 LPRINT 8070 TOTAL=0 8110 pstw 8120 FOR I=1 TO M. 8131 LE=LT2(I)\* 8135 NEXT I 8145 TYTAL =(LT2(1)+TL 8150 LPRINT total Lc. 8170 TOTAL=0 : TL0=0: 8210 wstw 8220 FOR I=1 TO M2x-2 STEP 2 8231 LE=LT3(I)\*4 :TLE=, 8235 NEXT I 8245 TOTAL =(LT3(1)+TLE+TL0+LT3(M2 8250 LPRINT total load from wst. 8250 LPRINT total load from wst. 8250 FOR I=1 TO M2x-2 STEP 2 8331 LE=LT4(I)\*4 :TLE=TLE+LE 8332 NEXT I 8332 FOR I=1 TO M2x-2 STEP 2 8331 LE=LT4(I)\*4 :TLE=TLE+LE 8333 LO=LT4(I+1)\*2 :TLO=TLO+LO 135 135 NEXT I 135 NEXT I 136 Control total load from 135 137 TOTAL =(LT4(1)+TLE+TL0+LT4(M2x)) 147 LE=LT5(I)\*44 :TLE=TLE+LE 138 NEXT I 139 NEXT I 141 TO M2x-2 STEP 2 141 Input load to section 1 151 TO M2x-2 STEP 2 141 Input load to section 1 152 ITD=1 141 TO M2x-2 STEP 2 141 Input load to section 1 152 ITD=0 :TL=0 141 Input load to section 1 153 ITD=0 :TL=1 141 TO M2x-2 STEP 2 141 Input load inpu' 145(1)+TLE+TL0+LT5( 152 ITD=1 141 TO=0 : 141 Input IO=1 141 Input ID=1 141 Input IO=1 141 Input ID=1 141 Input ID=1 141 NEXT I TOTAL=(LT1(1)+TLE+TLO+LT1(M2%))\*28800\*(180/M2%) LPRINT" total load from 9a="TOTAL g" TOTAL=0 : TLE =0 : TLO=0 NEXT I TOTAL =(LT2(1)+TLE+TLO+LT2(M2%))\*28800\*(180/M2%) LPRINT total load from pstw="TOTAL TOTAL=0 : TLO=0: TLE=0 NEXT I TOTAL =(LT3(1)+TLE+TLO+LT3(M2%))\*28800\*(180/M2%) LPRINT" total load from wstw="TOTAL TOTAL=0 : TLE=0 : TLO=0 8600 RETURN 8700 8800 8900 9000 9200 9250 9300 FOR I=1 TO M4% Z=T(I,1)\*2-1 : IF Z<0 THEN Z=0 OBS=T(I,8) PRED=TB(Z,1) EI=(OBS-PRED) SS=SS+(EI^2) T21=T21+(EI^2\*PRED) T12=T12+(EI\*PRED^2) T11=T11+(EI\*PRED) 9350 9400 9450 9500 9550 9600 3000 T11=T11+(E1\*PRED) 9700 NEXT I 9750 MS=SS/(M4%-2) 9800 PRINT"sum of squares="SS" mean squares="MS"t21="T21" t12="T12" t11="T11 9999 RETURN 10000 \_\_\_\_\_error handling \_\_\_\_\_ 9650 10000 '----error handling -----10010 INPUT "ERROR check drive/disk <<< return >>>",ER\$ : RESUME 213 10020 INPUT "ERROR check drive/disk <<< return >>>",ER\$ : RESUME 515 10030

Transport model : Section 2

Command : SECTION2

Definition

SECTION2 uses a modified version of the mass continuity equation to predict the temporal and spatial variation in the phosphorus load at discrete points along the main river channel (see Chapter 7 for details on the model).

The model uses the simulated chemograph at Lady Loch Bridge (from program SECTIONI) to predict the chemograph at each station along the main river channel between Lady Loch Bridge and Drie Heuwels Weir (see Fig A2.4).

Data Entry

The program is initiated and the following data must be entered

| A2.74                             |   |  |  |
|-----------------------------------|---|--|--|
| Prompt                            | Expected Input  |  |  |
| Period of data required           | <ul> <li>Enter the period</li> <li>of data required</li> <li>for the model</li> <li>simulation.</li> </ul>                      |  |  |
| Maximum [TP] plotted              | <pre>[700] - Enter the maximum<br/>value of the<br/>phosphorus<br/>concentration<br/>plotted on the<br/>y-axis (in µg/l).</pre> |  |  |
| value of time weighting coeff [.  | .4]-  |  |  |
| ·                                 | Enter the coefficients used in the model.   |  |  |
| value of space weighting coeff [. | . 4 ] -   |  |  |
| Do you wish to save we data       | (y/_) ?   |  |  |
|                                   | Enter the<br>character if you<br>wish to save the<br>ouput data   |  |  |
| Do you wish to plot we data at 10 |   |  |  |
| Decay coefficient A [015]         | -<br>Enter<br>coefficients used<br>in sedimentation<br>equation   |  |  |
| Decay coefficient 8 [.005]        | -   |  |  |
| File name for channel flow [c     |   |  |  |
| File name for chemograph at 13b   |   |  |  |
|                                   | Enter filenames<br>of composite flow<br>data file and<br>chemograph at<br>Lady Loch Bridge.                                     |  |  |

Example

In the following example the model is used to simulate the phosphorus chemograph for stations along the main river channel (Section 2).

Prompt

Reply

Period of data required Maximum [TP plotted [700] [.4]~ "" value of time weighting coeff value of space weighting coeff [.4]~ Do you wish to save we data (y/\_) ? "" Do you wish to plot we data at 18a (y/\_) ? [-.015] Decay coefficient A [.005] Decay coefficient B File name for channel flow [chanq12] file name for chemograph at 13b [13btp12]- ""

Once the data are entered the procedure loads the data from disk, processes the data and displays the simulated chemograph at Drie Heuwels Weir. The measured phosphorus concentrations are also displayed.

Listing of source code (based on the advective routing scheme devised by Li (1979) SECTION2 10 CLEAR : COLOR 10,9 : DIM L(360,8),TPL(360),Q(360,8),C(360,8),TP(380,3),TM(60,9) + USING L.R.C LATERAL INPUT + ALSO PLOTS [TP] AT 18A 20 40 SCREEN 0,0,0 GOSUB 1000 450550 IF RERUN\$="y" THEN 70 GOSUB 2000 GOSUB 3000 GOSUB 4000 GOSUB 5000 GOSUB 6000 GOSUB 8000 GOSUB 8000 GOSUB 9900 load data hires screen plot input data ŽÕ 80 calculate and plot output (plot [tp] data at G1M13 (calculation of total TP load at 23d (saving output data files 90 **9**5 ğĕ 97 1000 -----options-----PRINT PRINT INPUT " Period of data required ";P\$ INPUT " Maximum [TP] plotted [700 ug/1] ";MT IF MT=0 THEN MT=700 INPUT " Value of time-weighting coeff [.4] ";AA IF AA=0 THEN AA=.4 INPUT " Value of space weighting coeff [.4] ";BB IF BB=0 THEN BB=.4 INPUT " Do you wish to save wq data (y/\_) ";SV\$ INPUT " Do you wish to plot wq data at 18a (y/\_)";GS\$ INPUT " Do you wish to plot flow data (y/\_) ";GS\$ INPUT " Do you wish to plot flow data (y/\_) ";GS\$ INPUT " Do you wish to plot flow data (y/\_) ";GS\$ INPUT " Do you wish to plot flow data (y/\_) ";GS\$ INPUT " Do you wish to plot flow data (y/\_) ";GS\$ INPUT " Decay coefficient A [ -.015] ";DECA IF DECA=0 THEN DECA=-.015 INPUT " Decay coefficient B [.0050] ";DECB IF DECB=0 THEN DECB=.005 IF RERUNS="y" THEN 1074 INPUT " File name for channel flow [chanq12] "; F2\$ IF F2\$="" THEN F2\$=" chanq12." +P\$ ELSE F2\$=F2\$+"." +P\$ IF SV\$="y" THEN INPUT " specify name of output file:";FDH\$ ELSE 1070 IF EDU#="" THEN INPUT " Specify name of output file:";FDH\$ 1025 1030 1035 İNPUT " 1037 040 INPUT " 1042 1045 1047 1053 054 1055 INFU-1056 INPUT " 1058 INPUT " 1060 INPUT " IF D .062 .063 1064 1065 1067 ir SV\$="y" THEN INPUT " specify name of output file:";FDH\$
ELSE 1070
1069 IF FDH\$="" THEN 1068 ELSE 1070
1070 INPUT " File name for chemograph @ 13B [13btp12] "; F3\$
1071 IF F3\$="" THEN F3\$="13btp12."+P\$ ELSE F3\$=F3\$+"."+P\$
1074 PRINT"
1074 PRINT"
1075 INPUT "Are you happy with the initialisation (\_/n)";NZ\$
IF NZ\$="n" THEN 1000
1076 PRINT
1077 PRINT"
1080 PRINT
1000 RETURN
2000 f 2000 2010 2020 ----load data----F1\$="latinf12."+P\$ ON ERROR GOTO 2600 2025 2030 OPEN "i",1,F1\$ 2035 ON ERROR GOTO O INPUT \$1,NN\$,M1%,K1% FOR J=1 TO K1% PRINT NNS 2040 ŽŎĠŎ

A 120

\$ 14

. 7 7

4

FOR I=1 TO M1% \_\_\_\_\_NPUT #1,L(I,J) 2070 2080 2090 NEXT NEXT iõõ çlose#1 2101 2103 2104 CHANNEL FLOW DATA:-ON ERROR GOTO 2610 2105 OPEN "i",1,F2\$ ON ERROR GOTO O :PRINT NN\$ 2108 2107 INPUT #1,NN\$,M2%,K2% 2108 FOR J=1 TO K2% 2109 FOR I=1 TO M2% 2110 INPUT #1,Q(I,J) 2108 2110 INFUT #1,Q(1,J) 2112 NEXT :NEXT 2114 CLOSE#1 2109 : 2200 INFUT " Place WQ data in drive B:-----<<<RETURN>> ",PROMPT 2220 F3\$="b:"+F3\$ ON ERROR GOTO 2620 2225 2230 OPEN "i",1,F3\$ 2235 ON ERROR GOTO O :PRINT NN\$ 235 240 INPUT #1,NN\$,M3%,K3% 260 FOR J= 2 TO 2 270 FOR I=1 TO M3% 280 INPUT #1,C(I,2) 2290 NEXT :NEXT 2300 CLOSE#1 2310 FOR I= 1 TO M3% :C(I,2)=C(I,2)/1000 :NEXT I 2320 F4\$="b:23dt."+P\$ 2325 ON ERROR GOTO 2630 2330 OPEN "i",1,F4\$ 2335 ON ERROR GOTO 0 2340 INPUT #1,NN\$,M4%,K4% :PRINT NN\$ 2360 FOR J=1 TO K4% 2370 FOR I=1 TO M4% 2380 INPUT #1,TP(I,J) 2390 NEXT :NEXT 2400 CLOSE#1 

 2350
 NEXT : NEXT

 2400
 CLOSE#1

 2410
 IF QS\$="y" THEN 2420 ELSE 2550

 2420
 F5\$="b:SCT2.T"+P\$

 2425
 ON ERROR GOTO 2640

 2430
 OPEN "i", 1,F5\$

 2435
 ON ERROR GOTO 0

 2435 ON ERROR GOI 2440 INPUT #1,NN\$,H5%,K5% 2460 FOR J=1 TO K5% 2470 FOR I=1 TO M5% 2480 INPUT #1,TM(I,J) 2490 NEXT :NEXT PRINT NN\$ 490 NEXT :NEXT 500 CLOSE#1 550 RETURN 600 INPUT "ERROR- check drive/disk <<return>>",ER\$ : RESUME 2030 610 INPUT "ERROR- check drive/disk <<return>>",ER\$ : RESUME 2105 620 INPUT "ERROR- check drive/disk <<return>>",ER\$ : RESUME 2230 630 INPUT "ERROR- check drive/disk <<return>>",ER\$ : RESUME 2330 640 INPUT "ERROR- check drive/disk <<return>>",ER\$ : RESUME 2430 2600 2610 2620 2630 3000 3020 SCREEN 2,0,0,0 3030 LINE (10,0)-(10,180),1 :LINE (639,0)-(639,180),1 3040 LINE (10,180)-(640,180),1 : LINE (10,0)-(640,0),1 3050 FOR I=1 TO 180 : X=(I\*3.55556)+10 : PSET (X,181),1 : 3055 PRINT" [TP] "MT" -- SECTION 2 F.D. MODEL PERIOD "P\$ 3060 RETURN : NEXT I 4020 [tp] 4040 FOR I=1 TO M3% 4050 TP=C(I,2)\*1000! 4060 Y=(180-(180/MT\*TP)) 4070 X=(I\*630/M3%)+10 4080 IF I=1 THEN 4100 4090 LINE (X,Y)-(XP,YP),1 4100 XP=X : YP=Y 4120 NEXT I 4140 4200 FDP ------plot input data--4300 FOR I=9 TO 178 STEP 2 4320 LINE (11,I)-(637,I),0 4330 NEXT I

4360 4370 flow f IF QQ\$="y" THEN 4440 ELSE RETURN FOR I=1 TO M2% 4440 G=G(I,2) G=G(I,2) Y=(180-(180/MQ\*G)) X=(1\*630/M2%)+10 IF I=1 THEN 4500 LINE (X,Y)-(XP,YP),1 KP=X : YP=Y 4450  $\overline{4}\overline{6}\overline{0}$ 47N 480 XĒ 50ð 20 NEXT I 50 RETURN -, m1%) 500 ----- boundary conditions 5555 FOR X=2 TO 8 5560 C(2,X)=C(2,2) 5561 C(1,X)=C(1,2) 5562 Q(2,X)=Q(2,2) 5565 NEXT X 5566 5567 : 5568 DIM D(9), A(9), B(9)568 5569 5570 5571 PSET (320,185),1 5575 FOR I=2 TO M1% 5580 FOR J= 3 TO 8 5582 DL=D(J) : K5= B(J)-1 : K1= (1-AA)/DL 5585 GOSUB 7000 '<----lateral inflow [tp]-----> K6=A(J)\*B(J)\*((((G(I,J-1)\*C(I,J-1))+(C(I-1,J)\* G(I-1,J)))/2)\*K5) P1=1/(K1+(K6\*K2)) P4=((K4\*CL4\*L(I,J)/DL)+(BB\*CL2\*L(I,J-1)/DL)+ (K4\*CL3\*L(I-1,J)/DL)+(BB\*CL1\*L(I-1,J-1)/DL))\*.5 5586 5587 5588 5589 . 5592 5595 5596  $C(I,J)=(P_1*P_2)/Q(I,J) : KK=DECA+(DECB*LOG(Q(I,J)))$  C(I,J)=C(I,J)\*EXP(KK\*DL\*.001):IF C(I,J)<0 THEN C(I,J)=.04  $TP_L(I)=C(I,J)*Q(I,J)$ 597 (I+140,189),1 \_\_\_\_\_plot [tp] data at g1m13-IF GS\$="y" THEN 6120 ELSE 6020 FOR I=1 TO M4% TP=TP(I,2) : Z=TP(I,1) TP=180-(180/MT\*TP) : Z=(Z\*3.5)+9 CIRCLE (Z,TP),2 6000 6010 6020 SO30 6040 6050 NEXT I FOR I = 6060 I I
 = 1 TO M1%
 Q=C(I,8)\*1000! : TT=(I\*630/M1%)+10
 QP=180-(180/MT\*Q)
 IF GP<0 THEN GP=0
 IF I=1 THEN 6067
 LINE (T4,Q4)-(TT,QP),1
 T4=TT: Q4=QP
 J
</pre> 5061 RAR RNF 6066 6068 NEXT I 6080 : RETURN 6120 FOR I=1 6080 6120 M 1 TO M5% TM=TM(I,5) : Z=TM(I,1) TM=180-(180/MT\*TM) : Z=(Z\*3.5)+9 CIRCLE (Z,TM),3 <u>6</u>130 6140 6150

Phosphorus transport Berg River

4-345 - 4-5 - 4-5

 $\cdot \cdot \eta$ 

| 6160 NEXT I<br>6170 :<br>6200 :<br>6261 FOR I = 1 TO M1%<br>6262 $Q=C(I,4)*1000!$ : TT=(I*630/M1%)+10<br>6263 $QP=180-(180/MT*Q)$<br>6264 IF $QP<0$ THEN $QP=0$<br>6264 IF $QP<0$ THEN $QP=0$<br>6265 IF I=1 THEN $6067$<br>6266 LINE (T4,Q4)-(TT,QP),1<br>6267 T4=TT: Q4=QP<br>6268 NEXT I<br>6280 :RETURN   |   |
|---|---|
| 7000<br>7003 IF J=3 THEN LRA= .022 AND LRB=.015<br>7004 IF J=4 THEN LRA= .026 AND LRB=.035<br>7005 IF J=5 THEN LRA= .025 AND LRB=.020<br>7006 IF J=8 THEN LRA= .025 AND LRB=.025<br>7007 IF J=7 THEN LRA= .025 AND LRB=.02<br>7008 IF J=8 THEN LRA= .015 AND LRB=.003<br>7010 nps model algorithms:-<br>7011 :<br>7012 Q1=L(I-1,J-1):Q2=L(I,J-1):Q3=L(I-1,J):Q4=L(I,J):<br>Q5=L(I-2,J-1):Q6=L(I-2,J)  |   |
| 7013 $\vec{IF} \ \vec{Q1} > \vec{Q5} \ \vec{THEN}$<br>CL1=((LRB*Q1)+LRA)+((8.999999E-03*EXP(007*Q1))*(ABS(Q1-Q5)))<br>$ELSE \ CL1=(LRB*Q1)+LRA$<br>7014 $\vec{IF} \ Q2>Q1 \ THEN$<br>CL2=((LRB*Q2)+LRA)+((8.999999E-03*EXP(007*Q2))*(ABS(Q2-Q1)))   |   |
| ELSE CL2=(LRB*Q2)+LRA<br>7015 IF Q3>Q6 THEN<br>CL3=((LRB*Q3)+LRA)+((8.9999999E-03*EXP(007*Q3))*(ABS(Q3-Q6)))<br>ELSE CL3=(LRB*Q3)+LRA   |   |
| 7016 IF Q4>Q3 THEN<br>CL4=((LRB*Q4)+LRA)+((8.999999E-03*EXP(007*Q4))*(ABS(Q4-Q3)))<br>ELSE CL4=(LRB*Q4)+LRA<br>7020 TOTALLAT=TOTALLAT+((CL1*Q1)+(CL2*Q2)+(CL3*Q3)+(CL4*Q4))*43200!<br>7030 RETURN   | - |
| 8100<br>8100<br>71.E=0:TLO=0<br>8200<br>FOR I= 2 TO M3%-2 STEP 2<br>8300<br>LE=TPL(I)*4<br>1.O=TPL(I+1)*2<br>8350<br>1.O=TPL(I+1)*2<br>1.O=TLO+LO<br>8400<br>NEXT I<br>8450<br>FOR I = 1 TO M1%<br>70TAL13B=TOTAL13B+(C(I,2)*Q(I,2)*43200!)<br>8480<br>NEXT I<br>8490   |   |
| 8500 PRINT<br>"-LOAD @ 23D="TOTALLOAD"-LATERAL INP="TOTALLAT"-TOTAL @ 13B=<br>"TOTAL13B<br>8600 RETURN<br>9000 TP=TPOUT*1000 : TH=(180-(180/MT*TP))<br>9100 G=(((TIME/86400!)+I)*3.5)+10 converts secs to days<br>9200 IF 1=1 THEN 9400<br>9300 LINE (G,TH)-(GP,PH),1<br>9400 GP=G : PH=TH<br>9500 RETURN   |   |
| 9900       'save data from model ouput         9903       IF GS\$="y" THEN J=4 ELSE 9905         9904       FOR I=1 TO M3%: C(I,J)=C(I,J)*1000 :NEXT I         9905       IF SV\$="y" THEN 9910 ELSE 9999         9910:       FDH\$="b:"+FDH\$         9920       OPEN "o",1,FDH\$         9930       PRINT#1,FDH\$         9940       PRINT#1,FDH\$         9941       FOR I=1 TO M3%         9942       PRINT#1,K3%         9943       PRINT#1,K3%         9944       PRINT#1,K3%         9945       PRINT#1,K3%         9950       FOR I=1 TO M3%         9950       RETURN :::::::::::::::::::::::::::::::::::: |   |

...

Phosphorus Bed load model

Command BEDTRAN

Definition

BEDTRAN uses the unit stream power equation to estimate the mass of sediment and phosphorus transported as bed load (see Chapter 7, Section 4). The model calculates the mass transport and plots the simulated results on the graphics screen. Fig A2.5 shows the datafiles and utility programs used in conjunction with the bed load model.

ţ.

Data Entry

The procedure is initiated and calls for the following input

| Prompt                                   | Expected Input   |
|--|------------------|
|  | ÷<br>,           |
| PERIOD OF DATA REQUIRED AT G1M13 (1-6) - |                  |
|  | of data required |
|  | for the          |
| •  | simulation.      |
| MEDIAN SEDIMENT DIAMETER (.37 mm) [.3] - | Enter the median |
|  | sediment size of |
|  | the substrate at |
|  | Drie Heuwels     |
|  | Weir.            |
| MAXIMUM SED. CONC. PLOTTED [125] -       |                  |
|  | Enter the        |
|  | maximum sediment |
| •  | concentration    |
|  | plotted on the   |
|  | graphics screen. |
| MAXIMUN FLOW PLOTTED [125] -             | •                |
|  | Enter the        |
|  | maximum          |
|  | dtscharge        |
|  | plotted on the   |
|  | screen.          |

Example

In the following example the model is used to predict the total mass of bed material exported at Drie Heuwels Weir for Period 2.

Prompt: Response:

| PERIOD OF DATA REQUIRED AT GIMI3 | (.]-6) - "2"  |  |
|----------------------------------|---------------|--|
| MEDIAN SEDIMENT DIAMETER (.37    | mm) [.3] - "" |  |
| MAXIMUM SED. CONC. PLOTTED       | [125] - ""    |  |
| MAXIMUM FLOW PLOTTED             | [125] - **    |  |

The data are loaded from disk, processed and the chemograph of bed material is displayed in addition to the hydrograph for Drie Heuwels Weir. The total mass of bed load is calculated using Simpson's Approximation.

#### Listing of source code

2 SCREEN 0,0,0: CLEAR bed load transport using the unit stream equation devised by YANG & STALL (1976) 5 10 20 30 40 45 ( this method uses the flow data for drie heuwels only and does not accommodate for temperature fx or wash load determination. 48 60 70 80 90 GOSUB 1000OPTIONSGOSUB 2000LOAD FLOW DATA FOR G1M13GOSUB 3000HIRES SCREENGOSUB 4000CALCULATION & PLOT OF OUTPUT DATAGOSUB 5000PLOT OF SS DATAINPUT" re-run? {y/n} ";QE\$: IF QE\$="y" THEN 5 ELSE END 100 110 115 120 13ŏ 1000 -----initialization---1000 1010 CLS 1030 PRINT" << place flow data in drive A & wq data in B:>>" 1040 PRINT" 1050 PRINT" 1050 PRINT" 1050 PRINT" 1070 PRINT" 1075 PRINT 1075 PRINT 1070 INPUT" PERIOD OF DATA REQUIRED AT G1M13 (1-6)"; P\$ 1200 INPUT" MEDIAN SEDIMENT DIAMETER (3-7, mm) [3]", D ----BED LOAD TRANSPORT MODEL: BEDTRAN1------":MAX : ";MAXQ: 2000 ;-----2100 ;------2200 FL\$= "23dq12."+P\$ ----load flow data g1m13 \* OPEN "i",1,FL\$ INPUT#1,NN\$,M%,K% 2300 2400 2450 DIM Q(360,1) FOR J=1 TO K% FOR I=1 TO M% INPUT#1, Q(I,J) INPUT#1, Q(I,J) NEXT : NEXT CLOSE#1 IF P\$="1" OR P\$="2" OR P\$="3" THEN 2900 ELSE 2800 SS\$= "B:23DSS."+P\$\_\_\_\_ 2700 2800 >. "+P\$ OPEN "i",1,SS\$ INPUT#1,NN\$,M1%,K1% DIM S(60,3) I=1 TO K1% FOR I=1 TO M1% INPUT#1, S(I,J) 2810 2815 2820 FOR J=1 NEXT : NE CLOSE#1 2845 2850 NEÑÏ 2900 RETURN 3000 ----graphics screen--3100 3200 3300 SCREEN 2,0,0,0 LINE (10,0)-(10,180),1 : LINE (10,180)-(630,180),1 FOR I=1 TO M%:X=(I\*3.44445)+10 : PSET(X,181),1: NEXT PRINT"Ct "MAX" Q "MAXQ "period:"P\$" RETURN 3400 3500 3600 ੇਰ:ੈ"D 4000 ; -----calculation and plot **41**00 4150 4175 TOTALSEDLOAD=0 : KV=1.307E-06 P=999! : G=9.8 : SO=.00041 : U=.001307

Phosphorus transport Berg River

TR 143 March 1989

1 ...

: \*

4180 4190 FOR I=1 TO M% 0=Q(I,1) AREA= 2.2\*(Q^.99) 4200 4220 : V=Q/AREA : R=AREA/35 230 shear velocity:  $VX=(G*R*SO)^{.5}$ 35 fall velocity: VF=((3.48\*U^2+(.0884 \* P \* G \* (2650-999)\*D^3))^.5)-(1.87\*U) VF=VF/(.265\*P\*D) :60 :70 reynolds particle no. RP=(VF\*D\*P)/U 80 90 reynolds erosion no. RE=(VX\*D)/KV unit stream power equation WW=SO\*V ദവറ empirical factor J J=272000!/((RP^.286)\*((VX/VF)^.457)) , factor K K=1.799-(.178\*LOG(RP))-(.136\*LOG(VX/VF)) 35 IF RE >=70 THEN WCVF=2.05\*SO ELSE WCVF=SO\*((2.5/((.434\*LOG(RE)-.06)))+.66) 370 and stall equation \_\_\_\_\_CT=((WW/VF)-WCVF) yang =0 THEN CT=0 TT=(CT^K)\*J IF CT<=0 THEN CT=0 QSED= 1E-09 \* CT \* 2.65 \* P \* G \* Q TOTALSEDLOAD = TOTALSEDLOAD + QSED plot sediment concentration CT=(180-(180/MAX\*CT)) X=(1\*(630/M%))+10 CIRCLE (X,CT),2 IF CT<0 THEN CT=0 : 30 plot flow data (line graph) G=(180-(180/MAXQ\*Q)) IF I=1 THEN 4600 LINE (XP,QP)-(X,Q),1 XP=X : QP=Q 60 580 8 350 NEXT I' 4700 4710 4800 PRINT" total sed. load: "TOTALSEDLOAD" (ton)" RETURN --- PLOT SS DATA -5000 100 FOR I = 1 TO M1% Z = S(I,1) : SS=S(I,2) SP = (180-(180/MAX\*SS)) : IF SP<0 THEN SP=0 Z = (Z + 10)CIRCLE (Z,SP),3 NEXT RETURN 5600

Pre-impoundment model

Command : DAMP

Definition

DAMP is an interactive program which simulates the sedimentation of phosphorus in pre-impoundments. The program uses the simulated chemograph and hydrograph at Drie Heuwels Weir (Station 23D) to estimate the mass of phosphorus sedimented within the waterbody. The volume of the waterbody may be selected as well as the sedimentation rate. The phosphorus budget is calculated over periods of one month, with the final output given in tabular form. For more details on the approach adopted see Chapter 8.

Data Entry

Once initiated the following data must be entered

Prompt

Expected Input

filename of chemograph - Enter the filename of the chemograph and hydrograph filename of hydrograph - for Drie Heuwels Weir which will be used in the simulation.

sed. const [.00002] - Enter the sedimentation constant used in the equation to simulate the removal of phosphorus from the water column of the waterbody.

volume of pre-imp.(million m<sup>3</sup>)

Enter the volume of the waterbody used in the simulation exercise.

Example

In the following example the procedure is used to predict the influence of a pre-impoundment at Drie Heuwels Weir on the phosphorus budget of the downstream river for Period 2.

Prompt Reply

filename of chemograph - "a:23dtp12.2" filename of hydrograph - "b:chanq12.2" sed. const [.00002] - "" volume of pre-imp.(million m3) - "30"

The program loads the specific data files; if a file contains more than one field then the user is requested to select the field required:

The data are processed and output to the monitor in the following format:

-----output data-----[files:a:23dtp12.2 + b:chanq12.2] .00002 imp.:30 sed.const: volume of . \_\_\_\_\_\_ \_\_\_\_\_\_\_ month inputload inputQ Pin Pout loadout loadret 1 2 3 4 5 6 %retention total input= total output= \_\_\_\_\_ \_\_\_\_\_

where: inputQ is the monthly discharge (m<sup>3</sup>) Pin is the mean [TP] of the inflow Pout is the mean [TP] of the outflow

The program asks the user if DAMP must be re-run

re-run program (y/n)

If "y" is entered the program is re-initialized and if not, the procedure is quit and the operating system prompt is displayed. Listing of source code

10 20 30 program: DAMP predicts the influence of a pre-impoundment on the nutrient budget of a river 1000 CLS: SCREEN 0,0,0 : DIM A(360,8), B(360,8), C(360,1), W(60), Q(60), P(60), S(60), PO(60) 1001 PRINT 1003 PRINT 1004 PRINT 1004 PRINT 1050 PRINT 1050 PRINT 1100 INPUT 1100 I Demonstration of the influence of pre-impoundments" 1600 RETURN
2000 PRINT"-\_\_\_\_\_ load data files --\_\_\_\_"
2100 OPEN "i" 1 NC\$
2110 INPUT#1,NN\$,M%,K%
2120 FOR J= 1 TO K%
2120 FOR J= 1 TO K%
2130 FOR I= 1 TO M%
2140 INPUT#1,A(I,J)
2150 NEXT
2160 NEXT
2160 NEXT
2160 INPUT" select one field required";FD1
2190 INPUT#1,NN\$,N%,C%
2210 INPUT#1,NN\$,N%,C%
2220 FOR J= 1 TO C%
2230 FOR J= 1 TO C%
2230 FOR I= 1 TO N%
2260 NEXT
2270 CLOSE#1 load hydrograph
2280 PRINT"file contains "C%"field(s)" : IF C%=1 THEN FD2=1 :
2200 INPUT" select one field required";FD2
2300 RETURN
2300 RETURN
2300 RETURN
2300 NETURN
2300 NE monthly mass balances will now be calculated using the input hydrograph and chemograph as well as simulating the mass sedimentation of phosphorus within the preimpoundment. 

A2.88

3089 NEXT I 3090 I=1 3091 W(I) = TOTALLOAD/1000 3092 Q(I) = TOTALFLOW/1000000! 3093 P(I) = TOTALLOAD / TOTALFLOW 3094 S(I) = K\*((P(I)\*1000)^2) sedimentation rate model 3095 PO(I) = (W(I)/(Q(I)+(S(I)\*V)) )\*1000 3095 PO(1)= ( W(1)/(W(1)+(S(1)+(S(1)+)), 3099 :: 3110 TOTALLOAD=0 : TOTALFIOW=0. 3150 FOR I= (M%/6) TO (M%/3) '+++++ Month number two +++++++++++ 3160 C(I,1)=A(I,FD1) \* B(I,FD2)\*.001 3170 TOTALLOAD= TOTALLOAD + (C(I,1) \*TIME) 3180 TOTALFIOW= TOTALFIOW + (B(I,FD2)\* TIME) 3180 TOTALFIOW= TOTALFIOW + (B(I,FD2)\* TIME) 3189 NEXT I 3190 I=2 3191 W(I) = TOTALLOAD/1000 3192 G(I) = TOTALLOAD/1000 3193 P(I) = TOTALLOAD/10000! 3193 P(I) = TOTALLOAD / TOTALFIOW 3194 S(I) = K\*((P(I)\*1000!)^2) ' sedimentation rate model 3195 PO(1)= ( W(I)/(Q(I)+(S(I)\*V)) )\*1000 3199 ::  $\begin{array}{l} 3194 \\ 3(1)5 \\ = & (1)/(Q(1)+(S(1)*V)) \\ 3195 \\ P(1) \\ = & (W(1)/(Q(1)+(S(1)*V)) \\ 3195 \\ P(1) \\ = & (W(3) \\ 10 \\ 101 \\$ 3399 ::: 3410 TOTALLOAD=0 : TOTALFLOW=0 3450 FOR I= (M%/1.5) TO (M%/1.2) '+++ Month number five ++++++++ 3460 C(I,1)=A(I,FD1) \* B(I,FD2)\*.001 3470 TOTALLOAD= TOTALLOAD + (C(I,1) \*TIME) 3480 TOTALFLOW= TOTALFLOW + (B(I,FD2)\* TIME) 3489 NEXT I 3600 PRINT: '---- data output --3602 : 3610 PRINT"------output data----3620 PRINT"[ files:"nC\$ " + "NH\$ "]" 3622 PRINT" Volume of imp:"V" Sed. const:"K 3623 PRINT 3625 PRINT"------

#### A2.89

ų

3630 PRINT"month inputload inputQ Pin Pout loadout load ret" 3640 FOR I =1 TO 6 3650 PRINT I"" W(I) Q(I) P(I) PO(I) (Q(I)\*pO(I)/1000) (W(I)-(Q(I)\*PO(I)/1000)) 3660 NEXT I 3670 PRINT 3680 PRINT"------" 3690 FOR I= 1 TO 6 3692 TOTALINP=TOTALINP+W(I) : TOTALOUT=TOTALOUT+(Q(I)\*PO(I)/1000!) 3693 NEXT I 3694 PERCENT=100-((TOTALOUT/TOTALINP)\*100!) 3696 PRINT" total input="TOTALINP" total output="TOTALOUT" % retention"PERCENT 3698 PRINT"------" 3698 PRINT"-------"

#### 4 INTERACTIVE PROGRAM APPLICATION

Command : PCHAT.BAT

#### Definition

This interactive batch program is designed to use each of the procedures described above so that the user may edit, process and analyse the data files as well as run the various models.

#### Data Entry

The procedure is initiated and the following data must be entered.

Prompt Expected Input

Press key From the list of procedures shown on the menu enter a character representing the procedure to be initiated.

The procedure is loaded from disk and once completed the main menu is displayed.

Example

In the following example the procedure is used to display a hydrograph and then re-display the same hydrograph in the form of a duration curve.

| Prompt    | Reply        | Program Response   |
|-----------|--------------|--|
| Press Key | <b>" g "</b> | The procedure for displaying a time<br>series will be initiated. Once<br>the program is finished the main<br>menu is displayed             |
| Press Key | "h"          | The procedure for displaying a<br>duration curve will be initiated.<br>Once the program is complete the<br>main menu is then<br>displayed. |
| Press key | "q"          | The procedure returns to the operating system.   |

Figs A2.1 to A2.5 shown how the procedures in the previous sections may be used interactively using this program.

Listing of source code ECHO OFF CLS ASK " Do you wish to load CGA emulation ? (y/n)", yn IF ERRORLEVEL 2 GOTO RUN for use with Hercules Cards only !!! IF ERRORLEVEL 1 GOTO EMULATE :EMULATE HGCIBM /H : RUN :RERUN **REM -- INTERACTIVE P-CHAT BATCH FILE -- CLS** TYPE MAINMENU.TXT а, "Press ASK key: A 0 ABCDEFGHIJKLMNOPQ IF ERRORLEVEL 17 GOTO Q IF ERRORLEVEL 16 GOTO P IF ERRORLEVEL 15 GOTO O IF ERRORLEVEL 14 GOTO N IF ERRORLEVEL 13 GOTO M IF ERRORLEVEL 12 GOTO L IF ERRORLEVEL 1) GOTO K IF ERRORLEVEL 10 GOTO J IF ERRORLEVEL 9 GOTO I IF ERRORLEVEL 8 GOTO H IF ERRORLEVEL 7 GOTO G IF ERRORLEVEL 6 GOTO F IF ERRORLEVEL 5 GOTO E IF ERRORLEVEL 4 GOTO D **IF ERRORLEVEL 3 GOTO C** IF ERRORLEVEL 2 GOTO B IF ERRORLEVEL 1 GOTO A

:A DISKID.EXE GOTO RERUN :B LATINF12.EXE GOTO RERUN :C CHANDATA.EXE GOTD RERUN :D ABSTRACT.EXE GOTO RERUN :E LOADCALC.EXE GOTO RERUN :F WQ-PLOT.EXE GOTO RERUN :G FLOWPLOT.EXE GOTO RERUN :# DURACV1.EXE GOTO RERUN :I **REGRESS.EXE** GOTO RERUN :J NPSM.EXE GOTO RERUN :K OMODEL.EXE GOTO RERUN :L SECTION1.EXE GOTO RERUN :H SECTION2.EXE GOTO RERUN :N **BEDTRAN.EXE** GOTO RERUN :0 DAMP.EXE GOTO RERUN :P DIR B: /P GOTO RERUN :0

\* \*

• ---

Listing of text file (MAINMENU.TXT) displayed during execution of the procedure:-

-----Ctrl-C : return to menu

#### --DATA MANAGEMENT--

A Data Editor

B Data file merger (lateral inflow)

C Data file splitter (channel data files)

D Data file modifier (hydrograph modification)

E Load integration

-- PLOTTING AND DESCRIPTIVE PROCEDURES--

F Scatter plot

G Hydrograph plot

H Duration curve

--MODEL DEVELOPMENT--

I Regression analysis

J Phosphorus nonpoint source model

K Hydrodynamic flow model

L Phosphorus transport model : Section 1

M Phosphorus transport model : Section 2

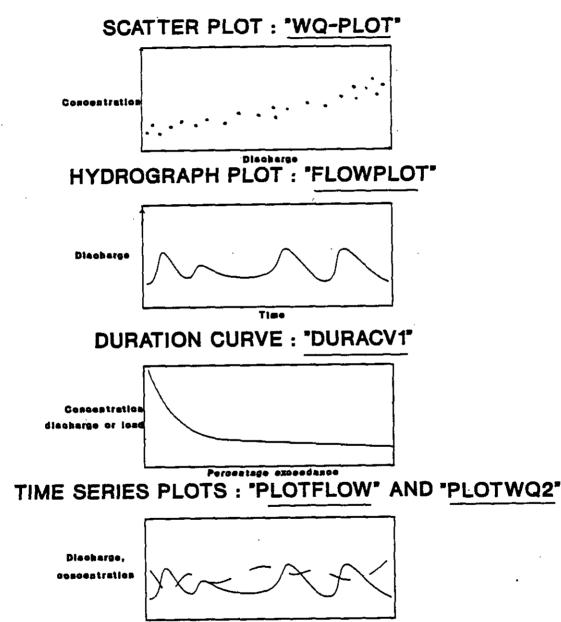
N Phosphorus bed load model

0 Pre-impoundment model

P -----Directory

0 -----Ouit (Exit to DOS)

## PLOTTING AND DESCRIPTIVE FUNCTIONS



Time

Fig A2.1. Schematic presentation of the plotting and descriptive functions used in this investigation.

. . . . . . . .

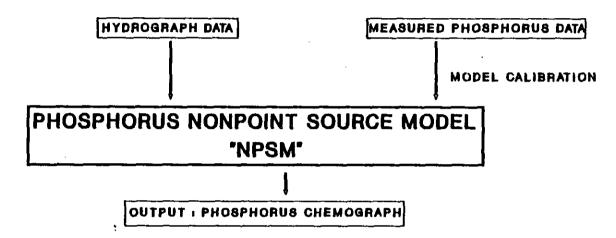


Fig A2.2. Graphic presentation of the input and output data files used in the nonpoint source model (NPSM).

#### Phosphorus transport Berg River

TR 143 March 1989

A2.96

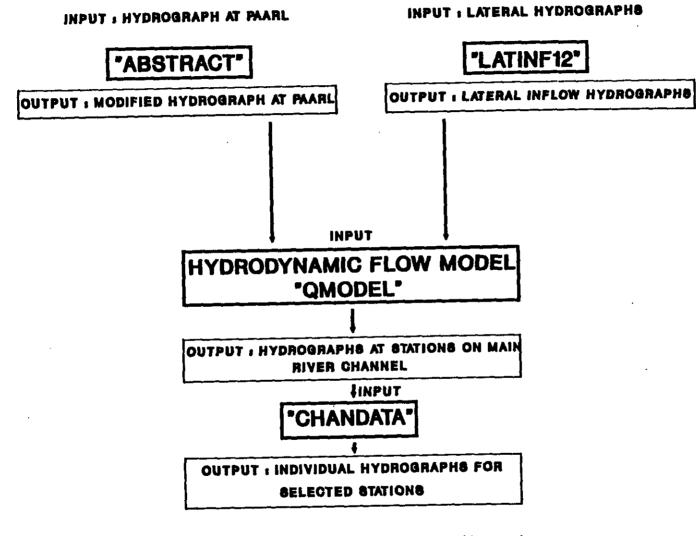
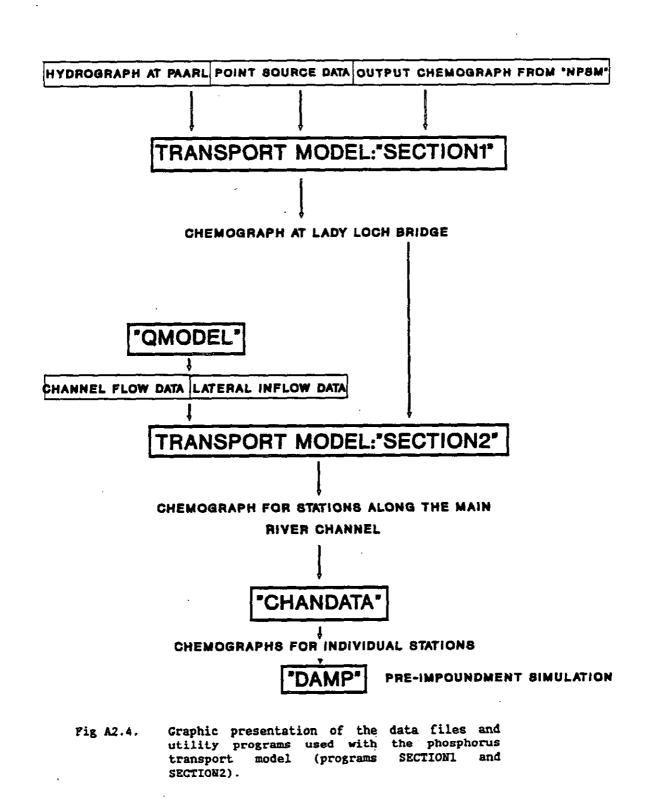


Fig A2.3. Graphic presentation of the data files and utility programs used with the hydrodynamic flow model (QMODEL). A2.97

.....



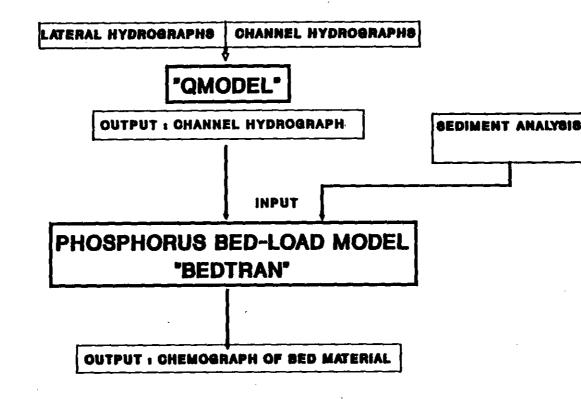


Fig A2.5. Graphic presentation of the data files and utility programs used with the phosphorus bed load model (program BEDTRAN).

#### **APPENDIX 3**

#### WATER QUALITY AND FLOW DATA

1 WATER QUALITY DATA

Water quality data used in this investigation are presented in the following groups

- (1) Total phosphorus data for stations located along the main river channel from Paarl to Lady Loch Bridge and from Lady Loch Bridge to Drie Heuwels Weir (page A3.3 to A3.4).
- (2) Total phosphorus concentration data for the sampling stations located on the discharge lines of Paarl and Wellington wastewater treatment plants (pages A3.5 to A3.10).
- (3) Total phosphorus concentration and discharge data for tributaries of the Berg River e.g.

| Krom River       | -              | Station | 148 | page A3.11 |
|------------------|----------------|---------|-----|------------|
| Doringspruit     | -              | Station | 150 | page A3.11 |
| Kompagnies River | ´ <del>_</del> | Station | 178 | page A3.12 |
| Klein Berg River | -              | Station | 23A | page A3.13 |
| Sandspruit       | -              | Station | 23B | page A3.13 |

as well as for the two sampling stations located on the main river channel at:

| Paar]             | -  | Station 9A  | page A3.14 |
|-------------------|----|-------------|------------|
| Drie Heuwels Weir | '- | Station 23D | page A3.15 |

A blank record signifies no data available. All phosphorus concentration data are expressed in  $\mu g/2$  and discharge in cumecs.

(4) Total suspended solids concentration (expressed in mg/%) and discharge data are collected at

| Drie Heuwels Weir   | - | Station 23D | page A3.17 |
|---------------------|---|-------------|------------|
| Klein Berg River    | - | Station 23A | page A3.18 |
| Berg River at Paarl | - | Station 9A  | page A3.19 |
| Krom River          | - | Station 14B | page A3.20 |

#### 2 FLOW DATA

.

The discharge data used in this investigation are presented in block-form with incremental readings taken at 12-hour intervals for gauging weirs shown below

| River and location         | Weir   | Station | page  |
|----------------------------|--------|---------|-------|
| Berg River at Paarl        | G1M20  | 9A      | A3.21 |
| Paarl wastewater plant     | G1Q01  | PSTW    | A3.27 |
| Wellington wastewater      | G1Q01  | WSTW    | A3.33 |
| Krom River                 | G1M37  | 14B     | A3.39 |
| Doringspruit               | G1M39  | 150     | A3.45 |
| Kompagnies River           | G1M41  | 178     | A3.57 |
| Vis River                  | G7M40  | 20A     | A3.57 |
| Voëlvlei Dam release       | G1 R01 | 210     | A3.63 |
| Klein Berg River           | G1M08  | 23A     | A3.69 |
| Sandspruit                 | G1M35  | 23B     | A3.76 |
| Berg River at Drie Heuwels | G1M13  | 230     | A3.83 |

.

Water Quality date for Section 1 of the main river channel Period 1

| Le: | TP Ba | 9.94 | TP PSTW | Q PSTW | TP WSTW | Q 8578 | 78 13 |
|-----|-------|------|---------|--------|---------|--------|-------|
| 1   |       |      |         |        | :       |        | 27    |
| 20  | 39    | 1.00 |         |        | !       |        | 10    |
| 71  | 27    | 1.59 |         |        |         |        | 13    |
| 98  | 47    | 1.20 |         |        |         |        |       |
| 107 | ( 3   | . 57 | •       |        |         |        |       |
| 119 | 37    | .20  |         |        | •       |        |       |
| 126 | l     |      |         |        | •       |        | 7     |
| 141 | ł     |      |         | •      |         |        | 13    |
| 147 | 1     |      | _       | -      | -       | .04    | 15    |
| 79  | 62    | 16.9 | 251     | .3     | 700     | .09    |       |

Veter Quality data for Section 1 of the main river channel Period 2

The Vetel ebomberus concentration

| : 71  | TP Total phosphorus concentration |        |         |        |         | Q - discharge |        |  |  |  |
|-------|-----------------------------------|--------|---------|--------|---------|---------------|--------|--|--|--|
| Date: | TP 9a                             | Q 84   | TP PSTN | Q PSTN | TP WSTW | Q VSTV        | TP 136 |  |  |  |
|       | 44                                | 8.34   | 2950    | . 20   | 7275    | .04           | 185    |  |  |  |
| 2     |                                   | 4.72   | 2770    | .21    | 7000    | .04           | 133    |  |  |  |
| 24    | 23                                | 4.10   | 3360    | . 20   | 7400    | .03           | 156    |  |  |  |
| 31    | 20                                |        | 4130    | 21     | 7200    | .05           | . 61   |  |  |  |
| 41    | 60                                | 70.83  |         | .21    | 7000    | .05           | 160    |  |  |  |
| 51    | 50                                | 7,90   | 4900    | . 21   | 7270    | .05           | 150    |  |  |  |
| 64    | 40                                | 11.40  | 4430    | 21     | 7860    | .04           | 9      |  |  |  |
| 70    | 40                                | 18.22  | 4360    |        | 7346    | .03           | 13     |  |  |  |
| 90    | 10                                | 6.99   | 3380    | .21    | 6970    | .02           | 24     |  |  |  |
| 100   | 18                                | 4.53   | 5050    | .21    | 7100    | .05           | 7      |  |  |  |
| 108   | 42                                | \$1.10 | 4930    | .25    |         | .07           | 19     |  |  |  |
| 135   | 56                                | 7.80   | 5070    | .21    | 7880    |               | 12     |  |  |  |
| 150   | 31                                | 7.90   | 4080    | .21    | 6940    | .03           | 12     |  |  |  |
| 170   | 24                                | 1.90   | 2850    | .09    | 6900    | .01           | 17     |  |  |  |
| 177   | 34                                | . 77   | ·2660   | .11    | 9160    | .02           |        |  |  |  |

Q - discharge

| Water Quelity | 4.84 |     | Reation | 1. | of th | e asia | -river | channe l | Period | 3 |
|---------------|------|-----|---------|----|-------|--------|--------|----------|--------|---|
| Affet Mnersch |      | 101 | 9906101 |    |       | •      |        | 1        |        |   |

| : 11  | TP - Total phosphorus concentration |       |         |        | Q - discharge |        |        |  |  |
|-------|-------------------------------------|-------|---------|--------|---------------|--------|--------|--|--|
| Data: | TP 84                               | Q Da  | TP PSTN | Q PSTN | TP WSTW       | Q USTU | TP 136 |  |  |
|       |                                     | 1.56  | 2470    | .08    | 8600          | .02    | 208    |  |  |
| 5     | 28                                  |       |         | .12    | 10000         | .02    | 87     |  |  |
| 28    | 33                                  | 8.13  | 4130    |        | 10770         | 04     | 138    |  |  |
| 32    | 49                                  | 15.83 | 4230    | .12    | 9650          | .02    | 366    |  |  |
| 48    | 1 15                                | . 74  | 4090    | . 15   |               | .01    | 110    |  |  |
| 60    | 1 19                                | 3.48  | 4110    | .08    | 10380         |        |        |  |  |
|       | 27                                  | .54   | 4010    | .00    | 8500          | .01    | 250    |  |  |
| 74    | 22                                  | .74   | 4330    | .14    | 9860          | .01    | 244    |  |  |
| 68    |                                     | .51   | 3330    | . 10   | 9690          | .01    | 478    |  |  |
| 102   | 20                                  |       | 2870    | . 15   | 9700          | .01    | 256    |  |  |
| 118   | <b>a</b>                            | 3.46  |         | .15    | 8640          | .02    | 143    |  |  |
| 328   | 24                                  | 4.53  | 1960    |        | 10320         | .03    | 129    |  |  |
| 130   | 20                                  | 2.26  | 1600    | - 14   | 8090          | .01    | 236    |  |  |
| 148   | 1 17                                | 1.79  | 3140    | . 17   |               | .03    | 112    |  |  |
| 150   | 27                                  | 12.30 | 393     | . 20   | 7870          |        | 418    |  |  |
| 172   | 36                                  | 2.41  | 5310    | . 21   | 8390          | .02    | 410    |  |  |

. Nater Quality data for Section 1 of the main river channel Period 4

| ; T\$   | - Total phosphorus concentration                           |   |  |  | Q - discharge  |   |   |  |
|---|--|---|--|--|--|---|---|--|
| Dete:   | TP 9a  | 9.9.  | TP PSTW  | Q PSTW   | TP WSTW  | Q NSTN  | TP 136  |  |
| 8<br>20<br>34<br>55<br>69<br>84<br>98<br>111<br>125<br>139<br>183 | 53<br>27<br>73<br>111<br>58<br>103<br>62<br>29<br>85<br>36 | 22.83<br>3.82<br>24.42<br>95<br>30.60<br>216<br>10.89<br>7.45<br>7.45<br>6.99 | 4820<br>4580<br>3420<br>3780<br>4190<br>3240<br>3270<br>3850<br>4350<br>4350 | . 18<br>. 21<br>. 26<br>. 24<br>. 22<br>. 38<br>. 21<br>. 20<br>. 18<br>. 09 | 9500<br>9510<br>\$420<br>\$570<br>4360<br>5490<br>5550<br>8970<br>7480<br>7200<br>8480 | .03<br>.02<br>.05<br>.09<br>.03<br>.11<br>.04<br>.03<br>.03<br>.02<br>.03 | 91<br>234<br>320<br>155<br>156<br>491<br>145<br>147<br>392<br>154 |  |

Noter Quality data for Section 1 of the main river channel Period 5

TP - Totas phosphorus concentration BET:

| Dates    | TP 94 | Q 9a  | TP PSTM | Q PSTW | TP WSTW | Q USTU | TP 136 |
|----------|-------|-------|---------|--------|---------|--------|--------|
|          | 15    | 1.30  | 960     | .10    | 9670    | .02    | 125    |
| 14       | l ii  | 1.90  | 750     | . 18   | 8580    | . 02   | 124    |
|          | 27    |       | 1560    | .11    | 11980   | .03    | 109    |
| 23<br>37 | 22    | 2.60  | 2290    | .10    | 11340   | .01    | 161    |
|          | 35    | 2.02  | 2800    | .03    | 11130   | .02    | 130    |
| 59       | 1 11  | 2.15  | 2210    | .09    | 11270   | .02    | 136    |
| 78       | 32    | .17   | 2400    | . 10   | 1314D   | . 01   | 148    |
| 91       | 40    | 2.54  | 3090    | . 10   | 11600   | .03    | 161    |
| 102      | 40    |       | 2530    | .11    | 12640   | 10.    | 162    |
| 114      | 27    | . 66  | 3110    | . 18   | 11050   | .02    | 283    |
| 127      |       | 2.15  | 2700    | . 16   | 12270   | . 02   | 158    |
| 140      | 26    | .74   | 2370    | .17    | 13270   | . 02   | 316    |
| 154      | 59    |       | 2330    | .17    | 10930   | .02    | 351    |
| 155      | 90    | 2.02  | 2330    | . 16   | 12430   | .03    | 434    |
| 156      | 29    | 5.72  |         | .17    | 11150   | .05    | 199    |
| 181      | 84    | 27.60 | 2400    |        | 11000   | .03    |        |
| 162      | 24    | 10.13 | 2330    | . 15   |         | .04    | 236    |
| 164      | 320   | 51.80 | 2350    | .18    | 10900   |        | 235    |
| 178      | 29    | 2.54  | 2720    | . 20   | 11310   | .03    | £.3-3  |

Q - discharge

12 12 ι

. Water Quality data for Section 1 of the main river channel feriod 8

Q - discharge TP - Total phosphorus concentration

KEY: Q PSTW TP WSTW Q NSTN TP 135 TP PSTN Q 8= TP 98 Date: 492 158 10920 .02 2530 2420 · . 15 78.07 35.77 10.70 198 5 .D2 .17 11790 52 21 22 32 24 29 45 43 61 45 38 10 62 213 12 19 24 26 33 38 45 57 59 11570 .03 **5860** .10 2.98 293 2.27 70 .02 . 18 11050 2850 21.80 111 10590 ,04 2520 . 17 11.78 115 78 115 9.68 9110 03 . 21 33.30 2520 23.64 84 83 26.66 22.30 29.60 60 ,07 185 7100 2290 . 21 66 131

Phosphorus transport Berg River

K1

| Date: | 138-2       | 13013 01 | 1761 | 186: | 2141 | 2241 | 2341 | 25a: |
|-------|-------------|----------|------|------|------|------|------|------|
|       | 91          | 107      |      |      |      | 13#  | 85   | 83   |
| 20    | 234         | 100      | 248  | -    | 190  | 44   | 90   |      |
| 24    | 120         | 123      | -    | 121  | •    | 140  | 113  | 3    |
| 33    | 138         | 192      | •    | 278  | -    | 183  | 221  | 31   |
| 33    | 158         | 144      | -    | 138  | -    | -    | 67   | 10   |
|       | 681         | 481      |      | 374  | •    | 202  | 151  |      |
|       | L4 <b>Q</b> | 1.47     | -    | 175  | -    | 100  | 95   | •    |
|       | 173         | 104      | -    | :11  | -    | 80   | 50   |      |
| 125   | 192         | 173      | -    | 134  | 181  | #2   | 53   | 5    |
| 129   | 154         | 135      | -    | 120  | -    | 74   | 44   | •    |
| 153   | #0          | 82       | -    | 52   | -    | 85   | 52   | 3    |

| Detei  | 1363  | 154) | 176: | 184: | 214: | 22a: | 234: | 2581 |
|--|-------|------|------|------|------|------|------|------|
|  | 492   |      |      |      |      |      |      |      |
| 3 <u>0</u> -                                 | 154   | 152  |      | 65   | 78   | 44   | 48   |      |
| 12<br>19                                     | 62    |      |      |      |      |      |      |      |
| 10   | 213   | 178  |      | 110  | 101  | 78   | \$3  | 4    |
| 26   | 293   |      |      |      |      |      |      |      |
| 24<br>28<br>33<br>36<br>45<br>37<br>58<br>60 | [ 70  | 73   |      | 267  |      | 85   | ¥7   |      |
| 33   | 1 111 | 104  |      | 98   | 71   |      | 74   |      |
| 38   | 113   |      |      |      |      |      |      |      |
| 45   | 36    | 75   |      | 108  |      | 83   | 48   |      |
| 37   | 115   |      |      |      |      |      |      |      |
| 54   | 1 84  |      |      | 101  |      |      |      |      |
| 60   | 63    | 77   |      | 13   |      | 99   | 112  |      |
| 64   | 1 185 |      |      | 152  |      |      | 75   |      |

| 18  | - 47  | 34  | •   | 153 | 346 | 62  | 18  | -  |
|-----|-------|-----|-----|-----|-----|-----|-----|----|
| 32  | 126   | 558 | -   | 60  | 163 | 138 | 37  | •  |
| 46  | 364   | 210 | -   | 88  | 80  | 84  | \$4 | -  |
| 89  | 110   | 158 | -   | 113 | 100 | 42  | 42  | -  |
| 74  | 230   | 106 | 134 | -   | 78  | 40  | 53  | -  |
|     | 244   | 174 | 115 | 107 | 112 | 104 | 47  | -  |
| 102 | 470   | 285 | 85  | -   | 83  | 31  | 87  | •  |
| 110 | 258   | 196 | 86  | •   | 74  | н   | -   | -  |
| 130 | 128   | 138 | \$3 | -   | 111 | 74  | 61  | -  |
| 149 | 230   | 172 | 124 | -   | 39  | 73  | 70  | 88 |
| 158 | - 113 | 131 | 87  | -   | 181 | 173 | 154 | 74 |
| 172 | ai    | 270 | 237 | •   | 181 | 112 | 78  | 35 |

|      |      |       | للقمج وربست | 11.45 20 |      | والمشتر الم |      | 224:  | 234: | 258:      |
|------|------|-------|-------------|----------|------|-------------|------|-------|------|-----------|
| 234: | 25a: | Dete: | 136:        | 136:     | 178: | 184:        | 2141 | 1 1 1 |      |           |
| 27   | •    | •     | 125         |          |      | 30          | ; 33 | 24    | 21   | 22        |
| 48   | -    | 23    | 100         | 45 .     | -    | 19          | 87   | 49    | 41   | 42        |
| 31   | -    |       | 101         | L32      | -    | 84          | 72   | 47    | 41   | 196       |
| 54   | -    | 58    | 130         | 134      | -    | 60          | 106  | ¥3    | 43   | 64        |
| 42   | -    | 70    | 128         | 158      | •    | 104         | 105  | 73    | 42   | 127       |
| 53   | -    |       | 144         | 345      | -    | 107         | 105  | 53    | 37   | 227       |
| 47   | - 1  | 102   | 181         | 342      | 113  | 191         |      | \$7   | 32   | 92        |
| 87   | •    | 114   | 182         | 136      | 127  | 124         | 143  | 76    | 38   | 64        |
| -    | -    | 127   | 283         | 272      | -    | 131         | #1   | 96    | 21   | <b>#1</b> |
| 41   | -    | 140   | 350         | 235      | 180  | 140         | 111  | 35    | 28   | 170       |
| 70   | 69   | 154   | 318         | 192      | 100  | 103         | 13   | 46    | 50   | 115       |
| 154  | 74   | 144   | 238         | 152      | -    | **          | 64   | 42    | 94   | - 1       |
| 78   | 36 ( | 170   | 235         | 178      | -    | 182         | 158  | 91    | 35   | 75        |

CATA FOR SECTION & PLPIUDIL BIRTID'-1 Bin Jonin BINER En-UNEL 1-Dater 235 396 678 184 284

21.8

DATA FOR SECTION 2 PERIOD:2 STRICTS OR NATE ALTER CHANNEL:-Date: 136 38 126 138 288

.14

4.4

Lef

-

-11

-

-

- 61

:##

- 69

Cater

...

...

-

11.4

144)

17\*

1.8

Detes

٠.

\$3

21A

μJ.

-

•

•

loz

۹ĩ,

•

-

\$7

12.

....

4\$

1.27

- 64

•

- 24

.

Lu#

-84

-

. .

\$ 204

-

. .

.

DATA FOR SECTION 2 PERIOD:S

ίu

|   |  | 80)   |                          |                          |  |  |  |  |                          | ( 91) 4200 |
|---|--|---|--------------------------|--------------------------|--|--|--|--|--------------------------|------------|
| (1) 2470 (19) 4130  | ( 37) 4230   | ( 55) 4100  | ( 73) 4014               | ( 91) 3900               | (1) 2510   | (19) 2950  | •  | ( 55) 4500<br>( 55) 4400   | ( 73) 4150<br>( 74) 4200 | ( 92) 4300 |
| ( 2) 2470 ( 20) 4130  | ( 38) 4230   | ( 56) 4100  | ( 74) 4010               | ( 92) 3850               | ( 2) 2940  | ( 20) 2900   | ( 38) 4100<br>( 39) 4100   | ( 57) 4400   | (75) 4200                | ( 93) 4400 |
| (-3) 2470 (21) 4130   | ( 39) 4230   | ( 57) 4100  | ( 75) 4010               | ( 93) 3800               | ( 3) 2940  | (21)2900<br>(22)2900   | (40) 4100  | ( 58) 4430   | ( 76) 4600               | ( 94) 4500 |
| ( 4) 2470 ( 22) 4200  | ( 40) 4230   | ( 58) 4111  | ( 76) 4010               | ( 94) 3700               | (4) 2940   | (23) 2900  | (41) 4130  | ( 59) 4400   | ( 77) 4380               | ( 95) 4500 |
| ( 5) 2470 ( 23) 4200  | ( 41) 4230   | ( 59) 4111  | ( 77) 4014               | ( 95) 3600               | ( 5) 2940<br>( 6) 2940   | (24) 2777  | ( 42) 4130   | ( 50) 4400   | (78) 4200                | ( 96) 4500 |
| ( 6) 2470 ( 24) 4200  | ( 42) 4100   | ( 60) 4111  | (78) 4010                | ( 96) 3550               |  | (25) 2777  | (43) 4100  | ( 61) 4400   | ( 79) 4200               | ( 97) 4510 |
| (7) 2470 (25) 4200  | ( 43) 4100   | ( 61) 4110  | (79) 4200                | (97) 3550                | ( 7) 3030<br>( B) 3030   | (26) 2777  | ( 44) 4100   | ( 62) 4400   | ( 80) 4200               | ( 98) 4650 |
| ( 8) 2470 ( 26) 4200  | ( 44) 4100   | ( 62) 4111  | (80) 4250                | ( 48) 3550               | (9) 3030   | (27) 2800  | (45) 4100  | ( 63) 4400   | (81) 4200                | ( 99) 4950 |
| ( 9) 2470 ( 27) 4200  | ( 45) 4100   | ( 63) 4111  | (81) 4250                | ( 99) 3450<br>(100) 3400 | (10) 3030  | (28) 2900  | (46) 4100  | ( 64) 4250   | (82) 4100                | (100) 5555 |
| ( 10) 2450 ( 28) 4200   | ( 46) 4090   | ( 64) 4111  | (82) 4250                | (100) 3400               | (11) 3000  | ( 29) 3360   | (47) 4100  | ( 45) 4000   | (83) 4000                | (101) 5100 |
| ( 11) 2450 ( 29) 4210   | ( 47) 4090   | ( 65) 4111  | ( 83) 4300               | (102) 3300               | (12) 3000  | ( 30) 3360   | ( 48) 4100   | ( 66) 4100   | ( 84) 4040               | (102) 5000 |
| (12) 2450 (30) 4210   | ( 48) 4090   | ( 66) 4111  | ( 84) 4300<br>( 85) 4300 | (103) 3300               | (13) 3000  | ( 31) 3480   | ( 49) 4100   | ( 57) 4000   | (85) 4000                | (103) 5000 |
| (13) 2450 (31) 4200   | ( 49) 4100   | ( 67) 4050  | (86) 4300                | (104) 3300               | (14) 3000  | ( 32) 3480   | ( 50) 4900   | ( 68) 4000   | (86) 4000                | (104) 5000 |
| (14) 2470 (32) 4230   | ( 50) 4100   | ( 68) 4050  | (87) 4250                | (105) 3200               | (15) 2950  | ( 33) 3480   | ( 51) 4900   | ( 69) 4000   | (87)4000                 | (105) 5000 |
| (15) 3000 (33) 4230   | ( 51) 4100   | ( 69) 4050<br>( 70) 4050  | (88) 4300                | (106) 3220               | (16) 2950  | ( 34) 3400   | ( 52) 4900   | ( 70) 4100   | ( 68) 4100               | (106) 5000 |
| (16) 3100 (34) 4200   | ( 52) 4100   | (71) 4040   | (89) 4300                | (107) 3320               |  |  | ( 53) 4500   | ( 71) 4200   | ( 89) 4100               | (107) 4910 |
| (17) 3200 (35) 4230   | ( 53) 4100<br>( 54) 4100   | ( 72) 4040  | ( 90) 4000               | (108) 3220               | 1 181 2450   | ( 36) 3900   |  |  | ( 90) 4200               | (108) 4500 |
| (18) 4130 (36) 4230   |  |   |                          |                          |  |  |  |  |                          |            |
|   |  |   |                          |                          |  |  |  |  |                          |            |
|   |  |   |                          |                          |  |  |  |  |                          | AJ         |
|   |  | (153) 900   |                          |                          | (109) 4900   | (127) 4910   | (145) 4550   | (142) 2000   | <b>-</b>                 | •          |
| (109) 3220 (127) 1350   | (145) 2800<br>(146) 2900   | (153) 900<br>(154) 1000   |                          |                          | (109) 4900<br>(110) 4900   | (127) 4910<br>(128) 4920   | (145) 4550<br>(145) 4500   | (163) 3000<br>(164) 2900   |                          | A3.5       |
| (109) 3220 (127) 1350   | (145) 2800<br>(146) 2900<br>(147) 3000   | (153) 900<br>(154) 1000<br>(155) 1230   |                          |                          | (109) 4900<br>(110) 4900<br>(111) 4900   | (127) 4910<br>(128) 4920<br>(129) 4920   | (145) 4550<br>(145) 4500<br>(147) 4400   | (163) 3000<br>(164) 2900<br>(165) 2900   |                          | •          |
| (109) 3220 (127) 1350<br>(110) 3320 (128) 1800  | (145) 2800<br>(144) 2900<br>(147) 3000<br>(148) 3100   | (153) 900<br>(154) 1000<br>(155) 1230<br>(155) 2000   |                          |                          | (109) 4900<br>(110) 4900<br>(111) 4900<br>(111) 4900<br>(112) 4900   | (127) 4910<br>(128) 4920<br>(129) 4920<br>(130) 4950   | (145) 4550<br>(145) 4500<br>(147) 4400<br>(148) 4200   | (143) 3000<br>(144) 2900<br>(145) 2900<br>(146) 2900   |                          | •          |
| (109) 5220 (127) 1350<br>(110) 5320 (128) 1000<br>(111) 3200 (129) 1800<br>(112) 3100 (130) 1800<br>(113) 3090 (131) 1800   | (145) 2300<br>(142) 2900<br>(147) 3000<br>(148) 3100<br>(149) 3140   | (153) 900<br>(154) 1000<br>(155) 1230<br>(155) 2000<br>(157) 2500   |                          |                          | (109) 4900<br>(110) 4900<br>(111) 4900<br>(111) 4900<br>(112) 4900<br>(113) 4900   | (127) 4910<br>(128) 4920<br>(129) 4920<br>(130) 4920<br>(130) 4950<br>(131) 4950   | (145) 4550<br>(145) 4500<br>(147) 4400<br>(148) 4200<br>(148) 4100   | (143) 3000<br>(164) 2900<br>(145) 2900<br>(166) 2900<br>(166) 2900   |                          | •          |
| (109) 3220 (127) 1350<br>(110) 3320 (128) 1800<br>(111) 3200 (129) 1800<br>(112) 3100 (130) 1800<br>(113) 3090 (131) 1800<br>(114) 2850 (132) 1800  | (145) 2800<br>(146) 2900<br>(147) 3000<br>(148) 3100<br>(148) 3140<br>(149) 3140<br>(150) 2900   | (153) 900<br>(154) 1000<br>(155) 1230<br>(155) 2000<br>(157) 2500<br>(158) 2500   |                          |                          | (109) 4900<br>(110) 4900<br>(111) 4900<br>(112) 4900<br>(112) 4900<br>(113) 4900<br>(114) 4900   | (127) 4910<br>(128) 4920<br>(129) 4920<br>(130) 4950<br>(131) 4950<br>(132) 4950   | (145) 4550<br>(145) 4500<br>(147) 4400<br>(148) 4200<br>(148) 4200<br>(149) 4100<br>(150) 4080   | (143) 3000<br>(144) 2900<br>(145) 2900<br>(146) 2900   |                          | •          |
| (109) 3220 (127) 1350<br>(110) 5320 (128) 1600<br>(111) 3200 (129) 1800<br>(112) 3100 (130) 1800<br>(113) 3090 (131) 1800<br>(114) 2850 (132) 1800<br>(115) 2700 (133) 1800   | (145) 2300<br>(144) 2900<br>(147) 3006<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800   | (153) 900<br>(154) 1000<br>(155) 1230<br>(155) 2000<br>(157) 2500<br>(158) 2500<br>(169) 2700   |                          |                          | (109) 4900<br>(110) 4900<br>(111) 4900<br>(112) 4900<br>(113) 4900<br>(113) 4900<br>(114) 4900<br>(115) 4900   | (127) 4910<br>(128) 4920<br>(129) 4920<br>(130) 4950<br>(131) 4950<br>(132) 4950<br>(133) 4950   | (145) 4550<br>(145) 4500<br>(147) 4400<br>(148) 4200<br>(148) 4100   | (163) 3000<br>(164) 2900<br>(165) 2900<br>(166) 2900<br>(167) 2900<br>(168) 2900   |                          | •          |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (145) 2800<br>(144) 2900<br>(147) 3000<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(152) 2700   | (153)       900         (154)       1000         (155)       1230         (145)       2200         (145)       2500         (148)       2600         (169)       2700         (170)       4500  |                          |                          | (109) 4900<br>(110) 4900<br>(111) 4900<br>(112) 4900<br>(113) 4900<br>(113) 4900<br>(114) 4900<br>(115) 4900<br>(116) 4900   | (127) 4910<br>(128) 4920<br>(129) 4920<br>(130) 4950<br>(131) 4950<br>(132) 4950   | $\begin{array}{c} (145) & 4550 \\ (145) & 4500 \\ (147) & 4400 \\ (148) & 4200 \\ (148) & 4200 \\ (149) & 4100 \\ (150) & 4080 \\ (151) & 3700 \end{array}$  | <pre>(143) 3000 (164) 2900 (145) 2900 (166) 2900 (167) 2900 (168) 2900 (168) 2900 (168) 2900</pre>   |                          | •          |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (145) 2800<br>(144) 2900<br>(147) 3000<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(152) 2700<br>(153) 2600   | (153)       900         (154)       1000         (165)       1230         (145)       2000         (145)       2500         (148)       2600         (169)       2700         (170)       4500         (171)       4700   |                          |                          | (109) 4900<br>(110) 4900<br>(111) 4900<br>(112) 4900<br>(113) 4900<br>(113) 4900<br>(114) 4900<br>(115) 4900<br>(116) 4900<br>(117) 4900   | (127) 4910<br>(128) 4920<br>(129) 4920<br>(130) 4950<br>(131) 4950<br>(132) 4950<br>(133) 4950<br>(133) 4950<br>(134) 5000   | (145) 4550<br>(145) 4500<br>(147) 4400<br>(148) 4200<br>(149) 4100<br>(150) 4080<br>(151) 3900<br>(152) 3800   | (163) 3000<br>(164) 2900<br>(165) 2900<br>(165) 2900<br>(166) 2900<br>(167) 2900<br>(168) 2900<br>(169) 2850<br>(170) 2850<br>(171) 2850<br>(172) 2809   |                          | •          |
| (109) 3220 (127) 1350<br>(110) 3320 (128) 1000<br>(111) 3200 (129) 1800<br>(112) 3100 (130) 1800<br>(113) 3090 (131) 1800<br>(113) 3090 (131) 1800<br>(114) 2850 (132) 1800<br>(115) 2700 (133) 1800<br>(116) 2450 (134) 2000<br>(117) 2470 (135) 1800<br>(118) 2500 (134) 1800 | (145) 2300<br>(146) 2900<br>(147) 3000<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(151) 2800<br>(152) 2700<br>(153) 2600<br>(154) 2500   | (153) 900<br>(154) 1000<br>(155) 1230<br>(155) 2200<br>(155) 2500<br>(159) 2500<br>(169) 2700<br>(169) 2700<br>(170) 4500<br>(171) 4700<br>(172) 5310   |                          |                          | (109) 4900<br>(110) 4900<br>(111) 4900<br>(112) 4900<br>(113) 4900<br>(113) 4900<br>(114) 4900<br>(115) 4900<br>(116) 4900<br>(118) 4900   | (127) 4910<br>(128) 4920<br>(129) 4920<br>(130) 4950<br>(131) 4950<br>(132) 4950<br>(133) 4950<br>(133) 4950<br>(133) 5000<br>(135) 5070   | (145) 4550<br>(145) 4500<br>(147) 4400<br>(148) 4200<br>(149) 4100<br>(150) 4080<br>(151) 3900<br>(152) 3800   | <pre>(163) 3000<br/>(164) 2900<br/>(165) 2900<br/>(166) 2900<br/>(166) 2900<br/>(168) 2900<br/>(168) 2900<br/>(169) 2850<br/>(170) 2850<br/>(171) 2850<br/>(172) 2800<br/>(173) 2800</pre>   |                          | •          |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (145) 2300<br>(144) 2900<br>(147) 3006<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(151) 2800<br>(152) 2700<br>(153) 2800<br>(154) 2500<br>(154) 2500   | (153) 900<br>(154) 1000<br>(155) 1230<br>(155) 2200<br>(157) 2500<br>(158) 2500<br>(158) 2500<br>(159) 2700<br>(159) 2700<br>(150) 4500<br>(171) 4700<br>(172) 5310<br>(173) 5310   |                          |                          | (109) 4900<br>(110) 4900<br>(111) 4900<br>(112) 4900<br>(113) 4900<br>(113) 4900<br>(114) 4900<br>(115) 4900<br>(116) 4900<br>(117) 4900   | (127) 4910<br>(128) 4920<br>(129) 4920<br>(130) 4950<br>(131) 4950<br>(132) 4950<br>(133) 4950<br>(133) 4950<br>(133) 5000<br>(135) 5070<br>(136) 5000   | (145) 4550<br>(145) 4500<br>(147) 4400<br>(147) 4400<br>(148) 4200<br>(150) 4080<br>(151) 3900<br>(152) 3800<br>(152) 3800<br>(155) 3750<br>(155) 3750<br>(155) 3750   | <pre>(143) 3000<br/>(144) 2900<br/>(145) 2900<br/>(145) 2900<br/>(146) 2900<br/>(147) 2900<br/>(147) 2900<br/>(148) 2900<br/>(148) 2900<br/>(149) 2850<br/>(170) 2850<br/>(171) 2850<br/>(172) 2800<br/>(173) 2800<br/>(174) 2800</pre>  |                          | •          |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (145) 2300<br>(144) 2900<br>(147) 3006<br>(148) 3100<br>(148) 3140<br>(150) 2900<br>(151) 2800<br>(151) 2800<br>(152) 2700<br>(153) 2600<br>(154) 2500<br>(155) 2400<br>(156) 1700   | (153)       900         (154)       1000         (165)       1230         (145)       2000         (145)       2000         (145)       2000         (146)       2400         (149)       2700         (170)       4500         (171)       4700         (172)       \$310         (174)       5310         (174)       5310  |                          |                          | (109) 4900<br>(110) 4900<br>(111) 4900<br>(112) 4900<br>(113) 4900<br>(113) 4900<br>(114) 4900<br>(115) 4900<br>(115) 4900<br>(117) 4900<br>(118) 4900<br>(119) 4900   | (127) 4910<br>(128) 4920<br>(129) 4920<br>(130) 4950<br>(131) 4950<br>(132) 4950<br>(133) 4950<br>(133) 4950<br>(134) 5000<br>(135) 5070<br>(136) 5000<br>(137) 5000   | (145) 4550<br>(145) 4500<br>(147) 4400<br>(147) 4400<br>(149) 4100<br>(150) 4080<br>(151) 3900<br>(151) 3900<br>(152) 3800<br>(155) 3800<br>(155) 3750<br>(155) 3750<br>(155) 3750   | <pre>(143) 3000<br/>(144) 2900<br/>(145) 2900<br/>(146) 2900<br/>(147) 2900<br/>(168) 2900<br/>(168) 2900<br/>(168) 2900<br/>(169) 2850<br/>(170) 2850<br/>(171) 2850<br/>(172) 2800<br/>(173) 2800<br/>(174) 2800<br/>(175) 2700</pre>  |                          | •          |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (145) 2300<br>(144) 2900<br>(147) 3000<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(152) 2700<br>(153) 2600<br>(153) 2600<br>(154) 2500<br>(155) 1700   | (153)       900         (154)       1000         (155)       1230         (145)       2000         (157)       2500         (158)       2600         (169)       2700         (170)       4500         (171)       4700         (172)       \$310         (173)       \$310         (174)       5310         (175)       \$310  |                          |                          | (109) 4900<br>(110) 4900<br>(111) 4900<br>(112) 4900<br>(113) 4900<br>(113) 4900<br>(115) 4900<br>(115) 4900<br>(117) 4900<br>(117) 4900<br>(119) 4900<br>(120) 4900   | (127) 4910<br>(128) 4920<br>(129) 4920<br>(130) 4950<br>(131) 4950<br>(131) 4950<br>(133) 4950<br>(133) 4950<br>(135) 5070<br>(134) 5000<br>(135) 5070<br>(136) 5000<br>(137) 5000<br>(138) 5000<br>(139) 5000<br>(140) 4900                             | (145) 4550<br>(145) 4500<br>(147) 4400<br>(147) 4400<br>(149) 4100<br>(150) 4080<br>(151) 3900<br>(152) 3800<br>(152) 3800<br>(153) 3750<br>(155) 3750<br>(155) 3750<br>(158) 3500   | <ul> <li>(163) 3000</li> <li>(164) 2900</li> <li>(165) 2900</li> <li>(166) 2900</li> <li>(167) 2900</li> <li>(168) 2900</li> <li>(169) 2850</li> <li>(170) 2850</li> <li>(171) 2850</li> <li>(172) 2800</li> <li>(173) 2800</li> <li>(174) 2800</li> <li>(175) 2700</li> <li>(176) 2600</li> </ul> |                          | •          |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (145) 2300<br>(144) 2900<br>(147) 3000<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2900<br>(151) 2900<br>(152) 2700<br>(153) 2600<br>(154) 2500<br>(154) 2500<br>(155) 2400<br>(155) 700<br>(156) 1700<br>(158) 393 | (153) 900<br>(154) 1000<br>(155) 1230<br>(155) 2200<br>(155) 2500<br>(158) 2500<br>(159) 2700<br>(170) 4500<br>(171) 4700<br>(171) 4700<br>(172) 5310<br>(173) 5310<br>(174) 5310<br>(175) 5310   |                          |                          | (109) 4900<br>(110) 4900<br>(111) 4900<br>(112) 4900<br>(113) 4900<br>(113) 4900<br>(114) 4900<br>(115) 4900<br>(115) 4900<br>(117) 4900<br>(117) 4900<br>(117) 4900<br>(120) 4900<br>(121) 4900<br>(123) 4900 | (127) 4910<br>(128) 4920<br>(129) 4920<br>(130) 4950<br>(131) 4950<br>(132) 4950<br>(133) 4950<br>(133) 4950<br>(134) 5000<br>(135) 5070<br>(135) 5070<br>(136) 5000<br>(137) 5000<br>(138) 5000<br>(139) 5000<br>(140) 4900<br>(141) 4800               | (145) 4550<br>(145) 4500<br>(147) 4400<br>(148) 4200<br>(149) 4100<br>(150) 4080<br>(151) 3900<br>(152) 3800<br>(152) 3800<br>(155) 3750<br>(155) 3750<br>(155) 3750<br>(158) 3500<br>(159) 3400                             | <pre>(163) 3000<br/>(164) 2900<br/>(165) 2900<br/>(165) 2900<br/>(166) 2900<br/>(167) 2900<br/>(169) 2850<br/>(170) 2850<br/>(171) 2850<br/>(172) 2800<br/>(173) 2800<br/>(174) 2800<br/>(175) 2700<br/>(175) 2700<br/>(176) 2600</pre>  |                          | •          |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (145) 2300<br>(144) 2900<br>(147) 3006<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(151) 2800<br>(152) 2700<br>(153) 2600<br>(155) 2400<br>(155) 2400<br>(155) 1700<br>(156) 1700<br>(156) 393<br>(139) 500 | (153)       900         (154)       1000         (155)       1230         (145)       2000         (145)       2500         (145)       2500         (146)       2600         (147)       2500         (147)       2500         (147)       3500         (171)       4700         (172)       \$310         (173)       \$310         (174)       \$310         (175)       \$310         (177)       \$310 |                          |                          |  | (127) 4910<br>(128) 4920<br>(129) 4920<br>(130) 4950<br>(131) 4950<br>(132) 4950<br>(132) 4950<br>(133) 4950<br>(134) 5000<br>(135) 5070<br>(136) 5000<br>(136) 5000<br>(137) 5000<br>(136) 5000<br>(139) 5000<br>(140) 4900<br>(140) 4900<br>(142) 4700 | (145) 4550<br>(145) 4500<br>(147) 4400<br>(147) 4400<br>(149) 4100<br>(150) 4080<br>(151) 3900<br>(152) 3800<br>(152) 3800<br>(155) 3750<br>(155) 3750<br>(155) 3750<br>(155) 3750<br>(156) 3500<br>(158) 3500<br>(159) 3400 | <pre>(143) 3000<br/>(144) 2900<br/>(145) 2900<br/>(146) 2900<br/>(146) 2900<br/>(147) 2900<br/>(148) 2900<br/>(148) 2900<br/>(149) 2850<br/>(170) 2850<br/>(171) 2850<br/>(171) 2850<br/>(172) 2800<br/>(173) 2800<br/>(174) 2800<br/>(175) 2700<br/>(176) 2600<br/>(178) 2600</pre>               |                          | •          |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (145) 2300<br>(144) 2900<br>(147) 3000<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2900<br>(151) 2900<br>(152) 2700<br>(153) 2600<br>(154) 2500<br>(154) 2500<br>(155) 2400<br>(155) 700<br>(156) 1700<br>(158) 393 | (153) 900<br>(154) 1000<br>(155) 1230<br>(155) 2200<br>(155) 2500<br>(158) 2500<br>(159) 2700<br>(170) 4500<br>(171) 4700<br>(171) 4700<br>(172) 5310<br>(173) 5310<br>(174) 5310<br>(175) 5310   |                          |                          | (109) 4900<br>(110) 4900<br>(111) 4900<br>(112) 4900<br>(113) 4900<br>(113) 4900<br>(114) 4900<br>(115) 4900<br>(115) 4900<br>(117) 4900<br>(117) 4900<br>(117) 4900<br>(120) 4900<br>(121) 4900<br>(123) 4900 | (127) 4910<br>(128) 4920<br>(129) 4920<br>(130) 4950<br>(131) 4950<br>(132) 4950<br>(133) 4950<br>(133) 4950<br>(134) 5000<br>(135) 5070<br>(135) 5070<br>(136) 5000<br>(137) 5000<br>(138) 5000<br>(139) 5000<br>(140) 4900<br>(141) 4800               | (145) 4550<br>(145) 4500<br>(147) 4400<br>(148) 4200<br>(149) 4100<br>(150) 4080<br>(151) 3900<br>(152) 3800<br>(152) 3800<br>(155) 3750<br>(155) 3750<br>(155) 3750<br>(158) 3500<br>(159) 3400                             | <pre>(163) 3000<br/>(164) 2900<br/>(165) 2900<br/>(165) 2900<br/>(166) 2900<br/>(167) 2900<br/>(169) 2850<br/>(170) 2850<br/>(171) 2850<br/>(172) 2800<br/>(173) 2800<br/>(174) 2800<br/>(175) 2700<br/>(175) 2700<br/>(176) 2600</pre>  | <b></b>                  | •          |

Phosphorus concentration of Paarl wastewater effluent: Periods 1 and 2

Phosphorus transport Berg River

;

TR 143 March 1989

.

| ( 2) 2470  | 1 201 4130   | ( 38) 4230   | ( 20) 4100  | 1 141 4010 | ( /1/ 0000 |
|--|--|--|---|------------|------------|
|  | (21) 4130  | ( 39) 4230   | ( 57) 4100  | ( 75) 4010 | ( 93) 3800 |
|  | ( 22) 4200   | ( 40) 4230   | ( 58) 4111  | ( 76) 4010 | ( 94) 3700 |
| · · · · · · · · · · · · · · · · · · ·  | (23) 4200  | ( 41) 4230   | ( 59) 4111  | ( 77) 4014 | ( 95) 3600 |
| ( 5) 2470  |  | ( 42) 4100   | ( 60) 4111  | ( 78) 4010 | ( 96) 3550 |
| ( 6) 2470  | ( 24) 4200   |  | ( 61) 4110  | ( 79) 4200 | ( 97) 3550 |
| ( 7) 2470  | (25) 4200  | ( 43) 4100   | ( 62) 4111  | ( 80) 4250 | (98) 3550  |
| ( B) 2470  | ( 26) 4200   | ( 44) 4100   |   | (81) 4250  | ( 99) 3450 |
| ( 7) 2470  | 1 27) 4200   | ( 45) 4100   | ( 63) 4111  |            | (100) 3400 |
| ( 10) 2450   | ( 28) 4200   | (46)4090   | ( 64) 4111  | (82) 4250  |            |
| (11) 2450  | ( 29) 4210   | ( 47) 4090   | ( 65) 4111  | (83) 4300  | (101) 3500 |
| (12) 2450  | (-30) 4210   | ( 48) 4090   | ( 66) 4111  | (84) 4300  | (102) 3300 |
| (13) 2450  | ( 31) 4200   | ( 49) 4100   | ( 67) 4050  | (85) 4300  | (103) 3300 |
| ( 14) 2470   | ( 32) 4230   | ( 50) 4100   | ( 68) 4050  | ( 86) 4000 | (104) 3300 |
| (15) 3000  | ( 33) 4230   | ( 51) 4100   | ( 67) 4050  | ( 87) 4250 | (105) 3200 |
| ( 16) 3100   |  |  | ( 70) 4050  | (88) 4300  | (106) 3220 |
| (17) 3200  | ( 35) 4230   | ( 53) 4100   | (71) 4040   | ( 89) 4300 | (107) 3320 |
| (18) 4130  |  | ( 54) 4100   | ( 72) 4040  | ( 90) 4000 | (108) 3220 |
| ( 10) 4100   | ( 307 1255   |  |   |            |            |
|  |  |  |   |            |            |
|  |  | ţ  | 6   | ł          |            |
|  | (127) 1850   | (145) 2800   | (163) 900   |            |            |
| (109) 3220   | (127) 1850   | (145) 2800   | (163) 900   |            |            |
| (109) 3230<br>(110) 3320   | (127) 1850<br>(129) 1800"  | (145) 2800<br>(145) 2900   | (163) 900<br>(154) 1000   |            |            |
| (109) 3220<br>(110) 3320<br>(111) 3200   | (127) 1850<br>(129) 1800''<br>(129) 1800   | (145) 2800<br>(146) 2900<br>(147) 3000   | (163) 900<br>(164) 1000<br>(165) 1230   |            |            |
| (107) 3220<br>(110) 3320<br>(111) 3200<br>(112) 3100   | (127) 1850<br>(129) 1800"<br>(129) 1800<br>(120) 2150  | (145) 2900<br>(142) 2900<br>(147) 2900<br>(147) 3000<br>(148) 3100   | (163) 900<br>(164) 1000<br>(165) 1230<br>(166) 2000   |            |            |
| (107) 3220<br>(110) 3320<br>(111) 3200<br>(112) 3100<br>(113) 3070   | (127) 1850<br>(129) 1800<br>(129) 1800<br>(129) 1800<br>(130) 2150<br>(131) 1800   | (145) 2900<br>(142) 2900<br>(147) 3000<br>(148) 3100<br>(149) 3140   | (163) 900<br>(164) 1000<br>(165) 1230<br>(166) 2000<br>(166) 2500   |            |            |
| (109) 3220<br>(110) 3320<br>(111) 3200<br>(112) 3100<br>(112) 3100<br>(113) 3090<br>(114) 2850   | (127) 1850<br>(129) 1800<br>(129) 1800<br>(129) 1800<br>(130) 2150<br>(131) 1800<br>(132) 1800   | (145) 2800<br>(142) 2900<br>(147) 3000<br>(148) 3100<br>(148) 3140<br>(150) 2900   | (163) 900<br>(164) 1000<br>(165) 1230<br>(165) 22000<br>(166) 2500<br>(168) 2500  |            |            |
| (109) 3220<br>(110) 3320<br>(111) 3200<br>(112) 3100<br>(112) 3100<br>(113) 3090<br>(114) 2850<br>(115) 2700   | (127) 1850<br>(129) 1800"<br>(129) 1800<br>(120) 2150<br>(130) 2150<br>(131) 1800<br>(132) 1800<br>(133) 1800  | (145) 2800<br>(145) 2900<br>(147) 3003<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800   | (163) 900<br>(164) 1000<br>(165) 1230<br>(166) 2000<br>(166) 2500<br>(168) 2500<br>(168) 2500   |            |            |
| (107) 3220<br>(110) 3320<br>(111) 3200<br>(112) 3100<br>(112) 3100<br>(113) 3070<br>(114) 2850<br>(115) 2700<br>(114) 2450   | (127) 1850<br>(129) 1800<br>(129) 1800<br>(130) 2150<br>(131) 1800<br>(132) 1800<br>(133) 1800<br>(133) 1800<br>(134) 2000   | (145) 2800<br>(145) 2900<br>(147) 3603<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(152) 2700   | (163) 900<br>(164) 1000<br>(165) 1230<br>(166) 2000<br>(166) 2500<br>(166) 2500<br>(169) 2700<br>(169) 2700<br>(170) 4500   |            |            |
| (107) 3220<br>(110) 3320<br>(111) 3200<br>(112) 3100<br>(112) 3100<br>(113) 3090<br>(114) 2850<br>(115) 2700<br>(115) 2700<br>(116) 2650   | (127) 1850<br>(129) 1800<br>(129) 1800<br>(120) 2150<br>(131) 1800<br>(132) 1800<br>(133) 1800<br>(133) 1800<br>(135) 1800   | (145) 2800<br>(142) 2900<br>(147) 3003<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(151) 2800<br>(152) 2700<br>(153) 2600   | (163) 900<br>(164) 1000<br>(163) 1230<br>(166) 2000<br>(167) 2500<br>(168) 2600<br>(169) 2700<br>(169) 2700<br>(170) 4500<br>(171) 4700   |            |            |
| <pre>(109) 3220<br/>(110) 3320<br/>(111) 3200<br/>(111) 3200<br/>(112) 3100<br/>(113) 3090<br/>(113) 3090<br/>(114) 2850<br/>(115) 2700<br/>(116) 2650<br/>(117) 2670<br/>(118) 2500</pre>   | (127) 1850<br>(120) 1800"<br>(129) 1800<br>(130) 2150<br>(131) 1800<br>(132) 1800<br>(133) 1800<br>(133) 1800<br>(134) 2000<br>(135) 1800<br>(135) 1800  | (145) 2800<br>(142) 2900<br>(147) 3000<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(151) 2800<br>(152) 2700<br>(153) 2600<br>(154) 2500   | (163) 900<br>(164) 1000<br>(165) 1230<br>(166) 2000<br>(167) 2500<br>(167) 2500<br>(169) 2700<br>(169) 2700<br>(170) 4500<br>(171) 4700<br>(172) 5720   |            |            |
| (109) 3220<br>(110) 3320<br>(111) 3200<br>(112) 3100<br>(112) 3100<br>(113) 3090<br>(114) 2850<br>(115) 2700<br>(115) 2700<br>(116) 2450<br>(117) 2400   | (127) 1850<br>(129) 1800<br>(129) 1800<br>(130) 2150<br>(131) 1800<br>(132) 1800<br>(133) 1800<br>(133) 1800<br>(134) 2000<br>(135) 1800<br>(135) 1800<br>(135) 1800   | (145) 2800<br>(145) 2900<br>(147) 3003<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(151) 2800<br>(152) 2700<br>(153) 2600<br>(154) 2500<br>(155) 2400   | (163) 900<br>(164) 1000<br>(165) 1230<br>(166) 2000<br>(167) 2500<br>(168) 2600<br>(169) 2700<br>(170) 4500<br>(171) 4700<br>(172) 5720<br>(173) 5310   |            |            |
| <pre>(10?) 3220<br/>(110) 3320<br/>(111) 3200<br/>(112) 3100<br/>(112) 3100<br/>(113) 3090<br/>(114) 2850<br/>(115) 2700<br/>(115) 2700<br/>(115) 2650<br/>(117) 2670<br/>(118) 2500<br/>(119) 2400<br/>(120) 2300</pre>   | (127) 1850<br>(129) 1800<br>(129) 1800<br>(130) 21800<br>(131) 1800<br>(132) 1800<br>(133) 1800<br>(133) 1800<br>(135) 1800<br>(135) 1800<br>(135) 1800<br>(137) 1999<br>(133) 2100  | (145) 2800<br>(144) 2900<br>(144) 3003<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(151) 2800<br>(153) 2600<br>(155) 2400<br>(155) 2400<br>(155) 2400   | (163) 900<br>(164) 1000<br>(165) 1230<br>(166) 2000<br>(167) 2500<br>(168) 2600<br>(168) 2700<br>(169) 2700<br>(170) 4500<br>(171) 4700<br>(172) 5720<br>(173) 5310<br>(174) 5310                             |            |            |
| (107) 3220<br>(110) 3320<br>(111) 3200<br>(112) 3100<br>(112) 3100<br>(113) 3090<br>(114) 2850<br>(115) 2700<br>(115) 2700<br>(115) 2650<br>(117) 2470<br>(118) 2500<br>(117) 2400<br>(119) 2400<br>(120) 2300   | (127) 1850<br>(129) 1800<br>(129) 1800<br>(120) 2150<br>(131) 1800<br>(132) 1800<br>(133) 1800<br>(135) 1800<br>(135) 1800<br>(135) 1800<br>(137) 1800<br>(137) 1900<br>(137) 2100   | (145) 2800<br>(145) 2900<br>(147) 3003<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(151) 2800<br>(153) 2600<br>(153) 2600<br>(155) 2400<br>(155) 2400<br>(155) 2400<br>(155) 700  | (163) 900<br>(164) 1000<br>(165) 1230<br>(166) 2000<br>(167) 2500<br>(169) 2500<br>(169) 2700<br>(170) 4500<br>(171) 4700<br>(172) 5720<br>(173) 5310<br>(175) 5310   |            |            |
| <pre>(10?) 3220<br/>(110) 3320<br/>(111) 3200<br/>(112) 3100<br/>(113) 3090<br/>(113) 2090<br/>(114) 2850<br/>(115) 2700<br/>(115) 2700<br/>(116) 2670<br/>(117) 2670<br/>(118) 2500<br/>(119) 2400<br/>(120) 2300<br/>(121) 2300<br/>(122) 2200</pre>   | (127) 1850<br>(120) 1800"<br>(129) 1800<br>(130) 2150<br>(131) 1800<br>(132) 1800<br>(133) 1800<br>(133) 1800<br>(135) 1800<br>(135) 1800<br>(135) 1800<br>(135) 1999<br>(135) 2200<br>(140) 2300  | (145) 2800<br>(146) 2900<br>(147) 3000<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(152) 2700<br>(153) 2600<br>(155) 2400<br>(155) 2400<br>(155) 2400<br>(155) 1700<br>(157) 700<br>(156) 393   | (163) 900<br>(164) 1000<br>(165) 1230<br>(166) 2000<br>(167) 2500<br>(167) 2500<br>(169) 2700<br>(169) 2700<br>(170) 4500<br>(171) 4700<br>(172) 5720<br>(173) 5310<br>(174) 5310<br>(175) 5310               |            |            |
| <pre>(109) 3220<br/>(110) 3320<br/>(111) 3200<br/>(111) 3200<br/>(112) 3100<br/>(113) 3090<br/>(114) 2850<br/>(115) 2700<br/>(114) 2450<br/>(117) 2470<br/>(118) 2500<br/>(119) 2400<br/>(120) 2300<br/>(121) 2300<br/>(122) 2200</pre>  | (127) 1850<br>(120) 1800"<br>(129) 1800<br>(130) 2150<br>(131) 1800<br>(132) 1800<br>(133) 1800<br>(133) 1800<br>(134) 2000<br>(135) 1800<br>(135) 1800<br>(135) 1800<br>(137) 1999<br>(133) 2100<br>(139) 2200<br>(140) 2300<br>(141) 2400              | (145) 2800<br>(146) 2900<br>(147) 3003<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(151) 2800<br>(152) 2700<br>(153) 2600<br>(153) 2400<br>(155) 2400<br>(155) 2400<br>(155) 2400<br>(155) 2700<br>(156) 1700<br>(156) 393<br>(159) 500                           | (163) 900<br>(164) 1000<br>(165) 1230<br>(166) 2000<br>(167) 2500<br>(168) 2600<br>(169) 2700<br>(170) 4500<br>(171) 4700<br>(171) 4700<br>(172) 5720<br>(173) 5310<br>(174) 5310<br>(176) 5310<br>(177) 5310 |            |            |
| $\begin{array}{c} (107) & 3220 \\ (110) & 3320 \\ (111) & 3200 \\ (112) & 3100 \\ (113) & 3090 \\ (113) & 3090 \\ (114) & 2850 \\ (115) & 2700 \\ (116) & 2500 \\ (117) & 2400 \\ (117) & 2400 \\ (119) & 2400 \\ (120) & 2300 \\ (121) & 2300 \\ (122) & 2200 \\ (122) & 2200 \\ (123) & 1940 \\ (124) & 1900 \\ \end{array}$                           | (127) 1850<br>(129) 1800<br>(129) 1800<br>(120) 2150<br>(131) 1800<br>(132) 1800<br>(132) 1800<br>(133) 1800<br>(133) 1800<br>(135) 1800<br>(135) 1800<br>(135) 1800<br>(135) 2000<br>(137) 1999<br>(136) 2100<br>(137) 2200<br>(140) 2300<br>(141) 2400 | (145) 2800<br>(144) 2900<br>(147) 3003<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(151) 2800<br>(153) 2400<br>(154) 2500<br>(155) 2400<br>(155) 2400<br>(155) 1700<br>(157) 700<br>(157) 700<br>(156) 393<br>(159) 500   | (163) 900<br>(164) 1000<br>(165) 1230<br>(166) 2000<br>(167) 2500<br>(168) 2600<br>(169) 2700<br>(170) 4500<br>(171) 4700<br>(172) 5720<br>(173) 5310<br>(174) 5310<br>(176) 5310<br>(177) 5310<br>(178) 5310 |            |            |
| $      \begin{array}{l} (107) & 3220 \\ (110) & 3320 \\ (111) & 3320 \\ (112) & 3100 \\ (112) & 3100 \\ (113) & 2070 \\ (114) & 2850 \\ (115) & 2700 \\ (116) & 2650 \\ (117) & 2470 \\ (118) & 2500 \\ (117) & 2470 \\ (118) & 2500 \\ (121) & 2300 \\ (121) & 2300 \\ (122) & 2200 \\ (122) & 1200 \\ (123) & 1940 \\ (123) & 1850 \\ \end{array}    $ | (127) 1850<br>(129) 1800<br>(129) 1800<br>(120) 2150<br>(131) 1800<br>(132) 1800<br>(133) 1800<br>(133) 1800<br>(135) 1800<br>(135) 1800<br>(135) 1800<br>(137) 1999<br>(138) 2100<br>(137) 2200<br>(140) 2300<br>(141) 2400<br>(142) 2500<br>(143) 2400 | (145) 2800<br>(144) 2900<br>(147) 3603<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(151) 2800<br>(152) 2700<br>(153) 2600<br>(153) 2600<br>(154) 2500<br>(154) 2500<br>(155) 2400<br>(155) 2400<br>(156) 1700<br>(157) 700<br>(156) 393<br>(159) 555<br>(161) 789 | (163) 900<br>(164) 1000<br>(165) 1230<br>(166) 2000<br>(167) 2500<br>(169) 2700<br>(170) 4500<br>(170) 4500<br>(171) 4700<br>(172) 5720<br>(173) 5310<br>(174) 5310<br>(177) 5310<br>(177) 5310<br>(178) 5310 |            |            |
| $\begin{array}{c} (107) & 3220 \\ (110) & 3320 \\ (111) & 3200 \\ (112) & 3100 \\ (113) & 3090 \\ (113) & 3090 \\ (114) & 2850 \\ (115) & 2700 \\ (116) & 2500 \\ (117) & 2400 \\ (117) & 2400 \\ (119) & 2400 \\ (120) & 2300 \\ (121) & 2300 \\ (122) & 2200 \\ (122) & 2200 \\ (123) & 1940 \\ (124) & 1900 \\ \end{array}$                           | (127) 1850<br>(129) 1800<br>(129) 1800<br>(120) 2150<br>(131) 1800<br>(132) 1800<br>(132) 1800<br>(133) 1800<br>(133) 1800<br>(135) 1800<br>(135) 1800<br>(135) 1800<br>(135) 2000<br>(137) 1999<br>(136) 2100<br>(137) 2200<br>(140) 2300<br>(141) 2400 | (145) 2800<br>(144) 2900<br>(147) 3003<br>(148) 3100<br>(149) 3140<br>(150) 2900<br>(151) 2800<br>(151) 2800<br>(153) 2400<br>(154) 2500<br>(155) 2400<br>(155) 2400<br>(155) 1700<br>(157) 700<br>(157) 700<br>(156) 393<br>(159) 500   | (163) 900<br>(164) 1000<br>(165) 1230<br>(166) 2000<br>(167) 2500<br>(168) 2600<br>(169) 2700<br>(170) 4500<br>(171) 4700<br>(172) 5720<br>(173) 5310<br>(174) 5310<br>(176) 5310<br>(177) 5310<br>(178) 5310 |            |            |

| ( 18) 4600 | ( 36) 3400 | ( 54) 3780 |                           |  |        |
|------------|------------|------------|---------------------------|--|--------|
|            |            |            |                           |  |        |
|            |            |            |                           |  | A<br>J |
| (109) 3500 | (127) 4350 | (145) 4200 | · (155) 3400 <sup>-</sup> | - Argentanten ander angen av er er er er | 5      |
| (110) 3600 | (128) 4350 | (146) 4150 |                           |  |        |
| (111) 4100 | (129) 4350 | (147) 4100 | (165) 3400                |  |        |
| (112) 3700 | (130) 4400 | (148) 4000 | (166) 3400                |  |        |
| (113) 3700 | (131) 4500 | (149) 3950 | (167) 3400                |  |        |
| (114) 3800 | (132) 4500 | (150) 3900 | (168) 3400                |  |        |
| (115) 3850 | (133) 4500 | (151) 3800 | (159) 3380                |  |        |
| (116) 3850 | (134) 4600 | (152) 3700 | (170) 3380                |  |        |
| (117) 4100 | (135) 4600 | (153) 2900 | (171) 3380                |  |        |
| (118) 4150 | (136) 4600 | (154) 3760 | (172) 3380                |  |        |
| (119) 4200 | (137) 4600 | (155) 3700 |                           |  |        |
| (120) 4250 | (138) 4600 | (156) 3700 |                           |  |        |
| (121) 4230 | (139) 4600 | (157) 3600 |                           |  |        |
| (121) 4230 | (140) 4600 | (158) 3500 |                           |  |        |
| (123) 4300 | (141) 4555 | (159) 3500 |                           |  |        |
| (124) 4350 | (142) 4500 | (160) 3500 |                           |  |        |
| (125) 4350 | (143) 4400 | (161) 3500 |                           |  |        |
| (120) 4000 | 1 107 4400 |            |                           |  |        |

(162) 3500

\_\_\_\_\_\_

( 37) 3400

( 38) 3400

( 39) 3500

( 40) 3500

( 41) 3500

( 42) 3650

( 43) 3600

( 44) 3650

( 45) 3650

( 46) 3650

( 47) 3655

( 48) 3660

( 49) 3650

( 50) 3600

( 51) 3600

( 52) 3800

( 53) 3780

( 54) 3780

( 55) 3780

( 56) 3780

( 57) 3800

( 58) 3900

( 59) 3950

( 60) 3900

( 61) 3900

( 60) 4000

( 65) 4100

( 54) 4100

( 65) 4100

( 66) 4100

( 67) 4100

( 68) 4110

( 69) 4500

( 70) 4190

( 71) 4190

( 72) 4190

( 73) 4190

( 74) 4190

( 75) 4120

( 75) 4200

( 77) 4230

( 78) 4312

( 79) 4000

( 80) 3900

( 81) 3500

( 82) 3400

( 83) 3240

( 85) 3200

( 85) 3200

( 87) 3200

(88) 3200

( 89) 3200

( 90) 3200

( B4) 3200

Variable: PSTWT4.pstwt\_4 (length = 172)

( 19) 4650

( 20) 4600

( 21) 4560

( 22) 4500

( 23) 4440

( 24) 4400

(25) 4300

( 27) 4200

(

1

•

t

26) 4300

28) 4100

29) 4000

30) 3900

( 31) 3900

( 32) 3900

( 33) 3800

( 34) 3800

( 35) 3800

( 36) 3400

(144) 4300

\_\_\_\_\_

( 1) 4620

( 2) 4620

( 3) 4620

( 4) 4620

( 5) 4600

( 7) 4400

( 9) 4600

( 10) 4600

1 11) 4600

( 12) 4500

( 13) 4555

( 14) 4600

( 15) 4610

( 16) 4620

( 17) 4600

( 18) 4600

.(126) 4350

1

.

6) 4600

B) 4600

( 91) 3900

( 92) 3850

( 55) 4100 ( 73) 4014

( 38) 4230 ( 56) 4100 ( 74) 4010

Phosphorus concentration of Paarl wastewater effluent: Periods 3 and 4

Phosphorus transport Berg River

Variable: PSTWF3.pstwt\_3 (length = 100)

( 20) 4130

1) 2470 (19) 4130

(

2) 2470

( 27) 4230

TR 143 March 1989

( 91) 3200

( 92) 3200

( 93) 3200

( 94) 3200

( 95) 3200

( 96) 3100

( 97) 3200

( 98) 3700

( 99) 5200

(100) 3200

(101) 3200

(102) 3200

(103) 3200

(104) 3200

(105) 3200

(106) 3200

(107) 3200

(108) 3450

| ariable: PSI   | TWT5.ostwt 5   | (length = 1  | B0)  |            |            |   | WT4.pstwt_5  | (length = )  |  |            |            |
|--|--|--|--|------------|------------|---|--|--|--|------------|------------|
|  | · · · · · · · · · · · · · · · · · · ·  | ( 37) 2290   | ( 55) 2600   | (73) 2300  | ( 91) 2700 |   | ( 19) 2960   | ( 37) 3000   | ( 55) 3450   | ( 73) 2200 | ( 91) 1700 |
|  | (19) 1300  | ( 38) 2300   | ( 56) 2900   | (74) 2300  | ( 92) 2800 | ( 2) 2530   | (20) 2950  | ( 38) 2900   | ( 56) 3450   | (74) 2200  | ( 92) 1700 |
|  | ( 20) 1400   |  | ( 57) 2800   | (75) 2130  | ( 93) 2850 |   | ( 21) 2960   | ( 39) 2850   | ( 57) 345ù   | (75) 2100  | ( 93) 1720 |
|  | ( 21) 1500   | ( 39) 2300   | ( 58) 2800   | (76) 2300  | ( 94) 2850 | (4) 2530  | (22) 2900  | (40) 2800  | ( 58) 3400   | ( 76) 2100 | ( 94) 2200 |
| 4) 1000  | ( 22) 1580   | ( 40) 2300   | •  | (77) 2200  | ( 95) 2900 |   | ( 23) 2900   | ( 41) 2700   | ( 59) 3400   | ( 77) 2200 | ( 95) 1950 |
| 5) 1000  | ( 23) 1580   | (41) 2300  | (59) 2800  | (78) 2200  | ( 96) 2900 | ( 6) 2570   | (24) 2900  | (42) 2600  | ( 60) 3400   | (78) 1900  | ( 96) 1900 |
| 6) 96ú   | ( 24) 1600   | (42) 2300  | ( 60) 2800   | (79) 2210  | ( 97) 2950 | (7) 2500  | ( 25) 2900   | (43) 2600  | ( 61) 3400   | ( 79) 1900 | ( 97) 1950 |
| 7) 950   | ( 25) 1600   | (43) 2400  | ( 61) 2800   |            | ( 98) 2950 |   | ( 26) 2850   | (44) 2550  | ( 62) 3400   | ( 80) 2300 | ( 98) 2100 |
| 191) 1970<br>1911  | ( 26) 1900   | (44) 2500  | ( 62) 2800   | (80) 2300  | ( 99) 2999 |   | ( 27) 2850   | (45) 2520  | ( 63) 3450   | (81) 1800  | ( 99) 2400 |
| 9) 970   | ( 27) 2000   | (45) 2500  | ( 60) 2700   | (81) 2400  |            | (10) 2420   | ( 28) 2800   | (45) 2600  | ( 64) 3500   | ( 82) 1800 | (100) 2500 |
| 16) 900 -  | (28) 2100  | ( 46) 2500   | ( 64) 2700   | (82) 2500  | (100) 3000 |   | ( 29) 2800   | ( 47) 2700   | ( 65) 3500   | ( 83) 1800 | (101) 2500 |
| 11) B70  | (29) 2200  | ( 47) 2600   | ( 65) 2650   | (83) 2500  | (101) 3100 | ( 12) 2420  | ( 30) 2700   | ( 48) 2800   | ( 66) 2290   | ( 84) 1800 | (102) 4000 |
| 12) B50  | ( 30) 2600   | ( 48) 2700   | ( 66) 2650   | (84) 2700  | (102) 3020 |   | ( 31) 2700   | ( 49) 2950   | ( 67) 2200   | (85) 1750  | (103) 4000 |
| 13) 800  | ( 31) 2400   | ( 49) 2600   | ( 67) 2650   | (85) 2800  | (103) 3000 |   | ( 32) 2600   | ( 50) 3200   | ( 68) 2200   | (86) 1760  | (104) 3950 |
| 14) 750  | ( 32) 2500   | ( 50) 2600   | ( 68) 2600   | (86) 2800  | (104) 3090 |   | (33) 2520  | ( 51) 3400   | ( 29) 2200   | ( 87) 2200 | (105) 396  |
| 15) 1000   | ( 33) 2300   | ( 51) 2600   | ( 69) 2550   | (87) 2560  | (105) 3000 |   | (34) 2500  | ( 52) 2200   | ( 70) 2200   | (88) 1750  | (106) 390  |
| (5) 1100   | ( 34) 2290   | ( 52) 2600   | ( 70) 2550   | (88) 2650  | (106) 2900 |   | (35) 2500  | ( 53) 3450   | (71) 2200  | ( 89) 1750 | (107) 3800 |
| 17) 1200   | ( 35) 2290   | ( 53) 2500   | (71) 2550  | (89) 2700  | (107) 2850 |   | ( 36) 2900   | ( 54) 3450   | ( 72) 2200   | ( 90) 1750 | (108) 250  |
| 18) 1000   | ( 36) 2290   | ( 54) 2500   | ( 72) 2300   | ( 90) 2600 | (108) 2850 | ( 18) 2850  | ( 34) 2700   |  |  |            |            |
|  |  |  |  |            |            |   |  |  |  |            |            |
|  |  |  |  |            |            |   |  |  |  |            | E.K.       |
|  |  | (145) 2500   | (160) 2350   |            |            | (109) 3600  | (127) 2800   | (145) 3200   | (153) 3600   |            | A3.        |
| 07) 2700   |  | (145) 2500<br>(146) 2500   | (153) 2350<br>(164) 2350   |            |            | (107) 3600<br>(110) 3500  | (127) 2800<br>(128) 2800   | (145) 3200<br>(146) 3300   | (153) 3600<br>(154) 4300   |            | *          |
| 07) 2700<br>10) 2850   | (127) 3000   | (145) 2500   | (153) 2350<br>(154) 2350<br>(155) 2350   |            |            | (109) 3600<br>(110) 3500<br>(111) 3500  | (127) 2800<br>(128) 2800<br>(129) 3100   | (145) 3200<br>(146, 3300<br>(147) 3400   | (153) 3600<br>(154) 4300<br>(155) 3960   |            | A3.        |
| 07) 2700<br>10) 2550<br>11) 2530   | (127) 3000<br>(128) 3111   | (145) 2500<br>(146) 2500   | (153) 2350<br>(154) 2350<br>(155) 2350<br>(155) 2350   |            |            | (109) 3600<br>(110) 3500<br>(111) 3500<br>(112) 3400  | (127) 2800<br>(128) 2800<br>(129) 3100<br>(130) 2800   | (145) 3200<br>(146) 3300<br>(147) 3400<br>(148) 3500   | (153) 3600<br>(154) 4300<br>(155) 3960<br>(166) 3600   |            | A3.        |
| 07) 2700<br>10) 2550<br>11) 2550<br>12) 2600   | (127) 3000<br>(128) 3111<br>(129) 3111   | (145) 2500<br>(146) 2500<br>(147) 2500<br>(148) 2500<br>(148) 2500<br>(149) 2480   | (153) 2350<br>(164) 2350<br>(165) 2350<br>(165) 2350<br>(167) 2350   |            |            | (109) 3600<br>(110) 3500<br>(111) 3500<br>(112) 3400<br>(113) 3200  | (127) 2800<br>(128) 2800<br>(129) 3100<br>(130) 2800<br>(131) 2800   | (145) 3200<br>(1464 3300<br>(147) 3400<br>(148) 3500<br>(148) 3500   | (153) 3600<br>(154) 4300<br>(165) 3960<br>(166) 3600<br>(157) 3542   |            | A3.        |
| 07) 2700<br>10) 2550<br>11) 2630<br>12) 2600<br>13) 2530   | (127) 3000<br>(128) 3111<br>(129) 3111<br>(130) 3111   | (145) 2500<br>(146) 2500<br>(147) 2500<br>(148) 2500   | (153) 2350<br>(154) 2350<br>(155) 2350<br>(155) 2350   |            |            | (109) 3600<br>(110) 3500<br>(111) 3500<br>(112) 3400<br>(112) 3200<br>(114) 3100  | (127) 2800<br>(128) 2800<br>(129) 3100<br>(130) 2800<br>(131) 2800<br>(132) 2800   | (145) 3200<br>(146+ 3300<br>(147) 3400<br>(148) 3500<br>(149) 3600<br>(150) 3600   | (153) 3600<br>(154) 4300<br>(155) 3960<br>(166) 3600<br>(157) 3542<br>(168) 3500   |            | A3.        |
| 07) 2700<br>10) 2550<br>11) 2530<br>12) 2600<br>13) 2530<br>14) 2530   | (127) 3000<br>(129) 3111<br>(129) 3111<br>(130) 3111<br>(131) 3111   | (145) 2500<br>(146) 2500<br>(147) 2500<br>(148) 2500<br>(148) 2500<br>(149) 2480   | (153) 2350<br>(154) 2350<br>(155) 2350<br>(155) 2350<br>(157) 2350<br>(157) 2350<br>(168) 2350<br>(169) 2350   |            |            | (107) 3600<br>(110) 3500<br>(111) 3500<br>(112) 3400<br>(112) 3400<br>(114) 3100<br>(114) 3100<br>(115) 2800  | (127) 2800<br>(128) 2800<br>(129) 3100<br>(130) 2800<br>(131) 2800<br>(131) 2800<br>(133) 2800   | (145) 3200<br>(146, 3300<br>(147) 3400<br>(148) 3500<br>(149) 3600<br>(150) 3600<br>(151) 3600   | (153) 3600<br>(154) 4300<br>(155) 3960<br>(166) 3600<br>(157) 3542<br>(168) 3500<br>(159) 3500   |            | A3.        |
| 07) 2700<br>10) 2550<br>11) 2430<br>12) 2600<br>13) 2530<br>14) 2530<br>15) 2530   | (127) 3000<br>(128) 3111<br>(129) 3111<br>(130) 3111<br>(131) 3111<br>(131) 3111<br>(132) 3000   | (145) 2500<br>(146) 2500<br>(147) 2500<br>(147) 2500<br>(148) 2500<br>(148) 2480<br>(150) 2480<br>(151) 2480<br>(152) 2480   | (153) 2350<br>(154) 2350<br>(155) 2350<br>(155) 2350<br>(157) 2350<br>(157) 2350<br>(159) 2350<br>(159) 2350<br>(170) 2350   |            |            | (109) 3600<br>(110) 3500<br>(111) 3500<br>(112) 3400<br>(112) 3400<br>(113) 3200<br>(114) 3100<br>(115) 2800<br>(116) 2800  | (127) 2800<br>(128) 2800<br>(129) 3100<br>(130) 2800<br>(131) 2800<br>(132) 2800<br>(133) 2800<br>(133) 2800<br>(134) 2800   | (145) 3200<br>(146, 3300<br>(147) 3400<br>(148) 3500<br>(149) 3600<br>(150) 3600<br>(151) 3600<br>(152) 3600   | (153) 3600<br>(154) 4300<br>(155) 3960<br>(166) 3600<br>(157) 3542<br>(168) 3500<br>(169) 3500<br>(170) 3400   |            | A3.        |
| 07) 2700<br>10) 2550<br>11) 2530<br>12) 2600<br>13) 2530<br>14) 2530<br>15) 2530<br>15) 2530   | (127) 3000<br>(128) 3111<br>(129) 3111<br>(130) 3111<br>(131) 3111<br>(132) 3000<br>(133) 2900   | (145) 2500<br>(146) 2500<br>(147) 2500<br>(147) 2500<br>(148) 2500<br>(149) 2480<br>(150) 2480<br>(151) 2480   | (153) 2350<br>(164) 2350<br>(165) 2350<br>(165) 2350<br>(166) 2350<br>(167) 2350<br>(169) 2350<br>(170) 2350<br>(170) 2350   |            |            | (107) 3600<br>(110) 3500<br>(111) 3500<br>(112) 3400<br>(112) 3400<br>(113) 3200<br>(114) 3100<br>(115) 2800<br>(115) 2800<br>(117) 2800  | (127) 2800<br>(129) 2800<br>(129) 3100<br>(130) 2800<br>(131) 2800<br>(132) 2800<br>(133) 2800<br>(133) 2800<br>(134) 2800<br>(135) 2800   | (145) 3200<br>(146, 3300<br>(147) 3400<br>(148) 3500<br>(149) 3600<br>(150) 3600<br>(151) 3600<br>(151) 3600<br>(153) 3600   | (153) 3600<br>(154) 4300<br>(155) 3960<br>(166) 3600<br>(157) 3542<br>(168) 3500<br>(169) 3500<br>(170) 3400<br>(171) 3100   |            | A3.        |
| 07) 2700<br>10) 2550<br>11) 2530<br>12) 2600<br>13) 2530<br>14) 2530<br>15) 2530<br>15) 2550<br>15) 2650<br>17) 2700   | (127) 3000<br>(128) 3111<br>(129) 3111<br>(130) 3111<br>(131) 3111<br>(131) 3111<br>(132) 3000<br>(133) 2900<br>(134) 2800   | (145) 2500<br>(146) 2500<br>(147) 2500<br>(147) 2500<br>(148) 2500<br>(150) 2480<br>(150) 2480<br>(151) 2480<br>(151) 2480<br>(152) 2480<br>(153) 2400<br>(154) 2350   | (153) 2350<br>(164) 2350<br>(165) 2350<br>(165) 2350<br>(165) 2350<br>(167) 2350<br>(169) 2350<br>(170) 2350<br>(171) 2350<br>(172) 2350   |            |            | (109) 3600<br>(110) 3500<br>(111) 3500<br>(112) 3400<br>(112) 3400<br>(113) 3200<br>(114) 3100<br>(115) 2800<br>(115) 2800<br>(117) 2800<br>(118) 2800  | (127) 2800<br>(128) 2800<br>(129) 3100<br>(130) 2800<br>(131) 2800<br>(132) 2800<br>(133) 2800<br>(133) 2800<br>(134) 2800<br>(135) 2800<br>(135) 2800   | (145) 3200<br>(146, 3300<br>(147) 3400<br>(148) 3500<br>(149) 3600<br>(150) 3600<br>(151) 3600<br>(151) 3600<br>(151) 3600<br>(153) 3600<br>(154) 3600   | (153) 3600<br>(154) 4300<br>(155) 3960<br>(166) 3600<br>(157) 3542<br>(168) 3500<br>(169) 3500<br>(170) 3400<br>(171) 3100<br>(172) 3500   |            | A3.        |
| 07) 2700<br>10) 2550<br>11) 2630<br>12) 2600<br>13) 2630<br>14) 2530<br>14) 2530<br>15) 2550<br>15) 2650<br>17) 2700<br>18) 2700   | (127) 3000<br>(128) 3111<br>(129) 3111<br>(130) 3111<br>(131) 3111<br>(132) 3000<br>(133) 2900<br>(133) 2900<br>(135) 2859   | (145) 2500<br>(146) 2500<br>(147) 2500<br>(147) 2500<br>(149) 2480<br>(150) 2480<br>(151) 2480<br>(151) 2480<br>(152) 2480<br>(152) 2480   | (153) 2350<br>(154) 2350<br>(155) 2350<br>(155) 2350<br>(155) 2350<br>(166) 2350<br>(167) 2350<br>(164) 2350<br>(164) 2350<br>(170) 2350<br>(171) 2350<br>(173) 2350   |            |            | (109) 3600<br>(110) 3500<br>(111) 3500<br>(112) 3400<br>(112) 3400<br>(114) 3100<br>(114) 3100<br>(115) 2800<br>(114) 2800<br>(117) 2800<br>(118) 2800<br>(119) 2800  | (127) 2800<br>(128) 2800<br>(129) 3100<br>(130) 2800<br>(131) 2800<br>(132) 2800<br>(132) 2800<br>(133) 2800<br>(134) 2800<br>(135) 2800<br>(135) 2800<br>(137) 2850   | (145) 3200<br>(146, 3300<br>(147) 3400<br>(148) 3500<br>(149) 3400<br>(150) 3600<br>(151) 3600<br>(151) 3600<br>(152) 3600<br>(153) 3600<br>(155) 3600   | (153) 3600<br>(154) 4360<br>(155) 3960<br>(166) 3600<br>(157) 3542<br>(168) 3560<br>(169) 3500<br>(169) 3500<br>(170) 3400<br>(171) 3500<br>(172) 3500<br>(173) 3600   |            | A3.        |
| 07) 2700<br>10) 2550<br>11) 2430<br>12) 2400<br>13) 2530<br>14) 2530<br>14) 2530<br>15) 2530<br>15) 2530<br>16) 2650<br>17) 2700<br>18) 2700   | (127) 3000<br>(128) 3111<br>(129) 3111<br>(130) 3111<br>(131) 3111<br>(131) 3111<br>(132) 3000<br>(133) 2900<br>(133) 2900<br>(134) 2800<br>(135) 2850<br>(136) 2750   | (145) 2500<br>(146) 2500<br>(147) 2500<br>(147) 2500<br>(148) 2500<br>(150) 2480<br>(150) 2480<br>(151) 2480<br>(151) 2480<br>(152) 2480<br>(153) 2400<br>(154) 2350   | (153) 2350<br>(154) 2350<br>(155) 2350<br>(155) 2350<br>(167) 2350<br>(167) 2350<br>(169) 2350<br>(169) 2350<br>(170) 2350<br>(171) 2350<br>(172) 2350<br>(172) 2350<br>(174) 2350                             |            |            | (109) 3600<br>(110) 3500<br>(111) 3500<br>(112) 3400<br>(112) 3400<br>(113) 3200<br>(114) 3100<br>(114) 2800<br>(114) 2800<br>(114) 2800<br>(117) 2800<br>(119) 2800<br>(119) 2800  | (127) 2800<br>(128) 2800<br>(129) 3100<br>(130) 2800<br>(131) 2800<br>(131) 2800<br>(132) 2800<br>(133) 2800<br>(135) 2800<br>(135) 2800<br>(135) 2850<br>(136) 2850   | (145) 3200<br>(146) 3300<br>(147) 3400<br>(148) 3500<br>(149) 3600<br>(150) 3600<br>(151) 3600<br>(152) 3600<br>(153) 3600<br>(154) 3600<br>(155) 3600   | (153) 3600<br>(154) 4300<br>(155) 3960<br>(166) 3600<br>(157) 3542<br>(168) 3500<br>(169) 3500<br>(170) 3400<br>(171) 3100<br>(172) 3600<br>(172) 3600<br>(174) 2300   |            | A3.        |
| 07) 2700<br>10) 2550<br>11) 2430<br>12) 2400<br>13) 2430<br>14) 2530<br>14) 2530<br>15) 2530<br>15) 2550<br>16) 2650<br>17) 2700<br>18) 2700<br>20) 2800   | (127) 3000<br>(128) 3111<br>(129) 3111<br>(130) 3111<br>(131) 3111<br>(131) 3111<br>(132) 3000<br>(133) 2900<br>(133) 2900<br>(134) 2800<br>(135) 2859<br>(136) 2750<br>(137) 2800   | (145) 2500<br>(146) 2500<br>(147) 2500<br>(147) 2500<br>(147) 2480<br>(150) 2480<br>(151) 2480<br>(151) 2480<br>(152) 2480<br>(153) 2490<br>(153) 2400<br>(154) 2350   | (153) 2350<br>(164) 2350<br>(165) 2350<br>(165) 2350<br>(166) 2350<br>(167) 2350<br>(169) 2350<br>(170) 2350<br>(171) 2350<br>(172) 2350<br>(172) 2350<br>(173) 2350<br>(175) 2350                             |            |            | (107) 3400<br>(110) 3500<br>(111) 3500<br>(112) 3400<br>(112) 3400<br>(113) 3200<br>(114) 3100<br>(115) 2800<br>(115) 2800<br>(117) 2800<br>(117) 2800<br>(117) 2800<br>(119) 2800<br>(119) 2800<br>(121) 2800  | (127) 2800<br>(128) 2800<br>(129) 3100<br>(130) 2800<br>(131) 2800<br>(131) 2800<br>(132) 2800<br>(134) 2800<br>(134) 2800<br>(135) 2800<br>(135) 2850<br>(137) 2850<br>(137) 2850<br>(139) 2900   | (145) 3200<br>(146, 3300<br>(147) 3400<br>(147) 3400<br>(149) 3600<br>(150) 3600<br>(151) 3600<br>(151) 3600<br>(153) 3600<br>(154) 3600<br>(155) 3600<br>(155) 3600<br>(157) 4200                             | (153) 3600<br>(154) 4300<br>(155) 3960<br>(166) 3600<br>(157) 3542<br>(168) 3500<br>(169) 3500<br>(170) 3600<br>(171) 3100<br>(172) 3500<br>(172) 3600<br>(173) 3600<br>(175) 2587                             |            | A3.        |
| 07) 2700<br>10) 2550<br>11) 2550<br>12) 2600<br>13) 2530<br>14) 2530<br>15) 2530<br>15) 2530<br>15) 2530<br>17) 2700<br>18) 2700<br>19) 2700<br>20) 2600<br>21) 2650   | (127) 3000<br>(126) 3111<br>(129) 3111<br>(130) 3111<br>(131) 3111<br>(131) 3111<br>(132) 3000<br>(133) 2900<br>(134) 2800<br>(135) 2850<br>(136) 2750<br>(137) 2800<br>(137) 2800<br>(138) 2400   | (145) 2500<br>(146) 2500<br>(147) 2500<br>(147) 2500<br>(148) 2500<br>(148) 2500<br>(150) 2480<br>(151) 2480<br>(151) 2480<br>(152) 2480<br>(153) 2400<br>(155) 2300<br>(155) 2300<br>(156) 2666   | (153) 2350<br>(154) 2350<br>(155) 2350<br>(155) 2350<br>(167) 2350<br>(167) 2350<br>(169) 2350<br>(169) 2350<br>(170) 2350<br>(171) 2350<br>(172) 2350<br>(172) 2350<br>(174) 2350                             |            |            | (109) 3600<br>(110) 3500<br>(111) 3500<br>(112) 3400<br>(113) 3200<br>(114) 3100<br>(115) 2800<br>(115) 2800<br>(117) 2800<br>(117) 2800<br>(119) 2800<br>(119) 2800<br>(120) 2800<br>(121) 2800<br>(122) 2800  | (127) 2800<br>(128) 2800<br>(129) 3100<br>(130) 2800<br>(131) 2800<br>(131) 2800<br>(132) 2800<br>(133) 2800<br>(133) 2800<br>(134) 2800<br>(135) 2800<br>(135) 2850<br>(137) 2850<br>(139) 2850<br>(139) 2850<br>(139) 2800               | (145) 3200<br>(146, 3300<br>(147) 3400<br>(148) 3500<br>(149) 3600<br>(150) 3600<br>(151) 3600<br>(151) 3600<br>(151) 3600<br>(155) 3600<br>(155) 3600<br>(155) 3600<br>(155) 3600<br>(155) 3600               | (153) 3500<br>(154) 4300<br>(155) 3960<br>(166) 3600<br>(157) 3542<br>(168) 3500<br>(169) 3500<br>(170) 3400<br>(171) 3100<br>(172) 3500<br>(172) 3500<br>(173) 3600<br>(174) 2300<br>(175) 2687<br>(176) 3855 |            | A3.        |
| 07) 2700<br>10) 2550<br>11) 2530<br>12) 2400<br>13) 2530<br>14) 2530<br>15) 2530<br>15) 2530<br>15) 2530<br>15) 2530<br>15) 2570<br>15) 2700<br>18) 2700<br>19) 2700<br>19) 2700<br>20) 2850<br>21) 2850<br>22) 2850 | (127) 3000<br>(128) 3111<br>(129) 3111<br>(130) 3111<br>(131) 3111<br>(131) 3111<br>(132) 3000<br>(133) 2900<br>(134) 2800<br>(135) 2850<br>(134) 2800<br>(137) 2800<br>(137) 2800<br>(139) 2400   | (145) 2500<br>(146) 2500<br>(147) 2500<br>(147) 2500<br>(147) 2480<br>(150) 2480<br>(151) 2480<br>(151) 2480<br>(152) 2480<br>(153) 2400<br>(153) 2400<br>(155) 2300<br>(156) 2646<br>(157) 2333   | (153) 2350<br>(154) 2350<br>(155) 2350<br>(155) 2350<br>(165) 2350<br>(167) 2350<br>(164) 2350<br>(164) 2350<br>(170) 2350<br>(171) 2350<br>(172) 2350<br>(173) 2350<br>(175) 2350<br>(175) 2350<br>(177) 2350 |            |            | <pre>(109) 3600<br/>(110) 3500<br/>(111) 3500<br/>(112) 3400<br/>(113) 3200<br/>(114) 3100<br/>(115) 2800<br/>(114) 2800<br/>(117) 2800<br/>(118) 2800<br/>(118) 2800<br/>(119) 2800<br/>(119) 2800<br/>(120) 2800<br/>(121) 2800<br/>(122) 2800<br/>(123) 2800</pre> | (127) 2800<br>(128) 2800<br>(129) 3100<br>(130) 2800<br>(131) 2800<br>(131) 2800<br>(132) 2800<br>(133) 2800<br>(135) 2800<br>(135) 2800<br>(135) 2800<br>(137) 2850<br>(137) 2850<br>(137) 2900<br>(140) 3000<br>(140) 3000               | (145) 3200<br>(146; 3300<br>(147) 3400<br>(148) 3500<br>(150) 3600<br>(151) 3600<br>(151) 3600<br>(151) 3600<br>(155) 3600<br>(155) 3600<br>(155) 3600<br>(157) 4200<br>(158) 3600<br>(159) 3600               | (153) 3600<br>(154) 4360<br>(155) 3960<br>(166) 3600<br>(157) 3542<br>(168) 3560<br>(169) 3500<br>(170) 3400<br>(171) 3100<br>(172) 3500<br>(173) 3600<br>(173) 3600<br>(175) 2647<br>(176) 3856<br>(177) 3542 |            | A3.        |
|  | (127) 3000<br>(129) 3111<br>(129) 3111<br>(130) 3111<br>(131) 3111<br>(131) 3111<br>(132) 3000<br>(133) 2900<br>(133) 2900<br>(134) 2800<br>(134) 2750<br>(137) 2800<br>(137) 2800<br>(137) 2800<br>(137) 2400<br>(139) 2400<br>(140) 2555   | (145) 2500<br>(146) 2500<br>(147) 2500<br>(147) 2500<br>(147) 2480<br>(150) 2480<br>(151) 2480<br>(151) 2480<br>(152) 2480<br>(153) 2400<br>(154) 2350<br>(155) 2300<br>(156) 2666<br>(157) 2333<br>(158) 2330                             | (153) 2350<br>(164) 2350<br>(165) 2350<br>(165) 2350<br>(166) 2350<br>(166) 2350<br>(167) 2350<br>(170) 2350<br>(171) 2350<br>(172) 2350<br>(172) 2350<br>(175) 2350<br>(175) 2350<br>(176) 2350               |            |            | (109) 3600<br>(110) 3500<br>(111) 3500<br>(111) 3500<br>(112) 3400<br>(113) 3200<br>(114) 3100<br>(115) 2800<br>(114) 2800<br>(117) 2800<br>(117) 2800<br>(119) 2800<br>(120) 2800<br>(122) 2800<br>(122) 2800<br>(124) 2800  | (127) 2800<br>(128) 2800<br>(129) 3100<br>(130) 2800<br>(131) 2800<br>(131) 2800<br>(132) 2800<br>(133) 2800<br>(135) 2800<br>(135) 2800<br>(135) 2800<br>(137) 2850<br>(139) 2850<br>(139) 2850<br>(139) 2900<br>(140) 3000<br>(141) 3100 | (145) 3200<br>(144) 3300<br>(147) 3400<br>(148) 3500<br>(149) 3400<br>(150) 3600<br>(151) 3600<br>(151) 3600<br>(151) 3600<br>(155) 3600<br>(155) 3600<br>(155) 3600<br>(158) 3600<br>(159) 3600<br>(159) 3600 | (153) 3600<br>(154) 4300<br>(155) 3960<br>(166) 3600<br>(157) 3542<br>(168) 3500<br>(170) 3400<br>(171) 3500<br>(172) 3500<br>(172) 3500<br>(172) 3600<br>(174) 2300<br>(175) 2687<br>(176) 3542<br>(176) 2300 |            | A3.        |
| 07) 2700<br>10) 2500<br>11) 2500<br>12) 2600<br>13) 2530<br>14) 2530<br>15) 2530<br>15) 2530<br>15) 2530<br>15) 2650<br>17) 2700<br>18) 2700<br>19) 2700<br>20) 2800<br>21) 2850<br>22) 2850<br>23) 2850             | (127) 3000<br>(128) 3111<br>(129) 3111<br>(130) 3111<br>(131) 3111<br>(131) 3111<br>(132) 3000<br>(133) 2900<br>(133) 2900<br>(134) 2800<br>(135) 2859<br>(136) 2750<br>(137) 2800<br>(137) 2800<br>(137) 2800<br>(137) 2800<br>(137) 2800<br>(137) 2800<br>(137) 2800<br>(137) 2800<br>(140) 2555<br>(141) 2700 | (145) 2500<br>(146) 2500<br>(147) 2500<br>(147) 2500<br>(147) 2500<br>(150) 2480<br>(150) 2480<br>(151) 2480<br>(152) 2480<br>(152) 2480<br>(153) 2400<br>(155) 2400<br>(155) 2300<br>(156) 2666<br>(157) 2333<br>(158) 2330<br>(159) 2340 | (153) 2350<br>(154) 2350<br>(155) 2350<br>(155) 2350<br>(165) 2350<br>(167) 2350<br>(164) 2350<br>(164) 2350<br>(170) 2350<br>(171) 2350<br>(172) 2350<br>(173) 2350<br>(175) 2350<br>(175) 2350<br>(177) 2350 |            |            | <pre>(109) 3600<br/>(110) 3500<br/>(111) 3500<br/>(112) 3400<br/>(113) 3200<br/>(114) 3100<br/>(115) 2800<br/>(114) 2800<br/>(117) 2800<br/>(118) 2800<br/>(118) 2800<br/>(119) 2800<br/>(119) 2800<br/>(120) 2800<br/>(121) 2800<br/>(122) 2800<br/>(123) 2800</pre> | (127) 2800<br>(128) 2800<br>(129) 3100<br>(130) 2800<br>(131) 2800<br>(131) 2800<br>(132) 2800<br>(133) 2800<br>(135) 2800<br>(135) 2800<br>(135) 2800<br>(137) 2850<br>(137) 2850<br>(137) 2900<br>(140) 3000<br>(140) 3000               | (145) 3200<br>(146; 3300<br>(147) 3400<br>(148) 3500<br>(150) 3600<br>(151) 3600<br>(151) 3600<br>(151) 3600<br>(155) 3600<br>(155) 3600<br>(155) 3600<br>(157) 4200<br>(158) 3600<br>(159) 3600               | (153) 3600<br>(154) 4360<br>(155) 3960<br>(166) 3600<br>(157) 3542<br>(168) 3560<br>(169) 3500<br>(170) 3400<br>(171) 3100<br>(172) 3500<br>(173) 3600<br>(173) 3600<br>(175) 2647<br>(176) 3856<br>(177) 3542 |            | A3.        |

Phosphorus concentration of Paarl wastewater effluent: Periods 5 and 6

Phosphorus transport Berg River

TR 143 March 1989

......

~3

| 1 | 1)  | 8500  | (   | 19) | 10000 | (   | 37) | 9600         |     | 55) | <b>99</b> 00 | •   | 73) |
|---|-----|-------|-----|-----|-------|-----|-----|--------------|-----|-----|--------------|-----|-----|
|   | 2)  | 8500  |     | 205 | 10000 | •   | 38) | 9600         |     |     | 10000        | (   |     |
|   | 31  | 8600  | (   | 21) | 10000 | •   | 39) | 96ŮŬ         | (   |     | 10000        | •   | 75) |
| t | 4)  | 8600  | (   | 22) | 9995  | - 6 | 40) | 9600         | (   |     | 10000        | 1   | 76) |
|   | 5)  | 8500  |     | 23) | 9999  | •   | 41) | <b>96</b> 00 | (   | 59) | 10000        | (   | 77) |
| ( | 6)  | B600  | (   | 24) | 9500  | (   | 42) | 9550         | (   |     | 10000        | - ( | 78) |
|   | 7)  | 8500  | E   | 25) | 9500  | - ( | 43) | 955Ù         | 1   | 61) | 19280        | - ( | 79) |
| t | 8)  | 8700  | 1   | 26) | 9600  | {   | 44) | 9550         | - ( | 62) | 10000        | •   | 801 |
| - | 91  | 8770  | - Č | 27) | 9600  | (   | 45) | 9650         | (   | 63) | <b>97</b> 00 | (   | 81) |
| ĺ | 10) | 8770  | Ċ   | 28) | 9600  | (   | 46) | 9650         | - ( | 64) | <b>97</b> 00 | (   | 82) |
|   | 111 | 8700  | 1   | 29) | 9600  | 1   | 47) | 9650         | (   | 65) | 9600         | (   |     |
|   | 12) | 8890  | Ċ   | 30) | 9700  | - ( | 48) | 9700         | (   | 66) | 9600         | - ( | 84) |
|   | 131 | 9200  | (   | 31) | 9700  | - ( | 47) | 9800         | (   | 67) | 9600         | -   | 85) |
|   | 14) | 9500  | 1   | 32) | 9700  | 1   | 50) | 9800         | 1   | 68) | 9650         | •   | 86) |
|   | 151 | 9600  | Ċ   | 331 | 9700  | (   | 51) | 9800         | - ( | 69) | 9600         | - ( | 87) |
|   | 15) | 4700  | Ċ   | 34) | 9700  | t   | 52) | 9900         | E   | 7Ú) | 9500         | * * | 88) |
|   | 17) | 9800  | i   | 35) | 9800  | - t | 53) | 9900         | ٤   | 71) |              | 1   | 84) |
|   | 185 | 10000 | Ċ   | 3á) | 9700  |     | 54) | 9900         | L   | 72) |              | . ( | 90) |

| (1) 7000 (19                   | 7410 (3     | 57) 7000 (         | 55) 7200 ( | 731 7500         | ( 91) 7600 |
|--------------------------------|-------------|--------------------|------------|------------------|------------|
| ( 2) 7000 ( 20                 | ) 7211 (3   | 38) 7200 (         | 56) 7200 ( | 74) 7600         | ( 92) 7650 |
| • • • •                        |             | 39) 7200 (         | 57) 7200 ( | 75) 7800         | ( 93) 7777 |
|                                |             | 10) 7361 (         | 58) 7220 ( | 76) 7800         | ( 94) 7800 |
|                                |             | 1) 7000 (          | 59) 7200 ( | 77) 7800         | ( 95) 7900 |
|                                |             |                    |            | 78) 7800         | ( 96) 8100 |
| • • • • • • •                  |             |                    |            | 791 7960         | ( 97) 8300 |
| • • • • • •                    |             |                    |            | 80) 7600         | ( 98) 8500 |
| • • • • • •                    |             |                    | 63) 7270 ( | 81) 7600         | ( 99) 8800 |
|                                | ,           |                    |            | 82) 7600         | (100) 9750 |
|                                |             |                    | 65) 7270 ( | 83) 7430         | (101) 8990 |
| • • • •                        | • • • • • • |                    |            |                  | (102) 8500 |
| (12)7200 (30                   |             | ,                  |            | 84) 7430         |            |
| (13) 7000 (3)                  | () 7210 (4  |                    |            | 85) 7430         | (103) 8200 |
| (14) 7000 (33                  | 2) 7210 ( 5 | 50) <b>75</b> 20 ( | 68) 7300 ( | 86) 7430         | (104) 8100 |
|                                | 5 7000 (5   | 51) 7500 (         | 69) 7300 ( | 87) 743 <u>0</u> | (105) 7900 |
|                                |             | 52) 7891 (         | 70) 7400 ( | 88) 7500         | (106) 7800 |
|                                |             |                    | 71) 7450 ( | 89) 7600         | (107) 7700 |
| <b>( - · · · · · · · · · ·</b> |             |                    | 72) 7400 ( | 90) 7600         | (108) 7050 |
|                                |             |                    |            |                  |            |

\_\_\_\_\_

A3.8

TR 143 March 1989

| ( 91) | (109) | (127) | (145) | •    | (163) | 8010         |
|-------|-------|-------|-------|------|-------|--------------|
| ( 92) | (110) | (128) | (146) |      | (164) | 8100         |
| ( 93) | (111) | (127) | (147) |      | (155) | 8200         |
| ( 94) | (112) | (130) | (148) | 6100 | (156) | <b>8</b> 300 |
| ( 95) | (113) | (131) | (147) | 6090 | (157) | 8300         |
| ( 90) | (114) | (132) | (150) | 6200 | (198) | 8350         |
| (97)  | (115) | (133) | (151) | 6000 | (159) | 8350         |
| ( 98) | (116) | (134) | (152) | 6400 | (170) | 8350         |
| (99)  | (117) | (135) | (153) | 6800 | (171) | <b>B</b> 360 |
| (100) | (118) | (135) | (154) | 7000 | (172) | <b>B</b> 390 |
| (101) | (119) | (137) | (155) | 7200 | (173) | 8390         |
| (102) | (120) | (138) | (156) | 7500 | (174) | 8390         |
| (103) | (121) | (139) | (157) | 7500 | (175) | 8400         |
| (104) | (122) | (140) | (158) | 7800 | (176) | 8500         |
| (105) | (123) | (141) | (159) | 787¢ | (177) | 8400         |
| (10a) | (124) | (142) | (160) | 7870 | (178) | 8300         |
| (107) | (125) | (143) | (161) | 7870 | (179) | 8200         |
| (108) | (126) | (144) | (162) | 8000 | (180) | 8100         |

| (109) 7100 | (127) 7600 | (145) 8900 | (163) 6800 |
|------------|------------|------------|------------|
| (110) 7100 | (128) 7600 | (146) 8900 | (154) 6800 |
| (111) 7100 | (129) 7500 | (147) 6700 | (155) 6800 |
| (112) 7100 | (130) 7300 | (146) 5800 | (186) 6800 |
| (113) 7100 | (131) 7600 | (149) 6800 | (157) 6800 |
| (114) 7200 | (132) 7531 | (150) 6800 | (168) 6800 |
| (115) 7200 | (133) 7660 | (151) 6800 | (169) 6800 |
| (116) 7200 | (134) 7660 | (152) 6800 | (170) 6800 |
| (117) 7200 | (135) 7660 | (153) 6800 | (171) 6900 |
| (118) 7300 | (136) 7656 | (154) 6800 | (172) 7200 |
| (119) 7320 | (137) 7666 | (155) 4800 | (173) 7500 |
| (120) 7330 | (138) 7665 | (156) 5800 | (174) 7800 |
| (121) 7400 | (139) 7666 | (157) 6800 | (175) 8500 |
| (122) 7450 | (140) 7500 | (158) 4800 | (176) 8600 |
| (123) 7400 | (141) 7400 | (159) 6800 | (177) 8600 |
|            | (142) 7300 | (160) 6800 | (178) 8500 |
|            | (143) 7200 | (161) 6800 | (179) 9100 |
|            |            |            | (180) 9100 |
| (126) 7600 | (144) 7000 | (162) 6800 | (100) 7100 |
| *******    |            |            |            |

Variable: WSTWT2.wstwt\_2 (length = 180)

Phosphorus concentration of Wellington wastewater effluent: Periods 1 and 2

|   | 1)         | 8600  | 1          | (9)             | 10000        | (   | 37) | 9600 | 1   | 55) | <b>99</b> 00 | <u>ا</u> | 73) | 9500         |
|---|------------|-------|------------|-----------------|--------------|-----|-----|------|-----|-----|--------------|----------|-----|--------------|
|   |            |       |            | 20)             | 10000        | ì   | 38) | 9600 | (   | 56) | 16000        | - C      | 74) | 9500         |
|   | 2)         | 8600  |            | $\frac{20}{21}$ | 10000        | - 2 | 39) | 9600 | - i | 57) | 10000        | - C      | 75) | 9500         |
| C | 3)         | 8500  |            |                 | 9995         | - 2 | 40) | 9600 | ì   | 58) | 10000        | (        | 76) | 9500         |
| ( | 4)         | 8600  |            | 22)             | 9999         | - 2 | 41) | 9600 | i   | 59) | 10000        | (        | 77) | 9600         |
| ( | 5)         | 8600  |            | 23)             | 7777<br>9500 | - 2 | 42) | 9550 | - 2 | 601 | 10000        | i.       | 78) | 9650         |
| • | <b>4</b> ) | 8600  |            | 24)             | 9500         | - ) | 43) | 9550 | ì   | 61) | 10380        | Ċ        | 79) | 9700         |
| ( | 23         | 8600  | Ę          | 25)             | 9600         |     | 44) | 9550 | ì   | 62) | 10000        | Ċ        | 80) | 9700         |
| ( | 6)         | 8700  | Ę.         | 26)             |              | - ) | 451 | 9650 | ì   |     | 9700         | Ē        | 81) | 97000        |
| ( | 41         | 8/70  | <u> </u>   | 27)             | 7600<br>7600 | - 2 | 46) | 9650 | ì   | 64) | 9700         | Ċ        | 82) | <b>97</b> 00 |
| ( | TÓ)        | 6770  |            | 28)             | 7600<br>9600 | - 2 | 47) | 9550 | ì   | 651 | 9600         | Ċ        | 631 | 9700         |
|   | 11)        | 8700  | - Ç        | 29)             |              |     | 40) | 9700 | ì   | 66) | 9600         | Ċ        | 84) | 9800         |
|   | 12)        | 8690  |            | -               | 9700<br>9700 | - 2 | 49) | 9800 | ì   | 67) | 9500         | Ċ        | 85) | 9800         |
| ( | 13)        | 9200  | <u> </u>   |                 | 9700<br>9700 | Ż   |     | 9800 | Ż   | 68) | 9650         | Ē        | 86) | 980ú         |
| ( | 14)        | 9500  | . !        | 32)             | 9700         | - 1 | 51) | 9800 | ì   | 69) | 9600         | Ċ        | 87) | 9800         |
| ( | 15)        | 9600  | - ť        | 33)             | 9700         | - } | 52) | 9900 | ì   | 70) | 9500         | i        | 88) | 9850         |
| ( | 15)        | 9700  | <u> </u>   | 34)             | 9800         | - ) | 53) | 9900 | 1   | 71) | 9500         | Ċ        | 89) | 9860         |
| ¢ | 17)        | 9800  | _ <u>;</u> | 351             | 9700         | - 2 | 54) | 9400 | ì   |     | 9500         | Ċ,       | 90) | <b>486</b> 0 |
| ( | 18)        | 10000 | ્ય         | 36)             | 4700         | •   |     |      |     |     |              |          |     |              |

| 1)     | 9500         | 1   | 19) | 9500 | (   | 37)    | 5420 |     |     | 5500  |            |             | 4360 | ( 91) |       |
|--------|--------------|-----|-----|------|-----|--------|------|-----|-----|-------|------------|-------------|------|-------|-------|
|        | 9500         | ì   | 201 | 9500 | •   | 3ġ)    | 5400 | (   | 56) | 5500  | - (        |             | 4360 | •     | 5555  |
|        | 9500         | ì   | 21) |      | Ċ,  | - 59 E | 5400 | (   | 57) | 5510  | - C        |             | 4360 | ( 93) | 5555  |
|        | 4500         | - 2 | 22) |      | ì   | 40)    |      | ć   | 58) | 5570  | - (        |             | 4360 |       | 5555  |
|        |              | - 2 |     | 9510 | - 2 | 411    |      | i   | 59) | 557Ŭ  | (          | 77)         | 4326 |       | 5555  |
|        | 9500         | - 5 |     | 9510 | - 7 | 42)    | -    | i   | 601 | 557Q  | (          | 78)         | 4360 | (96)  |       |
|        | 9500         |     |     |      | - 2 | 431    |      | ì   | 61) |       | i          | 79)         | 4360 | ( 97) | \$200 |
|        | 9500         | ļ   |     | 9510 | - 5 | 44)    |      | 2   | 62) |       | i          | 80)         | 4500 | ( 96) | 5950  |
|        | 9500         | . ( | -   | 9510 |     |        |      |     |     | 5000  | - è        | <b>e</b> r) | 4700 | ( 99) | 5500  |
| 9)     |              | - ( |     | 9510 | - 5 | 45)    | •    | •   | 64) |       | ì          |             | 4700 | (100) | 5555  |
| 101    | 9500         | (   |     | 9510 | . ( |        |      |     |     | 4800  | - 2        | 83)         |      | (101) | 5555  |
| 11)    | 9500         | - ( |     | 9510 |     | 47)    |      | -   | 66) |       |            |             | 5000 |       | 5555  |
| (12)   | <b>75</b> 00 | - ( |     | 9510 | ļ   | -48)   | -    | -   | -   | • • • | ì          | 85)         |      | (103) |       |
| ( 13)  | 9500         | - ( | 31) | 9510 | - 6 |        | 5500 | -   | 67) |       | - 2        |             | 5300 | (104) |       |
| (14)   | 9500         | - ( | 32) |      | (   | 5Q)    |      | -   | 6B) | • •   |            | 97)         |      | (105) | -     |
| (15)   | 9500         | (   | 33) | 7500 | (   |        |      |     | 49) |       | - !        |             | 5490 | (105) |       |
| ( 16 ) | 9500         | - ( | 34) | 6800 | . ( | 521    | -    |     |     | 4360  | . !        |             | 5400 | (107) |       |
| ( 17)  | 9500         | - ( | 35) | 6000 | - ( | 52)    | 5500 |     |     | 4390  | . <u>(</u> |             |      | (107) |       |
| ( 19)  |              | ć   | 36) | 5700 |     | 54)    | 5800 | • • | 72) | 4360  | •          | 20)         | 5400 | (100) | 6000  |

| ( 91) | <br>7860 | (107) | 9700         | (127) | 9900  | (145) | 6000          | (143) | 8010         |
|-------|----------|-------|--------------|-------|-------|-------|---------------|-------|--------------|
| 6 92) | 9860     | (110) | 9760         | (128) | 10100 | (146) | 2200          | (164) | 8100         |
| 1 93) | 9800     | (111) | 9760         | (129) | 10200 | (147) | 6100          | (145) | 8200         |
| { 94} | 9800     | (112) | 9700         | (13ù) | 12345 | (148) | 6100          | (166) | 8300         |
| (95)  | 9700     | (113) | 9700         | (131) | 10320 | (149) | 6090          | (167) | 8300         |
| ( 46) | 9700     | (114) | 9700         | (132) | 10320 | (150) | 6200          | (168) | 8350         |
| ( 97) | 9700     | (115) | 9700         | (133) | 10333 | (151) | 6300          | (169) | 8350<br>6750 |
| (98)  | 9700     | (114) | 9700         | (134) | 8000  | (152) | 6400          | (170) | 8050<br>8090 |
| ( 99) | 9700     | (117) | 9700         | (135) | 8100  | (153) | 6800          | (171) | 8790         |
| (100) | 9700     | (118) | 9700         | (136) | 7800  | (154) | 7000          | (172) | 8390         |
| (101) | 9700     | (119) | 9200         | (137) | 7700  | (155) | 7200          | (173) | 8390         |
| (102) | 9690     | (120) | 8900         | (138) | 7200  | (156) | 7500          | (175) | 8400         |
| (103) | 7400     | (121) | <b>87</b> 00 | (139) | 6900  | (157) | 7500          | (176) | 8500         |
| (104) | 9600     | (122) | 8450         | (140) | 6900  | (158) | 7 <b>9</b> 00 | (177) | 8400         |
| (105) | 9600     | (123) | 8440         | (141) | 6800  | (159) | 7870          | (178) | 8300         |
| (106) | 9600     | (124) | 8800         | (142) | 6700  | (160) | 7870          | (179) | 8200         |
| (107) | 9700     | (125) | 8900         | (143) | 6500  | (151) | 7870<br>8000  | (180) | 8100         |
| (108) | 9700     | (126) | 9960         | (144) | 6400  | (152) | 8000          | (100) |              |

| 109)  | 6300 | (127) |      | (145) |      | (163) |      |  |
|-------|------|-------|------|-------|------|-------|------|--|
| (011  | 6400 | (123) | 7400 | (145) |      | (164) |      |  |
| 111)  |      | (129) | 7400 | (147) | 7600 | (155) |      |  |
| 112)  |      | (130) |      | (148) | 7700 | (166) |      |  |
| 113   |      | (131) |      | (147) | 7608 | (147) | 9100 |  |
| (114) |      | (132) |      | (150) |      | (168) | 9100 |  |
|       |      | (133) |      | (151) |      | (159) | 9100 |  |
| 115)  |      |       |      | (152) |      | (170) | 9100 |  |
|       | 6970 | (134) |      | (153) |      | (171) |      |  |
| (117) | 697ú | (135) |      | • • • |      | (172) |      |  |
| (118) | 6470 | (135) | 7200 | (154) | -    | (1/2) | 4170 |  |
| (119) |      | (137) | 7200 | (155) | 8510 |       |      |  |
| (120) | 6970 | (138) | 7200 | (156) | 6480 |       |      |  |
| (121) | 7000 | (139) | 7200 | (157) | 8400 |       |      |  |
| (122) |      | (140) | 7200 | (158) | B400 |       |      |  |
|       |      | (141) |      | (157) |      |       |      |  |
| (123) |      |       |      |       |      |       |      |  |
| (124) | 7300 | (142) | 7200 | (160) |      |       |      |  |
| (125) | 7300 | (143) | 7300 | (161) |      |       |      |  |
|       | 7400 | (144) | 7300 | (162) | 8700 |       |      |  |
|       |      | ~     |      |       |      |       |      |  |

Phosphorus concentration of Wellington wastewater effluent: Periods 3 and 4

A3.10

Phosphorus concentration of Wellington wastewater effluent: Periods 5 and 6

\_\_\_\_

| ( 91) 11500   | (109) 11360           | (127) 11050 | (145) 12200   | (163) 10900 |
|---------------|-----------------------|-------------|---------------|-------------|
| (42) 11500    | (110) 11990           | (128) 11000 | (146) 12500   | (154) 10900 |
|               | (111) 12100           | (129) 11300 | (147) 12700   | (165) 10900 |
| 931 11500     |                       | (130) 11300 | (148) 12800   | (166) 10900 |
| 94) 11500     | (112) 12100           |             | (149) 12870   | (167) 10800 |
| 95) 11500     | (113) 12500           | (131) 11300 |               | (168) 10900 |
| 96) 11500     | (114) 12800           | (132) 11500 | (150) 12900   |             |
| 97) 11500     | (115) 12500           | (133) 11800 | (151) 13000   | (169) 11000 |
| 96) 11600     | (116) 12800           | (134) 11700 | (152) $13100$ | (170) 11000 |
|               | (117) 12900           | (135) 11900 | (153) 13270   | (171) 11000 |
| 99) 11600     | (118) 12000           | (136) 12200 | (154) 13270   | (172) 11200 |
| 100) 11400    |                       | (137) 12200 | (155) 10900   | (173) 11100 |
| 101) 11600    | (119) 11800           |             | (156) 12800   | (174) 11230 |
| (102) $11600$ | (120) 11600           | (138) 12200 |               | (175) 11200 |
| 103) 11800    | (121) 11500           | (139) 12200 | (157) 12200   |             |
| (104) 11900   | (122) $11400$         | (140) 12270 | (158) 12100   | (176) 11200 |
| (105) 11800   | (123) 11320           | (141) 12300 | (159) 12000   | (177) 11300 |
|               | (124) 11200           | (142) 12300 | (160) 11500   | (178) 11300 |
| (106) 11700   | · · · · · · · · · · · | (143) 12200 | (161) 11150   | (179) 11300 |
| (107) 11800 - | (125) 11200           |             | (162) 11000   | (180) 11200 |
| (108) 11800   | (126) 11100           | (144) 12200 | (101) 11000   |             |

|                |              |       |      | ~     |      |       |      |       |      |
|----------------|--------------|-------|------|-------|------|-------|------|-------|------|
| (91)           | 4550         | (109) | 5900 | (127) | 6500 | (145) | 7600 | (163) | 8200 |
| 92)            | 4600         | (110) | 5855 | (128) | 8700 | (145) | 7600 | (154) | 7000 |
| 93)            | 4680         | (111) | 5555 | (129) | 6900 | (147) | 7500 | (165) | 7605 |
| 94)            | 4700         | (112) | 5400 | (130) | 6400 | (148) | 7800 | (166) | 7500 |
| · 741<br>· 75) | 4800         | (113) | 5300 | (131) | 7000 | (149) | 7900 | (167) | 7000 |
|                | 4900         | (114) | 7100 | (132) | 7000 | (150) | 7600 | (148) | 6542 |
| 96)            | 4857         | (115) | 5421 | (133) | 7000 | (151) | 7400 | (169) | 6500 |
| 97)            | 4900         | (116) | 5555 | (134) | 7000 | (152) | 7600 | (170) | 8200 |
| (98)           | 4900         | (117) | 5600 | (135) | 7000 | (153) | 7600 | (171) | 6500 |
| 99)            | 4900         | (118) | 5642 | (136) | 7000 | (154) | 7500 | (172) | 6500 |
| (100)          |              | (110) | 5700 | (137) | 7100 | (155) | 7000 | (173) | 6500 |
| 101)           | 7500         | (117) | 5800 | (138) | 7200 | (156) | 8300 | (174) | 6500 |
| (102)          | 8000<br>8000 |       | 7400 | (139) | 7300 | (157) | 2000 | (175) | 5555 |
| (103)          | 7400         | (121) | 5900 | (140) | 7400 | (158) | 7000 | (176) | 5400 |
| (104)          | 6500         | (122) |      | (141) | 7300 | (159) | 7000 | (177) | 8400 |
| (105)          | 6200         | (123) | 6100 | (142) | 7400 | (160) | 7500 | (178) | 5577 |
| (106)          | 6200         | (124) | 6100 | • - • | 7500 | (151) | 6500 | (179) | 5789 |
| (107)          | 6700         | (125) | 6200 | (143) |      | (151) | 6500 | (180) | 5897 |
| (108)          | 6000         | (126) | 6500 | (144) | 7500 | (104) | 0000 |       |      |

\_\_\_\_

| Va | r190 | leat ₩ST     | WT5.wstwt_5 | (length = 180)             |                 |                                       |
|----|------|--------------|-------------|----------------------------|-----------------|---------------------------------------|
|    |      | <br>9670     | ( 19) 10100 | ( 37) 113/0                | ( 55) 11100     | ( 73) 11200                           |
|    | 1)   | -            | ( 20) 10200 | ( 38) 11400                | ( 56) 11100     | ( 74) 11300                           |
| (  | 2)   | 9670         | ( 21) 10300 | ( 39) 11300                | ( 57) 11130     | ( 75) 11200                           |
| (  | 3)   | 9600         | ( 22) 10300 | ( 40) 11300                | ( 58) 11210     | ( 76) 11200                           |
| 1  | 4)   | 9700         | ( 23) 10500 | ( 41) 11300                | ( 59) 11210     | ( 77) 11200                           |
| •  | 5)   | 9700         | (24) 10800  | 1 42) 11600                | ( 60) 11120     | ( 78) 11250                           |
| •  | 6)   | 9700         |             | (43) 11200                 | 1 611 11139     | ( 79) 11250                           |
| (  | 7)   | 9700         | ·/ - ··     | (44) 11230                 | ( 62) 11310     | ( 80) 11250                           |
| ť  | B)   | 9700         | ( 25) 11200 | ( 45) 11300                | ( 63) 11130     | (81) 11250                            |
| t  | 9)   | 9800         | ( 27) 11300 |                            | ( 64) 11200     | ( 82) 11300                           |
| (  | 10)  | 9800         | (28) 11500  | ( 46) 11340<br>{ 47) 11200 | ( 65) 11250     | ( 83) 11500                           |
| •  | 11)  | <b>78</b> 00 | ( 29) 11800 |                            | ( 66) 11200     | ( 84) 11400                           |
| •  | 12)  | 9700         | ( 30) 11900 | ( 48) 11200                | ( 67) 11200     | ( 85) 11400                           |
| (  | 13)  | 9700         | ( 31) 11500 | ( 49) 11200                | ( 48) 11200     | (86) 11500                            |
| (  | 14)  | 9700         | ( 32) 11500 | ( 50) 11200                | · · · · · · · · | ( 87) 11500                           |
| (  | 15)  | 9700         | ( 33) 11200 | ( 51) 11100                |                 | ( 88) 11200                           |
| ì  | 16)  | 9700         | ( 34) 11300 | ( 52) 11100                | ( 70) 11200     | ( 89) 11200                           |
| i  | 17)  | 9700         | ( 35) 11360 | ( 53) 11100                | (71) 11200      | (90) 11500                            |
| i  | 18)  | <b>97</b> 00 | ( 36) 11400 | ( 54) 11100                | ( 72) 11200     | · · · · · · · · · · · · · · · · · · · |

| V d | r Lai | 31 GF 2 | MG ( M) | <b>.</b> |     |       | ••• |     |       |     |            |       |          |             |      |
|-----|-------|---------|---------|----------|-----|-------|-----|-----|-------|-----|------------|-------|----------|-------------|------|
|     |       | 1092    |         |          | .9) | 11570 | ·   | 37) | 10770 | (   | 55)        | 6500  | t        | 73)         | 5400 |
| •   |       |         |         |          | 105 | 11400 | i   | 38) | 10000 | Ċ   | 561        | 6500  | - C      | 74)         | 4300 |
| L.  | 2)    |         |         | • -      | 21  | 11400 | - 2 | 39) | 10000 | i   | 57)        | 6200  | 1        | 75)         | 3600 |
| (   |       | 1092    |         | -        |     | 11400 | - 2 | 40) | 10000 |     | 59)        | 7200  | i.       | 76)         | 3700 |
| ¢   | 4)    | 1092    |         | •        | 22) | -     | - ; | 41) | 9000  | - 2 | 59)        | 6100  | Ċ        | 77)         | 3750 |
| ۲.  | 5)    | 1092    |         |          | 231 | 11500 |     | 42) | 9500  | - 2 | 60)        | 6000  | i        | 78)         | 3750 |
| t   | 6)    |         |         |          |     | 11500 | . ! |     |       | - 2 | 61)        | 5900  | ì        | 79)         | 4200 |
| C   | 7)    | 1100    | iù ù    |          | 25) | 11200 | ļ   | 43) | 9100  | - > | 62)        | 5800  | - 2      | 80)         | 3999 |
| C   | 8)    | 1150    | 10 1    | •        | 26) | 11050 | (   | 44) | 10500 |     |            | 5700  |          | B1)         | 4000 |
| (   | 9)    | 1190    | μÚ (    | 17       | 27) | 11050 | - ( | 45) | 9110  | ( ) | 63)        | • • • |          | 82)         | 4100 |
| ŧ   | 10)   | 1179    | 10 ·    | ( )      | 28) | 11000 | . ( | 46) | 8500  | C.  | 64)        | 5500  |          |             | 4200 |
| è   | 11)   | 1150    | ю (     | ( 2      | 29) | 10570 | - ( | 47) | 8500  | (   | 65)        | 5400  | <u> </u> | 83)         | 4100 |
| ì   | 121   | 1150    | 00      | 63       | 30) | 10590 | 1   | 4B) | 8500  | 1   | <b>66)</b> | 7100  |          | 84)         |      |
| ì   |       | 1150    |         | i 3      | 51) | 10570 | (   | 49) | 8200  | (   | 67)        | 7000  | •        | <b>8</b> 5) | 4200 |
| ì   |       |         |         | i :      | 52) | 10590 | (   | 5Ù) | 8000  | . ( | 68)        | 7000  | (        | 86)         | 4800 |
| 2   | 15)   | 1150    |         | •        | 53) | 10599 | (   | 51) | 7900  | - ( | 661        | 7000  | - 0      | 87)         | 4400 |
| 2   | 16)   | 1150    |         | •        | 34) | 10590 | Ċ   | 52) | 7600  | . ( | 70)        | 6500  | - (      | 69)         | 4450 |
| 2   | 17)   | 1150    |         | •        | 55) | 10590 | ì   | 53) | 7500  | t   | 71)        | 6100  | 1        | 83)         | 4505 |
| 2   | 18)   | 1155    |         | •        | 561 | 10700 | ì   | 54) | 7400  | (   | 721        | 5600  | - (      | 90)         | 4545 |
| ١.  | 10)   | 110.    |         | •        |     |       | •   | •   |       |     |            |       |          |             |      |

Variable: WSTWT6.wstwt\_6 (length = 180)

| Station:14b | Period:3 |           |  |  |  |
|-------------|----------|-----------|--|--|--|
| Date:       | (TP)     | Discharge |  |  |  |
| 18          | 110      | .44       |  |  |  |
| 32          | 293      | 4.33      |  |  |  |
| 46          | 188      | . 12      |  |  |  |
| 60          | 64       | . 22      |  |  |  |
| 74          | 23       | . 15      |  |  |  |
| 68          | 58       | . 15      |  |  |  |
| 102         | 69       | . 05      |  |  |  |
| 118         | 68       | . 15      |  |  |  |
| 130         | 82       | . 12      |  |  |  |
| 149         | 75       | . 15      |  |  |  |
| 150         | 78       | .47       |  |  |  |
| 172         | 48       | . 28      |  |  |  |

| eriod:5  | e Pa    | Station:14b |  |  |  |
|----------|---------|-------------|--|--|--|
| isoharge | (TP) Di | Date:       |  |  |  |
| .07      | 49      | 9           |  |  |  |
| .01      | 68      | 23          |  |  |  |
| .01      | 63      | 37          |  |  |  |
| .00      | 71      | 59          |  |  |  |
| .01      | 91      | 78          |  |  |  |
| .01      | 74      | 91          |  |  |  |
| .00      | 63      | 114         |  |  |  |
| .00      | 54      | 127         |  |  |  |
| .07      | 41      | 140         |  |  |  |
| .15      | 48      | 154         |  |  |  |
| 4.88     | 1090    | 164         |  |  |  |

| Station:150 | Period:4      |
|-------------|---------------|
| Date:       | [TP] Discharf |
| 8           | 289 .02       |
| 34          | 413 .01       |

| Station:14b |      | Period:4  |  |  |
|-------------|------|-----------|--|--|
| Date:       | {TP} | Discharge |  |  |
| 6           | 89   | 1.24      |  |  |
| 20          | 49   | . 36      |  |  |
| 34          | 154  | 2.45      |  |  |
| 55          | 400  | 5.05      |  |  |
| 69          | 75   | . 94      |  |  |
| 84          | 330  | 6.02      |  |  |
| 98          | 71   | 1.45      |  |  |
| 111         | 62   | .77       |  |  |
| 125         | 246  | 1.29      |  |  |
| 139         | 55   | .61       |  |  |
| 153         | 63   | .44       |  |  |
| 167         | 25   | . 26      |  |  |

| Station:14b | . <u> </u> | Period:6  |  |  |  |  |
|-------------|------------|-----------|--|--|--|--|
| Date:       | (TP) I     | Discharge |  |  |  |  |
| 10          | 142        | 2.05      |  |  |  |  |
| 19          | 33         |           |  |  |  |  |
| 26          | 69         | 1.04      |  |  |  |  |
| 29          | 131        | 1.24      |  |  |  |  |
| 33          | 61         | . 94      |  |  |  |  |
| 38          | 143        | 1.24      |  |  |  |  |
| 45          | 123        | 1.45      |  |  |  |  |
| 57          | 74         | .94       |  |  |  |  |
| 60          | 90         | 1.04      |  |  |  |  |
| 71          | 282        | 3.98      |  |  |  |  |
| 75          | 130        | 3.49      |  |  |  |  |
| 80          | 150        | 1.68      |  |  |  |  |
| 86          | 32         | 1.24      |  |  |  |  |
| 83          | 400        | 4.15      |  |  |  |  |

| Station:17a | tation:17a |           |
|-------------|------------|-----------|
| Date:       | [TP]       | Discharge |
| 5           | 58         | .01       |
| 21          | 78         | .02       |
| 26          | 70         | .03       |
| 61          | 101        | .02       |
| 71          | 33         | .01       |
| 88          | 98         | .01       |
| 120         | 67         | .01       |
| 127         | 87         | .03       |
| 141         | 53         | .02       |
| 179         | 55         | 2.18      |

.

| Station:17a | L           | Period:2  |  |
|-------------|-------------|-----------|--|
| Date:       | <u>(TP)</u> | Discharge |  |
| 2           | 50          | 1.01      |  |
| 16          | 47          | .45       |  |
| 24          | 21          | . 22      |  |
| 28          | 58          | .21       |  |
| 37          | 23          | .16       |  |
| 41          | 175         | 7.47      |  |
| 64.         | 30          | .78       |  |
| 78          | 27          | 1.42      |  |
| 80          | 24          | .40       |  |
| 100         | 32          | . 22      |  |
| 108         | 37          | 3.52      |  |
| 135         | 303         | .60       |  |
| 150         | 28          | .45       |  |
| 170         | 42          | . 10      |  |

| Station:17 | Station:17a |           |
|------------|-------------|-----------|
| Date:      | [TP]        | Discharge |
| 5          | 27          | .03       |
| 18         | 99          | .14       |
| 32         | 115         | 2.52      |
| 46         | 37          | .01       |
| 60         | 64          | .08       |
| 74         | 31          | .01       |
| 102        | 31          | .01       |
| 116        | 1060        | .02       |
| 130        | 114         | .08       |
| 149        | 37          | <b></b>   |
| 158        | 3640        | .66       |

| Station:17a |      | Period:4  |
|-------------|------|-----------|
| Date:       | [TP] | Discharge |
| 34          | 71   | 2,18      |
| 55          | 237  | 17.57     |
| 69          | 43   | .78       |
| 84          | 437  | 15.43     |
| 98          | 62   | 1.87      |
| 111         | 49   | .60       |
| 125         | 31   | .55       |
| 139         | 23   | .40       |
| 153         | 61   | .28       |
| 167         | l ō  | .12       |

| Station:17a |      | Period:5  |
|-------------|------|-----------|
| Date:       | [TP] | Discharge |
| 9           | 0    | 0         |
| 23          | 15   | .00       |
| 37          | 63   | .02       |
| 164         | 0    | . 30      |

| Station:17a |      | Period:6  |
|-------------|------|-----------|
| Date:       | [TP] | Discharge |
| 10          | 98   | 2.52      |
| 19          | 27   | . 19      |
| 26          | 48   | . 92      |
| 33          | 24   | . 50      |
| 45          | 73   | 1.15      |
| 60          | 29   | . 99      |
| 75          | 180  | 5.20      |
| 86          | 30   | 1.42      |
| 83          | 100  | 11.15     |

Phosphorus transport Berg River

2

| Station:23 | itation:23a |           |
|------------|-------------|-----------|
| Date:      | (TP)        | Discharge |
| 6          | 38          | 5.38      |
| 34         | 39          | 5.36      |
| 55         | 185         | 48.01     |
| 69         | 29          | 3.77      |
| 64         | 217         | 42.01     |
| 88         | 44          | 7.87      |
| 111        | 22          | 2.44      |
| 125        | 24          | 2.61      |
| 139        | 18          | 2.26      |
| 153        | 18          | 1.25      |

Station:23a

Date:

Period:5

.14 .16 .14 .09 .11 .12 .27 .20 7.15 .60

[TP] Discharge

| Station:23 | a Pa     | riod:8  |
|------------|----------|---------|
| Date:      | (TP) Di  | scharge |
| 2          | 14       |         |
| 8          | 15       |         |
| 16         | 10       | - 1     |
| 23         | 10<br>53 | ļ       |
| \$0<br>\$7 | 23       |         |
| 44         |          |         |
| 51         | 7        |         |
| 50         | 18       | 2       |
| 65         | 13       |         |
| 72 /       | 126      | Į       |
| 78         | 93       |         |
| 86         | 21       | [       |
| 83         | 203      |         |
| 100        | 36       |         |
| 107        | 43       |         |
| 114<br>121 | 24<br>24 |         |
| 128        | 22       |         |
| 135        | 27       |         |
| 142        | 23       |         |
| 149        | 15       |         |
| 158        | 13       |         |
| 163        | 15       |         |
| 170        | 13       | 1       |
| 177        | 54<br>64 | 2.44    |
| 10         | 14       | .70     |
| 28         | 25       | 2.28    |
| 33         | 1 14     | 1.26    |
| 45         | 70       | 4.53    |
| 60         | 22       | 3.31    |
| 75         | 85       | 8.91    |
| 88         |          | 2.44    |
| 83         | 400      | 47      |

| Station:23b |      | Period:1  |
|-------------|------|-----------|
| Date:       | [TP] | Discharge |
| 111         | 780  | ,03       |
| 166         | 330  | .04       |
| 173         | 870  | .85       |

| Station:23t |      | Period:2  |  |
|-------------|------|-----------|--|
| Date:       | [TP] | Discharge |  |
| 7           | 120  | . 22      |  |
| 14          | 60   | . 17      |  |
| 21          | 60   | .05       |  |
| 28          | 80   | . 03      |  |
| 35          | 90   | .03       |  |
| 42          | 270  | . 19      |  |
| 49          | 60   | .08       |  |
| 56          | 150  | .12       |  |
| 27          | 330  | . 19      |  |
| 91          | 30   | .04       |  |
| 98          | 30   | . 02      |  |
| 105         | 60   | . 55      |  |
| 112         | 150  | .25       |  |
| 119         | 90   | .08       |  |
| 128         | 90   | .03       |  |
| 133         | 60   | .03       |  |
| 140         | 220  | .14       |  |
| 147         | 90   | .04       |  |
| 154         | 150  | .01       |  |
| 181         | 120  | .01       |  |

| tion:9a | Period:1     |           |
|---------|--------------|-----------|
| Date:   | <b>[T</b> P] | Discharge |
| 5       | 42           | 1.13      |
| 20      | 39           | 1.08      |
| 51      |              | 3.48      |
| 71      | 27           | 1.59      |
| 98      | 47           | 1.28      |
| 107     | 30           | .57       |
| 119     | 37           | . 28      |
| 121     | 25           | ,09       |
| 140     | 40           | .09       |
| 147     | 65           | .62       |
| 173     | 75           |           |
| 179     | 82           | 18.69     |

| orarion    | tation:9a |           |
|------------|-----------|-----------|
| Date:      | [TP]      | Discharge |
| 5          | 26        | 1.58      |
| 18         | 33        | 15.63     |
| 32         | 140       | 8.13      |
| 48         | 15        | .74       |
| 60         | 19        | 3.46      |
| 74         | 27        | . 54      |
| 88         | 22        | .74       |
| 102        | 20        | .51       |
| 116        | l ē       | 3.48      |
| 123        | 24        | 4.53      |
| 130        | 20        |           |
|            | 17        | 1.79      |
| 149        | 27        |           |
| 158<br>172 | 36        |           |

| Station:8a |      | Period:5  |
|------------|------|-----------|
| Date:      | [97] | Discharge |
| 8          | 15   | 1.29      |
| 14         | 14   | 1.91      |
| 23         | 27   | . 90      |
| 37         | 22   | 2,83      |
| 59         | 35   | 2.02      |
| 78         | 77   | 2.15      |
| 91         | 32   | .77       |
| 102        | 48   | 2.54      |
| 114        | 48   | 1         |
| 127        | 27   | . 87      |
| 140        | 28   | 2.15      |
| 154        | 59   | .74       |
| 155        | 90   | 2.02      |
| 156        | 29   |           |
| 181        | 64   |           |
| 162        | 24   |           |
| 164        | 320  |           |

| Station:94 |           | Period:6       |
|------------|-----------|----------------|
| Date:      | [TP]      | Discharge      |
|            | 18        |                |
| 5          | 198       | 78.07          |
| 10         | 52        | 35.77          |
| 11         | 17<br>21  | 10.70          |
| 12<br>18   | 21        | 10.70          |
| 19         | 22        | 2.98           |
| 24         | 32        | 2.27           |
| 24         |           | 21.67          |
| 26<br>29   | 24<br>200 | 84.70          |
| 23         | 27        | 19             |
| 32         | 17        |                |
| 33         | 29        | 11.76          |
| 36         | 45        | 9.68           |
| 39         | 190<br>43 | 33.30          |
| 46         | 190       | 00.00          |
| 47         | 170       | 32.47          |
| 53         | 60        | · · · ·        |
| 57         | 61        | 23.64          |
| 59         | 45        | 26.86<br>22.38 |
| 60<br>60   | 40        | 22.00          |
| 68         | 131       | 29.60          |
| 88         | 118       | 88.90          |
| 68         | 105       | 82.30          |
| 68         | 96<br>64  | 74.60<br>39.50 |
| 69<br>71   | 479       | 107            |
| 1 11       | 636       | 171            |
| 71         | 614       | 255            |
| 72         | 98        | 100            |
| 74         | 88        | 43.50          |
| 74<br>75   | 86        | 103            |
| 60         | 75        | 27.60          |
| 81         | 110       |                |
| 82         | 59        |                |
| 62         | 81        | 30.02<br>19.60 |
| 86<br>68 . | 40        |                |
| 83         | 340       |                |
| 95         | 250       | Ì              |
| 102        | 28        |                |
| 109        | 18        |                |
| 116<br>123 | 18        |                |
| 130        | 20        |                |
| 137        | 42        |                |
|            |           |                |

| tation:9a |      | Period:2  |
|-----------|------|-----------|
| Date:     | [97] | Discharge |
| 2         | 62   | 9.34      |
| 15        | 44   | 8.34      |
| 24        | 33   | 4.72      |
| 31        | 26   | 4.18      |
| 41        | 46   | 70.83     |
| 51        | 50   | 7.90      |
| 64        | 40   | 11.48     |
| 78        | 1 40 | 18.22     |
| 90        | 1 18 | 7.00      |
| 100       | 18   | 4.53      |
| 108       | 42   | 51.09     |
| 135       | 1 58 | 7.90      |
| 150       | 31   | 7.90      |
| 170       | 24   |           |
| 177       | 38   |           |
| 711       | ] ~  |           |

| Station:8a | P       | stind:4  |
|------------|---------|----------|
| Date:      | [TP] Di | ischarge |
| 8          | 53      | 22.38    |
| 20         | 27      | 3.62     |
| 34         | 73      | 24.42    |
| 40         | 54      | 16.20    |
| 55         | 111     | 95       |
| 69         | 56      | 10.40    |
| 84         | 183     | 216      |
| 98         | 62      | 16.89    |
| 111        | 29      | 7.45     |
| 125        | 65      | 7.45     |
| 139        | 36      | 7.00     |
| 153        | 35      | 5.91     |
| 167        | Ĩ       | 7.90     |

| Station:23d | i P      | eriod:2  | ł   | Station:23d | I    | Period:3                                |
|-------------|----------|----------|-----|-------------|------|---|
| Dates       | (TP) D   | lucharge | ſ   | Date:       | (TP) | Discharge                               |
| 2           | 102      | 29.10    | Ĩ   | 2           | 55   |   |
| 1           | 110      |          |     | 5           | 27   | 1.29                                    |
| 14 1        | 85       |          | 1   | 9           | 49   |   |
| 16          | 81       | 11.10    | 1   | 10          | 39   |   |
| 21          | 83       |          | 1   | 16          | 49   | 4.25                                    |
| 24          | 39       | 7,40     | - 1 | 23          | 72   |   |
| 28          | 91       |          |     | 30-         | 84   |   |
| 31          | 43       | 6.40     | - 1 | 32          | 37   | 4.25                                    |
| 35          | 82       | ••••     |     | 37          | 82   |   |
| 42          | 285      | 1        | 1   | 46          | 54   | 1.89                                    |
| 49          | 115      |          |     | 49          | 51   |   |
| 56          | 130      | 5        | 1   | 58          | 231  |   |
| 64          | 80       | 24.30    | - 1 | 50          | 62   |   |
| 76          | 74       | 87.80    | 1   | 62          | 45   |   |
| 90          | 43       | 10.40    |     | 63          | 78   |   |
| 91          | 72       |          |     | 20          | 55   | - * · · · · · · · · · · · · · · · · · · |
| 98          | 60       |          |     | 74          | 53   |   |
| 100         | 57       | 0.10     |     | 17          | 50   |   |
| 105         | 78       | _        |     | 84          | 69   |   |
| 108         | 120      | 189      |     | 80          | 67   |   |
| 112         | 154      |          |     | 91          | 52   |   |
| 119         | 62       | 1        |     | 98          | 37   |   |
| 128         | 82       |          |     | 102         | 51   |   |
| 133         | 84       |          |     | 105         | 274  |   |
| 135         | 69       | 12.70    |     | 112         | 83   |   |
| 140         | 150      |          |     | 119         | 101  |   |
| 147         | 1 113    |          | i   | 128         | 70   |   |
| 150         | 58       | 12.70    |     | 130         | 161  |   |
| 154         | 61       |          |     | 133         | 50   |   |
| 161         | 70       |          |     | 140         | 35   |   |
| 168         | 1 74     |          |     | 147         | 47   |   |
| 170         | 40       | 4.40     |     | 149         | 70   |   |
| 175         | 50       |          |     | 154         | 75   |   |
|             | <u> </u> |          |     | 156         | 154  |   |
|             |          |          |     | 181         | 53   |   |
|             |          |          |     | 160         | 52   |   |
|             |          |          |     | 172         | 71   |   |
|             |          |          |     | 175         | 57   | 1                                       |

| tation:23d |            | Period:4       |
|------------|------------|----------------|
| Dates      | (12)       | Discharge      |
| 4          | 63         |                |
|            | 85<br>63   | 33.80          |
|            | 75         |                |
| 20         | 80         | 08.01          |
| 21         | 97         | 11.10          |
| 21         | 72         | 11.10          |
| 21         | 77<br>91   | 11.10<br>11.10 |
| 22 22      | 60         | 11.10          |
| 22         | 83         | 10,40          |
| 22         | 88         | 10.40          |
| 23         | 68         | 9.80           |
| 23         | 73<br>70   | 9.00<br>9.80   |
| 23         | 61         | 9.80           |
| 24         | 74         | 9.00           |
| 24         | 80         | 8.80           |
| 24 24      | 65<br>56   | 9.10           |
| 25         | 55         | 9,10           |
| 25         | 65         | 9.10           |
| 25         | 04         | 9.10           |
| 25         | 200        |                |
| 32 54      | 400        | 58.10          |
| 59         | 110        |                |
| 40         | 82         |                |
| 53         | 505        |                |
| 55         | 212        | 232            |
| 55<br>55   | 195        |                |
| 55 (       | 201        |                |
| 55         | 221        | 364            |
| 55         | 223        |                |
| 55<br>55   | 215<br>213 |                |
| . 55       | 162        |                |
| 58         | 208        | 356            |
| 56         | 275        |                |
| 56         | 264        |                |
| 58<br>56   | 219<br>187 |                |
| 58         | 204        |                |
| 56         | 219        | 240            |
| 54         | 201        |                |
| 57         | 209        |                |
| 57<br>57   | 216        |                |
| 57         | 183        |                |

| Date | [TP] | Discharge |
|------|------|-----------|
| 57   | 278  | 232       |
| 57   | 166  | 220       |
| 57   | 176  | 210       |
| 57   | 156  | 200       |
| 58   | 150  | 191       |
| 56   | 176  | 177       |
| 68   | 151  | 182       |
| 58   | 151  | 157       |
| 60   | 260  | • • • •   |
| 87   | 115  |           |
| 69   | 87   | 26.50     |
| 74   | 62   |           |
| 61   | 230  |           |
| 84   | 151  | 276       |
| 88   | 150  |           |
| 85   | 105  |           |
| 64   | 95   | 38.70     |
| 102  | 86   |           |
| 109  | 84   |           |
| 111  | 50   | 17.10     |
| 116  | 103  |           |
| 123  | 53   | 17.10     |
| 130  | 78   | 17.10     |
| 137  | 65   |           |
| 139  | 88   | 17.10     |
| 144  | l ši |           |
| 151  | 84   |           |
| 153  | 52   | 10.40     |
| 156  | 1 45 |           |
| 185  | 65   |           |
| 167  | 22   | 3.15      |
| 172  | 55   |           |

| Station:23d Period:5 |              |               |  |  |  |
|----------------------|--------------|---------------|--|--|--|
| Dete:                | (TP) D<br>21 | ischarge      |  |  |  |
| 23                   | 21           | 2.55          |  |  |  |
| 37                   | ii           | 1.49          |  |  |  |
| 59                   | 43           | 2.60          |  |  |  |
| 63                   | 57           | 1.14          |  |  |  |
| 70                   | 65           | . 60          |  |  |  |
| 77                   | 92           | 1.20          |  |  |  |
| 78                   | 42           | 1.28          |  |  |  |
| 01                   | 75           | . 10          |  |  |  |
| 91<br>91             | 37           | 1.80<br>1.73  |  |  |  |
| 96                   | 146          | 2.02          |  |  |  |
| 102                  | 35           | 1.33          |  |  |  |
| 105                  | 38           | 1.59          |  |  |  |
| 112                  | - 34         | 2.74          |  |  |  |
| 114                  | 36           | 2.94          |  |  |  |
| 119<br>128           | 35           | .91<br>.65    |  |  |  |
| 127                  | ว่า          | .70           |  |  |  |
| 133                  | 20           | .65           |  |  |  |
| 140                  | 20           | 1.36          |  |  |  |
| 240                  | 33           | 1.26          |  |  |  |
| 147                  | 1 44         | 5.54          |  |  |  |
| 154<br>154           | 50<br>43     | 1.80          |  |  |  |
| 161                  |              | 3.72          |  |  |  |
| 164                  | 6            | 12.70         |  |  |  |
| 164                  | 55           | 12.70         |  |  |  |
| 165                  | 90           | 9.10          |  |  |  |
| 881                  | 82           | 8.25<br>24.60 |  |  |  |
| 166<br>187           | 81<br>84     | 20.40         |  |  |  |
| 168                  | 103          | 12.70         |  |  |  |
| 188                  | 110          | 9,10          |  |  |  |
| 168                  | 73           | 8.50          |  |  |  |
| 169                  | 62           | 7.40          |  |  |  |
| 170                  | 96           | 6.40          |  |  |  |
| 170<br>171           | 97           | 5.54<br>5.13  |  |  |  |
| 171                  | 108          | 4.74          |  |  |  |
| 172                  | 89           | 4.30          |  |  |  |
| 173                  | 72           | 4.04          |  |  |  |
| 174                  | 79           | 3.72          |  |  |  |
| 175                  | 119          | 3.42          |  |  |  |
| 175                  | 77<br>67     | 3.42          |  |  |  |
| 175<br>176           | 87           | 3.42          |  |  |  |
| 177                  | 65           | 3 42          |  |  |  |
| 177                  | 74           | 3.15          |  |  |  |
| 178                  | 55           | 3.15          |  |  |  |
| 178                  | 56           | 3.15          |  |  |  |
| 179                  | 27           | 4.38          |  |  |  |
| 179<br>160           | 56           | 4.36          |  |  |  |

| tation:23d                 |      | Period:8  | Date | (TP)     | Dischar | 80     | Date       | (TP)           | Dischar | go      | Date | {TP} | Discharg   | •     |
|----------------------------|------|-----------|------|----------|---------|--------|------------|----------------|---------|---------|------|------|------------|-------|
| Date:                      | [TP] | Discharge |      |          |         |        |            |                |         | [       |      |      |            |       |
| 2                          | 63   | 4.04      |      | 33       | 81      | 23.30  |            | 66             | 75      | 21.50   |      | 100  | 69         |       |
|                            | 78   | 3.42      | 1    | 33       | 74      | 25.80  |            | 67             | 130     | 32.50   |      | 101  | 120        |       |
| 2<br>2                     | 83   |           | 4    | 34       | 72      | 21.50  |            | 88             | 140     | 50.60   | - F  | 101  | 130        | 58.40 |
| 3                          | 88   | 3.15      |      | 35       | 79      | 17.10  |            | 69             | 400     | 144.90  |      | 102  | 450        | 30.90 |
| 4                          | 89   | 2.94      |      | 36       | 80      | 14.30  |            | 69             | 450     | 77.10   |      | 103  | 333<br>199 |       |
| 5                          | 101  | 2.55      |      | 36       | 63      | 11.60  | _ <u> </u> | 70             |         | 122.80  | 1    | 103  | 188        | 258   |
| 6                          | 78   | 11.10     |      | 37       | 61      | 10.40  |            | 71             | 200     |         |      | 104  | 160        | 200   |
| 6                          | 74   | 8         |      | 97       | 68      |        |            | 71             | 460     |         |      | 105  | 155        |       |
| i l                        | 69   | 19.20     | 1    | 38       | 94      | 10.40  |            | 72             | 330     | 173     | 1    | 105  | 135        |       |
| ė                          | 103  | 25.20     |      | 38       | 88      | 9.80   |            | 72             | 268     |         | f    | 107  | 87         |       |
| 8                          | 108  | 30.40     |      | 30       | 84      | 9.80   |            | 73<br>73<br>74 | 830     |         |      | 107  |            |       |
| ě                          | 84   | 27.10     |      | 40       | 85      | 12.70  |            | 73             | 450     |         |      | 107  | 88         | 53.10 |
| 9                          | 80   |           |      | 40       | 98      | 20.40  | 1          | 74             | 370     | 118     |      | 108  | 82         | 55.10 |
| 10                         | 71   | 22.10     | 1    | 41       | 117     | 45     | 1          | 75<br>75       | 220     |         |      | 109  | 78         |       |
| 10                         | 89   | 21.50     |      | 42       | 145     | 64.20  |            | 75             | 250     |         | ſ    | 110  | 90         | 41.20 |
| ii l                       | 78   | 20.40     | 1    | 42       | 108     | 40.40  | i          | 75             | 220     | 101     | ł    | 111  | 61         | 41.20 |
| ii l                       | 68   | 18.20     |      | 43       | 89      | 29.10  |            | 76             | 270     | 92.80 · |      | 111  | 77         |       |
| 12                         | 54   | 24.60     | 1    | 44       | 75      | 25.80  |            | 77             | 74      |         |      | 112  | 76         |       |
| 13                         | 54   | 21.50     | 1    | 44       |         |        | 1          | 78             | 69      | 1       | - 5  | 112  | 85         |       |
| 13                         | 73   | 18.20     |      | 45       | 78      | 23.30  |            | 78             | 69      |         |      | 113  | 62         |       |
| 14                         | 71   | 15.20     |      | 45       | 66      | 24.60  |            | 79             | 69      | 42.70   |      | 114  | 91         |       |
| 15                         | 75   | 10.40     | 1    | 48       | 89      | 24.60  | l l        | 79             | 80      |         |      | 114  | 86         |       |
| 15                         | 82   | 9.60      | 1    | 46       | 132     | 38.90  |            | 80             | 69      |         |      | 114  | 56         |       |
| 18                         | 78   | 6.50      | 1    | 47       | 108     | 33.90  |            | 80             | 110     |         | i i  | 115  | 91         | 29.80 |
| 16                         | 59   |           | [    | 48       | 100     | 102.10 | 1          | 81             | 81      | 59      | l.   | 116  | 82         |       |
| 17                         | 71   | 6         |      | 48       | 86      | 43.50  |            | 82             | 78      | ł       |      | 116  | 80         |       |
| 17                         | 69   | 7.40      |      | 49       | 142     | 72     |            | 82             | 110     |         |      | 117  | 73         | 29.10 |
| 18                         | 85   | 6.90      |      | 50       | 110     | 62.50  |            | 83             | 60      | 35.30   |      | 110  | 75         |       |
| 19                         | 87   | 6.40      | 1    | 51       | 99      | 38.20  |            | 84             | 64      | . ]     | 1    | 118  | 71         |       |
| 19                         | 55   | 6.19      |      | 51       | 27      | 29.10  |            | 84             | 86      | 1       |      | 119  | 91         | 78.10 |
| 20                         | 104  | 5.97      |      | 51       | 73      |        |            | 85             | 64      | 34.60   |      | 120  | 150        |       |
| 20                         | 82   | 5.97      | 1    | 52       | 77      | 28.50  | 1          | 88             | 30      | 29.45   | 1    | 121  | 150        | ~~ ~~ |
| 21                         | 78   | 5.54      |      | 53       | áó      | 24.60  |            | 86             | 81      |         |      | 121  | 180        | 33.60 |
| 22                         | 64   | 5.54      | 1    | 53       | 91      | 22.70  |            | 87             | 54      |         | 1    | 121  | 56         |       |
| 22                         | 84   | 5.13      | 4    | 54       | 83      | 22.10  |            | 87             | 44      | 4       | 1    | 122  | 150        |       |
| 22<br>22<br>23             | 79   | 4.74      |      | 55       | 85      | 20.40  | 1          | 66             | 44      | 24.60   |      | 123  | 120        |       |
| 23                         | 55   |           |      | 55       | 84      | 20.40  |            | 69             | 48      | 23.30   |      | 123  | 95         |       |
| 24                         | 84   | 4.74      | 4    | 58       | 84      | 20.40  |            | 69             | 28      |         | (    | 124  | 76         | 26.50 |
| 26                         | 87   | 4.21      | 1    | 57       | 64      | 20.40  |            | 90             | 35      | 20.40   |      | 125  | 70         |       |
| 28<br>27<br>28<br>29<br>29 | 127  | 4.74      |      | 58       | 85      | 24.80  | 1          | 91             | 35      |         |      | 125  | 59         |       |
| 27                         | 62   | 12.70     | l    | 58       | 81      | 33.20  | l          | 82             |         |         | 1    | 128  | 57         |       |
| 28                         | 99   | 22.70     |      | 58       | 78      |        |            | 92             |         |         | 1    | 135  | 55         |       |
| 29                         | 107  | 16.20     |      | 59       | 150     | 30.40  |            | 83             | 280     | 424     |      | 142  | 71         |       |
| 29                         | 81   | 11.90     | 1    | 60       | 500     | 38.70  | 1          | 83             | 172     |         |      | 149  | 55         |       |
| 30                         | 119  | 26.50     | 1    | 60       | 150     | 39.70  | 1          | 94             | 400     | 1       | )    | 156  | 58         |       |
| 30                         | 105  |           |      | 80       | 112     | 41.20  |            | 94             | 375     |         | l l  | 163  | 41         |       |
| 31                         | 80   | 23.30     |      | 61       | 110     | 30,40  |            | 85             | 350     | 398     |      | 170  | 44         |       |
| 31                         | 113  | 44.20     | 1    | 62       | 80      | 27.60  | 1          | 96             | 275     | ļ       | 1    | 177  | 21         |       |
| 32                         | 125  | 42.70     |      | 62       | 80      | 26,50  |            | 96             | 350     | 1       |      |      |            |       |
| 33                         | 83   | 27.80     |      | 62<br>63 | 75      | 25.20  |            | 97             |         | 135     |      |      |            |       |
|                            |      |           | 1    | 64       | 80      | 24,60  | 1          | 86             |         | ſ       |      |      |            |       |
|                            |      |           | 1    | 64       | 80      | 23.30  |            | 89             |         |         |      |      |            |       |
|                            |      |           |      | 65       | 71      |        |            | 99             |         |         |      |      |            |       |
|                            |      |           |      | 68       | 85      | 24     |            | 100            |         | 71.50   |      |      |            |       |

A3,16

Phosphorus transport Berg River

:

. .

.

ţ

.

. .

| STATIO | N 23D E | PERIOD 4  | STATIO | N 23D P | ERIOD 5   |
|--------|---------|-----------|--------|---------|-----------|
| DATE   | [\$\$]  | DISCHARGE | DATE   | [\$\$]  | DISCHARGE |
| 84     | 100     | 276       | 9      | 6       | 2.55      |
| 98     | 0       | 39.70     | 23     | 14      | .51       |
| 111    | 13      | 17.10     | 37     | 12      | 1.49      |
| 125    | 13      | 17.10     | 59     | 0       | 2.60      |
| 139    | 10      | 17.10     | 78     | 24      | 1.26      |
| 153    | 12      | 10.40     | 91     | 1       | 1.80      |
| 167    | 28      | 3.15      | 102    | 9       | 1.33      |
|        |         |           | 114    | 36      | 2.94      |
|        |         |           | 127    | 13      | .70       |
| ,      |         |           | 140 🕚  | 12      | 1.36      |
|        |         |           | 154    | 36      | 1.80      |
|        |         |           | 164    | 19      | 12.70     |
|        |         |           | 178    | 14      | 3.15      |

SUSPENDED SOLIDS CONCENTRATION DATA:

| STATI | ON 23D | PERIOD 6  |
|-------|--------|-----------|
| DATE  | [\$\$] | DISCHARGE |
| 10    | 13     | 21.50     |
| 19    | 23     | 6.19      |
| 26    | 13     | 4.21      |
| 33    | 20     | 25.80     |
| 45    | 17     | 24.60     |
| 60    | · 57   | 41.20     |
| 66    | 87     | 21.50     |
| 75    | 60     | 101       |
| 86    | 20     | 29.45     |
| 93    | 235    | 424       |
| 106   | 22     | 90        |

Phosphorus transport Berg River

| STATIC | N 23A E | ERIOD 4   | STATIO | N 23A P | ERIOD 5   |
|--------|---------|-----------|--------|---------|-----------|
| DATE   | [\$\$]  | DISCHARGE | DATE   | [\$\$]  | DISCHARGE |
| 34     | 22      | 5.36      | 9      | 3       | . 21      |
| 55     | 50      | 48        | 23     | 5       | . 14      |
| 69     | 11      | 3.77      | 37     | 10      | . 16      |
| 84     | 0       | 42        | 78     | 12      | .09       |
| 98     | 30      | 7.87      | 91     | 3       | .11       |
| 111    | 2       | 2.44      | 102    | 3       | . 12      |
| 125    | 9       | 2.81      | 114    | 3       | . 12      |
| 139    | 2       | 2.28      | 127    | 8       | .07       |
| 153    | 2       | 1.25      | 140    | 10      | . 27      |
| 167    | 2       | .81       | 154    | 2       | . 20      |
|        |         |           | 164    | 2       | . 80      |

| 23A P: | ERIOD 6                             |
|--------|-------------------------------------|
| [\$\$] | DISCHARGE                           |
| 3      | 2.44                                |
| 9      | 2.28                                |
| 6      | 1.26                                |
| 26     | 4.53                                |
| 4      | 3.31                                |
| 8      | 8.91                                |
| 230    | 47                                  |
|        | [SS]<br>3<br>9<br>6<br>26<br>4<br>8 |

•••

| STATIO | N 9A PE | RIOD 4    | STATIO | N SA FAI | RIOD 5    |
|--------|---------|-----------|--------|----------|-----------|
| DATE   | [\$\$]  | DISCHARGE | DATE   | [\$\$]   | DISCHARGE |
| 84     | 265     | 216       | 9      | 2        | 1.29      |
| 98     | 15      | 18.90     | 23     | 23       | .90       |
| 111    | Э       | 7.45      | 37     | 8        | 2.83      |
| 125    | 7       | 7.45      | 78     | 4        | 2.15      |
| 139    | 1       | 7.00      | 91     | 17       | .77       |
| 153    | 1       | 5.31      | 102    | 2        | 2.54      |
| 167    | 4       | 7.90      | 114    | 6        | 1 -       |
|        |         |           | 127    | 4        | .87       |
|        |         |           | 140    | 8        | 2.15      |
|        |         |           | 154    | 7        | .74       |

|      |        | STATION 9A | PERIOD 6 |        |           |
|------|--------|------------|----------|--------|-----------|
| DATE | [\$\$] | DISCHARGE  | DATE     | [\$\$] | DISCHARGE |
| 5    | 186    | 78.07      | 71       | 570    | 107.8     |
| 10   | 18     | 35.77      | 71       | 1700   | 171.0     |
| 12   | 2      | 10.70      | 71       | 1460   | 255.0     |
| 19   | 1      | 2,99       | 74       | 50     | 43.5      |
| 24   | 2      | 2.28       | 80       | 11     | 27.6      |
| 26   | 6      | 21.67      | 82       | 12     | 27.8      |
| 29   | 96     | 94.70      | 82       | 45     | 30.0      |
| 31   | 8      | 19.83      | 86       | 9      | 19.6      |
| 33   | 3      | 11.76      | 93       | 315    | 237.6     |
| 38   | 4      | 9.66       |          |        |           |
| 45   | 6      | 33.30      |          |        |           |
| 47   | 52     | 32.47      |          |        |           |
| 57   | 8      | 23.84      |          |        |           |
| 59   | 4      | 26.86      |          |        |           |
| 60   | 4      | 22.38      |          |        |           |
| 68   | 120    | 88.98      |          |        |           |
| 68   | 21     | 82.23      |          |        |           |
| 68   | 19     | 74.85      |          |        |           |
| 69   | 11     | 39.50      |          |        |           |

A3.19

.

ŝ

;

### Phosphorus transport Berg River

......

-

. . . .

الالمريد المحاجر المريو

#### TR 143 March 1989

| STATION | 14B E  | PERIOD 6  |
|---------|--------|-----------|
| DATE    | [\$\$] | DISCHARGE |
| 10      | 150    | 2.05      |
| 19      | 3      | .47       |
| 26      | 27     | 1.04      |
| 29      | 24     | 1.24      |
| 33      | 15     | . 94      |
| 38      | 30     | 1.24      |
| 45      | 20     | 1.45      |
| 57      | 14     | . 94      |
| 60      | 5      | 1.04      |
| 71      | 220    | 3.98      |
| 75      | 79     | 3.49      |
| 80      | 21     | 1.68      |
| 86      | 6      | 1.24      |
| 93      | 165    | 4.15      |

A3.20

----

.

TR 143 March 1989

- -

- - -

|   | e: PAARLO   | l.varl  | (length  | = 369)<br>  |  |  |   |   |  |  |  | (199)  | 1.07  | (217)  | 2.76  | (235)  | 0.62  | (253)  | 0.06   |
|---|---|---|--|---|--|--|---|---|--|--|--|--|---|--|---|--|---|--|--|
| 1)  | 2.76  | (19)  | 0.866  | (37)  | 1  | ( 55)  | 1   | (73)  | 0.87   | (181)<br>(182)   | 0.42<br>0.278  | (200)  | 0.9   | (218)  | 2.544   | (236)  | 0.438   | (254)  | 0.27   |
| 2)  | 2.276   | (29)  | 0.967  | ( 78)   | 1.426  | ( 56)  | 0.624   | (74)  | 0.482  | (183)  | 0.192  | (201)  | 0.93  | (219)  | 1.93  | (237)  | 0.22  | (255)  | 0.2  |
| 3)  | 1.44  | (21)  | 1.21   | ( 39)   | 0.741  | (57)   | 0.93  | (75)  | 1.2  | (184)  | 0.132  | (202)  | 0.966   | (220)  | 1.791   | (238)  | 0.2   | (256)  | 0.18   |
| 4)  | 1.14  | (22)  | 1.14   | (40)  | 0.541  | (58)   | 0.772   | (76)  | 1.326  | (185)  | 0.076  | (203)  | 0.999   | (221)  | 1.36  | (239)  | 0.11  | (257)  | 0.16   |
| 5)  | 1.44  | (23)  | 0.8  | (41)  | 0.77   | ( 59)  | 0.93  | ( 77).  | 1.44   | (186)  | 0.103  | (204)  | 1   | (222)  | 1.213   | (240)  | 0.107   | (258)  | 9.16   |
| 6)  | 1.364   | (24)  | 0.568  | (42)  | 0.568  | (60)   | 0.867   | (78)  | 1.448  | (187)  | 0.076  | (205)  | 1.14  | (222)  | 1.14  | (241)  | 0.076   | (259)  | 0.24   |
| 7)  | 1.27  | (25)  | 0.465  | (43)  | 0.93   | ( 61)  | 1.48  | ( 79)   | 1.13   | (168)  | 0.803  | (206)  | 1.791   | (224)  | 1   | (242)  | 0.076   | (260)  | 0.23   |
| 8)  | 1.268   | (26)  | 0.541  | (44)  | 0.596  | ( 62)  | 1.791   | (80)  | 0.867  | (188)  | 2  | (207)  | 2.2   | (225)  | 0.37  | (243)  | 1.29  | (261) -  | 0.2  |
| 9)  | 0.931   | (27)  | 0.999  | (45)  | 3.72   | ( 63)  | 1.93  | (81)  | 0.741  | (190)  | 2.149  | (208)  | 4.155   | (226)  | 0.772   | (244)  | 0.772   | (262)  | 0.3  |
| 101   | 0.624   | (28)  | 0.867  | ( 46)   | 5,111  | ( 64)  | 2.149   | (82)  | 0.624  |  | 1.68   | (209)  | 3.75  | (227)  | 0.87  | (245)  | 0.624   | (263)  | 0.1  |
| -   | 0.57  | (27)  | 0.999  | (47)  | 3.75   | ( 65)  | 1.5   | (83)  | 0.48   | (191)  | 1.288  | (210)  | 3.178   | (228)  | 0.741   | (245)  | 1.907   | (264)  | 0.1  |
| 11)<br>12)  | 0.514   | ( 30)   | 0.682  | (48)  | 3.459  | (66)   | 1.213   | (84)  | 0.624  | (192)  |  | (211)  | 0.75  | (229)  | 0.87  | (247)  | 3.5   | (265)  | 0.0  |
|   | 0.741   | ( 31)   | 0.999  | ( 47)   | 2.47   | ( 67)  | 0.93  | (85)  | U.74   | (193)  | 1.24   | (211)  | 0.650   | (230)  | 0,867   | (248)  | 2.985   | (266)  | 0.1  |
| 13)   | 0.514   | (32)  | 0.741  | ( 50)   | 2.688  | (68)   | 0.624   | (86)  | 0.624  | (194)  | 1.069  | (212)  | 0.57  | (231)  | 1   | (249)  | 1.76  | (267)  | 0.0  |
| 14)   | 0.741   | (33)  | 3.1  | ( 51)   | 1.44   | ( 67)  | 0.87  | ( 87)   | 0.54   | (195)  | 1.28   | (214)  | 0.514   | (232)  | 0.933   | (250)  | 1.14  | (258)  | 0.0  |
| 15)   | 0.568   | (34)  | 2,688  | (52)  | 1  | ( 70)  | 0.682   | (88)  | 0.624  | (196)  | 0.933  | (214)<br>(215)   | 0.548   | (233)  | 0.74  | (251)  | 0.741   | (267)  | 4.2  |
| 16)   | 0.200   | ( 75)   | 1.68   | ( 53)   | 1.03   | (71)   | Ú.87  | ( 87)   | 0.74   | (197)  | 1.28   |  | 0.867   | (234)  | 0.624   | (252)  | 0.653   | (270)  | 3.4  |
| 17)<br>1H)  | 0.568   | (36)  | 1.689  | (54)  | 0.712  | (72)   | 0.653   | ( 90)   | 0.966  | (198)  | 0.9  | (216)  |   |  |   |  |   |  |  |
| •   |   |   |  |   |  |  | :   | •   |  |  |  |  |   |  |   |  |   |  |  |
| •   |   |   |  |   |  |  | :<br>:  | ,<br>   |  | (271)  | 1.68   | (289)  | 4,05  | (307)  | 0.75  | (325)  | 1.07  | (343)  |  |
| •   |   |   |  | (127)   | 1.29   | (145)  | 1.29  | (163)   | 0.321  | (271)  | 1.68   | (289)  | 4.05  | (307)<br>(308)   |   |  | 1.07<br>1.791   | (343)<br>(344)   | 147  |
| 91)   | 1.29  |   |  |   | 1.29<br>1.069  | (145)<br>(146)   | :<br>1.29<br>1.289  | (163)<br>(164)  | 0.321<br>0.321 :   | (271)<br>(272)   | 1.68<br>0.653  | (289)<br>(290)   | 2.872   |  | 0.75  | (325)  | 1.07  | (343)<br>(344)<br>(345)  | 147  |
| •<br>91)<br>92)   | 1.29  | (109)   | 1.03   | (127)   | 1.27<br>1.069<br>1.28  | (145)<br>(146)<br>(147)  | :<br>1.29<br>1.289<br>1.62  | (163)<br>(164)<br>(165)   | 0.321<br>0.321 :<br>0.133  | (271)<br>(272)<br>(273)  | 1.68<br>0.653<br>1.1   | (289)<br>(290)<br>(291)  | 2.800<br>0.931  | (COB)  | 0.75<br>7.447   | (325)<br>(326)   | 1.07<br>1.791   | (343)<br>(344)<br>(345)<br>(346)   | 147<br>91.0<br>102   |
| 91)<br>92)<br>93)   | 1.27<br>1.213<br>0.87   | (109)<br>(110)  | 1.03   | (127)<br>(129)  | 1.29<br>1.069<br>1.28<br>0.867   | (145)<br>(146)<br>(147)<br>(148)   | :<br>1.29<br>1.289<br>1.62<br>1.448   | (153)<br>(164)<br>(165)<br>(166)  | 0.321<br>0.321 :<br>0.133<br>0.132   | (271)<br>(272)<br>(273)<br>(274)   | 1.68<br>0.653<br>1.1<br>0.514  | (289)<br>(290)<br>(291)<br>(292)   | 2.830<br>0.931<br>0.893   | (C08)<br>(C08)   | 0.75<br>7.447<br>9,66   | (325)<br>(326)<br>(327)  | 1.07<br>1.791<br>5.18   | (343)<br>(344)<br>(345)  | 147<br>91.2<br>122<br>200  |
| +<br>91)<br>92)<br>93)<br>94)   | 1.27<br>1.213<br>0.87<br>0.624  | (109)<br>(110)<br>(111)   | 1.03<br>1.14<br>1.44   | (127)<br>(129)<br>(129)   | 1.29<br>1.069<br>1.28<br>0.867<br>1.44   | (145)<br>(146)<br>(147)<br>(148)<br>(149)  | 1.29<br>1.289<br>1.62<br>1.449<br>1.44  | (163)<br>(164)<br>(165)<br>(166)<br>(167)   | 0.321<br>0.321<br>0.133<br>0.132<br>0.105  | (271)<br>(272)<br>(273)<br>(274)<br>(275)  | 1.68<br>0.653<br>1.1<br>0.514<br>0.42  | (289)<br>(290)<br>(291)<br>(292)<br>(293)  | 2.830<br>0.931<br>0.893<br>0.48   | (208)<br>(210)<br>(210)  | 0.75<br>7.447<br>9.66<br>5.514  | (325)<br>(326)<br>(327)<br>(328)   | 1.07<br>1.791<br>5.18<br>91.09  | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(347)   | 147<br>91-2<br>122<br>200<br>86.6  |
| +<br>91)<br>92)<br>93)<br>94)<br>95)  | 1.29<br>1.213<br>0.89<br>0.624<br>1.59  | (109)<br>(110)<br>(111)<br>(112)  | 1.03<br>1.14<br>1.44<br>1.448  | (127)<br>(129)<br>(129)<br>(130)  | 1.29<br>1.069<br>1.29<br>0.867<br>1.44<br>1.448  | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(149)<br>(150)  | 1.23<br>1.289<br>1.62<br>1.448<br>1.44<br>1.035   | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(166)  | 0.321<br>0.321 :<br>0.133<br>0.132<br>0.105<br>0.091   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)   | 1.68<br>0.653<br>1.1<br>0.514<br>0.42<br>0.366   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)   | 2.800<br>0.931<br>0.803<br>0.48<br>0.514  | (208)<br>(209)<br>(210)  | 0.75<br>7.447<br>9,66<br>5.514<br>3,72  | (325)<br>(326)<br>(327)<br>(328)<br>(328)  | 1.07<br>1.791<br>5.18<br>91.09<br>21.23<br>11.48<br>7.73  | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(347)<br>(348)<br>(349)   | 147<br>91-2<br>122<br>200<br>86.6<br>68.7  |
| +<br>91)<br>92)<br>93)<br>93)<br>95)<br>95)   | 1.29<br>1.213<br>0.89<br>0.624<br>1.59<br>1.907   | (109)<br>(110)<br>(111)<br>(112)<br>(113)   | 1.03<br>1.14<br>1.44<br>1.448<br>1.59  | (127)<br>(129)<br>(129)<br>(120)<br>(130)<br>(131)  | 1.29<br>1.069<br>1.29<br>0.867<br>1.44<br>1.449<br>1.9   | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)  | 1.29<br>1.289<br>1.62<br>1.449<br>1.44<br>1.035<br>1.93   | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(169)   | 0.321<br>0.321<br>0.133<br>0.132<br>0.105<br>0.091<br>0.076  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)  | 1.68<br>0.653<br>1.1<br>0.514<br>0.42<br>0.366<br>0.22   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)  | 2.800<br>0.931<br>0.803<br>0.48<br>0.514<br>0.36  | (308)<br>(309)<br>(310)<br>(311)<br>(312)  | 0.75<br>7.447<br>9.66<br>5.514<br>3.72<br>2.832   | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)   | 1.07<br>1.791<br>5.18<br>91.09<br>21.23<br>11.48  | (343)<br>(344)<br>(345)<br>(344)<br>(347)<br>(347)<br>(348)<br>(349)<br>(350)  | 147<br>91.2<br>200<br>86.6<br>68.7<br>107  |
| •<br>91)<br>92)<br>93)<br>94)<br>95)<br>95)<br>95)<br>97)   | 1.29<br>1.213<br>0.69<br>0.624<br>1.59<br>1.907<br>9.16   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)   | 1.03<br>1.14<br>1.44<br>1.448<br>1.57<br>1.364   | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)  | 1,29<br>1,069<br>1,28<br>0,867<br>1,44<br>1,448<br>1,9<br>1,791  | (145)<br>(146)<br>(147)<br>(148)<br>(147)<br>(150)<br>(151)<br>(151)<br>(152)  | 1.29<br>1.289<br>1.62<br>1.440<br>1.44<br>1.44<br>1.035<br>1.93<br>1.440  | (163)<br>(164)<br>(165)<br>(166)<br>(166)<br>(167)<br>(168)<br>(169)<br>(170)   | 0.321<br>0.321<br>0.133<br>0.132<br>0.105<br>0.091<br>0.076<br>0.103   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)   | 1.68<br>0.653<br>1.1<br>0.514<br>0.42<br>0.366<br>0.22<br>0.183  | (287)<br>(270)<br>(271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)   | 2.800<br>0.931<br>0.803<br>0.48<br>0.514<br>0.36<br>0.321   | (308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)  | 0.75<br>7.447<br>9.66<br>5.514<br>3.72<br>2.832<br>2.1  | (325)<br>(324)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)  | 1.07<br>1.791<br>5.18<br>91.09<br>21.23<br>11.48<br>7.73  | (344)<br>(344)<br>(345)<br>(344)<br>(347)<br>(347)<br>(348)<br>(349)<br>(350)<br>(351)   | 147<br>91.2<br>200<br>86.6<br>68.7<br>107<br>86.3  |
| +<br>91)<br>92)<br>93)<br>94)<br>95)<br>96)<br>97)<br>98)   | 1.29<br>1.213<br>0.89<br>0.624<br>1.59<br>1.907<br>9.16<br>3.797  | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)  | 1.03<br>1,14<br>1.44<br>1.448<br>1.59<br>1.364<br>1.52   | (127)<br>(129)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)   | 1.29<br>1.069<br>1.29<br>0.867<br>1.44<br>1.449<br>1.791<br>1.791<br>1.36  | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(152)<br>(153)  | 1.29<br>1.289<br>1.62<br>1.449<br>1.44<br>1.025<br>1.93<br>1.448<br>2.05  | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(169)<br>(170)<br>(170)   | 0.321<br>0.321<br>0.133<br>0.132<br>0.105<br>0.091<br>0.076<br>0.103<br>0.34   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(278)  | 1.68<br>0.633<br>1.1<br>0.514<br>0.42<br>0.366<br>0.22<br>0.183<br>9   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(294)<br>(295)<br>(296)<br>(297)   | 2.800<br>0.931<br>0.803<br>0.48<br>0.514<br>0.36<br>0.321<br>0.34   | (208)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)   | 0.75<br>7.447<br>9.66<br>5.514<br>3.72<br>2.832<br>2.1<br>1.791   | (325)<br>(324)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)   | 1.07<br>1.791<br>5.18<br>91.09<br>21.23<br>11.48<br>7.73<br>6.134   | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(347)<br>(347)<br>(347)<br>(349)<br>(349)<br>(359)<br>(351)<br>(352)                            | 147<br>91.2<br>200<br>86.6<br>68.7<br>107<br>86.7<br>55.7  |
| •<br>91)<br>92)<br>93)<br>93)<br>94)<br>95)<br>96)<br>97)<br>98)<br>99)   | 1.29<br>1.213<br>0.69<br>0.624<br>1.59<br>1.907<br>9.16<br>3.797<br>2.76  | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)   | 1.03<br>1,14<br>1.44<br>1.59<br>1.364<br>1.52<br>1.213   | (127)<br>(129)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)  | 1.29<br>1.069<br>1.28<br>0.867<br>1.44<br>1.448<br>1.9<br>1.791<br>1.36<br>1.069   | (145)<br>(146)<br>(147)<br>(149)<br>(149)<br>(150)<br>(151)<br>(152)<br>(155)<br>(154)                                     | 1.28<br>1.289<br>1.62<br>1.449<br>1.44<br>1.035<br>1.93<br>1.448<br>2.05<br>1.448   | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(167)<br>(169)<br>(170)<br>(171)<br>(172)                                     | 0.321<br>0.321<br>0.133<br>0.132<br>0.105<br>0.091<br>0.076<br>0.103<br>0.54<br>0.321  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)   | 1.68<br>0.653<br>1.1<br>0.514<br>0.366<br>0.22<br>0.183<br>9<br>0.065  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(294)<br>(295)<br>(296)<br>(297)<br>(298)  | 2.800<br>0.931<br>0.803<br>0.48<br>0.514<br>0.36<br>0.321<br>0.54<br>0.521  | (308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)  | 0.75<br>7.447<br>9.66<br>5.514<br>3.72<br>2.832<br>2.1<br>1.791<br>1.44   | (325)<br>(324)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)  | $1.07 \\ 1.791 \\ 5.18 \\ 91.09 \\ 21.23 \\ 11.48 \\ 7.73 \\ 6.134 \\ 4.8 \\ 5.51 \\ 4.42 \\ \end{cases}$   | (543)<br>(344)<br>(345)<br>(346)<br>(346)<br>(347)<br>(349)<br>(349)<br>(350)<br>(351)<br>(352)<br>(352)<br>(353)                            | 147<br>91.2<br>200<br>86.6<br>68.7<br>107<br>86.7<br>55.7  |
| •<br>91)<br>92)<br>93)<br>93)<br>95)<br>95)<br>96)<br>97)<br>97)<br>97)<br>97)  | 1.29<br>1.213<br>0.89<br>0.624<br>1.59<br>1.907<br>9.16<br>3.797<br>2.76<br>6.559   | (107)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(117)<br>(118)  | 1.03<br>1.14<br>1.448<br>1.59<br>1.364<br>1.52<br>1.213<br>1.93  | (127)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)  | 1.29<br>1.069<br>1.29<br>0.867<br>1.44<br>1.449<br>1.791<br>1.791<br>1.36  | (145)<br>(146)<br>(147)<br>(148)<br>(147)<br>(150)<br>(151)<br>(151)<br>(155)<br>(155)<br>(155)                            | 1.29<br>1.289<br>1.62<br>1.449<br>1.44<br>1.035<br>1.93<br>1.448<br>2.05<br>1.448<br>0.93   | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(169)<br>(170)<br>(171)<br>(172)<br>(173)                                     | 0.321<br>0.321<br>0.133<br>0.132<br>0.105<br>0.071<br>0.076<br>0.103<br>0.34<br>0.321<br>1.08  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)<br>(281)  | 1.68<br>0.633<br>1.1<br>0.514<br>0.42<br>0.366<br>0.22<br>0.183<br>9<br>0.065<br>0.053                             | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(296)<br>(296)<br>(297)<br>(298)<br>(299)   | 2.800<br>0.931<br>0.893<br>0.48<br>0.514<br>0.36<br>0.321<br>0.54<br>0.521<br>0.41                                    | (208)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(316)<br>(316)<br>(317)  | 0.75<br>7.447<br>9,66<br>5.514<br>3.72<br>2.832<br>2.1<br>1.791<br>1.44<br>1.105  | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(331)<br>(332)<br>(333)<br>(334)  | $1.07 \\ 1.791 \\ 5.18 \\ 91.09 \\ 21.23 \\ 11.48 \\ 7.73 \\ 6.134 \\ 4.8 \\ 5.31 \\ \end{array}$   | (747)<br>(344)<br>(345)<br>(346)<br>(346)<br>(347)<br>(248)<br>(349)<br>(350)<br>(350)<br>(351)<br>(352)<br>(352)<br>(354)                   | 147<br>91.2<br>200<br>86.6<br>68.1<br>107<br>86.5<br>55.1<br>37.1<br>39.   |
| •<br>91)<br>92)<br>93)<br>93)<br>95)<br>97)<br>97)<br>97)<br>97)<br>97)<br>97)<br>97)<br>100)   | 1.29<br>1.213<br>0.89<br>0.624<br>1.59<br>1.907<br>9.16<br>3.797<br>2.76<br>6.559<br>2.47                                   | (10?)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)   | 1.07<br>1.14<br>1.44<br>1.57<br>1.364<br>1.57<br>1.213<br>1.93<br>2.276  | (127)<br>(128)<br>(129)<br>(131)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)  | 1.29<br>1.069<br>1.20<br>0.867<br>1.44<br>1.448<br>1.9<br>1.791<br>1.36<br>1.069<br>1.36<br>1.14                               | (145)<br>(146)<br>(147)<br>(148)<br>(147)<br>(150)<br>(151)<br>(151)<br>(152)<br>(155)<br>(153)<br>(154)                   | 1.29<br>1.289<br>1.62<br>1.449<br>1.44<br>1.44<br>1.448<br>2.05<br>1.448<br>2.05<br>1.448<br>0.93<br>0.453                                  | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(169)<br>(170)<br>(170)<br>(171)<br>(173)<br>(173)                                     | 0.321<br>0.321<br>0.133<br>0.132<br>0.105<br>0.091<br>0.076<br>0.103<br>0.34<br>0.321<br>1.08<br>1.364                                   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)<br>(281)<br>(282)                                     | 1.68<br>0.633<br>1.1<br>0.514<br>0.366<br>0.22<br>0.183<br>9<br>0.065<br>0.053                                     | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(296)<br>(297)<br>(298)<br>(299)<br>(300)   | 2,800<br>0,931<br>0,803<br>0,48<br>0,514<br>0,34<br>0,321<br>0,321<br>0,34<br>0,321<br>0,41<br>0,438                  | (308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(314)<br>(315)<br>(315)<br>(316)<br>(317)<br>(318)  | 0.75<br>7.447<br>9.66<br>5.514<br>3.72<br>2.832<br>2.1<br>1.791<br>1.791<br>1.44<br>1.105<br>3.39                                   | (325)<br>(324)<br>(527)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(334)<br>(335)  | $1.07 \\ 1.791 \\ 5.18 \\ 91.09 \\ 21.23 \\ 11.48 \\ 7.73 \\ 6.134 \\ 4.8 \\ 5.51 \\ 4.42 \\ \end{cases}$   | (743)<br>(344)<br>(345)<br>(346)<br>(347)<br>(347)<br>(347)<br>(349)<br>(359)<br>(359)<br>(351)<br>(352)<br>(352)<br>(355)                   | 147<br>91.2<br>200<br>86.6<br>68.7<br>107<br>86.7<br>55.7<br>37.0<br>39.2<br>24.                                 |
| •<br>91)<br>92)<br>93)<br>94)<br>95)<br>96)<br>97)<br>99)<br>100)<br>1001<br>102)   | 1.29<br>1.213<br>0.89<br>0.624<br>1.59<br>1.907<br>9.16<br>3.797<br>2.76<br>6.559<br>2.47<br>2.276                          | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(119)<br>(120)  | 1.03<br>1.14<br>1.44<br>1.59<br>1.364<br>1.55<br>1.213<br>1.93<br>2.276<br>2.47  | (127)<br>(128)<br>(129)<br>(131)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(137)                                     | 1.29<br>1.069<br>1.20<br>0.867<br>1.44<br>1.448<br>1.9<br>1.791<br>1.36<br>1.069<br>1.36                                       | (145)<br>(146)<br>(147)<br>(148)<br>(150)<br>(151)<br>(151)<br>(152)<br>(153)<br>(155)<br>(155)<br>(155)                   | 1.29<br>1.289<br>1.62<br>1.448<br>1.44<br>1.025<br>1.448<br>2.05<br>1.448<br>2.05<br>1.448<br>0.93<br>0.453<br>0.59                         | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(169)<br>(169)<br>(170)<br>(171)<br>(172)<br>(173)<br>(174)<br>(175)                   | 0.321<br>0.321<br>0.133<br>0.132<br>0.105<br>0.076<br>0.103<br>0.34<br>0.321<br>1.08<br>1.364<br>2.33                                    | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)<br>(281)<br>(281)<br>(282)<br>(293)                   | 1.68<br>0.633<br>1.1<br>0.514<br>0.366<br>0.22<br>0.183<br>9<br>0.063<br>0.053<br>0.053                            | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(296)<br>(297)<br>(298)<br>(297)<br>(298)<br>(299)<br>(300)<br>(301)                            | 2,830<br>0,931<br>0,803<br>0,49<br>0,514<br>0,321<br>0,34<br>0,321<br>0,34<br>0,521<br>0,438<br>0,38                  | (208)<br>(309)<br>(310)<br>(311)<br>(312)<br>(314)<br>(314)<br>(315)<br>(314)<br>(315)<br>(316)<br>(317)<br>(318)<br>(319)                                     | 0.75<br>7.447<br>9.66<br>5.514<br>3.72<br>2.832<br>2.1<br>1.791<br>1.44<br>1.105<br>3.39<br>1.177                                   | (325)<br>(324)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(331)<br>(332)<br>(333)<br>(334)<br>(335)<br>(335)  | 1.07<br>1.791<br>5.18<br>91.09<br>21.23<br>11.48<br>7.73<br>6.134<br>4.8<br>5.51<br>4.42<br>4.155   | (747)<br>(344)<br>(345)<br>(346)<br>(346)<br>(347)<br>(248)<br>(349)<br>(350)<br>(350)<br>(351)<br>(352)<br>(352)<br>(354)                   | 147<br>91.2<br>200<br>86.6<br>68.<br>107<br>86.<br>37.0<br>39.<br>24.<br>21.                                     |
| <ul> <li>91)</li> <li>92)</li> <li>93)</li> <li>94)</li> <li>95)</li> <li>96)</li> <li>97)</li> <li>98)</li> <li>97)</li> <li>98)</li> <li>99)</li> <li>100)</li> <li>102)</li> <li>103)</li> </ul>   | 1.29<br>1.213<br>0.89<br>0.624<br>1.59<br>1.907<br>9.16<br>3.797<br>2.76<br>6.559<br>2.47<br>2.276<br>2.01                  | (10?)<br>(110)<br>(111)<br>(112)<br>(115)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(117)<br>(120)<br>(121)                                     | 1.03<br>1,14<br>1.44<br>1.59<br>1.364<br>1.52<br>1.213<br>1.93<br>2.276<br>2.47<br>2.41  | (127)<br>(129)<br>(129)<br>(130)<br>(151)<br>(133)<br>(134)<br>(135)<br>(134)<br>(137)<br>(139)                                     | 1.29<br>1.069<br>1.20<br>0.867<br>1.44<br>1.448<br>1.9<br>1.791<br>1.36<br>1.069<br>1.36<br>1.14                               | (145)<br>(146)<br>(147)<br>(148)<br>(147)<br>(150)<br>(151)<br>(151)<br>(152)<br>(155)<br>(153)<br>(154)                   | 1.29<br>1.289<br>1.62<br>1.449<br>1.44<br>1.025<br>1.448<br>2.05<br>1.448<br>0.93<br>0.453<br>0.59<br>0.428                                 | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(167)<br>(170)<br>(170)<br>(171)<br>(172)<br>(173)<br>(175)<br>(176)          | 0.321<br>0.321<br>0.133<br>0.132<br>0.105<br>0.091<br>0.076<br>0.103<br>0.54<br>0.321<br>1.08<br>1.364<br>2.33<br>2.276                  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)<br>(281)<br>(281)<br>(282)<br>(283)<br>(284) | 1.68<br>0.633<br>1.1<br>0.314<br>0.366<br>0.22<br>0.183<br>9<br>0.063<br>0.053<br>0.075<br>0.076                   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(296)<br>(296)<br>(297)<br>(298)<br>(299)<br>(300)<br>(301)<br>(302)                            | 2,830<br>0,931<br>0,803<br>0,49<br>0,514<br>0,321<br>0,34<br>0,321<br>0,34<br>0,321<br>0,41<br>0,438<br>0,38<br>0,413 | (308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)<br>(315)<br>(316)<br>(316)<br>(317)<br>(318)<br>(319)<br>(320)                   | 0.75<br>7.447<br>9.66<br>5.514<br>3.72<br>2.832<br>2.1<br>1.791<br>1.44<br>1.105<br>3.39<br>1.177<br>3.07<br>2.276                  | (325)<br>(324)<br>(327)<br>(328)<br>(327)<br>(329)<br>(330)<br>(331)<br>(331)<br>(332)<br>(334)<br>(335)<br>(335)<br>(335)<br>(335)  | 1.07<br>1.791<br>5.18<br>91.09<br>21.23<br>11.48<br>7.73<br>6.134<br>4.8<br>5.31<br>4.42<br>4.155<br>3.85<br>4.72   | (743)<br>(344)<br>(345)<br>(346)<br>(347)<br>(347)<br>(347)<br>(349)<br>(349)<br>(350)<br>(351)<br>(352)<br>(352)<br>(352)<br>(355)          | 147<br>91.2<br>200<br>86.6<br>68.<br>107<br>86.<br>37.0<br>39.<br>24.<br>21.                                     |
| <ul> <li>91)</li> <li>92)</li> <li>93)</li> <li>94)</li> <li>95)</li> <li>97)</li> <li>97)</li> <li>98)</li> <li>99)</li> <li>100)</li> <li>101)</li> <li>102)</li> <li>104)</li> </ul>               | 1.29<br>1.213<br>0.89<br>0.624<br>1.59<br>1.907<br>9.16<br>3.797<br>2.76<br>6.559<br>2.47<br>2.276<br>2.01<br>2.149         | (107)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(117)<br>(120)<br>(121)<br>(122)          | 1.03<br>1.14<br>1.448<br>1.59<br>1.364<br>1.52<br>1.213<br>1.93<br>2.276<br>2.47<br>2.41<br>1.44                                 | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(134)<br>(135)<br>(136)<br>(137)<br>(138)<br>(139)                            | 1.29<br>1.069<br>1.28<br>0.867<br>1.44<br>1.448<br>1.9<br>1.771<br>1.36<br>1.069<br>1.36<br>1.36<br>1.14<br>1.28               | (145)<br>(146)<br>(147)<br>(149)<br>(150)<br>(151)<br>(152)<br>(153)<br>(154)<br>(153)<br>(154)<br>(156)<br>(159)          | 1.23<br>1.289<br>1.62<br>1.449<br>1.44<br>1.025<br>1.448<br>2.05<br>1.448<br>0.93<br>0.453<br>0.453<br>0.453<br>0.453                       | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(169)<br>(170)<br>(170)<br>(172)<br>(173)<br>(174)<br>(175)<br>(177)          | 0.321<br>0.321<br>0.133<br>0.132<br>0.105<br>0.071<br>0.076<br>0.103<br>0.321<br>1.08<br>1.364<br>2.33<br>2.276<br>1.68                  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(278)<br>(279)<br>(280)<br>(281)<br>(282)<br>(283)<br>(284)<br>(285)                   | 1.68<br>0.633<br>1.1<br>0.514<br>0.366<br>0.22<br>0.183<br>9<br>0.065<br>0.053<br>0.053<br>0.055<br>0.076          | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(294)<br>(295)<br>(294)<br>(297)<br>(298)<br>(297)<br>(298)<br>(299)<br>(300)<br>(301)<br>(302)<br>(303) | 2,830<br>0,931<br>0,803<br>0,803<br>0,514<br>0,321<br>0,321<br>0,321<br>0,41<br>0,438<br>0,38<br>0,38                 | (208)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(316)<br>(316)<br>(317)<br>(318)<br>(319)<br>(320)<br>(221)                            | 0.75<br>7.447<br>9.66<br>5.514<br>3.72<br>2.832<br>2.1<br>1.791<br>1.44<br>1.105<br>3.39<br>1.177<br>3.07<br>2.276<br>1.68          | (325)<br>(326)<br>(527)<br>(528)<br>(329)<br>(330)<br>(331)<br>(331)<br>(335)<br>(334)<br>(335)<br>(334)<br>(335)<br>(334)<br>(335)<br>(334)<br>(335)<br>(334)                   | 1.07<br>1.791<br>5.18<br>91.09<br>21.23<br>11.48<br>7.73<br>6.134<br>4.8<br>5.31<br>4.48<br>5.31<br>4.42<br>3.85<br>3.85<br>4.72                          | (743)<br>(344)<br>(345)<br>(346)<br>(347)<br>(347)<br>(347)<br>(348)<br>(349)<br>(350)<br>(351)<br>(352)<br>(352)<br>(352)<br>(354)          | 147<br>91.2<br>200<br>86.6<br>68.<br>107<br>86.5<br>37.1<br>39.<br>24.<br>21.<br>18.                             |
| <ul> <li>91)</li> <li>92)</li> <li>93)</li> <li>94)</li> <li>97)</li> <li>97)</li> <li>97)</li> <li>97)</li> <li>97)</li> <li>101)</li> <li>102)</li> <li>103)</li> <li>104)</li> <li>105)</li> </ul> | 1.29<br>1.213<br>0.89<br>0.624<br>1.59<br>1.907<br>9.16<br>3.797<br>2.76<br>6.559<br>2.47<br>2.276<br>2.01<br>2.149<br>2.19 | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(117)<br>(118)<br>(117)<br>(118)<br>(117)<br>(120)<br>(121)<br>(122)<br>(123) | 1.02<br>1.14<br>1.44<br>1.59<br>1.364<br>1.52<br>1.213<br>1.93<br>2.276<br>2.47<br>2.41<br>1.44<br>1.14                          | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(137)<br>(137)<br>(139)<br>(140)          | 1.29<br>1.069<br>1.29<br>0.867<br>1.44<br>1.449<br>1.9<br>1.791<br>1.36<br>1.069<br>1.36<br>1.049<br>1.36<br>1.14<br>1.28<br>1 | (145)<br>(146)<br>(147)<br>(148)<br>(147)<br>(150)<br>(151)<br>(152)<br>(152)<br>(153)<br>(154)<br>(155)<br>(156)<br>(156) | 1.29<br>1.289<br>1.62<br>1.449<br>1.44<br>1.44<br>2.05<br>1.448<br>2.05<br>1.448<br>0.93<br>0.453<br>0.453<br>0.59<br>0.453<br>0.2<br>0.183 | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(169)<br>(170)<br>(170)<br>(171)<br>(172)<br>(173)<br>(174)<br>(175)<br>(177)<br>(178) | 0.521<br>0.321<br>0.133<br>0.132<br>0.105<br>0.091<br>0.076<br>0.103<br>0.54<br>0.321<br>1.08<br>1.364<br>2.33<br>2.276<br>1.68<br>1.251 | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)<br>(281)<br>(282)<br>(283)<br>(293)<br>(293)<br>(294) | 1.68<br>0.633<br>1.1<br>0.514<br>0.366<br>0.22<br>0.183<br>9<br>0.065<br>0.053<br>0.053<br>0.075<br>0.076<br>0.076 | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(296)<br>(297)<br>(298)<br>(297)<br>(298)<br>(299)<br>(300)<br>(301)<br>(302)<br>(303)<br>(304) | 2.830<br>0.931<br>0.803<br>0.48<br>0.514<br>0.35<br>0.321<br>0.41<br>0.438<br>0.413<br>0.413<br>0.38<br>0.413         | (208)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)<br>(315)<br>(316)<br>(316)<br>(317)<br>(318)<br>(319)<br>(320)<br>(321)<br>(322) | 0.75<br>7.447<br>9.66<br>5.514<br>3.72<br>2.832<br>2.1<br>1.791<br>1.44<br>1.105<br>3.39<br>1.177<br>5.07<br>2.276<br>1.68<br>1.449 | (325)<br>(324)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(331)<br>(333)<br>(333)<br>(333)<br>(334)<br>(335)<br>(334)<br>(335)<br>(326)<br>(327)<br>(329)<br>(329)<br>(340) | 1.07<br>1.791<br>5.18<br>91.09<br>21.23<br>11.48<br>7.73<br>6.134<br>4.8<br>5.31<br>4.42<br>4.155<br>3.85<br>4.72<br>19.2<br>23.84                        | (743)<br>(344)<br>(345)<br>(346)<br>(347)<br>(348)<br>(349)<br>(359)<br>(359)<br>(352)<br>(352)<br>(353)<br>(354)<br>(354)<br>(356)<br>(357) | 147<br>91.2<br>200<br>86.6<br>68.7<br>107<br>86.7<br>55.7<br>37.6<br>39.4<br>24.<br>21.5<br>18.4<br>18.4         |
| +<br>91)<br>93)<br>93)<br>94)<br>95)<br>96)<br>97)  | 1.29<br>1.213<br>0.89<br>0.624<br>1.59<br>1.907<br>9.16<br>3.797<br>2.76<br>6.559<br>2.47<br>2.276<br>2.01<br>2.149         | (107)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(117)<br>(120)<br>(121)<br>(122)          | 1.03<br>1.14<br>1.44<br>1.59<br>1.364<br>1.55<br>1.364<br>1.52<br>1.213<br>1.93<br>2.276<br>2.47<br>2.41<br>1.44<br>1.14<br>1.44 | (127)<br>(128)<br>(129)<br>(131)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(137)<br>(138)<br>(137)<br>(138)<br>(141) | 1.29<br>1.069<br>1.20<br>0.867<br>1.44<br>1.448<br>1.9<br>1.791<br>1.36<br>1.069<br>1.36<br>1.14<br>1.28                       | (145)<br>(146)<br>(147)<br>(149)<br>(150)<br>(151)<br>(152)<br>(153)<br>(154)<br>(153)<br>(154)<br>(156)<br>(159)          | 1.23<br>1.289<br>1.62<br>1.449<br>1.44<br>1.025<br>1.448<br>2.05<br>1.448<br>0.93<br>0.453<br>0.453<br>0.453<br>0.453                       | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(169)<br>(170)<br>(170)<br>(172)<br>(173)<br>(174)<br>(175)<br>(177)          | 0.321<br>0.321<br>0.133<br>0.132<br>0.105<br>0.071<br>0.076<br>0.103<br>0.321<br>1.08<br>1.364<br>2.33<br>2.276<br>1.68                  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(278)<br>(279)<br>(280)<br>(281)<br>(282)<br>(283)<br>(284)<br>(285)                   | 1.68<br>0.633<br>1.1<br>0.514<br>0.366<br>0.22<br>0.183<br>9<br>0.065<br>0.053<br>0.053<br>0.055<br>0.076          | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(294)<br>(297)<br>(298)<br>(297)<br>(298)<br>(299)<br>(300)<br>(301)<br>(302)<br>(303)          | 2,830<br>0,931<br>0,803<br>0,803<br>0,514<br>0,321<br>0,321<br>0,321<br>0,41<br>0,438<br>0,38<br>0,38                 | (208)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(316)<br>(316)<br>(317)<br>(318)<br>(319)<br>(320)<br>(221)                            | 0.75<br>7.447<br>9.66<br>5.514<br>3.72<br>2.832<br>2.1<br>1.791<br>1.44<br>1.105<br>3.39<br>1.177<br>3.07<br>2.276<br>1.68          | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(333)<br>(333)<br>(333)<br>(334)<br>(335)<br>(335)<br>(336)<br>(337)<br>(338)<br>(329)                            | $\begin{array}{c} 1.07\\ 1.791\\ 5.18\\ 91.09\\ 21.25\\ 11.48\\ 7.73\\ 6.134\\ 4.8\\ 5.51\\ 4.42\\ 4.155\\ 3.85\\ 4.72\\ 19.2\\ 23.84\\ 12.9 \end{array}$ | (743)<br>(344)<br>(345)<br>(344)<br>(344)<br>(349)<br>(350)<br>(352)<br>(352)<br>(352)<br>(352)<br>(354)<br>(355)<br>(356)<br>(357)<br>(357) | 147<br>91.2<br>200<br>86.6<br>68.7<br>107<br>107<br>55.7<br>37.6<br>39.1<br>24.2<br>21.3<br>18.6<br>18.6<br>18.6 |

ι.

÷

:

ę

.

# River discharge data at 12-hourly intervals for Station: 9A Period : 1

Phosphorus transport Berg River

,

....

í

,

| Variable: PAARLQ.varl  | (length   | = 360)  |  |   |  |   |   |  |   |   |  |   |   | (235)  | 17.8  | (253)   | 8.36  |
|--|---|---|--|---|--|---|---|--|---|---|--|---|---|--|---|---|---|
|  |   | ( 37)   | 5.31   | ( 55)   | 4.16   | (73)  | 3.459   | (191) '  |   | (177)   | 4.53   | (217)   | 34.7  | (276)  | 13.40   | (254)   | 8.2   |
| (1) 13.2 (19)  | 6.39  | (38)  | 5.18   | (56)  | 4.1  | (74)  | 2.8   | (192)  | 6.6   | (200)   | 4.5  | (218)   |   | (207)  | 13.3  | (255)   | 6.36  |
| (2) 12.01 (20)   |   | (39)  | 5.31   | (57)  | 4.53   | (75)  | 4.53  | ·(183)   | 6.339   | (201)   | 4.91   | (219)   |   | (200)  |   | (256)   | 8.2   |
| (3) 11.48 (21)   |   | (40)  | 3.18   | ( 58)   | 4.2  | ( 761   | 10.82   | (184)  | 6.4   | (202)   | 4.5  | (220)   |   | (237)  |   | (257)   | 8.36  |
| (4) 10 (22)  |   | • •   | 5.31   | ( 57)   | 4.155  | (77)  |   | (185)  | 6.559   | (203)   | 4.71   |   | 45.71   |  |   | (258)   | 7.73  |
| (5) 9.86 (23)  |   | (41)  | 5.19   | ( 60)   | 4.1  |   | 12.34   | (186)  | 6   | (204)   | 4.5  | (222)   | 39.3  | •  | 17.17   |   | 7.45  |
| ( 6) 9.16 ( 24)  |   | (42)  |  | (61)  | 4.155  |   | 203   | (187)  | 6.134   | (205)   | 16.91  |   | 37.45   | (241)  | 20.26   | (257)   | 7.3   |
| (7) 8,84 (25)  |   | (43)  | 4.912  | (62)  | 4.1  |   | 162   | (198)  | 6   | (205)   | 12.9   | (224)   | 26.4  | (242)  | 14.57   | (250)   |   |
| (8) 8.4 (26)   |   | (44)  | 4.792  |   | 4.155  | ( 01)   | 97  | (189)  | 5.72  | (207)   | 9.86   | (225)   | 23.11   | (243)  | 13.2  | (261)   | 7.45  |
| (9) 10.93 (27)   |   | (45)  | 4.912  | ( 63)   |  | (82)  |   | (190)  | 5.57  | (208)   | 11.48  | (226)   | 21.9  | (244)  | 11.8  | (262)   | 7   |
| (10) 11.4 (28)   | 7.95  | (46)  | 4.79   | (64)  | 4  | (83)  | 41.77   | (191)  | 5.72  | (209)   | 44.43  | (227)   | 22.4  | (245)  | 10.93   | (263)   | 6.99  |
| (11) 10.93 (29)  |   | (47)  | 4.912  | ( 65)   | 3.797  |   | 29.6  | (192)  | 5.37  | (210)   | 53.31  | (228)   | 24.45   | (246)  | 10.2  | (264)   | 7.7   |
| (12) 9.66 (30)   | 9.16  | (48)  | 4.4  | ( 66)   | 3.4  | (84)  |   | (193)  | 5.31  | (211)   | 84.45  | (227)   | 20.25   | (247)  | 7.86  | (265)   | 8.84  |
| (13) 8.84 (31)   | 7.902   | (49)  | 4.53   | ( 67)   | 3.459  | (85)  |   | (194)  | 5.2   | (212)   | 86.7   | (250)   | 18.82   | (248)  | 9.10  | (266)   | 8.2   |
| (14) 8.2 (32)  | 6.39  | ( 50)   | 4.2  | ( 68)   | 3.4  |   | 19.83   | (195)  | 5.31  | (213)   |  | (231)   | 27.5  | (249)  | 8.84  | (267)   | 7.447   |
| (15) 7 902 (33)  | 6.13  | ( 51)   | 4.16   | ( 69)   | 3.459  | (87)  | 20.96   | (196)  | 5.2   | (214)   |  | (232)   | 15.9  | (259)  | 0.4   | (268)   | 7.27  |
| (16) 7-3 (34)  | 5.57  | ( 52)   | 4.1  | (70)  | 3.4  | (89)  | 18.82   | (177)  | 4.91  |   |  |   | 15.01   | (251)  | 7.902   | (269)   | 6.99  |
| (17) 7.447 (35)  |   | ( 53)   | 4.15   | (71)  | 3.459  | (87)  | 22.4  | 71001  | 4 5   | 17161   | 47.4   | (234)   | 13.48   | (252)  | 8.2   | (270)   | 12.34   |
|  |   | ( 54)   | 4.1  | ( 72)   | 3.4  | (90)  |   | (1707  |   |   |  |   |   |  |   |   |   |
|  |   |   |  |   |  |   |   |  | -   |   |  |   |   |  |   |   |   |
|  |   |   |  |   |  |   |   |  |   |   | 1,1 9"   |   |   | (325)  | 3.459   | (242)   | 0.933   |
| / D1\ 16.91 / 169  |   | (127)   | 12.04  | (145)   | 7.447  | (155)   | 11-40   | (271)  | 87.8  | (289)   | 10.95  | (007)   | 5.72  | (325)  | 3.459   | (242)<br>(344)  | 0.933   |
| (91) 16.91 (109)   | ) 32.47   | (127)   | 12.04  | (145)<br>(146)  | 7.447  | (153)   | 10.7  | (271)<br>(272)   | 87.8<br>73.5  | (289)<br>(290)  | 10.95<br>10.2  | (C07)<br>(C08)  | 5.72<br>5.57  | (325)<br>(326)   | 3.459<br>2.7  | ( 4.)   | 0.9.3   |
| (91) 16,91 (109)<br>(92) 15,3 (110)  | ) 32 <b>.4</b> 7<br>) 26  | (127)<br>(128)  | $12.04 \\ 11.23$   | (145)<br>(146)  | 7.447  | (153)<br>(164)<br>(165)   | 10.7<br>10.93   | (271)<br>(272)<br>(273)  | 87.8<br>73.5<br>51.8  | (289)<br>(290)<br>(291)   | 10.95<br>10.2<br>10.4  | (307)<br>(308)<br>(309)   | 5.72<br>5.57<br>4.91  | (325)<br>(326)<br>(327)  | 3.459<br>3.7<br>3.457   | (343)<br>(344)<br>(345)   | 0.933<br>1.21   |
| (91) 16.91 (107)<br>(92) 15.3 (110)<br>(93) 13.9 (111)   | ) 32.47<br>) 26<br>) 22.4   | (127)<br>(128)<br>(129)   | 12.04<br>11.23<br>10.93  | (145)<br>(146)<br>(147)   | 7.447<br>67.7  | (153)<br>(154)<br>(155)<br>(155)  | 10.7<br>10.73<br>10.2   | (271)<br>(272)<br>(273)<br>(274)   | 87.8<br>93.5<br>51.8<br>110.3   | (289)<br>(290)<br>(291)<br>(292)  | 10.95<br>10.2<br>10.4<br>9.9   | (207)<br>(308)<br>(309)<br>(310)  | 5.72<br>5.57<br>4.91<br>5.3   | (325)<br>(326)<br>(327)<br>(328)   | 3.459<br>3.7<br>3.457<br>3.72   | (242)<br>(344)<br>(345)<br>(346)  | 0.933<br>1.21<br>1.448  |
| (91)       16.91       (109)         (92)       15.3       (110)         (93)       13.8       (111)         (94)       12.34       (112)  | ) 32.47<br>) 26<br>) 22.4<br>) 19.15  | (127)<br>(128)<br>(129)<br>(130)  | 12.04<br>11.23<br>10.93<br>10.2  | (145)<br>(146)<br>(147)   | 7.447<br>67.7<br>61.64<br>71.75  | (153)<br>(164)<br>(165)   | 10.7<br>10.7<br>10.2<br>10.4  | (271)<br>(272)<br>(273)<br>(274)<br>(275)  | 87.8<br>93.5<br>51.8<br>110.3<br>67.8   | (289)<br>(290)<br>(291)<br>(292)<br>(293)   | 10.95<br>10.2<br>10.4<br>9.9<br>9.24   | (207)<br>(308)<br>(309)<br>(310)<br>(311)   | 5.72<br>5.57<br>4.91<br>5.3<br>4.91   | (325)<br>(326)<br>(327)<br>(328)<br>(329)  | 3.459<br>3.7<br>3.457<br>3.72<br>3.14   | (343)<br>(344)<br>(345)<br>(346)<br>(347)   | 0.933<br>1.21<br>1.448<br>1.93  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | ) 32.47<br>) 26<br>) 22.4<br>) 19.15<br>) 18.22   | (127)<br>(128)<br>(129)<br>(130)<br>(131)   | 12.04<br>11.23<br>10.93<br>10.2<br>10.39   | (145)<br>(146)<br>(147)<br>(148)  | 7.447<br>67.7<br>61.64<br>71.75<br>113   | (153)<br>(154)<br>(155)<br>(155)  | 10.7<br>10.73<br>10.2<br>10.4<br>10.2   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)   | 87.8<br>73.5<br>51.8<br>110.3<br>67.8<br>42.46  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)  | 10,95<br>10,2<br>10,4<br>9,9<br>9,34<br>8,9  | (007)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)  | 5.72<br>5.57<br>4.91<br>5.3<br>4.91<br>4.79   | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)   | 3.459<br>3.7<br>3.457<br>3.72<br>3.14<br>3.38   | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(348)  | 0.933<br>1.21<br>1.448<br>1.93<br>2.022   |
| (91)       16.91       (109)         (92)       15.3       (110)         (93)       13.9       (111)         (94)       12.34       (112)         (95)       12.04       (113)         (96)       10.7       (114) | ) 32.47<br>26<br>22.4<br>19.15<br>10.22<br>10.22<br>10.22<br>10.17  | $(127) \\ (128) \\ (129) \\ (130) \\ (131) \\ (132) \end{cases}$  | 12.04<br>11.23<br>10.93<br>10.2<br>10.39<br>10.2   | (145)<br>(146)<br>(147)<br>(148)<br>(148)<br>(149)<br>(150)   | 7.447<br>67.7<br>61.64<br>71.75<br>113<br>81.2   | (153)<br>(164)<br>(165)<br>(165)<br>(167)   | 10.7<br>10.7<br>10.2<br>10.4  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)  | 87.8<br>73.5<br>51.8<br>110.3<br>67.8<br>42.46<br>32.47   | (287)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)   | 10.95<br>10.2<br>10.4<br>9.9<br>9.34<br>8.9<br>8.36  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)   | 5.72<br>5.57<br>4.91<br>5.3<br>4.91<br>4.79<br>4.155  | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)  | 3.459<br>3.7<br>3.72<br>3.72<br>3.14<br>3.38<br>3.48  | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(348)<br>(349)   | 0.933<br>1.21<br>1.448<br>1.93<br>2.022<br>1.93<br>1.089  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | ) 32.47<br>) 26<br>) 22.4<br>) 19.15<br>) 10.22<br>) 17.17<br>) 45.33   | (127) (120) (129) (130) (131) (132) (133)   | 12.04<br>11.23<br>10.93<br>10.2<br>10.39<br>10.2<br>9.34   | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)   | 7.447<br>67.7<br>61.64<br>71.75<br>113<br>81.2<br>53.78  | (153)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)  | 10.7<br>10.73<br>10.2<br>10.4<br>10.2   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)   | 87.8<br>93.5<br>51.8<br>110.3<br>67.8<br>42.46<br>32.47<br>34.02  | (287)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(296)  | 10.95<br>10.2<br>10.4<br>9.9<br>9.34<br>8.9<br>8.36<br>8.15  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)  | 5.72<br>5.57<br>4.91<br>5.3<br>4.91<br>4.79<br>4.155<br>4.42  | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)   | 3.459<br>3.7<br>3.72<br>3.72<br>3.14<br>3.38<br>3.46<br>3.38  | (343)<br>(344)<br>(345)<br>(346)<br>(346)<br>(348)<br>(349)<br>(350)  | 0.933<br>1.21<br>1.448<br>1.93<br>2.022<br>1.93<br>1.089<br>1.44  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | ) 32.47<br>) 26<br>) 22.4<br>) 19.15<br>) 18.22<br>) 17.17<br>) 45.33<br>) 32.6   | (127)  (128)  (129)  (130)  (131)  (132)  (133)  (134)  | 12.04<br>11.23<br>10.93<br>10.2<br>10.39<br>10.2<br>9.34<br>9.34<br>9.16   | (145)<br>(146)<br>(147)<br>(148)<br>(148)<br>(149)<br>(150)   | 7.447<br>67.7<br>61.64<br>71.75<br>113<br>81.2<br>53.78  | (153)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(169)   | 10.7<br>10.93<br>10.2<br>10.4<br>10.2<br>9.34   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)  | 87.8<br>93.5<br>51.8<br>110.3<br>67.8<br>42.46<br>32.47<br>34.02<br>21.67   | (287)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(294)<br>(295)<br>(296)<br>(297)  | 10,90<br>10,2<br>10,4<br>9,9<br>9,34<br>8,9<br>8,76<br>8,15<br>7,447   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)   | 5.72<br>5.57<br>4.91<br>5.7<br>4.91<br>4.79<br>4.155<br>4.42<br>4.155   | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)  | 3.459<br>3.7<br>3.72<br>3.14<br>3.38<br>3.48<br>3.38<br>3.48<br>3.38  | (343)<br>(344)<br>(345)<br>(346)<br>(346)<br>(348)<br>(348)<br>(350)<br>(351)   | 0.933<br>1.21<br>1.448<br>1.93<br>2.022<br>1.93<br>1.089<br>1.44<br>1.14  |
|  | ) 32.47<br>26<br>27.4<br>19.15<br>18.22<br>17.17<br>45.33<br>32.6<br>27.64  | $(127) \\ (128) \\ (129) \\ (130) \\ (131) \\ (132) \\ (133) \\ (133) \\ (134) \\ (135) \end{cases}$  | 12.04<br>11.23<br>10.93<br>10.2<br>10.39<br>10.2<br>9.34<br>9.16<br>8.84   | (145)<br>(146)<br>(147)<br>(140)<br>(149)<br>(150)<br>(151)<br>(152)<br>(153)   | 7.447<br>67.7<br>61.64<br>71.75<br>113<br>81.2<br>53.78<br>44.9<br>29.21   | (153)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(169)<br>(170)  | 11.40<br>10.7<br>10.93<br>10.2<br>10.4<br>10.2<br>9.34<br>8.7   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)   | 87.8<br>93.5<br>51.8<br>110.3<br>67.8<br>42.46<br>32.47<br>34.02<br>21.67<br>19.83  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)<br>(296)<br>(298)  | 10,90<br>10,2<br>10,4<br>9,9<br>9,34<br>8,9<br>8,76<br>8,76<br>8,15<br>7,447<br>7,27   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(313)<br>(314)<br>(315)<br>(315)   | 5.72<br>5.57<br>4.91<br>5.3<br>4.91<br>4.79<br>4.155<br>4.42<br>4.155<br>4.42   | (325)<br>(326)<br>(327)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(333)  | 3.459<br>2.7<br>3.72<br>3.72<br>3.38<br>3.38<br>3.46<br>3.38<br>3.46<br>3.38  | (343)<br>(344)<br>(345)<br>(346)<br>(346)<br>(348)<br>(348)<br>(350)<br>(351)<br>(352)  | 0.933<br>1.21<br>1.440<br>1.93<br>2.022<br>1.93<br>1.089<br>1.44<br>1.14  |
|  | ) 32.47<br>) 26<br>) 27.4<br>) 19.15<br>) 18.22<br>) 17.17<br>) 45.33<br>) 32.6<br>) 27.64<br>) 22.6  | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)  | 12.04<br>11.23<br>10.93<br>10.2<br>10.39<br>10.2<br>9.34<br>9.16<br>8.84<br>9.2  | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(152)<br>(153)<br>(154)  | 7.447<br>67.7<br>61.64<br>71.75<br>113<br>81.2<br>53.78<br>44.9<br>29.21<br>24.13  | (153)<br>(164)<br>(165)<br>(165)<br>(167)<br>(168)<br>(169)<br>(170)<br>(171)   | 10.7<br>10.93<br>10.2<br>10.4<br>10.2<br>9.34<br>8.7<br>8.84  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)<br>(280)  | 87.8<br>93.5<br>51.8<br>110.3<br>67.8<br>42.46<br>32.47<br>34.02<br>21.67<br>19.83<br>16.91   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(295)<br>(295)<br>(295)<br>(296)<br>(297)<br>(298)<br>(299)   | 10.95<br>10.2<br>10.4<br>9.9<br>9.34<br>8.9<br>8.36<br>8.15<br>7.447<br>7.447<br>7.447   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(313)<br>(314)<br>(315)<br>(315)<br>(315)<br>(317)   | 5.72<br>5.57<br>4.91<br>5.5<br>4.91<br>4.99<br>4.155<br>4.42<br>4.155<br>4.42<br>4.912  | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(333)<br>(334)<br>(335)   | 3.459<br>3.7<br>3.457<br>3.14<br>3.38<br>3.46<br>3.38<br>3.46<br>3.38<br>3.46<br>3.2<br>2.29  | (142)<br>(344)<br>(345)<br>(346)<br>(346)<br>(346)<br>(348)<br>(348)<br>(350)<br>(351)<br>(351)<br>(352)<br>(353)   | 0.933<br>1.21<br>1.448<br>1.93<br>2.022<br>1.93<br>1.089<br>1.44<br>1.14<br>1.14<br>0.867   |
|  | ) 32.47<br>) 26<br>) 22.4<br>) 19.15<br>) 19.22<br>) 17.17<br>) 45.33<br>) 32.6<br>) 27.64<br>) 22.6<br>) 20.26   | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(137)   | 12.04<br>11.23<br>10.23<br>10.2<br>10.39<br>10.2<br>9.34<br>9.16<br>8.84<br>8.2<br>8.36  | (145)<br>(146)<br>(147)<br>(148)<br>(150)<br>(151)<br>(151)<br>(152)<br>(153)<br>(154)<br>(155)                                     | 7.447<br>67.7<br>61.64<br>71.75<br>113<br>81.2<br>53.78<br>44.9<br>29.21<br>24.13<br>32.47   | (153)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(167)<br>(170)<br>(171)<br>(172)  | 11.43<br>10.7<br>10.93<br>10.2<br>10.4<br>10.2<br>9.34<br>8.7<br>8.84<br>8.4  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(276)<br>(276)<br>(279)<br>(280)<br>(280)<br>(281)<br>(282)                            | 87.8<br>93.5<br>51.8<br>110.3<br>67.8<br>42.46<br>32.47<br>34.02<br>21.67<br>19.83<br>16.91<br>19.83  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)<br>(294)<br>(295)<br>(297)<br>(299)<br>(299)   | 10.95<br>10.2<br>10.4<br>9.9<br>9.34<br>8.75<br>8.36<br>8.15<br>7.447<br>7.27<br>7.247<br>7.5                                    | (507)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(314)<br>(315)<br>(315)<br>(315)<br>(315)<br>(317)<br>(318)                                     | 5.72<br>5.57<br>4.91<br>5.3<br>4.91<br>4.79<br>4.155<br>4.42<br>4.155<br>4.42<br>4.912<br>4.79                                    | (325)<br>(526)<br>(527)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(333)<br>(334)<br>(335)<br>(336)  | 3.459<br>3.7<br>3.459<br>3.14<br>3.38<br>3.48<br>3.38<br>3.48<br>3.38<br>3.48<br>3.29<br>2.76   | (242)<br>(344)<br>(345)<br>(346)<br>(347)<br>(348)<br>(349)<br>(350)<br>(351)<br>(351)<br>(352)<br>(353)<br>(354)   | 0.933<br>1.21<br>1.448<br>1.93<br>2.022<br>1.93<br>1.059<br>1.44<br>1.14<br>0.867<br>0.931  |
|  | ) 32.47<br>26) 22.4<br>19.15<br>19.15<br>16.22<br>17.17<br>0 45.33<br>32.6<br>) 37.64<br>) 27.64<br>) 20.26<br>1 18.82  | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(137)<br>(138)  | 12.04<br>11.23<br>10.73<br>10.2<br>10.39<br>10.2<br>9.34<br>9.16<br>8.84<br>8.84<br>8.2<br>8.36<br>7.9                         | (145)<br>(146)<br>(147)<br>(148)<br>(150)<br>(150)<br>(151)<br>(152)<br>(153)<br>(153)<br>(155)<br>(156)                            | 7.447<br>67.7<br>61.64<br>71.75<br>113<br>81.2<br>53.78<br>44.9<br>29.21<br>24.13<br>32.47<br>18.48  | (153)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(167)<br>(168)<br>(170)<br>(171)<br>(172)<br>(173)                            | 11.46<br>10.7<br>10.93<br>10.2<br>10.4<br>10.2<br>9.34<br>8.7<br>8.84<br>8.84<br>8.4<br>8.36                        | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(279)<br>(280)<br>(280)<br>(281)<br>(282)<br>(282)                            | 87.8<br>93.5<br>51.8<br>110.3<br>67.8<br>42.46<br>32.47<br>21.67<br>19.83<br>16.91<br>19.83<br>15.01  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)<br>(294)<br>(295)<br>(296)<br>(297)<br>(298)<br>(300)<br>(301)                                     | 10.95<br>10.2<br>10.4<br>9.9<br>9.34<br>8.9<br>8.36<br>8.15<br>7.447<br>7.27<br>7.447<br>7.5<br>7.447                            | (207)<br>(308)<br>(309)<br>(311)<br>(312)<br>(313)<br>(313)<br>(314)<br>(315)<br>(315)<br>(316)<br>(319)<br>(319)   | 5.72<br>5.57<br>4.91<br>5.3<br>4.91<br>4.79<br>4.155<br>4.42<br>4.155<br>4.42<br>4.912<br>4.912                                   | (325)<br>(526)<br>(527)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(334)<br>(335)<br>(336)<br>(336)<br>(337)   | 3.459<br>5.459<br>5.457<br>3.452<br>3.14<br>3.345<br>3.46<br>3.46<br>3.42<br>2.29<br>2.79   | (142)<br>(344)<br>(345)<br>(346)<br>(346)<br>(347)<br>(348)<br>(349)<br>(351)<br>(351)<br>(351)<br>(354)<br>(355)   | 0.933<br>1.21<br>1.448<br>1.93<br>2.022<br>1.93<br>1.089<br>1.44<br>1.14<br>1.14<br>0.867<br>0.931<br>0.74                          |
|  | ) 32.47<br>26<br>) 22.4<br>) 19.15<br>) 18.22<br>) 17.17<br>) 45.33<br>) 32.6<br>) 27.64<br>) 22.6<br>) 20.26<br>) 20.26<br>) 16.62<br>) 17.56                                | (127)<br>(129)<br>(120)<br>(131)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(137)<br>(139)<br>(137)   | 12.04<br>11.23<br>10.73<br>10.2<br>10.39<br>10.2<br>9.34<br>9.16<br>8.84<br>8.2<br>8.36<br>7.9<br>7.902                        | (145)<br>(146)<br>(147)<br>(148)<br>(150)<br>(151)<br>(152)<br>(153)<br>(154)<br>(155)<br>(155)                                     | 7.447<br>69.7<br>51.64<br>71.75<br>113<br>81.2<br>53.78<br>44.9<br>29.21<br>24.13<br>32.47<br>18.48<br>23.84                                     | (153)<br>(164)<br>(165)<br>(165)<br>(166)<br>(167)<br>(168)<br>(167)<br>(177)<br>(172)<br>(172)<br>(173)<br>(174)                   | 11.43<br>10.7<br>10.93<br>10.2<br>10.4<br>10.2<br>9.34<br>8.7<br>8.84<br>8.84<br>8.56<br>7.7                        | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(279)<br>(280)<br>(280)<br>(281)<br>(282)<br>(283)<br>(284)                   | 87.8<br>93.5<br>51.8<br>110.3<br>67.8<br>42.46<br>32.47<br>34.02<br>21.67<br>19.83<br>16.91<br>19.83<br>15.01<br>13.49                          | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(294)<br>(297)<br>(298)<br>(297)<br>(298)<br>(299)<br>(300)<br>(301)<br>(302)                            | 10.90<br>10.2<br>10.4<br>9.3<br>8.9<br>8.36<br>8.36<br>8.36<br>8.35<br>7.447<br>7.27<br>7.447<br>7.5<br>7.447<br>7.5<br>7.447    | (207)<br>(208)<br>(309)<br>(311)<br>(312)<br>(313)<br>(314)<br>(314)<br>(315)<br>(315)<br>(316)<br>(317)<br>(319)<br>(329)  | 5.72<br>5.57<br>4.91<br>5.3<br>4.91<br>4.79<br>4.155<br>4.42<br>4.155<br>4.42<br>4.79<br>4.79<br>4.79                             | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(333)<br>(334)<br>(335)<br>(335)<br>(335)<br>(336)<br>(327)<br>(338)  | 3.459<br>3.7<br>3.472<br>3.14<br>3.38<br>3.46<br>3.46<br>3.46<br>3.46<br>3.42<br>2.76<br>2.79<br>2.2  | (242)<br>(344)<br>(344)<br>(247)<br>(348)<br>(349)<br>(350)<br>(351)<br>(351)<br>(352)<br>(353)<br>(354)<br>(355)   | 0.933<br>1.21<br>1.448<br>1.93<br>2.022<br>1.93<br>1.089<br>1.44<br>1.14<br>1.14<br>1.14<br>0.867<br>0.931<br>0.74<br>0.624         |
|  | ) 32.47<br>26<br>) 22.4<br>) 19.15<br>) 18.22<br>) 17.17<br>) 45.33<br>) 32.6<br>) 32.6<br>) 27.64<br>) 22.6<br>) 20.26<br>) 20.26<br>) 20.26<br>) 18.82<br>) 17.56<br>) 15.9 | $(127) \\ (129) \\ (129) \\ (131) \\ (132) \\ (132) \\ (133) \\ (134) \\ (135) \\ (136) \\ (137) \\ (138) \\ (137) \\ (139) \\ (140) \\ (140) \\ (140) \\ (1100) \\ $ | 12.04<br>11.23<br>10.93<br>10.2<br>10.39<br>10.2<br>9.34<br>9.16<br>8.84<br>8.2<br>8.36<br>7.9<br>7.902<br>7.73                | (145)<br>(146)<br>(147)<br>(148)<br>(150)<br>(151)<br>(152)<br>(153)<br>(153)<br>(154)<br>(154)<br>(156)<br>(157)<br>(158)          | 7.447<br>67.7<br>61.64<br>71.75<br>113<br>81.2<br>53.78<br>44.9<br>29.21<br>24.13<br>32.47<br>18.48<br>23.84<br>14.06                            | (153)<br>(164)<br>(165)<br>(166)<br>(167)<br>(169)<br>(170)<br>(170)<br>(171)<br>(172)<br>(173)<br>(175)<br>(174)                   | 10.7<br>10.93<br>10.2<br>10.4<br>10.2<br>9.34<br>8.7<br>8.84<br>8.4<br>8.36<br>7.7<br>7.902                         | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(279)<br>(280)<br>(280)<br>(281)<br>(282)<br>(282)                            | 87.8<br>93.5<br>51.8<br>110.3<br>67.8<br>42.46<br>32.47<br>34.02<br>21.67<br>19.83<br>16.91<br>19.83<br>15.01<br>15.01<br>15.149<br>20.26       | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(294)<br>(295)<br>(296)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(300)<br>(301)<br>(302)<br>(303) | 10.95<br>10.2<br>10.4<br>9.9<br>9.34<br>8.7<br>8.36<br>8.15<br>7.447<br>7.27<br>7.447<br>7.5<br>7.447<br>7.5<br>7.447<br>7.5     | (207)<br>(308)<br>(307)<br>(311)<br>(312)<br>(313)<br>(314)<br>(314)<br>(315)<br>(315)<br>(315)<br>(315)<br>(316)<br>(317)<br>(318)<br>(317)<br>(318)<br>(320)<br>(320) | 5.72<br>5.57<br>4.91<br>5.3<br>4.91<br>4.79<br>4.155<br>4.42<br>4.155<br>4.42<br>4.79<br>4.912<br>4.79<br>4.79<br>4.155           | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(333)<br>(333)<br>(333)<br>(333)<br>(334)<br>(335)<br>(336)<br>(336)<br>(337)<br>(339)  | 3.459<br>3.7<br>3.459<br>3.14<br>3.38<br>3.46<br>3.346<br>3.346<br>3.346<br>3.20<br>2.76<br>2.79<br>2.36  | (242)<br>(344)<br>(344)<br>(344)<br>(347)<br>(348)<br>(350)<br>(350)<br>(350)<br>(355)<br>(355)<br>(355)<br>(355)<br>(355)<br>(355)<br>(355)                            | 0.933<br>1.21<br>1.448<br>1.95<br>2.022<br>1.93<br>1.069<br>1.44<br>1.14<br>1.14<br>1.14<br>0.867<br>0.931<br>0.74<br>0.624         |
|  | ) 32.47<br>) 26<br>) 27.4<br>) 19.15<br>) 19.22<br>) 17.17<br>) 45.33<br>) 32.6<br>) 27.64<br>) 27.64<br>) 20.26<br>) 14.82<br>) 17.56<br>) 15.9<br>) 15.01                   | $(127) \\ (128) \\ (129) \\ (131) \\ (132) \\ (132) \\ (133) \\ (134) \\ (135) \\ (136) \\ (137) \\ (138) \\ (137) \\ (139) \\ (140) \\ (141) \end{cases}$  | 12.04<br>11.23<br>10.2<br>10.39<br>10.2<br>9.34<br>9.16<br>8.84<br>8.2<br>8.36<br>7.9<br>7.902<br>7.73<br>7.447                | (145)<br>(146)<br>(147)<br>(148)<br>(150)<br>(151)<br>(152)<br>(153)<br>(153)<br>(153)<br>(154)<br>(155)<br>(156)<br>(157)<br>(158) | 7.447<br>69.7<br>61.64<br>71.75<br>113<br>81.2<br>53.78<br>44.9<br>29.21<br>24.13<br>32.47<br>18.48<br>23.84<br>14.06<br>(13.79                  | (153)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(167)<br>(170)<br>(171)<br>(172)<br>(173)<br>(174)<br>(175)<br>(177)          | 11.40<br>10.7<br>10.93<br>10.2<br>10.4<br>10.2<br>9.34<br>8.7<br>8.84<br>8.4<br>8.36<br>7.7<br>7.902<br>7.7         | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(276)<br>(276)<br>(279)<br>(280)<br>(280)<br>(280)<br>(281)<br>(282)<br>(283)<br>(284) | 87.8<br>93.5<br>51.8<br>110.3<br>67.8<br>42.46<br>32.47<br>34.02<br>21.67<br>19.83<br>16.91<br>19.83<br>15.01<br>13.48<br>20.26<br>13.2         | (209)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)<br>(294)<br>(295)<br>(294)<br>(297)<br>(298)<br>(299)<br>(299)<br>(300)<br>(301)<br>(303)<br>(304) | 10.95<br>10.4<br>9.9<br>9.34<br>8.9<br>8.36<br>8.15<br>7.447<br>7.5<br>7.447<br>7.5<br>7.447<br>7.5<br>7.447<br>6.99<br>6.95     | (207)<br>(208)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(315)<br>(315)<br>(316)<br>(317)<br>(318)<br>(319)<br>(320)<br>(322)                   | 5.72<br>5.57<br>4.91<br>5.3<br>4.91<br>4.79<br>4.155<br>4.42<br>4.155<br>4.42<br>4.79<br>4.79<br>4.79<br>4.79<br>4.153<br>4.79    | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(333)<br>(335)<br>(335)<br>(326)<br>(327)<br>(328)<br>(327)<br>(328)<br>(329)<br>(329)  | 3.459<br>3.473.333.333.459<br>7.4748888<br>7.4748888<br>7.474888<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77287<br>7.77288<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77277<br>7.7727777777777 | (142)<br>(344)<br>(345)<br>(346)<br>(346)<br>(347)<br>(354)<br>(350)<br>(351)<br>(352)<br>(353)<br>(354)<br>(355)<br>(355)<br>(355)<br>(355)<br>(355)<br>(355)<br>(356) | 0.933<br>1.21<br>1.448<br>1.93<br>2.022<br>1.93<br>1.059<br>1.44<br>1.14<br>0.867<br>0.931<br>0.74<br>0.624<br>0.5                  |
|  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $(127) \\ (129) \\ (129) \\ (130) \\ (131) \\ (132) \\ (133) \\ (134) \\ (135) \\ (134) \\ (137) \\ (138) \\ (137) \\ (138) \\ (137) \\ (140) \\ (1441) \\ (142) \end{cases}$   | 12.04<br>11.23<br>10.2<br>10.2<br>10.39<br>10.2<br>9.34<br>9.16<br>8.84<br>9.2<br>8.36<br>7.9<br>7.902<br>7.73<br>7.447<br>7.3 | (145)<br>(146)<br>(147)<br>(148)<br>(150)<br>(151)<br>(152)<br>(153)<br>(153)<br>(153)<br>(154)<br>(157)<br>(159)<br>(169)          | 7.447<br>69.7<br>61.64<br>71.75<br>113<br>81.2<br>53.78<br>44.9<br>29.21<br>24.13<br>32.47<br>18.48<br>23.84<br>14.06<br>(13.79<br>12.9          | (163)<br>(164)<br>(164)<br>(165)<br>(166)<br>(168)<br>(170)<br>(170)<br>(171)<br>(172)<br>(173)<br>(174)<br>(175)<br>(177)<br>(177) | 10.7<br>10.93<br>10.2<br>10.4<br>10.2<br>9.34<br>8.7<br>8.84<br>8.4<br>8.36<br>7.7<br>7.902<br>7.7<br>7.447         | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(280)<br>(281)<br>(281)<br>(283)<br>(284)<br>(285)<br>(286)<br>(287)          | 87.8<br>93.5<br>51.8<br>110.3<br>67.9<br>42.46<br>32.47<br>34.02<br>21.67<br>19.83<br>16.91<br>19.83<br>15.01<br>13.48<br>20.26<br>13.2<br>13.2 | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(296)<br>(296)<br>(297)<br>(297)<br>(297)<br>(299)<br>(300)<br>(301)<br>(303)<br>(304)<br>(305)          | 10.90<br>10.2<br>10.4<br>9.9<br>9.34<br>8.36<br>8.35<br>7.447<br>7.27<br>7.447<br>7.447<br>7.27<br>7.447<br>7.27<br>6.95<br>6.55 | (207)<br>(208)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)<br>(315)<br>(316)<br>(317)<br>(318)<br>(217)<br>(320)<br>(221)<br>(322)<br>(322) | 5.72<br>5.57<br>4.91<br>5.3<br>4.91<br>4.79<br>4.155<br>4.42<br>4.155<br>4.42<br>4.912<br>4.912<br>4.79<br>4.155<br>4.79<br>4.155 | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(334)<br>(334)<br>(3354)<br>(3354)<br>(3354)<br>(337)<br>(328)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329) | 3.459<br>5.459<br>5.459<br>3.459<br>3.42<br>3.438<br>3.48<br>3.48<br>3.42<br>2.79<br>2.26<br>1.79<br>1.14   | (142)<br>(344)<br>(345)<br>(346)<br>(346)<br>(347)<br>(354)<br>(355)<br>(351)<br>(353)<br>(354)<br>(355)<br>(356)<br>(356)<br>(358)                                     | 0.933<br>1.21<br>1.448<br>1.93<br>2.022<br>1.93<br>1.059<br>1.44<br>1.14<br>1.14<br>0.867<br>0.931<br>0.74<br>0.624<br>0.5<br>0.803 |
|  | ) 32.47<br>) 26<br>) 27.4<br>) 19.15<br>) 19.22<br>) 17.17<br>) 45.33<br>) 32.6<br>) 27.64<br>) 27.64<br>) 20.26<br>) 14.82<br>) 17.56<br>) 15.9<br>) 15.01                   | $(127) \\ (128) \\ (129) \\ (131) \\ (132) \\ (132) \\ (133) \\ (134) \\ (135) \\ (136) \\ (137) \\ (138) \\ (137) \\ (139) \\ (140) \\ (141) \end{cases}$  | 12.04<br>11.23<br>10.2<br>10.39<br>10.2<br>9.34<br>9.16<br>8.84<br>8.2<br>8.36<br>7.9<br>7.902<br>7.73<br>7.447                | (145)<br>(146)<br>(147)<br>(148)<br>(150)<br>(151)<br>(152)<br>(153)<br>(153)<br>(153)<br>(154)<br>(157)<br>(159)<br>(169)          | 7.447<br>69.7<br>61.64<br>71.75<br>113<br>81.2<br>53.78<br>44.9<br>29.21<br>24.13<br>32.47<br>18.48<br>23.84<br>14.06<br>(13.79<br>12.9<br>12.62 | (153)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(169)<br>(170)<br>(171)<br>(172)<br>(172)<br>(173)<br>(174)<br>(175)<br>(177) | 10.7<br>10.93<br>10.2<br>10.4<br>10.2<br>9.34<br>8.7<br>8.84<br>8.4<br>8.36<br>7.7<br>7.902<br>7.7<br>7.447<br>7.27 | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(280)<br>(281)<br>(281)<br>(282)<br>(283)<br>(284)<br>(285)<br>(286)<br>(287) | 87.8<br>93.5<br>51.8<br>110.3<br>67.9<br>42.46<br>32.47<br>34.02<br>21.67<br>19.83<br>16.91<br>19.83<br>15.01<br>13.48<br>20.26<br>13.2<br>13.2 | (209)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)<br>(294)<br>(295)<br>(294)<br>(297)<br>(298)<br>(299)<br>(299)<br>(300)<br>(301)<br>(303)<br>(304) | 10.95<br>10.4<br>9.9<br>9.34<br>8.9<br>8.36<br>8.15<br>7.447<br>7.5<br>7.447<br>7.5<br>7.447<br>7.5<br>7.447<br>6.99<br>6.95     | (207)<br>(208)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(315)<br>(315)<br>(316)<br>(317)<br>(318)<br>(319)<br>(320)<br>(322)                   | 5.72<br>5.57<br>4.91<br>5.3<br>4.91<br>4.79<br>4.155<br>4.42<br>4.155<br>4.42<br>4.79<br>4.79<br>4.79<br>4.79<br>4.153<br>4.79    | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(333)<br>(335)<br>(335)<br>(326)<br>(327)<br>(328)<br>(327)<br>(328)<br>(329)<br>(329)  | 3.459<br>3.473.333.333.459<br>7.4748888<br>7.4748888<br>7.474888<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77288<br>7.77287<br>7.77288<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77287<br>7.77277<br>7.7727777777777 | (142)<br>(344)<br>(345)<br>(346)<br>(346)<br>(347)<br>(354)<br>(350)<br>(351)<br>(352)<br>(353)<br>(354)<br>(355)<br>(355)<br>(355)<br>(355)<br>(355)<br>(355)<br>(356) | 0.933<br>1.21<br>1.448<br>1.93<br>2.022<br>1.93<br>1.059<br>1.44<br>1.14<br>0.867<br>0.931<br>0.74<br>0.624<br>0.5                  |

÷.

River discharge data at 12-hourly intervals for Station: 9A Period : 2

Phosphorus transport Berg River

.

414

.

| TR | 143 | March | 1989 |
|----|-----|-------|------|
|----|-----|-------|------|

(356) 1.791

(357) 1.58

(358) 1,791

(359) 1,68

(360) 1.587

. .

(163) 11.23 0.741 (127) 2,19 (145)(109) 2.47 ( 91) 2.76 (272) 1 (164) 32.47 Q.653 (146) (110) 2.544 (123)1.069 ( 92) 2.872 (165) 15.27 (147)0.741 (129) 1.07 (111) 3.07 ( 93) 3.07 (274) £ (166) 11.48 0.424 (130)0,803 (148) (112) 3.108 ( 94) 2.275 (167) 9.66 0.463 (131) 0.741 (149) (95) 2.76 (113) 4.06 (276) (168) 8.84 0.712 (132)0,867 (150)(114) 3.459 ( 96) 2.832 (169) 3.07 0.802 1.48 (151)(133) (115) 3.39 3.07 (278) (170) 2.022 1,213 (152)1.069 (116) 3.459 (134)3.459 (171) 1.60 (153)1.14 1.29 (117) 4.42 (135)5.57 (136) 0.488 (154) 1.288 (172) 1 (118) 3.459 4,155 (281)(155) 1.14 (173) 1.14 (137) 1.29 (119) 3.72 3.39 0.568 (174) 0.741 (138) 1.177 (156)(120) 12.62 1.907

(157)

(158)

(161)

0.514

1.067

0.568

(159) 0.514

(160) 0.488

(162) 2.275

(343)2.19 1.68 (325)5.57 (289) 2.47 (307)(271) 1.14 (344) 2..276 (308) 2.022 (324) 5.31 (290) 2.276 (345) 2.17 (309) 2.47 (327) 4,06 2.19 (291) (275) 1.07 (029) 4,155 (346) 2.276 (310) 3.459 (292) 2.276 (329) 3.39 (347) 2.19 దె (511) 59 (293) 1.93 (275) 1.39 (348) 2.276 (330) 3.797 (312) 30.02 1.426 (294) 2.022 (349) 2.19 3.39 (331) (313) 18.48 N (277) 3.06 (295) 1.93 (350) 2.276 ω (332) 3.459 6.998 (296) 1.669 (314) 14.4 (351) 2.19 (333) 3.39 (297) 1.68 (315) 12.34 (279) 9.2 (334) 3.138 (352) 1.791 1.448 (316) 8.84 (298) (280) 8.36 (353) 1.93 (335) 3.07 (317) 5.98 (299) 1.68 4.91 (336) 3.138 (354) 1.791 (318)5.717 1.587 (282) 4.912 (300) (355) 1.9 (337) 2.76 (301) 1.68 (319)4.79

4.912

5.57

8.36

6.4

(324) 5.111

(320)

(321)

(322)

(323)

(302) 1.587

(304) 1.448

(306) 1.518

(303) 1.52

(305) 1.52

(338)

(339)

(340)

(341)

2.832

2.61

2.544

2,19

(342) 2.276

| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$       | Variab   | le: PAA  | RLQ.varl (le | ngth = 360) |  |  |  |
|--|--|--|--------------|-------------|--|--|--|
| (19) 0.933 $(36)$ 4.912 $(54)$ 2.832 $(72)$ 4.341 $(90)$ 0.7 | ( 1)<br>( 2)<br>( 3)<br>( 4)<br>( 5)<br>( 6)<br>( 7)<br>( 8)<br>( 10)<br>( 11)<br>( 12)<br>( 13)<br>( 14)<br>( 15) | 1.14<br>0.682<br>0.4<br>0.413<br>1.143<br>1.771<br>2<br>1.587<br>1.44<br>1.288<br>1.68<br>2.276<br>2.31<br>2.544<br>2.76<br>1.14 |              |             | ( 56) 2.832<br>( 57) 2.76<br>( 58) 1.449<br>( 59) 5.18<br>( 60) 8.84<br>( 61) 14.06<br>( 62) 7.447<br>( 63) 84.51<br>( 64) 32.06<br>( 45) 15.27<br>( 66) 10.39<br>( 67) 7.73<br>( 68) 6.347<br>( 69) 5.18<br>( 70) 4.527 | ( 74)<br>( 75)<br>( 76)<br>( 77)<br>( 77)<br>( 77)<br>( 80)<br>( 81)<br>( 81)<br>( 82)<br>( 82)<br>( 82)<br>( 83)<br>( 84)<br>( 85)<br>( 84)<br>( 86)<br>( 89) | 4.155<br>4.06<br>4.155<br>3.39<br>2.832<br>2.47<br>1.907<br>1.93<br>2.022<br>1.93<br>1.791<br>1.44<br>0.867<br>1.21<br>1.035 |

(139) 1.44

(140) 1.448

(141) 1.36

(142) 1.14

(143) 1.07

(144) 0.624

(121) 11.23

(122) 7.447

5.18

3.39

2.832

3.976

(123)

(124)

(125)

(125)

|       |       |       |       |       |       | 10761 |       | (253) | 3.07  |   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---|
| (181) | 0.802 | (199) | 0.57  | (217) | 3.54  | (235) |       | •     | 2.832 |   |
| (182) | 0.803 | (200) | 0.65% | (218) | 3,459 | •     | 19.3B | (254) |       |   |
| (183) | 1     | (201) | 0.514 | (219) | 3.07  |       | 14.67 | (255) | 1.9   |   |
| (184) | 0,548 | (202) | 0.653 | (220) | 2.832 | (228) | 12.42 | (256) | 2.544 |   |
| (185) | 0.413 | (203) | 0.77  | (221) | 2.76  | (239) | 11.78 | (257) | 2.19  |   |
| (186) | 0.482 | (204) | 0.835 | (222) | 2.544 | (240) | 8.36  | (258) | 2.022 |   |
| (187) | 1.07  | (205) | 3,38  | (223) | 2.47  | (241) | 6.85  | (259) | 2.19  |   |
| (188) | 0.741 | (206) | 8.6   | (224) | 2.276 | (242) | 6.347 | (250) | 1.791 |   |
| (189) | 0.802 |       | 11.23 | (225) | 1.90  | (243) | 5.18  | (261) | 1.68  |   |
| (187) | 0.741 |       | 51.85 | (226) | 1.326 | (244) | 4.912 | (262) | 1.448 |   |
| • •   | 0.366 |       | 47.42 | (227) | 1.52  | (245) | 4.42  | (260) | 1.68  |   |
| (191) | • •   |       | 30.43 | (228) | 1.177 | (246) | 4.72  | (264) | 1.791 |   |
| (192) | 0.624 |       | 18.82 | (229) | 3.39  | (247) | 4.06  | (265) | 1.58  | • |
| (193) | 0.741 |       |       | (230) | 3.459 | (248) | 4.155 | (266) | 1,791 |   |
| (194) | 0.966 | • - · | 10.39 | (231) | 5.77  | (249) | 3.72  | (267) | 1.48  |   |
| (195) | 1.14  | (213) | 7.728 | • •   | 8.06  | (250) | 3,797 | (268) | 1.069 |   |
| 196)  | 1.14  | (214) | -     | (232) |       | • • • | 3.39  | (259) | 1.21  |   |
| (197) | 1.36  | (215) |       | (233) | 11.78 | (251) |       | • •   | 1.035 |   |
| (198) | 0.741 | (216) | 4.341 | (234) | 29,21 | (252) | 3.138 | (270) | 1.035 |   |

River discharge data at 12-hourly intervals for Station: 9A Period : 3

. :

Phosphorus transport Berg River

( 97)

( 98)

( 99)

(100)

(101)

(102)

(103)

(104)

(105)

(106)

(107) 2.47

(108) 1.907

1.68

0.933

2.47

1.907

Page 1

(283) 4.06

(284) 4.155

(286) 3.459

(288) 2.688

(285) 3.39

(287) 2.76

0.9

0.596

**0.51**4

0.514

0.463

0.682

(175)

(176)

(177)

(17년)

(179)

(180)

| Variable:PAARL04.var1(length(1) $1.587$ (19) $5.31$ (2) $1.60$ (20) $4.79$ (3) $1.791$ (21) $5.72$ (4) $1.68$ (22) $12.34$ (5) $1.791$ (23) $10.4$ (6) $1.68$ (24) $8.1$ (7) $1.448$ (25) $7.45$ (8) $3.47$ (26) $5.98$ (9) $4.912$ (27) $5.72$ (10) $56.23$ (28) $5.18$ (11) $40.03$ (29) $5.31$ (12) $19.83$ (30) $4.79$ (13) $15.01$ (31) $4.53$ (14) $11.23$ (32) $4.06$ (15) $8.84$ (33) $4.16$ (16) $7.27$ (34) $4.06$ (17) $6.56$ (35) $3.79$ (18) $5.98$ (36) $6.39$ | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$ | $\begin{array}{c} 8.36 & (23) \\ 8.36 & (23) \\ 8.36 & (23) \\ 7.902 & (23) \\ 7.902 & (23) \\ 7.902 & (23) \\ 7.27 & (24) \\ 7.447 & (24) \\ 6.998 & (24) \\ 6.998 & (24) \\ 6.998 & (24) \\ 6.998 & (24) \\ 6.998 & (24) \\ 6.998 & (24) \\ 6.998 & (24) \\ 6.998 & (24) \\ 6.998 & (24) \\ 6.998 & (24) \\ 6.998 & (24) \\ 6.998 & (24) \\ 6.998 & (24) \\ 6.998 & (24) \\ 6.998 & (25) \\ 6.999 & (25) \\ 9.92 & (25) \\ 9.9$ |  | $\begin{array}{ccccc} (253) & 7.447 \\ (254) & 7.27 \\ (255) & 6.998 \\ (255) & 6.44 \\ (257) & 6.134 \\ (257) & 6.134 \\ (259) & 58.55 \\ (260) & 24.88 \\ (261) & 26.09 \\ (262) & 18.82 \\ (263) & 16.26 \\ (264) & 13.48 \\ (265) & 12.04 \\ (266) & 10.7 \\ (267) & 9.34 \\ (269) & 8.36 \\ (270) & 7.73 \end{array}$ |
|--|---|--|--|--|--|--|
|--|---|--|--|--|--|--|

.

|  | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ |
|--|---|
|--|---|

River discharge data at 12-hourly intervals for Station: 9A Period : 4

.

.

.

. . .

.

|        |          |              |       |              |        |         |       |       |         | 1         |       |       |       |       |                |       |       |                |                |
|--------|----------|--------------|-------|--------------|--------|---------|-------|-------|---------|-----------|-------|-------|-------|-------|----------------|-------|-------|----------------|----------------|
| Variab | le: PAAR | L05.varl     | (leng | th = 360     | )      |         |       |       | <b></b> |           |       |       |       |       |                |       |       |                |                |
|        |          |              |       |              |        |         | 10.39 | 1 731 | 2.832   | (191)     | 0.424 | (199) |       | (217) |                |       | 2.022 | (253)          | 0.867          |
| (1)    | 3.067    | ( 19)        |       | (37)         | 2.0222 | ( 55)   | 0.131 | (74)  |         | (182)     | 0.39  | (200) | 2.147 | (218) | 3.797          | (236) | 0.835 | (254)<br>(255) |                |
| (2)    | 5.31     | ( 20)        |       |              | 2.276  |         | 4.527 | ( 75) |         | (183)     | 4.527 | (201) | 2.49  | (219) | 4.15           |       | 1.213 | (255)<br>(256) |                |
| ( 3)   | 4,155    | (21)         |       |              | 2.022  | (58)    | 6.779 | (76)  |         | (184)     | 3,976 | (202) | 2.022 | (220) | 4.527          | (208) | 0.803 |                |                |
| (4)    | 2.785    | ••           | 1     |              |        | ( 59)   |       |       | 3.178   | (185)     | 3.459 | (203) | 2.544 | (221) | 3.797          | (239) | 1,19  | (257)          |                |
| (5)    | 3.130    |              | 1.18  | (41)         | 0.741  |         | 5.514 | (78)  |         | (186)     | 2.276 | (204) | 2.544 | (222) | 2.544          | (240) |       | (258)          |                |
| ( 6)   | 3.459    | (24)         |       |              |        | ( 61)   |       |       | 3.797   | (187)     | 2.544 | (205) | 2.832 | (223) | 2.149          |       | 1.213 |                | 1.79           |
| (7)    | 4.155    |              | 2.276 | (43)         | 0,803  | ( 62)   |       | ( 80) | 3.459   | (188)     | 2.149 | (206) | 2.802 |       | 1.251          |       | 0.305 |                | 1.907          |
| (8)    | 3.797    |              | 1.791 | (44)<br>(45) |        | ( 63)   | 3     | ( 81) | 2.832   | (189)     | 2.99  | (207) | 2.032 | (225) | 1.587          | (245) |       | (261)          |                |
| (9)    | 3.459    |              | 1.79  |              | 0.741  | (64)    |       | (82)  | 2.276   | (190)     | 2.985 | (208) |       |       | 0.933          |       | 0.867 |                | 2.832          |
| (10)   | 3,178    |              | 1.208 | (46)<br>(47) |        | ( 65)   |       | (83)  | 2.932   | (191)     | 3.29  | (209) | 2.41  | (227) | 1.14           |       | 1.298 |                | 2.544<br>1.448 |
| (11)   | 2.544    | ( 27)        |       | (47)         |        |         | 2.276 | (84)  | 2.022   |           | 3.138 | (219) | 1.687 | (228) | 0.867          |       | 1.326 | (264)<br>(255) |                |
| ( 12)  | 1.518    | • - • •      | 1.213 | (49)         |        | (67)    |       | (85)  | 2.276   | (193)     | 2.276 | (211) | 2.276 | (229) | 1.364          |       | 2.022 |                |                |
| (13)   | 1,91     |              | 1.79  |              | 2.022  |         | 1.587 | ( 06) | 1.907   | (194)     | 2.022 | (212) |       | (230) | 1              |       | 1.907 |                | 1.426          |
| (14)   | 1.14     | • • - •      | 1.069 |              |        | ( 59)   |       | (87)  | 2.544   | (195)     | 2.544 | (213) |       |       | 1.587          |       | 2.022 | (267)<br>(268) | 0.803          |
| (15)   | 1.268    |              | 1.587 |              | 2.544  |         | 1,288 | (88)  | 2,022   | (196)     | 1.791 |       | 2.276 | (232) | 1.587          |       | 0.967 |                | 0.867          |
| (16)   | 0.966    | (34)         |       | (52)         |        |         | 1.79  | (89)  | 2.544   |           | 2.41  |       | 2,832 | (253) |                |       | 1.104 |                | 0.682          |
| ( 17)  |          | (35)<br>(36) |       | (34)         |        |         | 1.288 |       | 2.276   | (198)     | 2.022 | (216) | 2.276 | (234) | 1.907          | (252) | 0.835 |                |                |
| (18)   | 0.4.33   |              |       |              |        | ~       |       |       |         |           |       |       |       |       |                |       |       |                |                |
|        |          |              |       |              |        |         | •     |       | ,       |           |       |       |       |       |                |       |       |                |                |
|        |          |              |       |              |        |         |       |       |         |           |       |       |       |       |                |       |       |                |                |
|        |          |              |       |              |        |         |       |       |         |           |       |       |       |       |                |       |       |                |                |
|        |          |              |       |              |        |         |       |       |         |           |       |       |       |       |                |       |       |                |                |
|        |          |              |       |              |        |         |       |       | . 713   |           |       |       | 34.95 |       | 0.741          | (025) | 4.912 | (343)          | 1 771          |
|        | 3.138    | (107)        |       | (127)        | 1.689  | (145)   | 20022 | (100) | 1 4 9   | , , _, _, |       |       | 11.48 | (208) |                |       | 4.912 | (344)          | 1.791          |
| (92)   |          | (110)        |       | (128)        | 1.105  | (146)   |       |       | 2.276   | (272)     |       |       | 5.717 | (207) |                |       | 51.85 | (345)          | 1.791          |
|        | 3.139    |              | 2.276 | (129)        | 2.022  | (147)   |       |       | 2.276   | (27.5)    |       |       | 3.797 |       | 2.276          |       | 20.95 | (346)          | 1.587          |
| (94)   |          | (112)        |       | (130)        | 1.14   |         | 2.2/6 |       | 1.213   | (274)     |       |       | 2.832 |       | 5.717          | (329) |       | (347)          | 1.597          |
| ( 95)  |          | (113)        |       | (131)        | 2.022  |         | 2.276 | (167) |         | (275)     |       |       | 2.276 |       | 4,912          |       | 7.902 | (348)          | 1.364          |
|        | 2.022    | (114)        |       | (132)        | 1.208  | (150)   | 2.276 |       | 1.288   | (276)     |       |       | 1.79  |       | 3.459          | (331) |       | (349)          | 1.448          |
| (97)   | 2.54     | (115)        |       | (133)        | 2.276  | (151)   |       | (169) |         | (277)     |       |       | 1.426 |       | 2.544          |       | 4.72  | (350)          | 2.832          |
|        | 1.364    | (116)        |       | (134)        | 2.544  | (152)   |       |       | 3.976   | (278)     |       |       | 1.288 |       | 2.276          | (033) |       | (351)          | 6.134          |
|        | 2.544    | (117)        |       | (135)        | 2.832  | (153)   | 2.276 |       | 2.544   | (279)     |       |       |       |       | 1.791          | (334) |       | (352)          | 4.912          |
|        | 2.785    | (118)        |       |              | 2.832  | (154)   | 1.587 |       | 1.791   | (280)     |       | (298) |       |       | 1.587          | (335) |       | (353)          | 3.459          |
|        | 2.832    | (119)        |       |              | 2.832  | (155)   |       |       | 3.138   | (281)     |       |       | 1.14  |       | 1,448          |       | 2.544 | (354)          | 3.459          |
| (102)  |          | (120)        |       |              | 1.791  | (156)   | 1.448 |       | 2.680   | (282)     | _     | (300) |       |       | 2.022          | (337) |       | (355)          |                |
|        | 2.544    | (121)        |       |              | 2.276  | r (157) | 1.213 |       | 2.544   | (283)     |       |       | 1.14  |       | 13.79          | (337) |       | (356)          | 2.688          |
|        | 1.791    |              | 2.41  |              | 4.527  | (158)   |       |       | 2.544   | (284)     |       |       | 0.835 |       | 27.64          | (339) |       | (357)          |                |
|        | 2.544    | (123)        |       |              | 4,527  |         | 1.069 |       | 2.832   | (285)     |       | (303) |       |       | 15.01          | (337) |       | (358)          | 2.022          |
|        | 2 544    | (124)        |       |              | 3,138  |         | 0.624 |       | 2.544   | (286)     |       | (304) |       |       |                | (341) |       | (359)          |                |
| (107)  |          | (125)        | 1.791 | (143)        |        | (161    | 0.568 |       | 2.544   | (287)     |       | (305) |       |       | 10.13<br>6.134 |       | 1.791 | (360)          |                |
| 11000  | 7 000    | (176)        | 1.789 | (144)        | 1.791  | (162)   | 0.867 |       | 1.507   |           | 0.624 | (306) |       |       | 0.1.24<br>     |       |       |                |                |
| (100)  |          |              |       |              |        |         |       |       |         |           |       |       |       |       |                |       |       |                |                |

River discharge data at 12-hourly intervals for Station: 9A Period : 5

TR 143 March 1989

| •  |  |   | •  |   |   |  |  |  |  |  |  |  |  |  |  |   |  |  |  |
|--|--|---|--|---|---|--|--|--|--|--|--|--|--|--|--|---|--|--|--|
| Variab   | le: PAARL  | .06.varl  | (leng)   | th = 360  | )   |  |  |  | <b>.</b>   |  |  |  |  |  |  |   |  |  |  |
|  |  | ·   | 24.96  | ( 37)   | 2.832   | ( 55)  | 5.717  |  | 7.447  | (181)  | 9.34   | (197)  | 20.43  | (217)  |  |   | 42.65<br>27.25   | (253)<br>(254)   | 24.21<br>20.96   |
| ( 1)   | 1.587  | (20)  | 15.01  | (30)  | 2.802   | ( 56)  | 7.447  | (74)   | 10.39  | (182)  | 18.89  | (200)  | 24.58  | (218)  | 16.59  | (236)<br>(237)  | 22.38  | (255)  | 18.89  |
| .(2)   | 1,288  | (20)  | 13.01  | (30)  | 2.832   | ( 57)  | 86.66  | (75)   | 10.39  |  | 82.27  | (201)  | 23.48  | (217)  | 16.26  | (238)   | 19.89  | (256)  | 17.24  |
| (3)  | 1,288  | (21)  | 13.79  | (40)  | 2.832   | ( 58)  | 40.9   | ( 76)  | 26.09  | (184)  |  | (202)  | 26.09  | (220)  | 15.01  | (229)   | 17.24  | (257)  | 18 89  |
| (4)  | 1,288  | (22)  | 10.39  | (41)  | 2.832   | ( 59)  | 40.9   | (77)   | 67.75  | (185)  | 91.09  | (203)  |  | (221)  | 15.01  |   | 19.92  | (258)  | 20.26  |
| (5)  | 1.251  | •   | 8.84   | (42)  | 2.932   | ( 60)  | 27.64  | (78)   |  | (186)  | 127  | (204)  |  | (222)  | 14.4   | (240)   | 21.67  | (259)  | 39.16  |
| (6)  | 1  | (24)  | 7.447  | (43)  | 2.544   | ( 51)  | 17.56  | (79)   | 42.65  | (187)  | 105  | (205)  | 70.57  | (223)  | 13.79  | (241)   | 18.87  | (250)  | 59.64  |
| (7)  | 1.14   | (25)  |  | (44)  | 2.41  | ( 62)  | 17.56  | ( 80)  | 34.13  |  | 80.17  | (206)  | 52.81  | (224)  | 13.2   | (242)   | 18.22  | (261)  | 44.88  |
| (8)  | 1,518  | (26)  | 6 559  | (45)  | 2.41  | ( 63)  | 16.26  | ( 81)  | 27.64  | (187)  | 61.64  | (207)  | 45.33  | (225)  | 13.79  | (243)   |  | (262)  | 34,95  |
| (9)  | 55.72  | (27)  | 6.134  | •   | 2.276   | ( 54)  | 13.79  | (82)   | 23.11  | (170)  |  | (208)  | 40.03  | (226)  | 13.2   | (244)   | 16.71  | (262)  | 28.42  |
| ( 10)  | 16.26  | (28)  | 5.514  | (46)<br>(47)  | 2.276   | ( 65)  | 11.48  | (83)   | 20.26  | (171)  | 47.15  | (209)  | 44.43  | (227)  | 13.2   | (245)   |  | (264)  | 20.96  |
| (11)   | 39.16  | (29)  | 4.912  | (47)  | 2.276   | ( 66)  | 9.6  | (84)   | 18.87  |  | 35.77  | (210)  | 29.21  | (228)  | 17.89  |   | 15.63  | · ·  | 21.32  |
| (12)   | 25.33  | ( 30)   | 4.912  |   | 3.459   | ( 67)  | 8.84   |  | 17.56  |  | 31.24  | (211)  | 26.09  | (229)  | 15.95  |   | 15.95  | (265)  | 19.57  |
| (13)   | 25.71  | (31)  | 4.527  | ( 49).  | 40.9  | (68)   | 7.902  | (86)   | 16.26  |  | 29.62  | (212)  | 24.21  |  | 16.26  | (248)   | 18.22  |  |  |
| (14)   | 14.4   | (32)  | 4.527  |   | 17.56   | ( 69)  | 7.447  | (87)   | 49.94  | (195)  | 42.65  | (213)  | 22.30  | (231)  |  | (249)   | 18.89  | (267)  |  |
| (15)   | 20.24  | (33)  | 4,155  | (51)  |   | (70)   | 6.998  | (88)   | 40.47  | (176)  | 64.68  | (214)  | 20.96  | (232)  | 14.1   |   | 17.89  | (268)  |  |
| • •  | 12.04  | (34)  | 3.459  | (52)  | 10.93   | (71)   | 6.359  | (89)   | 32.47  | (197)  | 49.47  | (215)  | 19.57  | (233)  | 59.64  |   | 16.26  |  | 74.45  |
|  | 9.5  | (35)  | 3,459<br>2,985   | (53)<br>(54)  | 8.131<br>6.559  | (72)   | 6.134  | ( 90)  | 29.21  | (198)  | 35.77  | (216)  | 24.58  | (234)  | 83.35  | (252)   | 27.64  | (270)  | 43,53  |
|  | 16.26  | (36)  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |  |  |  |
|  |  |   |  |   |   |  |  |  |  |  |  |  |  |  |  |   |  |  |  |
| <u>_</u>   |  |   |  |   |   |  |  | (163)  | 35.77  | (271)  | 35.77  | (289)  | 10.4   | (307)  | 6.559  | (025)   | 5.31   | (347)  | 2,83   |
| ( 91)  | 23,34  | (109)   | 13.79  | (127)   | 16.26   | (145)  | 45.33  | (163)  | 35.77  |  |  |  | 10.4<br>9.34   | (307)<br>(308)   | 6.559<br>6.55  | (326)   | 5.31<br>4.927  | (040)<br>(044)   | 2.544  |
| (92)   | 23,34<br>20,96   | (109)<br>(110)  | 13.79<br>13.79   | (127)<br>(120)  | 16.26<br>16.26  | (145)<br>(146)   | 45.33<br>40.03   | (163)<br>(164)   | 35.77<br>32.47   | (271)  | 35.77  | (289)<br>(290)<br>(291)  | 10.4<br>9.34<br>9.34   | (307)<br>(008)<br>(309)  | 6.559<br>6.55<br>7.447   | (326)<br>(327)  | 5.31<br>4.927<br>4.927   | (040)<br>(044)<br>(345)  | 2,544<br>2,83  |
| (92)<br>(93)   | 23,34<br>20.96<br>44,43  | (109)<br>(110)<br>(111)   | 13.79<br>13.79<br>44.43  | (127)<br>(120)<br>(127)   | 16.26<br>16.26<br>34.13   | (145)<br>(146)<br>(147)  | 43.33<br>40.03<br>46.24  | (163)<br>(164)<br>(165)  | 35.77<br>32.47<br>27.64  | (271)<br>(272)   | 35.77<br>30.83<br>29.21  | (289)<br>(290)<br>(291)<br>(292)   | 10.4<br>9.34<br>9.34<br>8.84   | (307)<br>(008)<br>(309)<br>(310)   | 6.559<br>6.55<br>7.447<br>7.902  | (326)<br>(327)<br>(328)   | 5.31<br>4.527<br>4.527<br>4.527  | (343)<br>(344)<br>(345)<br>(346)   | 2,544<br>2,83<br>2,022   |
| (92)<br>(93)<br>(93)   | 23.34<br>20.96<br>44.43<br>77.04   | (109)<br>(110)<br>(111)<br>(112)  | 13.79<br>13.79<br>44.43<br>30.83   | (127)<br>(128)<br>(127)<br>(130)  | 16.26<br>16.26<br>34.13<br>41.77  | (145)<br>(146)<br>(147)<br>(148)   | 43.33<br>40.03<br>46.24<br>85.56   | (163)<br>(164)<br>(165)<br>(166)   | 35.77<br>32.47<br>27.64<br>25.33   | (271)<br>(272)<br>(273)  | 35.77<br>30.83<br>29.21<br>25.33   | (289)<br>(290)<br>(291)  | 10.4<br>9.34<br>9.34<br>8.84<br>8.84   | (307)<br>(008)<br>(309)<br>(310)<br>(311)  | 6.559<br>6.55<br>7.447<br>7.902<br>7.447   | (326)<br>(327)<br>(328)<br>(329)  | 5.31<br>4.527<br>4.527<br>4.527<br>4.912   | (343)<br>(344)<br>(345)<br>(346)<br>(347)  | 2,544<br>2,83<br>2,022<br>2,83   |
| (92)<br>(93)<br>(94)<br>(95)   | 23.34<br>20.96<br>44.43<br>77.04<br>40.9   | (109)<br>(110)<br>(111)<br>(112)<br>(113)   | 13.79<br>13.79<br>44.43<br>30.83<br>23.11  | (127)<br>(120)<br>(127)<br>(130)<br>(131)   | 16.26<br>16.26<br>34.13<br>41.77<br>28.42   | (145)<br>(146)<br>(147)<br>(148)<br>(148)  | 43.33<br>40.03<br>46.24<br>85.56<br>91.09  | (163)<br>(164)<br>(165)<br>(166)<br>(167)  | 35.77<br>32.47<br>27.64<br>25.33<br>23.11  | (271)<br>(272)<br>(273)<br>(274)   | 35.77<br>30.83<br>29.21<br>25.33<br>2 <b>3.8</b> 4   | (289)<br>(290)<br>(291)<br>(292)   | 10.4<br>9.34<br>9.34<br>8.84   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)   | 0.559<br>6.55<br>7.447<br>7.902<br>7.447<br>6.55   | (326)<br>(327)<br>(328)<br>(329)<br>(330)   | 5.31<br>4.527<br>4.527<br>4.527<br>4.912<br>4.155  | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(348)   | 2.344<br>2.83<br>2.022<br>2.83<br>2.83<br>2.832  |
| (92)<br>(93)<br>(93)<br>(94)<br>(95)<br>(96)   | 23.34<br>20.96<br>44.43<br>77.04<br>40.9<br>30.83  | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)  | 13.79<br>13.79<br>44.43<br>30.83<br>23.11<br>22.38   | (127)<br>(120)<br>(127)<br>(130)<br>(131)<br>(132)  | 16.26<br>16.26<br>34.13<br>41.77<br>28.42<br>23.11  | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)   | 45.33<br>40.03<br>46.24<br>85.56<br>91.09<br>59.84   | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)   | 35.77<br>32.47<br>27.64<br>25.33<br>23.11<br>21.67   | (271)<br>(272)<br>(273)<br>(274)<br>(275)  | 35.77<br>30.83<br>29.21<br>25.33<br>2 <b>3.</b> 84<br>21.67  | (289)<br>(290)<br>(291)<br>(292)<br>(293)  | 10.4<br>9.34<br>9.34<br>8.84<br>8.84   | (307)<br>(008)<br>(309)<br>(310)<br>(311)  | 0.559<br>6.55<br>7.447<br>7.902<br>7.447<br>6.55<br>6.134  | (326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)  | 5.31<br>4.327<br>4.527<br>4.527<br>4.912<br>4.155<br>4.155   | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(348)<br>(349)  | 2,344<br>2,83<br>2,022<br>2,83<br>2,832<br>2,832<br>2,83   |
| (92)<br>(93)<br>(94)<br>(95)<br>(96)<br>(97)   | 23.34<br>20.96<br>44.43<br>77.04<br>40.9<br>30.83<br>26.09   | (109)(110)(111)(112)(113)(113)(114)(115)  | 13.79<br>13.79<br>44.43<br>30.83<br>23.11<br>22.38<br>57.67  | (127)<br>(120)<br>(127)<br>(130)<br>(131)<br>(132)<br>(133)   | 16.26<br>16.26<br>34.13<br>41.77<br>28.42<br>23.11<br>21.32   | (145)<br>(146)<br>(147)<br>(149)<br>(149)<br>(150)<br>(151)  | 45.33<br>40.03<br>46.24<br>85.56<br>91.09<br>59.84<br>45.33  | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(168)  | 35.77<br>32.47<br>27.64<br>25.33<br>23.11<br>21.67<br>20.96  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)   | 35.77<br>30.83<br>29.21<br>25.33<br>23.84<br>21.67<br>23.84  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)   | 10,4<br>9,34<br>9,34<br>8,84<br>8,84<br>8,84   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)   | 0.559<br>6.55<br>7.447<br>7.902<br>7.447<br>6.55   | (326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)   | 5.31<br>4.527<br>4.527<br>4.527<br>4.912<br>4.135<br>4.155<br>3.459  | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(348)<br>(349)<br>(350)   | 2,844<br>2,83<br>2,022<br>2,83<br>2,832<br>2,83<br>2,832   |
| (92)<br>(93)<br>(93)<br>(95)<br>(95)<br>(96)<br>(97)<br>(98)   | 23.34<br>20.96<br>44.43<br>77.04<br>40.9<br>30.83<br>26.09<br>23.11  | $(109) \\ (110) \\ (111) \\ (112) \\ (113) \\ (113) \\ (114) \\ (115) \\ (116$ | 13.79<br>13.79<br>44.43<br>30.83<br>23.11<br>22.38<br>57.67<br>32.06   | (127)<br>(128)<br>(127)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)  | 16.26<br>16.26<br>34.13<br>41.77<br>28.42<br>23.11<br>21.32<br>230  | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(152)   | 43.33<br>40.03<br>46.24<br>85.56<br>91.09<br>59.84<br>43.33<br>38.3  | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(169)<br>(169)<br>(170)  | 35.77<br>32.47<br>27.64<br>25.33<br>23.11<br>21.67<br>20.96<br>20.26   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)   | 35.77<br>30.83<br>29.21<br>25.33<br>23.84<br>21.67<br>23.84<br>20.26   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)  | 10,4<br>9,34<br>9,34<br>8,84<br>8,84<br>8,84<br>8,84<br>8,35   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)  | 0.559<br>6.55<br>7.447<br>7.902<br>7.447<br>6.55<br>6.134  | (326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)  | 5.31<br>4.527<br>4.527<br>4.527<br>4.912<br>4.135<br>4.155<br>3.459<br>4.155   | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(348)<br>(349)<br>(350)<br>(351)  | 2,344<br>2,83<br>2,022<br>2,83<br>2,83<br>2,83<br>2,83<br>2,852<br>2,544   |
| (92)<br>(93)<br>(93)<br>(95)<br>(95)<br>(96)<br>(97)<br>(98)<br>(99)   | 23.34<br>20.96<br>44.43<br>77.04<br>40.9<br>30.83<br>26.09<br>23.11<br>20.96   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)  | 13.79<br>13.79<br>44.43<br>30.83<br>23.11<br>22.38<br>57.67<br>32.06<br>26.09  | (127)<br>(128)<br>(127)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)   | 16.26<br>16.26<br>34.13<br>41.77<br>28.42<br>23.11<br>21.32<br>230<br>73.92   | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(151)<br>(152)<br>(153)   | 45.33<br>40.03<br>46.24<br>85.56<br>91.09<br>59.84<br>45.33<br>38.3<br>34.13   | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(169)<br>(170)<br>(171)  | 35.77<br>32.47<br>27.64<br>25.33<br>23.11<br>21.67<br>20.96<br>20.26<br>19.57  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)  | 35.77<br>30.83<br>29.21<br>25.33<br>23.84<br>21.67<br>23.84<br>20.26<br>20.26  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(296)   | 10.4<br>9.34<br>9.34<br>8.84<br>8.84<br>8.84<br>8.84<br>8.36<br>7.902  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)   | 0.559<br>6.55<br>7.447<br>7.902<br>7.447<br>6.55<br>6.134<br>5.717   | (326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)   | 5.31<br>4.527<br>4.527<br>4.527<br>4.912<br>4.135<br>3.459<br>4.155<br>3.459<br>4.155<br>3.797   | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(348)<br>(349)<br>(350)<br>(351)<br>(352)   | 2.344<br>2.83<br>2.022<br>2.83<br>2.832<br>2.83<br>2.83<br>2.83<br>2.852<br>2.544<br>1.448                                       |
| (92)<br>(93)<br>(93)<br>(95)<br>(95)<br>(96)<br>(97)<br>(98)   | 23.34<br>20.96<br>44.43<br>77.04<br>40.9<br>30.83<br>26.09<br>23.11<br>20.96<br>19.38  | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)   | 13.79<br>13.79<br>44.43<br>30.83<br>23.11<br>22.38<br>37.67<br>32.06<br>26.09<br>23.84   | $(127) \\ (120) \\ (120) \\ (130) \\ (131) \\ (132) \\ (133) \\ (134) \\ (135) \\ (136$ | 16.26<br>16.26<br>34.13<br>41.77<br>28.42<br>23.11<br>21.32<br>230<br>73.92<br>48.07  | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(151)<br>(152)<br>(153)<br>(154)  | 45.33<br>40.03<br>46.24<br>85.56<br>91.09<br>59.84<br>45.33<br>38.3<br>38.3<br>34.13<br>30.83  | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(169)<br>(169)<br>(170)<br>(171)<br>(172)  | 35.77<br>32.47<br>27.64<br>25.33<br>23.11<br>21.67<br>20.96<br>20.26<br>19.57<br>13.79   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)   | 35.77<br>30.83<br>29.21<br>25.33<br>23.84<br>21.67<br>23.84<br>20.26<br>20.26<br>20.96   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)<br>(295)<br>(296)<br>(297)<br>(298)   | 10.4<br>9.34<br>9.34<br>8.84<br>8.84<br>8.84<br>8.84<br>8.36<br>7.902<br>7.902   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(313)<br>(314)<br>(315)   | 6.559<br>6.55<br>7.447<br>7.902<br>7.447<br>6.55<br>6.134<br>5.717<br>6.134  | (326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)  | 5.31<br>4.527<br>4.527<br>4.527<br>4.912<br>4.135<br>4.155<br>3.459<br>4.155   | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(347)<br>(347)<br>(347)<br>(350)<br>(351)<br>(351)<br>(352)<br>(353)                            | 2.344<br>2.83<br>2.022<br>2.83<br>2.832<br>2.83<br>2.83<br>2.83<br>2.85<br>2.544<br>1.448<br>2.022                               |
| (92)<br>(93)<br>(93)<br>(95)<br>(96)<br>(97)<br>(98)<br>(99)<br>(100)<br>(101)   | 23.34<br>20.96<br>44.43<br>77.04<br>40.9<br>30.83<br>26.09<br>23.11<br>20.96<br>19.38<br>18.22   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(119)  | 13.79<br>13.79<br>44.43<br>30.83<br>23.11<br>22.38<br>57.67<br>52.06<br>26.09<br>23.84<br>21.67  | (127)<br>(120)<br>(127)<br>(130)<br>(131)<br>(132)<br>(133)<br>(133)<br>(135)<br>(136)<br>(136)<br>(137)  | 16.26<br>16.26<br>34.13<br>41.77<br>28.42<br>23.11<br>21.32<br>23.0<br>73.92<br>48.07<br>38.3   | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(152)<br>(153)<br>(154)<br>(155)  | 45.33<br>40.03<br>46.24<br>85.56<br>91.09<br>59.84<br>43.33<br>38.3<br>34.13<br>30.83<br>28.82   | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(169)<br>(170)<br>(171)<br>(172)<br>(173)  | 35.77<br>32.47<br>27.64<br>25.33<br>23.11<br>21.67<br>20.96<br>20.26<br>19.57<br>13.79<br>15.63  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(279)<br>(280)<br>(280)<br>(281)  | 25.77<br>30.83<br>27.21<br>25.33<br>23.84<br>21.67<br>23.84<br>20.26<br>20.26<br>20.96<br>20.96  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)<br>(296)<br>(297)   | 10.4<br>9.34<br>9.34<br>8.84<br>8.84<br>8.84<br>8.36<br>7.902<br>7.902<br>7.902<br>7.447   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(313)<br>(314)<br>(315)<br>(316)  | 6.559<br>6.55<br>7.447<br>7.902<br>7.447<br>6.55<br>6.134<br>5.717<br>6.134<br>5.717   | (326)<br>(327)<br>(328)<br>(330)<br>(331)<br>(332)<br>(333)<br>(334)  | 5.31<br>4.527<br>4.527<br>4.527<br>4.912<br>4.155<br>3.459<br>4.155<br>3.459<br>4.155<br>3.797<br>4.155                                    | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(348)<br>(349)<br>(350)<br>(351)<br>(351)<br>(352)<br>(353)<br>(354)                            | 2.544<br>2.83<br>2.022<br>2.83<br>2.832<br>2.83<br>2.832<br>2.832<br>2.832<br>2.832<br>2.544<br>1.448<br>2.022<br>1.289          |
| ( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 96)<br>( 97)<br>( 98)<br>( 99)<br>( 100)<br>( 101)<br>( 102)                               | 23.34<br>20.96<br>44.43<br>77.04<br>40.9<br>30.83<br>26.09<br>23.11<br>20.96<br>19.38<br>18.22<br>16.91  | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(117)<br>(118)   | 13.79<br>13.79<br>44.43<br>30.83<br>23.11<br>22.38<br>57.67<br>32.06<br>26.09<br>23.84<br>21.67<br>22.03                                     | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(137)<br>(138)   | 16.26<br>16.26<br>34.13<br>41.77<br>28.42<br>23.11<br>21.32<br>200<br>73.92<br>48.07<br>38.3<br>32.47                                 | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(151)<br>(152)<br>(153)<br>(155)<br>(155)                                     | 43.33<br>40.03<br>46.24<br>85.56<br>91.09<br>59.84<br>45.33<br>38.3<br>34.13<br>30.83<br>28.82<br>26.86  | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(169)<br>(169)<br>(170)<br>(177)<br>(172)<br>(173)<br>(174)                            | 35.77<br>32.47<br>27.64<br>25.33<br>23.11<br>21.67<br>20.96<br>20.26<br>19.57<br>13.79<br>15.63<br>16.59                                     | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)<br>(281)<br>(282)   | 35.77<br>30.83<br>29.21<br>25.33<br>23.84<br>21.67<br>23.84<br>20.26<br>20.26<br>20.96<br>20.96  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(294)<br>(295)<br>(297)<br>(298)<br>(299)<br>(300)  | 10.4<br>9.34<br>9.34<br>8.84<br>8.84<br>8.84<br>8.36<br>7.902<br>7.902<br>7.902<br>7.447<br>6.998                                    | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(313)<br>(314)<br>(315)<br>(316)<br>(317)                                     | 6.559<br>6.55<br>7.447<br>7.902<br>7.447<br>6.55<br>6.134<br>5.717<br>6.134<br>5.717<br>5.717  | (326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(331)<br>(333)<br>(333)<br>(333)<br>(334)<br>(335)  | 5.31<br>4.527<br>4.527<br>4.527<br>4.912<br>4.135<br>4.155<br>3.459<br>4.155<br>3.797<br>4.155   | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(347)<br>(347)<br>(347)<br>(350)<br>(351)<br>(351)<br>(352)<br>(353)                            | 2.544<br>2.83<br>2.022<br>2.83<br>2.83<br>2.83<br>2.83<br>2.544<br>1.448<br>2.022<br>1.288<br>1.79                               |
| ( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 96)<br>( 97)<br>( 98)<br>( 99)<br>( 100)<br>( 101)<br>( 102)                               | 23.34<br>20.96<br>44.43<br>77.04<br>40.9<br>30.83<br>26.09<br>23.11<br>20.96<br>19.38<br>18.22   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(119)<br>(120)<br>(121)  | 13.79<br>13.79<br>44.43<br>30.83<br>23.11<br>22.38<br>37.67<br>32.06<br>26.09<br>23.84<br>21.67<br>22.03<br>20.96                            | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(134)<br>(135)<br>(136)<br>(138)<br>(139)  | 16.26<br>16.26<br>34.13<br>41.77<br>28.42<br>23.11<br>21.32<br>230<br>73.92<br>48.07<br>39.3<br>32.47<br>37.43                        | (145)<br>(146)<br>(147)<br>(148)<br>(150)<br>(150)<br>(151)<br>(152)<br>(153)<br>(154)<br>(155)<br>(156)<br>(157)                            | 45.33<br>40.03<br>46.24<br>85.56<br>91.09<br>59.84<br>43.33<br>38.3<br>34.13<br>30.83<br>34.13<br>30.83<br>28.82<br>26.86<br>25.71                   | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(169)<br>(169)<br>(170)<br>(171)<br>(172)<br>(173)<br>(174)                                     | 35.77<br>32.47<br>27.64<br>25.33<br>23.11<br>21.67<br>20.96<br>20.26<br>19.37<br>13.79<br>13.63<br>16.59<br>12.62                            | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(270)<br>(279)<br>(280)<br>(281)<br>(282)<br>(283)  | 35.77<br>30.83<br>29.21<br>25.33<br>23.84<br>21.67<br>23.84<br>20.26<br>20.26<br>20.26<br>20.96<br>20.96<br>13.79                            | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(294)<br>(297)<br>(298)<br>(297)<br>(298)<br>(299)<br>(300)<br>(301)                            | 10.4<br>9.34<br>9.34<br>8.84<br>8.84<br>8.84<br>8.84<br>8.36<br>7.902<br>7.902<br>7.902<br>7.902<br>7.447<br>6.998<br>6.999<br>6.559 | (207)<br>(208)<br>(309)<br>(310)<br>(312)<br>(313)<br>(313)<br>(314)<br>(314)<br>(316)<br>(317)<br>(318)<br>(319)                            | 6.559<br>6.35<br>7.447<br>7.902<br>7.447<br>6.55<br>6.134<br>5.717<br>6.134<br>5.717<br>5.717<br>5.717                                     | (326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(331)<br>(333)<br>(333)<br>(333)<br>(333)<br>(335)<br>(336)                                     | 5.31<br>4.527<br>4.527<br>4.527<br>4.912<br>4.155<br>3.459<br>4.155<br>3.459<br>4.155<br>3.797<br>4.155                                    | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(348)<br>(349)<br>(350)<br>(351)<br>(351)<br>(352)<br>(353)<br>(354)                            | 2.544<br>2.83<br>2.022<br>2.83<br>2.832<br>2.83<br>2.832<br>2.832<br>2.832<br>2.832<br>2.544<br>1.448<br>2.022<br>1.289          |
| ( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 96)<br>( 97)<br>( 98)<br>( 99)<br>( 100)<br>( 101)<br>( 102)                               | 23.34<br>20.96<br>44.43<br>77.04<br>40.9<br>30.83<br>26.09<br>23.11<br>20.96<br>19.38<br>18.22<br>16.71<br>16.26                                     | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(119)<br>(120)<br>(121)<br>(122)   | 13.79<br>13.79<br>44.43<br>30.83<br>23.11<br>22.38<br>57.67<br>32.06<br>26.09<br>23.84<br>21.67<br>22.03<br>20.96<br>19.92                   | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(136)<br>(137)<br>(138)<br>(139)<br>(140)   | 16.26<br>16.26<br>34.13<br>41.77<br>28.42<br>23.11<br>21.32<br>200<br>73.92<br>48.07<br>38.3<br>32.47<br>37.45<br>32.89               | (145)<br>(146)<br>(148)<br>(148)<br>(148)<br>(150)<br>(151)<br>(152)<br>(152)<br>(153)<br>(154)<br>(155)<br>(156)<br>(157)<br>(158)          | 45.33<br>40.03<br>46.24<br>85.56<br>91.09<br>59.84<br>45.33<br>38.3<br>34.13<br>30.83<br>28.82<br>26.86<br>25.71<br>27.62                            | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(169)<br>(169)<br>(170)<br>(171)<br>(172)<br>(172)<br>(172)<br>(173)<br>(175)<br>(176)          | 35.77<br>32.47<br>27.64<br>25.33<br>23.11<br>21.67<br>20.96<br>20.26<br>19.57<br>13.79<br>13.63<br>16.59<br>12.62<br>11.48                   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(279)<br>(280)<br>(281)<br>(283)<br>(283)<br>(284)  | 35.77<br>30.83<br>29.21<br>25.33<br>23.84<br>21.67<br>23.84<br>20.26<br>20.26<br>20.96<br>20.96<br>13.79<br>12.04                            | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(294)<br>(297)<br>(298)<br>(297)<br>(300)<br>(301)<br>(302)                                     | 10.4<br>9.34<br>9.34<br>8.84<br>8.84<br>8.84<br>8.36<br>7.902<br>7.902<br>7.447<br>6.998<br>6.999<br>6.55<br>6.55                    | (207)<br>(208)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(313)<br>(313)<br>(314)<br>(315)<br>(316)<br>(317)<br>(318)<br>(319)<br>(320) | 6.559<br>6.35<br>7.447<br>7.902<br>7.447<br>6.55<br>6.134<br>5.717<br>6.134<br>5.717<br>5.717<br>5.717<br>5.717                            | (326)<br>(327)<br>(328)<br>(330)<br>(331)<br>(331)<br>(333)<br>(334)<br>(334)<br>(335)<br>(336)<br>(337)  | 5.31<br>4.527<br>4.527<br>4.527<br>4.912<br>4.155<br>3.459<br>4.155<br>3.459<br>4.155<br>3.797<br>4.155<br>3.797                           | (242)<br>(244)<br>(345)<br>(346)<br>(347)<br>(347)<br>(350)<br>(351)<br>(351)<br>(353)<br>(355)  | 2.544<br>2.83<br>2.022<br>2.83<br>2.83<br>2.83<br>2.83<br>2.544<br>1.448<br>2.022<br>1.288<br>1.79                               |
| ( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 96)<br>( 97)<br>( 98)<br>( 99)<br>( 100)<br>( 101)<br>( 102)<br>( 103)                     | 23.34<br>20.96<br>44.43<br>77.04<br>40.9<br>30.83<br>26.09<br>23.11<br>20.96<br>19.38<br>18.22<br>16.91<br>16.26                                     | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(113)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(117)<br>(118)<br>(117)<br>(120)<br>(121)<br>(122)  | 13.79<br>13.79<br>44.43<br>30.83<br>23.11<br>22.38<br>57.67<br>32.06<br>26.09<br>23.84<br>21.67<br>22.03<br>20.96<br>19.92<br>19.57          | (127)<br>(120)<br>(127)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(134)<br>(135)<br>(136)<br>(137)<br>(139)<br>(140)<br>(141)  | 16.26<br>16.26<br>34.13<br>41.77<br>28.42<br>23.11<br>21.32<br>230<br>73.92<br>48.07<br>38.3<br>32.47<br>37.45<br>32.89<br>235        | (145)<br>(146)<br>(148)<br>(148)<br>(149)<br>(150)<br>(151)<br>(152)<br>(153)<br>(154)<br>(155)<br>(155)<br>(156)<br>(157)<br>(158)<br>(159) | 45.33<br>40.03<br>46.24<br>85.56<br>91.09<br>59.84<br>45.33<br>38.3<br>38.3<br>30.83<br>28.82<br>26.86<br>25.71<br>29.62<br>27.25                    | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(167)<br>(170)<br>(171)<br>(172)<br>(172)<br>(173)<br>(174)<br>(176)<br>(177)          | 35.77<br>32.47<br>27.64<br>25.33<br>23.11<br>21.67<br>20.96<br>20.26<br>19.37<br>13.79<br>13.63<br>16.59<br>12.62<br>11.48<br>10.93          | (271)<br>(272)<br>(273)<br>(275)<br>(276)<br>(277)<br>(276)<br>(277)<br>(279)<br>(280)<br>(281)<br>(281)<br>(284)<br>(285)   | 25.77<br>30.83<br>27.21<br>25.33<br>23.84<br>21.67<br>23.84<br>20.26<br>20.26<br>20.96<br>20.96<br>20.96<br>13.79<br>12.04<br>11.48          | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(294)<br>(294)<br>(294)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(300)<br>(301)<br>(302)<br>(303) | 10.4<br>9.34<br>9.34<br>8.84<br>8.84<br>8.84<br>8.36<br>7.902<br>7.902<br>7.447<br>6.998<br>6.999<br>6.559<br>6.559                  | (207)<br>(208)<br>(309)<br>(310)<br>(312)<br>(313)<br>(313)<br>(314)<br>(314)<br>(316)<br>(316)<br>(317)<br>(318)<br>(319)<br>(320)<br>(321) | 6.559<br>6.55<br>7.447<br>7.902<br>7.447<br>6.55<br>6.134<br>3.717<br>6.134<br>5.717<br>5.717<br>5.717<br>5.717<br>5.717<br>5.717          | (326)<br>(327)<br>(328)<br>(330)<br>(331)<br>(333)<br>(333)<br>(333)<br>(334)<br>(335)<br>(334)<br>(337)<br>(338)<br>(339)                            | 5.31<br>4.527<br>4.527<br>4.527<br>4.912<br>4.155<br>4.155<br>3.459<br>4.155<br>3.797<br>4.155<br>4.155<br>3.797<br>2.83                   | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(348)<br>(348)<br>(350)<br>(351)<br>(351)<br>(351)<br>(352)<br>(355)<br>(355)<br>(355)          | 2.544<br>2.83<br>2.022<br>2.83<br>2.832<br>2.83<br>2.832<br>2.544<br>1.448<br>2.072<br>1.288<br>1.79<br>1.069                    |
| ( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 96)<br>( 97)<br>( 98)<br>( 99)<br>( 100)<br>( 101)<br>( 102)<br>( 103)<br>( 104)           | 23.34<br>20.96<br>44.43<br>77.04<br>40.9<br>30.83<br>26.09<br>23.11<br>20.96<br>19.38<br>18.22<br>16.71<br>16.26<br>15.65                            | $(109) \\ (110) \\ (111) \\ (112) \\ (113) \\ (113) \\ (114) \\ (115) \\ (116) \\ (117) \\ (118) \\ (117) \\ (118) \\ (119) \\ (120) \\ (121) \\ (122) \\ (123) \\ (124) \end{cases}$   | 13.79<br>13.79<br>44.43<br>30.83<br>23.11<br>22.38<br>57.67<br>32.06<br>26.09<br>23.64<br>21.67<br>22.03<br>20.98<br>19.92<br>19.57<br>18.22 | (127)<br>(129)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(134)<br>(135)<br>(136)<br>(137)<br>(138)<br>(139)<br>(139)<br>(140)<br>(141)  | 16.26<br>16.26<br>34.13<br>41.77<br>28.42<br>23.11<br>21.32<br>200<br>73.92<br>48.07<br>39.3<br>32.47<br>37.45<br>32.89<br>235<br>110 | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(151)<br>(152)<br>(153)<br>(154)<br>(155)<br>(156)<br>(157)<br>(159)<br>(159) | 45.33<br>40.03<br>46.24<br>85.56<br>91.09<br>59.84<br>45.33<br>38.3<br>34.13<br>30.83<br>28.82<br>26.86<br>25.71<br>27.62<br>27.25<br>24.58          | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(169)<br>(170)<br>(170)<br>(177)<br>(177)<br>(177)<br>(174)<br>(177)<br>(177)<br>(177)<br>(177) | 35.77<br>32.47<br>27.64<br>25.33<br>23.11<br>21.67<br>20.96<br>20.26<br>19.57<br>13.79<br>13.63<br>16.59<br>12.62<br>11.48<br>10.93<br>10.39 | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(276)<br>(276)<br>(280)<br>(280)<br>(280)<br>(281)<br>(283)<br>(284)<br>(285)  | 25.77<br>30.83<br>29.21<br>29.33<br>23.84<br>21.67<br>23.84<br>20.26<br>20.26<br>20.96<br>20.96<br>13.79<br>12.04<br>11.48<br>12.62          | (289)<br>(290)<br>(292)<br>(293)<br>(294)<br>(295)<br>(294)<br>(295)<br>(294)<br>(297)<br>(298)<br>(297)<br>(300)<br>(300)<br>(301)<br>(302)<br>(303)<br>(304) | 10.4<br>9.34<br>9.34<br>8.84<br>8.84<br>8.84<br>8.36<br>7.902<br>7.902<br>7.447<br>6.998<br>6.999<br>6.559<br>6.559<br>6.559         | (307)<br>(308)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(313)<br>(314)<br>(314)<br>(317)<br>(318)<br>(317)<br>(318)<br>(320)<br>(322) | 6.559<br>6.35<br>7.447<br>7.902<br>7.447<br>6.55<br>6.134<br>3.717<br>6.134<br>5.717<br>5.717<br>5.717<br>5.717<br>5.717<br>5.717<br>5.717 | (326)<br>(327)<br>(328)<br>(330)<br>(331)<br>(331)<br>(333)<br>(334)<br>(334)<br>(334)<br>(334)<br>(334)<br>(334)<br>(334)<br>(339)<br>(339)<br>(340) | 5.31<br>4.527<br>4.527<br>4.527<br>4.912<br>4.135<br>4.155<br>3.459<br>4.155<br>3.459<br>4.155<br>4.155<br>3.797<br>2.83<br>3.459<br>2.544 | (343)<br>(344)<br>(345)<br>(346)<br>(348)<br>(349)<br>(354)<br>(351)<br>(351)<br>(353)<br>(354)<br>(355)<br>(356)<br>(356)<br>(357)          | 2.544<br>2.83<br>2.022<br>2.83<br>2.832<br>2.832<br>2.832<br>2.832<br>2.544<br>1.448<br>2.022<br>1.288<br>1.79<br>1.067<br>1.587 |
| ( 92)<br>( 93)<br>( 93)<br>( 94)<br>( 95)<br>( 94)<br>( 97)<br>( 98)<br>( 100)<br>( 101)<br>( 102)<br>( 103)<br>( 104)<br>( 105) | 23.34<br>20.96<br>44.43<br>77.04<br>40.9<br>30.83<br>26.09<br>23.11<br>20.96<br>19.38<br>19.38<br>19.38<br>18.22<br>16.91<br>16.26<br>15.75<br>15.32 | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(117)<br>(120)<br>(121)<br>(122)<br>(122)<br>(122)<br>(124)<br>(125)   | 13.79<br>13.79<br>44.43<br>30.83<br>23.11<br>22.38<br>57.67<br>32.06<br>26.09<br>23.84<br>21.67<br>22.03<br>20.96<br>19.92<br>19.57          | (127)<br>(129)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(133)<br>(134)<br>(135)<br>(134)<br>(134)<br>(135)<br>(136)<br>(139)<br>(139)<br>(140)<br>(141)<br>(142)<br>(143)  | 16.26<br>16.26<br>34.13<br>41.77<br>28.42<br>23.11<br>21.32<br>230<br>73.92<br>48.07<br>38.3<br>32.47<br>37.45<br>32.89<br>235        | (145)<br>(146)<br>(148)<br>(148)<br>(149)<br>(150)<br>(151)<br>(152)<br>(153)<br>(154)<br>(155)<br>(155)<br>(156)<br>(157)<br>(158)<br>(159) | 45.33<br>40.03<br>46.24<br>85.56<br>91.09<br>59.84<br>43.33<br>38.3<br>34.13<br>30.83<br>28.82<br>26.86<br>25.71<br>29.62<br>27.25<br>24.58<br>23.84 | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(169)<br>(170)<br>(170)<br>(177)<br>(177)<br>(177)<br>(174)<br>(177)<br>(177)<br>(177)<br>(177) | 35.77<br>32.47<br>27.64<br>25.33<br>23.11<br>21.67<br>20.96<br>20.26<br>19.37<br>13.79<br>13.63<br>16.59<br>12.62<br>11.48<br>10.93          | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(276)<br>(277)<br>(278)<br>(280)<br>(281)<br>(281)<br>(281)<br>(281)<br>(281)<br>(283)<br>(284)<br>(285)<br>(286)<br>(286) | 25.77<br>30.83<br>29.21<br>29.33<br>23.84<br>21.67<br>23.84<br>20.26<br>20.26<br>20.96<br>20.96<br>20.96<br>13.79<br>12.04<br>11.48<br>12.62 | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(294)<br>(294)<br>(294)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(300)<br>(301)<br>(302)<br>(303) | 10.4<br>9.34<br>9.34<br>8.84<br>8.84<br>8.84<br>8.36<br>7.902<br>7.902<br>7.447<br>6.998<br>6.999<br>6.559<br>6.559                  | (207)<br>(208)<br>(309)<br>(310)<br>(312)<br>(313)<br>(313)<br>(314)<br>(314)<br>(316)<br>(316)<br>(317)<br>(318)<br>(319)<br>(320)<br>(321) | 6.559<br>6.55<br>7.447<br>7.902<br>7.447<br>6.55<br>6.134<br>3.717<br>6.134<br>5.717<br>5.717<br>5.717<br>5.717<br>5.717<br>5.717          | (326)<br>(327)<br>(328)<br>(330)<br>(331)<br>(333)<br>(333)<br>(333)<br>(334)<br>(335)<br>(334)<br>(337)<br>(338)<br>(339)                            | 5.31<br>4.527<br>4.527<br>4.527<br>4.912<br>4.135<br>4.155<br>3.459<br>4.155<br>3.797<br>4.155<br>4.155<br>3.797<br>2.83<br>3.459          | (242)<br>(244)<br>(345)<br>(346)<br>(347)<br>(347)<br>(347)<br>(350)<br>(351)<br>(352)<br>(353)<br>(354)<br>(355)<br>(356)<br>(356)<br>(356) | 2.544<br>2.83<br>2.022<br>2.83<br>2.832<br>2.832<br>2.832<br>2.832<br>2.544<br>1.448<br>2.022<br>1.288<br>1.79<br>1.069<br>1.587 |

•

River discharge data at 12-hourly intervals for Station: 9A Period : 6

.

۰.

River discharge data at 12-hourly intervals for Station: PSTW Period : 1 ۰.

| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ |
|---|---|
|---|---|

| Variable:         PARLSTW1.pstwq12_1         (length = 300)           (1)         0.113         (19)         0.113         (37)         0.113         (55)         0.122         (73)         0.0771           (1)         0.113         (20)         0.113         (38)         0.113         (56)         0.122         (74)         0.0771           (2)         0.113         (20)         0.113         (39)         0.113         (57)         0.122         (74)         0.0771           (3)         0.113         (21)         0.113         (39)         0.113         (57)         0.123         (76)         0.0771           (4)         0.113         (22)         0.113         (40)         0.113         (59)         0.122         (77)         0.0771           (5)         0.113         (22)         0.113         (41)         0.113         (59)         0.122         (77)         0.0771           (6)         0.113         (24)         0.113         (41)         0.113         (50)         0.122         (77)         0.0771           (6)         0.113         (24)         0.113         (43)         0.113         (50)         0.069           (7 |
|--|
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  |

3601

|              |             |              |             | 10621 0 117                |        |
|--------------|-------------|--------------|-------------|----------------------------|--------|
| (181) 0.1333 | (199) 0.113 | (217) 0.1632 | (235) 0.143 | (253) 0.113<br>(254) 0.113 |        |
| (182) 0.1333 | (200) 0.113 | (218) 0.1632 | (236) 0.143 |                            |        |
|              | (201) 0.118 | (219) 0.1632 | (237) 0.143 | (255) 0.118                |        |
| (183) 0.133  | (202) 0,118 | (220) 0.1632 | (238) 0.143 | (256) 0.118                |        |
| (184) 0.133  |             | (221) 0.1432 | (239) 0.143 | (257) 0.104                |        |
| (185) 0.133  | (203) 0.118 | (222) 0.1632 | (240) 0.143 | (258) 0.104                |        |
| (186) 0.133  | (204) 0.118 |              | (241) 0.153 | (259) 0.104                |        |
| (187) 0.123  | (205) 0.123 | (223) 0.153  |             | (260) 0.104                |        |
| (168) 0.123  | (206) 0.123 | (224) 0.153  | (242) 0.153 | (261) 0.113                |        |
| (189) 0.113  | (207) 0.128 | (225) 0.143  | (243) 0.153 |                            |        |
| (190) 0.113  | (208) 0.128 | (226) 0.143  | (244) 0.153 | (262) 0.113                | 7-1943 |
|              | (209) 0.103 | (227) 0.143  | (245) 0.153 | (263) 0.123                | ~      |
| (191) 0.104  | (210) 0.133 | (228) 0.143  | (246) 0.153 | (264) 0.123                |        |
| (192) 0.104  |             | (229) 0.127  | (247) 0.158 | (265) 0,133                |        |
| (193) 0.104  | (211) 0.133 | (230) 0.137  | (248) 0.158 | (266) 0.133                |        |
| (194) 0.104  | (212) 0.133 |              | (249) 0.143 | (267) 0.143                |        |
| (195) 0.104  | (213) 0.133 | (231) 0.137  |             | (268) 0.143                |        |
| (196) 0.104  | (214) 0.133 | (232) 0.137  | (250) 0.143 | (249) 0.153                | 1      |
| (197) 0.105  | (215) 0.133 | (233) 0.143  | (251) 0.133 |                            | •      |
| (198) 0-105  | (216) 0.133 | (234) 0.143  | (252) 0.133 | (270) 0.153                |        |
| (178) 01103  |             |              |             |                            |        |
|              |             |              |             |                            |        |

| (7)       0.218       (25)       0.2         (8)       0.218       (26)       0.2         (9)       0.218       (27)       0.2         (10)       0.218       (27)       0.2         (11)       0.218       (29)       0.2         (11)       0.218       (30)       0.2         (11)       0.218       (30)       0.2         (12)       0.218       (31)       0.2         (13)       0.218       (31)       0.2         (14)       0.218       (33)       0.2         (15)       0.218       (34)       0.2         (17)       0.218       (36)       0.2         (18)       0.218       (36)       0.2 | 18       (44) 0.195         18       (45) 0.185         18       (46) 0.185         18       (47) 0.185         18       (49) 0.185         18       (50) 0.185         18       (50) 0.185         18       (50) 0.185         18       (51) 0.185         18       (52) 0.185         18       (53) 0.185         18       (52) 0.185  | ( 52) 0.185<br>( 63) 0.185<br>( 64) 0.185<br>( 65) 0.174<br>( 65) 0.174<br>( 66) 0.174<br>( 68) 0.174<br>( 68) 0.174<br>( 68) 0.174<br>( 69) 0.174<br>( 70) 0.174<br>( 71) 0.163<br>( 72) 0.163 | ( 80) 0.185<br>( 81) 0.185<br>( 82) 0.185<br>( 82) 0.195<br>( 84) 0.195<br>( 84) 0.195<br>( 85) 0.195<br>( 86) 0.195<br>( 86) 0.195<br>( 89) 0.195<br>( 89) 0.195<br>( 90) 0.195 |  | (207) 0.183<br>(207) 0.185<br>(209) 0.185<br>(210) 0.185<br>(211) 0.185<br>(212) 0.185<br>(212) 0.195<br>(213) 0.195<br>(214) 0.195<br>(214) 0.185   | (225) 0.195<br>(226) 0.195<br>(227) 0.105<br>(228) 0.105<br>(229) 0.174<br>(230) 0.174<br>(231) 0.163<br>(232) 0.163<br>(233) 0.163   | (243) 0.185<br>(244) 0.185<br>(245) 0.185<br>(246) 0.185<br>(247) 0.185<br>(248) 0.185<br>(248) 0.185<br>(249) 0.195<br>(250) 0.195<br>(251) 0.195<br>(252) 0.195  | (261) 0.195<br>(262) 0.195<br>(263) 0.206<br>(264) 0.206<br>(265) 0.206<br>(265) 0.206<br>(267) 0.218<br>(268) 0.218<br>(269) 0.218<br>(269) 0.218 |
|--|--|---|--|--|--|---|--|--|
|  | 18       (127)       0.206         13       (128)       0.206         18       (129)       0.206         18       (130)       0.206         18       (131)       0.206         18       (132)       0.206         18       (132)       0.206         18       (134)       0.206         18       (135)       0.206         18       (135)       0.206         18       (137)       0.206         19       (138)       0.206         19       (139)       0.206         19       (140)       0.206         19       (143)       0.206         104       (141)       0.206 |   |  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | (239) 0.204<br>(290) 0.204<br>(291) 0.204<br>(292) 0.204<br>(293) 0.204<br>(293) 0.204<br>(293) 0.204<br>(294) 0.204<br>(294) 0.195<br>(294) 0.195<br>(297) 0.195<br>(300) 0.195<br>(301) 0.195<br>(302) 0.195<br>(303) 0.195<br>(304) 0.195<br>(305) 0.195<br>(305) 0.195 | $\begin{array}{c} (307) & 0.195 \\ (308) & 0.195 \\ (309) & 0.204 \\ (310) & 0.204 \\ (311) & 0.204 \\ (312) & 0.204 \\ (312) & 0.204 \\ (313) & 0.195 \\ (314) & 0.195 \\ (315) & 0.195 \\ (315) & 0.195 \\ (316) & 0.195 \\ (316) & 0.195 \\ (319) & 0.174 \\ (320) & 0.174 \\ (321) & 0.163 \\ (322) & 0.143 \\ (323) & 0.143 \end{array}$ | (325) 0.104<br>(326) 0.104<br>(327) 0.077<br>(328) 0.077<br>(329) 0.069<br>(331) 0.0607<br>(332) 0.0607<br>(333) 0.0607<br>(333) 0.0687<br>(334) 0.0687<br>(335) 0.086<br>(336) 0.086<br>(337) 0.095<br>(339) 0.104<br>(340) 0.104<br>(341) 0.1132<br>(342) 0.1132 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |

( 73) 0.163

( 74) 0.163

( 75) 0.174

( 76) 0.174

( 77) 0.174

( 78) 0.174

( 79) 0.185

( 80) 0.185

( 55) 0.185

( 56) 0.185

( 57) 0.185

( 58) 0.185

( 59) 0.185

( 60) 0.185

( 61) 0.185

| Variable: PAR | _STW2.pstwq12_2 | (length ≃ 36 |
|---------------|-----------------|--------------|
|               |                 |              |
| ( 1) 0.229    | ( 17) 0.218     | ( 37) 0.218  |

( 20) 0.219

( 21) 0.218

( 22) 0.218

( 23) 0.218

( 24) 0.218

( 25) 0.218

1) 0.229

2) 0.229

3) 0.218

4) 0.218

5) 0.218

6) 0.218

7) 0.218

(

6

5Û) ( 37) 0.218

( 38) 0.218

( 39) 0.206

( 40) 0.206

( 41) 0.206

( 42) 0.205

( 43) 0.195

(253) 0.195 (235) 0.174 (217) 0.195 (181) 0.206 (199) 0.185 (236) 0.174 (254) 0,195 (218) 0.195 (200) 0.185 (182) 0.206 (255) 0,195 (237) 0.174 (219) 0.195 (201) 0.174 (183) 0.205 (256) 0.195 (238) 0.174 (220) 0.195 (202) 0.174 (184) 0.206 (257) 0.195 (239) 0,174 (221) 0.195 (203) 0.174 (185) 0.195 (258) 0,195 (240) 0.174 (222) 0.195 (204) 0.174 (186) 0.195 (259) 0,195 (241) 0.174 (223) 0.195 (205) 0.163 (187) 0.195 (260) 0.195 (242) 0.174 (224) 0.195 (206) 0.165 (188) 0.195 (261) 0.195 (243) 0.185 (225) 0.195 (207) 0.174 (189) 0.185 (262) 0.195 . ....

| iable: PARL  |   |  | ·   | (73) 0.163   | (181) 0.133  | (199) 0.153   | (217) 0.123   | (235) 0.143   | (253) 0.133  |
|--|---|--|---|--|--|---|---|---|--|
| 1) 0.086   | ( 19) 0.095   | ( 37) 0.133  | ( 55) V.125   | ( 74) 0.163  | (182) 0.133  | (200) 0.153   | (218) 0.123   | (236) 0.163   | (254) 0.103  |
| 2) 0.086   | ( 20) 0.095   | ( 38) 0.133  | ( 56) 0.123   | (75) 0.174   | (183) 0.133  | (201) 0.163   | (219) 0.125   | (237) 0.163   | (255) 0.123  |
| 3) 0.095   | ( 21) 0.075   | ( 39) 0.133  | ( 57) 0.104   |  | (184) 0.133  | (202) 0.163   | (220) 0.123   | (238) 0.143   | (254) 0.123  |
| 4) 0.095   | (22) 0.095  | (40) 0.133   | ( 58) 0.104   | (76) 0.174   | (185) 0.133  | (203) 0.163   | (221) 0.133   | (239) 0.143   | (257) 0.123  |
| 5) 0.095   | (23) 0.095  | (41) 0.133   | ( 59) 0.104   | (77) 0.174   | (185) 0.133  | (204) 0.163   | (222) 0.133   | (240) 0.143   | (258) 0.123  |
| 6) 0.095   | ( 24) 0.095   | ( 42) 0.133  | ( 60) 0.104   | ( 78) 0.174  |  | (205) 0.143   | (223) 0.133   | (241) 0.143   | (259) 0.123  |
| 7) 0.095   | (25) 0.084  | (43) 0.133   | ( 61) 0.113   | ( 79) 0.174  | (187) 0.133  | (206) 0.143   | (224) 0.133   | (242) 0.163   | (260) 0.123  |
|  | (26) 0.084  | (44) 0.133   | ( 62) 0.113   | ( 80) 0.174  | (188) 0.133  | (207) 0.143   | (225) 0.143   | (243) 0.153   | (261) 0.133  |
| 8) 0.095   | (27) 0.084  | (45) 0.133   | ( 63) 0.128   | ( 81) 0.174  | (187) 0.123  |   | (225) 0.143   | (244) 0.153   | (262) 0.103  |
| 9) 0.095   | (28) 0.084  | (46) 0.133   | ( 64) 0.128   | ( 82) 0.174  | (190) 0.123  | (208) 0.143   | (227) 0,143   | (245) 0.153   | (263) 0.133  |
| 10) 0.095  | (28) 0.086<br>(29) 0.095  | (43) 0.143   | ( 65) 0.133   | ( 83) 0.174  | (191) 0.113  | (209) 0.143   | (229) 0.143   | (246) 0.153   | (264) 0.133  |
| 11) 0.086  |   | (48) 0.143   | ( 66) 0.133   | (84) 0.174   | (192) 0.113  | (210) 0.143   | (229) 0.143   | (243) 0.143   | (265) 0 143  |
| 12) 0.086  | ( 30) 0.095   | (48) 0.143   | ( 67) 0.133   | (85) 0.163   | (193) 0.123  | (211) 0.143   |   | (248) 0.143   | (266) 0.143  |
| 13) 0.0771   | (31) 0.104  | ( 50) 0.153  | ( 68) 0.133   | (86) 0.163   | (194) 0.123  | (212) 0.143   | (230) 0.143   | (248) 0.143<br>(249) 0.143  | (267) 0.143  |
| 14) 0.0771   | ( 32) 0.104   | ( 50) 0.157  | ( 69) 0.143   | (87) 0.153   | (195) 0.133  | (213) 0.133   | (231) 0.153   |   | (268) 0.143  |
| 15) 0.086  | ( 33) 0.113   | (51) 0.153   | (70) 0,143  | (88) 0.153   | (195) 0.153<br>(196) 0.133<br>(197) 0.143<br>(198) 0.143   | (214) 0.133   | (232) 0.153   | (250) 0.143   | (268) 0.143<br>(269) 0.143   |
| 16) 0.086  | ( 34) 0.113   | ( 52) 0.153  | (71) 0,153  | ( 87) 0.143  | (197) 0.145  | (215) 0.123   |   | (251) 0.133   | (289) 0.143<br>(270) 0.143   |
| 17) 0.095  | (35) 0.123<br>(36) 0.123  | ( 53) 0.143<br>( 54) 0.143   | (72) 0.153  | (90) 0.143   | (198) 0.143  | (216) 0.123   | (234) 0.153   | (252) 0.133   |  |
|  | ( 38) 0.123   |  |   |  | -  |   |   |   |  |
|  |   |  |   |  |  |   |   |   |  |
|  |   |  |   |  | (271) 0.153  | (289) 0.174   | (307) 0.185   | (325) 0.195   | (343) 0.193  |
| 91) 0.143  | (109) 0.077   | (127) 0.133  | (145) 0.113   | (143) 0.123  | (271) 0.153<br>(272) 0.153   | (289) 0.174<br>(290) 0.174  | (307) 0.185<br>(308) 0.185  | (325) 0.195<br>(326) 0.195  | (343) 0.195<br>(344) 0.195   |
| 91) 0.143<br>92) 0.143   | (109) 0.077<br>(110) 0.077  | (127) 0.133<br>(128) 0.133   | (145) 0.113<br>(146) 0.113  | (163) 0.123<br>(164) 0.123   | (271) 0.153  | (289) 0.174<br>(290) 0.174<br>(291) 0.174   | (307) 0.185<br>(308) 0.185<br>(309) 0.185   | (325) 0.195<br>(326) 0.195<br>(327) 0.195   | (343) 0.195<br>(344) 0.195<br>(345) 0.195  |
| 91) 0.143<br>92) 0.143<br>93) 0.123  | (109) 0.077<br>(110) 0.077<br>(111) 0.077   | (127) 0.133<br>(128) 0.133<br>(129) 0.133  | (145) 0.113<br>(146) 0.113<br>(147) 0.113   | (143) 0.123<br>(144) 0.123<br>(145) 0.123  | (271) 0.183<br>(272) 0.183<br>(272) 0.183<br>(273) 0.163<br>(274) 0.163  | (289) 0.174<br>(290) 0.174<br>(291) 0.174<br>(292) 0.174  | (307) 0.185<br>(308) 0.185<br>(309) 0.185<br>(310) 0.185  | (325) 0.195<br>(326) 0.195<br>(327) 0.195<br>(328) 0.195  | (343) 0.195<br>(344) 0.195<br>(345) 0.195<br>(345) 0.195   |
| 91) 0.143<br>92) 0.143<br>93) 0.123<br>94) 0.123   | (109) 0.077<br>(110) 0.077<br>(111) 0.077<br>(112) 0.077  | (127) 0.133<br>(128) 0.133<br>(129) 0.133<br>(130) 0.133   | (145) 0.113<br>(146) 0.113<br>(147) 0.113<br>(148) 0.113  | (143) 0.123<br>(164) 0.123<br>(165) 0.123<br>(166) 0.123   | (271) 0.183<br>(272) 0.185<br>(273) 0.163  | (289) 0.174<br>(290) 0.174<br>(291) 0.174<br>(292) 0.174<br>(293) 0.174   | (307) 0.185<br>(308) 0.185<br>(309) 0.185<br>(310) 0.185<br>(310) 0.185<br>(311) 0.195  | (325) 0.195<br>(326) 0.195<br>(327) 0.195<br>(328) 0.195<br>(329) 0.195   | (343) 0.195<br>(344) 0.195<br>(345) 0.195<br>(345) 0.195<br>(345) 0.195<br>(347) 0.195   |
| 91) 0.143<br>92) 0.143<br>93) 0.123<br>94) 0.123<br>95) 0.104  | (109) 0.077<br>(110) 0.077<br>(111) 0.077<br>(112) 0.077<br>(113) 0.086   | (127) 0.133<br>(128) 0.133<br>(129) 0.133<br>(130) 0.133<br>(131) 0.133  | (145) 0.113<br>(146) 0.113<br>(147) 0.113<br>(148) 0.113<br>(149) 0.104   | (143) 0.123<br>(164) 0.123<br>(165) 0.123<br>(166) 0.123<br>(166) 0.133  | (271) 0.153<br>(272) 0.155<br>(273) 0.163<br>(274) 0.163<br>(275) 0.163  | (289) 0.174<br>(290) 0.174<br>(291) 0.174<br>(292) 0.174<br>(293) 0.174<br>(293) 0.174  | $\begin{array}{cccc} (307) & 0.185 \\ (308) & 0.185 \\ (309) & 0.185 \\ (310) & 0.185 \\ (311) & 0.195 \\ (312) & 0.195 \end{array}$  | (325) 0.195<br>(326) 0.195<br>(327) 0.195<br>(328) 0.195<br>(329) 0.195<br>(330) 0.195  | $\begin{array}{c} (043) & 0.193 \\ (044) & 0.195 \\ (045) & 0.195 \\ (046) & 0.195 \\ (047) & 0.195 \\ (048) & 0.195 \end{array}$  |
| 91) 0.143<br>92) 0.143<br>93) 0.123<br>94) 0.123<br>95) 0.104<br>96] 0.104   | (109) 0.077<br>(110) 0.077<br>(111) 0.077<br>(112) 0.077<br>(113) 0.086<br>(114) 0.086  | (127) 0.133<br>(128) 0.133<br>(129) 0.133<br>(130) 0.133<br>(131) 0.133<br>(132) 0.133   | (145) 0.113<br>(146) 0.113<br>(147) 0.113<br>(148) 0.113<br>(148) 0.113<br>(149) 0.104<br>(150) 0.104   | (143) 0.123<br>(144) 0.123<br>(145) 0.123<br>(146) 0.123<br>(166) 0.133<br>(168) 0.133   | (271) 0.183<br>(272) 0.183<br>(273) 0.163<br>(274) 0.163<br>(275) 0.163<br>(276) 0.163   | (289) 0.174<br>(290) 0.174<br>(291) 0.174<br>(292) 0.174<br>(293) 0.174   | (307) 0.185<br>(308) 0.185<br>(309) 0.185<br>(310) 0.185<br>(311) 0.195<br>(312) 0.195<br>(313) 0.195   | (325) 0.195<br>(324) 0.195<br>(327) 0.195<br>(328) 0.195<br>(329) 0.195<br>(330) 0.195<br>(331) 0.195   | (343) 0.195<br>(344) 0.195<br>(345) 0.195<br>(345) 0.195<br>(347) 0.195<br>(348) 0.195<br>(349) 0.195  |
| 91) 0.143<br>92) 0.143<br>93) 0.123<br>94) 0.123<br>95) 0.104  | (109) 0.077<br>(110) 0.077<br>(111) 0.077<br>(112) 0.077<br>(113) 0.084<br>(114) 0.084<br>(115) 0.095   | (127) 0.133<br>(128) 0.133<br>(129) 0.133<br>(130) 0.133<br>(131) 0.133<br>(132) 0.133<br>(133) 0.143  | (145) 0.113<br>(146) 0.113<br>(147) 0.113<br>(148) 0.113<br>(149) 0.104<br>(150) 0.104<br>(151) 0.085   | (163) 0.123<br>(164) 0.123<br>(165) 0.123<br>(166) 0.123<br>(166) 0.133<br>(168) 0.133<br>(169) 0.133  | (271) 0.153<br>(272) 0.153<br>(273) 0.163<br>(274) 0.163<br>(274) 0.163<br>(276) 0.163<br>(276) 0.163<br>(277) 0.163   | (289) 0.174<br>(290) 0.174<br>(291) 0.174<br>(292) 0.174<br>(293) 0.174<br>(293) 0.174  | (307) 0.185<br>(308) 0.185<br>(309) 0.185<br>(310) 0.185<br>(311) 0.195<br>(312) 0.195<br>(313) 0.195<br>(314) 0.195  | (325) 0.195<br>(326) 0.195<br>(327) 0.195<br>(328) 0.195<br>(329) 0.195<br>(330) 0.195<br>(331) 0.195<br>(332) 0.195  | (343) 0.195<br>(343) 0.195<br>(345) 0.195<br>(345) 0.195<br>(347) 0.195<br>(347) 0.195<br>(349) 0.195<br>(350) 0.195   |
| 91) 0.143<br>92) 0.143<br>93) 0.123<br>94) 0.123<br>95) 0.104<br>96] 0.104   | (109) 0.077<br>(110) 0.077<br>(111) 0.077<br>(112) 0.077<br>(113) 0.086<br>(114) 0.084<br>(115) 0.095<br>(116) 0.095  | (127) 0.133<br>(128) 0.133<br>(129) 0.133<br>(130) 0.133<br>(131) 0.133<br>(132) 0.133<br>(133) 0.143<br>(134) 0.143   | (145) 0.113<br>(146) 0.113<br>(147) 0.113<br>(147) 0.113<br>(149) 0.104<br>(150) 0.104<br>(151) 0.085<br>(152) 0.086  | (143) 0.123<br>(164) 0.123<br>(165) 0.123<br>(166) 0.123<br>(166) 0.133<br>(168) 0.133<br>(169) 0.133<br>(169) 0.133   | (271) 0.153<br>(272) 0.153<br>(273) 0.163<br>(274) 0.163<br>(275) 0.163<br>(276) 0.163<br>(277) 0.163<br>(278) 0.163   | (289) 0.174<br>(290) 0.174<br>(291) 0.174<br>(292) 0.174<br>(293) 0.174<br>(293) 0.174<br>(294) 0.174<br>(295) 0.143  | (307) 0.185<br>(308) 0.185<br>(309) 0.185<br>(310) 0.185<br>(311) 0.195<br>(312) 0.195<br>(313) 0.195<br>(314) 0.195<br>(315) 0.195   | (325) 0.195<br>(326) 0.195<br>(327) 0.195<br>(328) 0.195<br>(329) 0.195<br>(330) 0.195<br>(331) 0.195<br>(332) 0.195  | (343) 0.195<br>(344) 0.195<br>(345) 0.195<br>(345) 0.195<br>(347) 0.195<br>(348) 0.195<br>(349) 0.195<br>(350) 0.195<br>(351) 0.195  |
| 91) 0.143<br>92) 0.143<br>93) 0.123<br>94) 0.123<br>95) 0.104<br>96) 0.104<br>97) 0.086  | (109) 0.077<br>(110) 0.077<br>(111) 0.077<br>(112) 0.077<br>(113) 0.086<br>(113) 0.086<br>(114) 0.085<br>(115) 0.095<br>(116) 0.095<br>(117) 0.194  | (127) 0.133<br>(128) 0.133<br>(129) 0.133<br>(130) 0.133<br>(131) 0.133<br>(132) 0.133<br>(132) 0.133<br>(133) 0.143<br>(134) 0.143<br>(135) 0.143   | (145) 0.113<br>(146) 0.113<br>(147) 0.113<br>(148) 0.113<br>(149) 0.104<br>(150) 0.104<br>(151) 0.085<br>(152) 0.086<br>(153) 0.086   | (143) 0.123<br>(164) 0.123<br>(165) 0.123<br>(166) 0.123<br>(167) 0.133<br>(168) 0.133<br>(169) 0.133<br>(169) 0.133<br>(170) 0.133  | (271) 0.153<br>(272) 0.155<br>(273) 0.163<br>(274) 0.163<br>(275) 0.163<br>(276) 0.163<br>(277) 0.163<br>(278) 0.163<br>(278) 0.163<br>(279) 0.153   | (289) 0.174<br>(290) 0.174<br>(291) 0.174<br>(292) 0.174<br>(293) 0.174<br>(293) 0.174<br>(294) 0.174<br>(295) 0.143<br>(296) 0.143   | (307) 0.185<br>(308) 0.185<br>(309) 0.185<br>(310) 0.185<br>(311) 0.195<br>(312) 0.195<br>(313) 0.195<br>(314) 0.195<br>(316) 0.195   | (325) 0.195<br>(326) 0.195<br>(327) 0.195<br>(329) 0.195<br>(329) 0.195<br>(330) 0.195<br>(331) 0.195<br>(331) 0.195<br>(332) 0.195<br>(334) 0.195  | (343) 0.195<br>(343) 0.195<br>(345) 0.195<br>(345) 0.195<br>(347) 0.195<br>(347) 0.195<br>(349) 0.195<br>(350) 0.195<br>(350) 0.195<br>(351) 0.195   |
| 91) 0.143<br>92) 0.143<br>93) 0.123<br>94) 0.123<br>95) 0.104<br>96) 0.104<br>97) 0.086<br>98) 0.086   | (109) 0.077<br>(110) 0.077<br>(111) 0.077<br>(112) 0.077<br>(113) 0.086<br>(114) 0.084<br>(115) 0.095<br>(116) 0.095  | $\begin{array}{c} (127) & 0.123 \\ (128) & 0.133 \\ (129) & 0.133 \\ (130) & 0.133 \\ (131) & 0.133 \\ (132) & 0.133 \\ (132) & 0.143 \\ (133) & 0.143 \\ (134) & 0.143 \\ (135) & 0.143 \\ (136) & 0.143 \end{array}$   | (145) 0.113<br>(146) 0.113<br>(147) 0.113<br>(147) 0.113<br>(149) 0.104<br>(150) 0.104<br>(151) 0.085<br>(152) 0.086<br>(153) 0.086<br>(153) 0.086  | (143) 0.123<br>(144) 0.123<br>(145) 0.123<br>(146) 0.123<br>(146) 0.133<br>(148) 0.133<br>(148) 0.133<br>(149) 0.133<br>(170) 0.133<br>(171) 0.133<br>(172) 0.133  | (271) 0.153<br>(272) 0.153<br>(273) 0.163<br>(274) 0.163<br>(275) 0.163<br>(276) 0.163<br>(277) 0.163<br>(278) 0.163<br>(279) 0.153<br>(280) 0.153   | (289) 0.174<br>(290) 0.174<br>(291) 0.174<br>(292) 0.174<br>(293) 0.174<br>(294) 0.174<br>(295) 0.143<br>(296) 0.143<br>(297) 0.143<br>(298) 0.143  | (307) 0.185<br>(308) 0.185<br>(309) 0.185<br>(310) 0.185<br>(311) 0.195<br>(312) 0.195<br>(313) 0.195<br>(314) 0.195<br>(315) 0.195   | (325) 0.195<br>(326) 0.195<br>(327) 0.195<br>(328) 0.195<br>(329) 0.195<br>(330) 0.195<br>(331) 0.195<br>(332) 0.195<br>(334) 0.195<br>(335) 0.195  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| 91) 0.143<br>92) 0.143<br>93) 0.123<br>94) 0.123<br>95) 0.104<br>95) 0.104<br>97) 0.086<br>98) 0.086<br>99) 0.086  | (109) 0.077<br>(110) 0.077<br>(111) 0.077<br>(112) 0.077<br>(113) 0.086<br>(113) 0.086<br>(114) 0.085<br>(115) 0.095<br>(116) 0.095<br>(117) 0.194  | (127) 0.133<br>(128) 0.133<br>(129) 0.133<br>(130) 0.133<br>(131) 0.133<br>(132) 0.133<br>(133) 0.143<br>(134) 0.143<br>(135) 0.143<br>(136) 0.143<br>(137) 0.143  | (145) 0.113<br>(146) 0.113<br>(147) 0.113<br>(149) 0.113<br>(149) 0.104<br>(150) 0.104<br>(150) 0.104<br>(151) 0.085<br>(152) 0.086<br>(153) 0.086<br>(155) 0.086   | (163) 0.123<br>(164) 0.123<br>(165) 0.123<br>(166) 0.123<br>(166) 0.133<br>(168) 0.133<br>(169) 0.133<br>(169) 0.133<br>(170) 0.133<br>(171) 0.133<br>(172) 0.133<br>(173) 0.143   | (271) 0.153<br>(272) 0.153<br>(273) 0.163<br>(274) 0.163<br>(275) 0.163<br>(276) 0.163<br>(277) 0.163<br>(277) 0.163<br>(278) 0.163<br>(279) 0.153<br>(280) 0.153<br>(281) 0.143   | (289) 0.174<br>(290) 0.174<br>(291) 0.174<br>(292) 0.174<br>(293) 0.174<br>(294) 0.174<br>(294) 0.143<br>(296) 0.143<br>(298) 0.143<br>(298) 0.143  | (307) 0.185<br>(308) 0.185<br>(309) 0.185<br>(310) 0.185<br>(311) 0.195<br>(312) 0.195<br>(313) 0.195<br>(314) 0.195<br>(316) 0.195   | $\begin{array}{c} (325) & 0.195 \\ (326) & 0.195 \\ (327) & 0.195 \\ (328) & 0.195 \\ (329) & 0.195 \\ (330) & 0.195 \\ (331) & 0.195 \\ (331) & 0.195 \\ (333) & 0.195 \\ (334) & 0.195 \\ (335) & 0.195 \\ (335) & 0.195 \\ (336) & 0.195 \end{array}$  | (343) 0.195<br>(344) 0.195<br>(345) 0.195<br>(345) 0.195<br>(347) 0.195<br>(349) 0.195<br>(349) 0.195<br>(350) 0.195<br>(351) 0.195<br>(352) 0.185   |
| 91) 0.143<br>92) 0.143<br>93) 0.123<br>94) 0.123<br>95) 0.104<br>96] 0.104<br>97) 0.086<br>98) 0.086<br>99) 0.086<br>100) 0.086  | (109) 0.077<br>(110) 0.077<br>(111) 0.077<br>(112) 0.077<br>(113) 0.086<br>(114) 0.086<br>(115) 0.095<br>(116) 0.095<br>(117) 0.104<br>(118) 0.104  | (127) 0.123<br>(128) 0.133<br>(129) 0.133<br>(130) 0.133<br>(131) 0.133<br>(132) 0.133<br>(133) 0.143<br>(134) 0.143<br>(135) 0.143<br>(136) 0.143<br>(137) 0.143<br>(138) 0.143   | (145) 0.113<br>(146) 0.113<br>(147) 0.113<br>(147) 0.113<br>(149) 0.104<br>(150) 0.104<br>(151) 0.085<br>(152) 0.086<br>(153) 0.086<br>(155) 0.086<br>(155) 0.086   | (163) 0.123<br>(164) 0.123<br>(165) 0.123<br>(166) 0.123<br>(166) 0.133<br>(169) 0.133<br>(169) 0.133<br>(170) 0.133<br>(170) 0.133<br>(171) 0.133<br>(172) 0.143<br>(174) 0.143   | $\begin{array}{c} (271) & 0.153 \\ (272) & 0.153 \\ (273) & 0.163 \\ (274) & 0.163 \\ (274) & 0.163 \\ (276) & 0.163 \\ (276) & 0.163 \\ (277) & 0.163 \\ (279) & 0.153 \\ (280) & 0.153 \\ (281) & 0.143 \\ (282) & 0.143 \end{array}$  | (289) 0.174<br>(290) 0.174<br>(291) 0.174<br>(292) 0.174<br>(293) 0.174<br>(294) 0.174<br>(294) 0.174<br>(295) 0.143<br>(296) 0.143<br>(297) 0.143<br>(298) 0.143<br>(299) 0.143  | (307) 0.185<br>(308) 0.185<br>(309) 0.185<br>(310) 0.185<br>(311) 0.195<br>(312) 0.195<br>(313) 0.195<br>(314) 0.195<br>(316) 0.195<br>(317) 0.195  | (325) 0.195<br>(326) 0.195<br>(327) 0.195<br>(328) 0.195<br>(329) 0.195<br>(330) 0.195<br>(331) 0.195<br>(332) 0.195<br>(334) 0.195<br>(335) 0.195  | $\begin{array}{c} (343) & 0.195 \\ (543) & 0.195 \\ (545) & 0.195 \\ (545) & 0.195 \\ (547) & 0.195 \\ (549) & 0.195 \\ (549) & 0.195 \\ (550) & 0.195 \\ (551) & 0.195 \\ (552) & 0.195 \\ (253) & 0.185 \\ (355) & 0.185 \\ (355) & 0.174 \end{array}$                                   |
| 91) 0.143<br>92) 0.143<br>93) 0.123<br>94) 0.123<br>95) 0.104<br>96) 0.104<br>97) 0.086<br>98) 0.086<br>99) 0.086<br>100) 0.086<br>100) 0.086<br>101) 0.077  | (109) 0.077<br>(110) 0.077<br>(111) 0.077<br>(112) 0.077<br>(113) 0.086<br>(114) 0.088<br>(115) 0.095<br>(116) 0.095<br>(117) 0.104<br>(118) 0.104  | $      \begin{array}{c} (127) & 0.137 \\ (128) & 0.133 \\ (129) & 0.133 \\ (130) & 0.133 \\ (131) & 0.133 \\ (132) & 0.133 \\ (133) & 0.143 \\ (134) & 0.143 \\ (135) & 0.143 \\ (136) & 0.143 \\ (137) & 0.143 \\ (137) & 0.143 \\ (137) & 0.133 \\ \end{array} $ | (145) 0.113<br>(146) 0.113<br>(147) 0.113<br>(147) 0.104<br>(150) 0.104<br>(151) 0.085<br>(152) 0.086<br>(152) 0.086<br>(155) 0.086<br>(155) 0.086<br>(156) 0.086<br>(157) 0.095  | (143) 0.123<br>(164) 0.123<br>(165) 0.123<br>(165) 0.123<br>(166) 0.123<br>(168) 0.133<br>(168) 0.133<br>(169) 0.133<br>(170) 0.133<br>(171) 0.133<br>(172) 0.133<br>(173) 0.143<br>(174) 0.143<br>(175) 0.143   | $\begin{array}{c} (271) & 0.153 \\ (272) & 0.155 \\ (273) & 0.163 \\ (273) & 0.163 \\ (274) & 0.163 \\ (275) & 0.163 \\ (276) & 0.163 \\ (276) & 0.163 \\ (279) & 0.153 \\ (280) & 0.153 \\ (281) & 0.143 \\ (292) & 0.143 \\ (283) & 0.143 \end{array}$   | (289) 0.174<br>(290) 0.174<br>(291) 0.174<br>(292) 0.174<br>(293) 0.174<br>(293) 0.174<br>(294) 0.174<br>(295) 0.143<br>(296) 0.143<br>(296) 0.143<br>(299) 0.143<br>(500) 0.143<br>(501) 0.143   | $\begin{array}{c} (307) & 0.185 \\ (308) & 0.185 \\ (309) & 0.185 \\ (310) & 0.185 \\ (311) & 0.195 \\ (312) & 0.195 \\ (312) & 0.195 \\ (314) & 0.195 \\ (315) & 0.195 \\ (316) & 0.195 \\ (317) & 0.195 \\ (318) & 0.195 \\ (319) & 0.195 \end{array}$  | $\begin{array}{c} (325) & 0.195 \\ (326) & 0.195 \\ (327) & 0.195 \\ (328) & 0.195 \\ (329) & 0.195 \\ (330) & 0.195 \\ (331) & 0.195 \\ (331) & 0.195 \\ (333) & 0.195 \\ (334) & 0.195 \\ (335) & 0.195 \\ (335) & 0.195 \\ (336) & 0.195 \end{array}$  | (343) 0.195<br>(344) 0.195<br>(345) 0.195<br>(345) 0.195<br>(347) 0.195<br>(348) 0.195<br>(349) 0.195<br>(350) 0.195<br>(351) 0.195<br>(352) 0.185<br>(355) 0.174<br>(356) 0.174   |
| 91) 0.143<br>92) 0.143<br>93) 0.123<br>94) 0.123<br>95) 0.104<br>96) 0.104<br>97) 0.086<br>97) 0.086<br>99) 0.086<br>100) 0.086<br>101) 0.077<br>102) 0.077<br>103) 0.077  | (109) 0.077<br>(110) 0.077<br>(111) 0.077<br>(112) 0.077<br>(113) 0.086<br>(114) 0.086<br>(114) 0.085<br>(115) 0.095<br>(116) 0.095<br>(117) 0.104<br>(118) 0.104<br>(119) 0.104<br>(121) 0.104                               | (127) 0.123<br>(128) 0.133<br>(129) 0.133<br>(130) 0.133<br>(131) 0.133<br>(132) 0.133<br>(133) 0.143<br>(134) 0.143<br>(135) 0.143<br>(136) 0.143<br>(137) 0.143<br>(138) 0.143<br>(139) 0.133<br>(140) 0.133   | (145) 0.113<br>(146) 0.113<br>(147) 0.113<br>(147) 0.113<br>(149) 0.104<br>(150) 0.104<br>(151) 0.085<br>(152) 0.086<br>(153) 0.086<br>(155) 0.086<br>(155) 0.086<br>(156) 0.095  | $\begin{array}{c} (163) & 0.123 \\ (164) & 0.123 \\ (165) & 0.123 \\ (165) & 0.123 \\ (166) & 0.133 \\ (168) & 0.133 \\ (169) & 0.133 \\ (169) & 0.133 \\ (170) & 0.133 \\ (171) & 0.133 \\ (172) & 0.133 \\ (173) & 0.143 \\ (174) & 0.143 \\ (175) & 0.143 \\ (175) & 0.143 \end{array}$                             | $\begin{array}{c} (271) & 0.153 \\ (272) & 0.155 \\ (273) & 0.163 \\ (274) & 0.163 \\ (275) & 0.163 \\ (275) & 0.163 \\ (276) & 0.163 \\ (277) & 0.163 \\ (279) & 0.163 \\ (279) & 0.153 \\ (280) & 0.143 \\ (281) & 0.143 \\ (284) & 0.143 \\ (284) & 0.143 \end{array}$  | (289) 0.174<br>(290) 0.174<br>(291) 0.174<br>(292) 0.174<br>(293) 0.174<br>(293) 0.174<br>(295) 0.143<br>(296) 0.143<br>(297) 0.143<br>(297) 0.143<br>(299) 0.143<br>(301) 0.143<br>(301) 0.143   | $\begin{array}{c} (307) & 0.185 \\ (308) & 0.185 \\ (309) & 0.185 \\ (310) & 0.185 \\ (311) & 0.195 \\ (312) & 0.195 \\ (312) & 0.195 \\ (314) & 0.195 \\ (315) & 0.195 \\ (316) & 0.195 \\ (317) & 0.195 \\ (319) & 0.195 \\ (319) & 0.195 \\ (320) & 0.195 \end{array}$   | (325) 0.195<br>(326) 0.195<br>(327) 0.195<br>(328) 0.195<br>(329) 0.195<br>(330) 0.195<br>(331) 0.195<br>(332) 0.195<br>(333) 0.195<br>(334) 0.195<br>(335) 0.195<br>(336) 0.195<br>(336) 0.195   | $\begin{array}{c} (343) & 0.195 \\ (343) & 0.195 \\ (345) & 0.195 \\ (345) & 0.195 \\ (347) & 0.195 \\ (347) & 0.195 \\ (349) & 0.195 \\ (350) & 0.195 \\ (351) & 0.195 \\ (351) & 0.195 \\ (352) & 0.185 \\ (355) & 0.185 \\ (355) & 0.174 \end{array}$                                   |
| 91) 0.143<br>92) 0.143<br>93) 0.123<br>94) 0.123<br>95) 0.104<br>97) 0.086<br>98) 0.086<br>99) 0.086<br>100) 0.086<br>101) 0.077<br>102) 0.077<br>103) 0.077   | (109) 0.077<br>(110) 0.077<br>(111) 0.077<br>(112) 0.077<br>(113) 0.086<br>(113) 0.095<br>(115) 0.095<br>(116) 0.095<br>(117) 0.104<br>(118) 0.104<br>(119) 0.104<br>(120) 0.104<br>(121) 0.104                               | $      \begin{array}{c} (127) & 0.137 \\ (128) & 0.133 \\ (129) & 0.133 \\ (130) & 0.133 \\ (131) & 0.133 \\ (132) & 0.133 \\ (133) & 0.143 \\ (134) & 0.143 \\ (135) & 0.143 \\ (136) & 0.143 \\ (137) & 0.143 \\ (137) & 0.143 \\ (137) & 0.133 \\ \end{array} $ | (145) 0.113<br>(146) 0.113<br>(147) 0.113<br>(147) 0.113<br>(149) 0.113<br>(149) 0.104<br>(150) 0.104<br>(151) 0.085<br>(152) 0.086<br>(153) 0.086<br>(155) 0.086<br>(155) 0.086<br>(157) 0.095<br>(158) 0.095<br>(159) 0.113 | $\begin{array}{c} (163) & 0.123 \\ (164) & 0.123 \\ (165) & 0.123 \\ (165) & 0.123 \\ (166) & 0.133 \\ (168) & 0.133 \\ (169) & 0.133 \\ (169) & 0.133 \\ (170) & 0.133 \\ (171) & 0.133 \\ (172) & 0.133 \\ (173) & 0.143 \\ (174) & 0.143 \\ (175) & 0.143 \\ (175) & 0.143 \end{array}$                             | $\begin{array}{c} (271) & 0.153 \\ (272) & 0.155 \\ (273) & 0.163 \\ (274) & 0.163 \\ (275) & 0.163 \\ (275) & 0.163 \\ (276) & 0.163 \\ (277) & 0.163 \\ (279) & 0.163 \\ (279) & 0.153 \\ (280) & 0.143 \\ (281) & 0.143 \\ (284) & 0.143 \\ (284) & 0.143 \end{array}$  | $\begin{array}{c} (289) & 0.174 \\ (290) & 0.174 \\ (291) & 0.174 \\ (292) & 0.174 \\ (292) & 0.174 \\ (293) & 0.174 \\ (294) & 0.173 \\ (295) & 0.143 \\ (296) & 0.143 \\ (297) & 0.143 \\ (299) & 0.143 \\ (500) & 0.143 \\ (301) & 0.143 \\ (301) & 0.143 \\ (302) & 0.143 \\ (303) & 0.143 \end{array}$ | $\begin{array}{c} (307) & 0.185 \\ (308) & 0.185 \\ (309) & 0.185 \\ (310) & 0.185 \\ (311) & 0.195 \\ (312) & 0.195 \\ (312) & 0.195 \\ (314) & 0.195 \\ (315) & 0.195 \\ (316) & 0.195 \\ (317) & 0.195 \\ (319) & 0.195 \\ (320) & 0.195 \\ (321) & 0.195 \end{array}$   | $\begin{array}{c} (325) & 0.195 \\ (326) & 0.195 \\ (327) & 0.195 \\ (328) & 0.195 \\ (329) & 0.195 \\ (330) & 0.195 \\ (331) & 0.195 \\ (332) & 0.195 \\ (334) & 0.195 \\ (335) & 0.195 \\ (335) & 0.195 \\ (335) & 0.195 \\ (336) & 0.195 \\ (336) & 0.195 \\ (339) & 0.195 \end{array}$  | (343) 0.195<br>(344) 0.195<br>(345) 0.195<br>(345) 0.195<br>(347) 0.195<br>(349) 0.195<br>(349) 0.195<br>(350) 0.195<br>(351) 0.195<br>(352) 0.185<br>(355) 0.174<br>(356) 0.174   |
| 91) 0.143<br>92) 0.143<br>93) 0.123<br>94) 0.123<br>95) 0.104<br>96] 0.104<br>96] 0.104<br>97) 0.086<br>97) 0.086<br>97) 0.086<br>100) 0.086<br>100) 0.086<br>101) 0.077<br>102) 0.077<br>102) 0.077<br>104) 0.077 | (109) 0.077<br>(110) 0.077<br>(111) 0.077<br>(112) 0.077<br>(113) 0.086<br>(113) 0.086<br>(114) 0.085<br>(115) 0.095<br>(116) 0.095<br>(117) 0.104<br>(118) 0.104<br>(120) 0.104<br>(121) 0.104<br>(122) 0.104<br>(123) 0.113 | (127) 0.133<br>(128) 0.133<br>(129) 0.133<br>(130) 0.133<br>(131) 0.133<br>(132) 0.133<br>(133) 0.143<br>(134) 0.143<br>(135) 0.143<br>(136) 0.143<br>(137) 0.143<br>(138) 0.143<br>(137) 0.133<br>(140) 0.133   | (145) 0.113<br>(146) 0.113<br>(147) 0.113<br>(147) 0.113<br>(149) 0.104<br>(150) 0.104<br>(151) 0.085<br>(152) 0.086<br>(153) 0.086<br>(155) 0.086<br>(155) 0.086<br>(156) 0.095<br>(158) 0.095<br>(159) 0.113<br>(160) 0.113 | $      \begin{array}{c} (163) & 0.123 \\ (164) & 0.123 \\ (165) & 0.123 \\ (165) & 0.123 \\ (166) & 0.123 \\ (167) & 0.133 \\ (169) & 0.133 \\ (170) & 0.133 \\ (171) & 0.133 \\ (172) & 0.133 \\ (173) & 0.143 \\ (174) & 0.143 \\ (175) & 0.143 \\ (177) & 0.143 \\ (177) & 0.143 \\ (177) & 0.153 \\ \end{array}  $ | $\begin{array}{c} (271) & 0.183 \\ (272) & 0.185 \\ (273) & 0.163 \\ (273) & 0.163 \\ (274) & 0.163 \\ (276) & 0.163 \\ (276) & 0.163 \\ (278) & 0.163 \\ (279) & 0.153 \\ (280) & 0.153 \\ (281) & 0.143 \\ (292) & 0.143 \\ (293) & 0.143 \\ (294) & 0.143 \\ (296) & 0.143 \\ (296) & 0.143 \\ (296) & 0.143 \end{array}$ | $\begin{array}{c} (289) & 0.174 \\ (290) & 0.174 \\ (291) & 0.174 \\ (292) & 0.174 \\ (293) & 0.174 \\ (293) & 0.174 \\ (294) & 0.174 \\ (295) & 0.143 \\ (296) & 0.143 \\ (297) & 0.143 \\ (299) & 0.143 \\ (500) & 0.143 \\ (301) & 0.143 \\ (301) & 0.143 \\ (302) & 0.143 \\ (304) & 0.143 \end{array}$ | $\begin{array}{c} (307) & 0.185 \\ (308) & 0.185 \\ (309) & 0.185 \\ (310) & 0.185 \\ (311) & 0.195 \\ (312) & 0.195 \\ (313) & 0.195 \\ (314) & 0.195 \\ (314) & 0.195 \\ (316) & 0.195 \\ (316) & 0.195 \\ (319) & 0.195 \\ (319) & 0.195 \\ (320) & 0.195 \\ (321) & 0.195 \\ (321) & 0.195 \\ (322) & 0.195 \\ (322) & 0.195 \end{array}$ | $\begin{array}{c} (325) & 0.195 \\ (326) & 0.195 \\ (327) & 0.195 \\ (328) & 0.195 \\ (329) & 0.195 \\ (330) & 0.195 \\ (331) & 0.195 \\ (332) & 0.195 \\ (333) & 0.195 \\ (334) & 0.195 \\ (335) & 0.195 \\ (335) & 0.195 \\ (337) & 0.195 \\ (337) & 0.195 \\ (339) & 0.195 \\ (339) & 0.195 \\ (339) & 0.195 \\ (340) & 0.195 \end{array}$ | $\begin{array}{c} (343) & 0.195 \\ (344) & 0.195 \\ (345) & 0.195 \\ (345) & 0.195 \\ (347) & 0.195 \\ (348) & 0.195 \\ (349) & 0.195 \\ (351) & 0.195 \\ (351) & 0.195 \\ (352) & 0.185 \\ (355) & 0.174 \\ (354) & 0.185 \\ (355) & 0.174 \\ (356) & 0.143 \\ (358) & 0.143 \end{array}$ |
| 91) 0.143<br>92) 0.143<br>93) 0.123<br>94) 0.123<br>95) 0.104<br>95) 0.104<br>97) 0.086<br>98) 0.086<br>99) 0.086<br>100) 0.086<br>100) 0.086<br>(101) 0.077<br>102) 0.077<br>(103) 0.077                          | (109) 0.077<br>(110) 0.077<br>(111) 0.077<br>(112) 0.077<br>(113) 0.086<br>(113) 0.095<br>(115) 0.095<br>(116) 0.095<br>(117) 0.104<br>(118) 0.104<br>(119) 0.104<br>(120) 0.104<br>(121) 0.104                               | (127) 0.123<br>(128) 0.133<br>(129) 0.133<br>(130) 0.133<br>(131) 0.133<br>(132) 0.133<br>(133) 0.143<br>(134) 0.143<br>(135) 0.143<br>(136) 0.143<br>(137) 0.143<br>(138) 0.143<br>(139) 0.133<br>(140) 0.133   | (145) 0.113<br>(146) 0.113<br>(147) 0.113<br>(147) 0.113<br>(149) 0.113<br>(149) 0.104<br>(150) 0.104<br>(151) 0.085<br>(152) 0.086<br>(153) 0.086<br>(155) 0.086<br>(155) 0.086<br>(157) 0.095<br>(158) 0.095<br>(159) 0.113 | $      \begin{array}{c} (163) & 0.123 \\ (164) & 0.123 \\ (165) & 0.123 \\ (165) & 0.123 \\ (166) & 0.123 \\ (167) & 0.133 \\ (169) & 0.133 \\ (170) & 0.133 \\ (171) & 0.133 \\ (172) & 0.133 \\ (173) & 0.143 \\ (174) & 0.143 \\ (175) & 0.143 \\ (177) & 0.143 \\ (177) & 0.143 \\ (177) & 0.153 \\ \end{array}  $ | $\begin{array}{c} (271) & 0.153 \\ (272) & 0.155 \\ (272) & 0.165 \\ (273) & 0.163 \\ (275) & 0.163 \\ (275) & 0.163 \\ (276) & 0.163 \\ (276) & 0.163 \\ (279) & 0.163 \\ (280) & 0.153 \\ (281) & 0.143 \\ (282) & 0.143 \\ (284) & 0.143 \\ (284) & 0.143 \end{array}$  | $\begin{array}{c} (289) & 0.174 \\ (290) & 0.174 \\ (291) & 0.174 \\ (292) & 0.174 \\ (292) & 0.174 \\ (293) & 0.174 \\ (294) & 0.173 \\ (295) & 0.143 \\ (296) & 0.143 \\ (297) & 0.143 \\ (299) & 0.143 \\ (500) & 0.143 \\ (301) & 0.143 \\ (301) & 0.143 \\ (302) & 0.143 \\ (303) & 0.143 \end{array}$ | $\begin{array}{c} (307) & 0.185 \\ (308) & 0.185 \\ (309) & 0.185 \\ (310) & 0.185 \\ (311) & 0.195 \\ (312) & 0.195 \\ (312) & 0.195 \\ (314) & 0.195 \\ (315) & 0.195 \\ (316) & 0.195 \\ (317) & 0.195 \\ (319) & 0.195 \\ (320) & 0.195 \\ (321) & 0.195 \end{array}$   | $\begin{array}{c} (325) & 0.195 \\ (326) & 0.195 \\ (327) & 0.195 \\ (328) & 0.195 \\ (329) & 0.195 \\ (330) & 0.195 \\ (331) & 0.195 \\ (332) & 0.195 \\ (333) & 0.195 \\ (334) & 0.195 \\ (335) & 0.195 \\ (335) & 0.195 \\ (337) & 0.195 \\ (337) & 0.195 \\ (339) & 0.195 \\ (339) & 0.195 \\ (339) & 0.195 \\ (340) & 0.195 \end{array}$ | $\begin{array}{c} (343) & 0.195 \\ (344) & 0.195 \\ (345) & 0.195 \\ (345) & 0.195 \\ (347) & 0.195 \\ (348) & 0.195 \\ (349) & 0.195 \\ (350) & 0.195 \\ (351) & 0.195 \\ (352) & 0.195 \\ (352) & 0.185 \\ (355) & 0.174 \\ (356) & 0.174 \\ (357) & 0.143 \end{array}$                  |

River discharge data at 12-hourly intervals for Station: PSTW Period : 3

ł

| Variable: PARLSTW4.pstwq12_4  | (length = 344)  |   |   |  |  |   |                            |
|---|---|---|---|--|--|---|----------------------------|
| Agelabres entrestanthacudta   |   |   |   | (199) 0.153  | (217) 0.206  | (235) 0.21B   |                            |
|   | ( 37) 0.206 ( 55) 0.206   | ( 73) 0.195   | (181) 0.185   |  | (218) 0.206  | (236) 0.218   | (254) 0.163                |
| ( 1) 0.153 ( 19) 0.185  | ( 3// 0.200   | ( 74) 0.195   | (182) 0.185   | (200) 0.153  | (219) 0.205  | (237) 0.206   | (255) U.163                |
| (2) 0.153 (20) 0.185  |   | ( 75) 0.195   | (183) 0.174   | (201) 0.163  |  | (238) 0.206   | (256) 0.163                |
| ( 3) 0.153 ( 21) 0.195  | ( 37) 0.020   | ( 76) 0.195   | (194) (.174   | (202) 0.163  | (220) 0.205  |   | (257) 0.163                |
| (4) 0.153 (22) 0.195  | (40) 0.026 (58) 0.195   |   | (185) 0.163   | (203) 0.163  | (221) 0.206  | (239) 0.206   |                            |
| ( 5) 0.153 ( 23) 0.195  | (41) 0.206 ( 59) 0.185  | ( 77) 0.195   | (186) 0.163   | (204) 0.153  | (222) 0.206  | (240) 0.206   | (258) 0.143                |
|   | (42) 0.206 (60) 0.185   | ( 78) 0.195   |   | (205) 0.174  | (223) 0.204  | (241) 0.195   | (259) 0.153                |
|   | (43) 0.206 (61) 0.185   | (-79) 0.195   | (187) 0.163   | (206) 0.174  | (224) 0.206  | (242) 0.195   | (240) 0.153                |
| (7) 0.153 (25) 0.206  |   | ( 80) 0.195   | (188) 0,163   |  | (225) 0.206  | (243) 0.195   | (261) 0.153                |
| (8) 0.153 (26) 0.206  |   | (81) 0.195  | (189) Ú.153   | (207) 0.185  |  | (244) 0.195   | (262) 0.153                |
| (9) 0.174 (27) 0.206  | (45) 0.206 (63) 0.185   | ( 82) 0.195   | (190) 0.153   | (208) 0,185  | (226) 0.206  | (244) 0.195   | (263) 0.163                |
| (10) 0.174 (28) 0.206   | (46) 0.206 ( 54) 0.185  |   | (191) 0.153   | (209) 0.195  | (227) 0.206  | (245) 0.195   |                            |
| (11) 0.174 (29) 0.206   | (47) 0.206 (65) 0.185   | ( 83) 0.195   | (192) 0.153   | (210) 0.195  | (228) 0.205  | (246) 0.195   | (254) 0.163                |
|   | (48) 0.206 (66) 0.185   | ( 84) 0.195   | (193) 0,153   | (211) 0.195  | (229) 0,206  | (247) 0.185   | (265) 0.163                |
|   | (49) 0.206 (67) 0.185   | ( 85) 0.195   |   | (212) 0.195  | (230) 0.206  | (248) 0.185   | (266) 0.163                |
|   | ( 50) 0.206 ( 68) 0.185   | ( 86) 0.195   | (194) 0.153   |  | (231) 0.204  | (249) 0.174   | (267) 0.163                |
| (14) 0.174 (32) 0.206   |   | ( 97) 0.206   | (195) 0.163   | (213) 0.195  |  | (250) 0.174   | (268) 0.163                |
| (15) 0.174 (33) 0.204   | ( 51) 0.110   | ( 88) 0.206   | (196) 0.163   | (214) 0.195  | (232) 0.206  |   | (269) 0.163                |
| 161 0.174 (34) 0.206  |   | ( 00) 0 704   | (197) 0.153   | (215) 0.206  | (233) 0.218  | (251) 0.174   | (270) 0.143                |
| (17) 0.174 (35) 0.206   |   | ( 89) 0.206   | (195) 0.143<br>(196) 0.143<br>(197) 0.153<br>(198) 0.153  | (216) 0.206  | (234) 0,218  | (252) 0.174   |                            |
| (18) 0.174 (36) 0.206   |   | ( 90) 0.206   |   |  |  |   | ****                       |
|   | ( 34) 0.210 ( 0.01)   |   |   |  |  |   |                            |
|   |   |   |   |  |  |   |                            |
|   |   |   |   |  |  | (778) 0 147   | (34.1) 0.085               |
|   |   | (143) (1 079  |   | (289) 0.195  | (307) 0.095  | (325) 0.140   | (343) 0.000                |
| (91) 0.206 (109) 0.252  |   | 11001 01401   | (271) 0.174   | (289) 0.195<br>(290) 0.195   | (307) 0.095<br>(308) 0.095   | (325) 0.145<br>(325) 0.143  | (345) 0.085<br>(344) 0.086 |
| (91) 0.206 (109) 0.232  | (127) 0.24 (145) 0.227 (128) 0.24 (146) 0.229   | (164) 0.229   | (271) 0.174<br>(272) 0.174  | (289) 0.195<br>(290) 0.195   | (307) 0.095  | (325) 0.140<br>(325) 0.143<br>(327) 0.143   | (343) 0.000                |
| (91) 0.206 (109) 0.252 (92) 0.206 (110) 0.252   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (166) 0.229<br>(165) 0.229  | (271) 0.174<br>(272) 0.174<br>(273) 0.174   | (289) 0.195<br>(290) 0.195<br>(291) 0.195  | (307) 0.095<br>(308) 0.095<br>(309) 0.104<br>(310) 0.104   | (325) 0.145<br>(325) 0.143<br>(327) 0.143<br>(328) 0.143  | (343) 0.000                |
| ( 91) 0.206 (109) 0.252<br>( 92) 0.206 (110) 0.252<br>( 93) 0.218 (111) 0.24  | $ \begin{array}{c} (127) \ 0.24 \\ (128) \ 0.24 \\ (129) \ 0.227 \\ (127) \ 0.227 \\ (147) \ 0.218 \\ (130) \ 0.229 \\ (148) \ 0.218 \end{array} $  | (166) 0.229<br>(163) 0.229<br>(166) 0.229   | (271) 0.174<br>(272) 0.174<br>(273) 0.174<br>(273) 0.174  | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195   | (307) 0.095<br>(308) 0.095<br>(309) 0.104<br>(310) 0.104   | (325) 0.140<br>(325) 0.143<br>(327) 0.143   | (343) 0.000                |
| (91) 0.206       (109) 0.282         (92) 0.206       (110) 0.252         (93) 0.218       (111) 0.24         (94) 0.218       (112) 0.24 | $ \begin{array}{c} (127) \ 0.24 \\ (145) \ 0.29 \\ (128) \ 0.22 \\ (127) \ 0.229 \\ (127) \ 0.229 \\ (147) \ 0.218 \\ (130) \ 0.229 \\ (148) \ 0.218 \end{array} $  | (166) 0.229<br>(163) 0.229<br>(165) 0.229<br>(166) 0.229<br>(166) 0.229   | (271) 0.174<br>(272) 0.174<br>(273) 0.174<br>(273) 0.174<br>(274) 0.174<br>(275) 0.185  | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(293) 0.185  | (307) 0.095<br>(308) 0.095<br>(309) 0.104<br>(310) 0.104<br>(311) 0.1137   | (325) 0.140<br>(325) 0.143<br>(327) 0.143<br>(328) 0.143<br>(329) 0.133   | (343) 0.000                |
|   | $ \begin{array}{c} (127) \ 0.24 \\ (145) \ 0.229 \\ (128) \ 0.229 \\ (129) \ 0.229 \\ (147) \ 0.218 \\ (130) \ 0.229 \\ (148) \ 0.218 \\ (131) \ 0.229 \\ (149) \ 0.229 \end{array} $   | (166) 0.229<br>(163) 0.229<br>(166) 0.229   | (271) 0.174<br>(272) 0.174<br>(273) 0.174<br>(274) 0.174<br>(275) 0.185<br>(276) 0.185  | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(293) 0.185<br>(294) 0.185   | (307) 0.095<br>(308) 0.095<br>(309) 0.104<br>(310) 0.104<br>(311) 0.1152<br>(312) 0.1152   | (325) 0.140<br>(325) 0.143<br>(327) 0.143<br>(328) 0.143<br>(329) 0.133<br>(330) 0.153  | (343) 0.000                |
|   | $      \begin{array}{lllllllllllllllllllllllllllllll$   | (166) 0.229<br>(163) 0.229<br>(165) 0.229<br>(166) 0.229<br>(166) 0.229<br>(166) 0.229  | (271) 0.174<br>(272) 0.174<br>(273) 0.174<br>(274) 0.174<br>(275) 0.185<br>(275) 0.185<br>(277) 0.185   | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(293) 0.185<br>(294) 0.185<br>(295) 0.174  | (307) 0.095<br>(308) 0.095<br>(309) 0.104<br>(310) 0.104<br>(311) 0.1152<br>(312) 0.1152<br>(313) 0.125  | (325) 0.143<br>(325) 0.143<br>(327) 0.143<br>(328) 0.143<br>(329) 0.133<br>(330) 0.133<br>(331) 0.123   | (343) 0.000                |
|   | $      \begin{array}{lllllllllllllllllllllllllllllll$   | (165) 0.229<br>(163) 0.229<br>(165) 0.229<br>(165) 0.229<br>(166) 0.229<br>(166) 0.229<br>(169) 0.218   | (271) 0.174<br>(272) 0.174<br>(273) 0.174<br>(274) 0.174<br>(275) 0.185<br>(276) 0.185  | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(293) 0.185<br>(293) 0.185<br>(295) 0.174<br>(294) 0.174   | (307) 0.095<br>(208) 0.095<br>(309) 0.104<br>(310) 0.104<br>(311) 0.1152<br>(312) 0.1152<br>(313) 0.123<br>(314) 0.123   | $\begin{array}{c} (325) & 0.140 \\ (325) & 0.143 \\ (327) & 0.143 \\ (329) & 0.143 \\ (329) & 0.133 \\ (330) & 0.153 \\ (331) & 0.123 \\ (332) & 0.123 \end{array}$   | (343) 0.000                |
|   | $      \begin{array}{lllllllllllllllllllllllllllllll$   | (165) 0.229<br>(165) 0.229<br>(165) 0.229<br>(166) 0.229<br>(167) 0.229<br>(168) 0.229<br>(168) 0.218<br>(170) 0.218  | (271) 0.174<br>(272) 0.174<br>(273) 0.174<br>(274) 0.174<br>(275) 0.185<br>(276) 0.185<br>(276) 0.185<br>(278) 0.185  | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(293) 0.185<br>(294) 0.185<br>(295) 0.174<br>(296) 0.174<br>(296) 0.153  | (307) 0.095<br>(208) 0.095<br>(309) 0.104<br>(310) 0.104<br>(311) 0.1132<br>(312) 0.1132<br>(313) 0.123<br>(314) 0.123<br>(315) 0.133  | (325) 0.140<br>(325) 0.143<br>(327) 0.143<br>(329) 0.143<br>(329) 0.133<br>(330) 0.153<br>(331) 0.123<br>(332) 0.123<br>(332) 0.095   | (343) 0.000                |
|   | $      \begin{array}{lllllllllllllllllllllllllllllll$   | (165) 0.229<br>(165) 0.229<br>(165) 0.229<br>(166) 0.229<br>(166) 0.229<br>(168) 0.229<br>(168) 0.229<br>(169) 0.218<br>(170) 0.218<br>(171) 0.218  | (271) 0.174<br>(272) 0.174<br>(273) 0.174<br>(273) 0.174<br>(275) 0.185<br>(275) 0.185<br>(276) 0.185<br>(277) 0.185<br>(277) 0.185<br>(279) 0.195  | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(293) 0.185<br>(294) 0.185<br>(295) 0.174<br>(296) 0.174<br>(296) 0.153  | (307) 0.095<br>(208) 0.095<br>(309) 0.104<br>(310) 0.104<br>(311) 0.1132<br>(312) 0.1152<br>(313) 0.123<br>(314) 0.133   | (325) 0.140<br>(325) 0.143<br>(327) 0.143<br>(329) 0.133<br>(330) 0.133<br>(331) 0.123<br>(331) 0.123<br>(332) 0.095<br>(334) 0.095   | (343) 0.000                |
|   | $      \begin{array}{lllllllllllllllllllllllllllllll$   | (165) 0.229<br>(165) 0.229<br>(165) 0.229<br>(166) 0.229<br>(166) 0.229<br>(168) 0.229<br>(169) 0.218<br>(170) 0.218<br>(171) 0.218<br>(172) 0.218  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(293) 0.185<br>(294) 0.185<br>(295) 0.174<br>(296) 0.174<br>(297) 0.153<br>(298) 0.133   | (307) 0.095<br>(208) 0.095<br>(309) 0.104<br>(310) 0.104<br>(311) 0.1132<br>(312) 0.1132<br>(313) 0.123<br>(314) 0.123<br>(315) 0.133  | $\begin{array}{c} (325) & 0.145 \\ (325) & 0.143 \\ (327) & 0.143 \\ (329) & 0.133 \\ (330) & 0.133 \\ (331) & 0.123 \\ (331) & 0.123 \\ (332) & 0.095 \\ (334) & 0.095 \\ (335) & 0.069 \end{array}$   | (343) 0.000                |
|   | $      \begin{array}{lllllllllllllllllllllllllllllll$   | (165) 0.229<br>(165) 0.229<br>(165) 0.229<br>(166) 0.229<br>(168) 0.229<br>(168) 0.229<br>(169) 0.218<br>(170) 0.218<br>(170) 0.218<br>(171) 0.218<br>(172) 0.218   | (271) 0.174<br>(272) 0.174<br>(273) 0.174<br>(274) 0.174<br>(275) 0.185<br>(275) 0.185<br>(277) 0.185<br>(277) 0.185<br>(278) 0.195<br>(279) 0.195<br>(280) 0.195   | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(293) 0.185<br>(294) 0.185<br>(295) 0.174<br>(294) 0.153<br>(298) 0.153<br>(298) 0.123   | $\begin{array}{c} (307) & 0.099 \\ (308) & 0.095 \\ (309) & 0.104 \\ (310) & 0.104 \\ (311) & 0.1132 \\ (312) & 0.1132 \\ (313) & 0.123 \\ (314) & 0.123 \\ (314) & 0.133 \\ (314) & 0.133 \\ (314) & 0.143 \end{array}$   | (325) 0.140<br>(325) 0.143<br>(327) 0.143<br>(329) 0.133<br>(330) 0.133<br>(331) 0.123<br>(331) 0.123<br>(332) 0.095<br>(334) 0.095   | (343) 0.000                |
|   | $      \begin{array}{lllllllllllllllllllllllllllllll$   | (165) 0.229<br>(165) 0.229<br>(165) 0.229<br>(166) 0.229<br>(168) 0.229<br>(168) 0.229<br>(169) 0.218<br>(170) 0.218<br>(170) 0.218<br>(171) 0.218<br>(172) 0.219<br>(173) 0.206<br>(174) 0.206   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(292) 0.185<br>(293) 0.185<br>(294) 0.185<br>(295) 0.174<br>(294) 0.174<br>(297) 0.153<br>(298) 0.133<br>(299) 0.123   | $\begin{array}{c} (307) & 0.099 \\ (308) & 0.095 \\ (509) & 0.104 \\ (310) & 0.104 \\ (311) & 0.1152 \\ (312) & 0.1152 \\ (313) & 0.123 \\ (314) & 0.123 \\ (314) & 0.123 \\ (315) & 0.133 \\ (314) & 0.143 \\ (318) & 0.143 \end{array}$  | $\begin{array}{c} (325) & 0.140 \\ (325) & 0.143 \\ (327) & 0.143 \\ (329) & 0.133 \\ (330) & 0.133 \\ (331) & 0.123 \\ (332) & 0.123 \\ (332) & 0.095 \\ (334) & 0.095 \\ (334) & 0.069 \\ (336) & 0.069 \\ \end{array}$   | (343) 0.000                |
|   | $      \begin{array}{lllllllllllllllllllllllllllllll$   | (165) 0.229<br>(165) 0.229<br>(165) 0.229<br>(166) 0.229<br>(167) 0.229<br>(167) 0.218<br>(170) 0.218<br>(170) 0.218<br>(171) 0.218<br>(172) 0.218<br>(172) 0.218<br>(173) 0.206<br>(174) 0.206<br>(175) 0.206  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(293) 0.185<br>(294) 0.185<br>(294) 0.174<br>(294) 0.174<br>(296) 0.174<br>(297) 0.153<br>(298) 0.133<br>(299) 0.123<br>(300) 0.123  | $\begin{array}{c} (307) & 0.095 \\ (308) & 0.095 \\ (309) & 0.104 \\ (310) & 0.104 \\ (311) & 0.1132 \\ (312) & 0.1132 \\ (313) & 0.123 \\ (314) & 0.123 \\ (315) & 0.133 \\ (314) & 0.133 \\ (314) & 0.143 \\ (318) & 0.143 \\ (319) & 0.153 \end{array}$   | $\begin{array}{c} (325) & 0.143 \\ (325) & 0.143 \\ (327) & 0.143 \\ (329) & 0.133 \\ (329) & 0.133 \\ (330) & 0.133 \\ (331) & 0.123 \\ (332) & 0.123 \\ (332) & 0.095 \\ (334) & 0.095 \\ (335) & 0.069 \\ (335) & 0.069 \\ (337) & 0.053 \end{array}$  | (343) 0.000                |
|   | $      \begin{array}{lllllllllllllllllllllllllllllll$   | (165) 0.229<br>(165) 0.229<br>(165) 0.229<br>(166) 0.229<br>(168) 0.229<br>(168) 0.229<br>(169) 0.218<br>(170) 0.218<br>(170) 0.218<br>(171) 0.218<br>(172) 0.219<br>(173) 0.206<br>(174) 0.206   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(292) 0.185<br>(293) 0.185<br>(294) 0.185<br>(295) 0.174<br>(296) 0.174<br>(297) 0.153<br>(298) 0.133<br>(299) 0.123<br>(300) 0.104<br>(302) 0.104   | (307) 0.095<br>(208) 0.095<br>(309) 0.104<br>(310) 0.104<br>(311) 0.1132<br>(312) 0.1132<br>(313) 0.123<br>(314) 0.123<br>(315) 0.133<br>(315) 0.133<br>(316) 0.143<br>(317) 0.143<br>(319) 0.153<br>(320) 0.153   | (325) 0.143<br>(325) 0.143<br>(327) 0.143<br>(329) 0.133<br>(330) 0.133<br>(331) 0.123<br>(332) 0.123<br>(332) 0.095<br>(334) 0.095<br>(335) 0.069<br>(336) 0.069<br>(336) 0.053  | (343) 0.000                |
|   | $      \begin{array}{lllllllllllllllllllllllllllllll$   | (165) 0.229<br>(165) 0.229<br>(165) 0.229<br>(166) 0.229<br>(167) 0.229<br>(168) 0.229<br>(169) 0.218<br>(170) 0.218<br>(170) 0.218<br>(171) 0.218<br>(172) 0.218<br>(173) 0.206<br>(174) 0.206   | $\begin{array}{ccccccc} (271) & 0.174 \\ (272) & 0.174 \\ (273) & 0.174 \\ (274) & 0.174 \\ (275) & 0.185 \\ (276) & 0.185 \\ (276) & 0.185 \\ (277) & 0.185 \\ (279) & 0.195 \\ (280) & 0.195 \\ (281) & 0.195 \\ (281) & 0.195 \\ (282) & 0.195 \\ (283) & 0.195 \\ (284) & 0.195 \\ (285) & 0.195 \end{array}$ | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(292) 0.185<br>(293) 0.185<br>(294) 0.185<br>(295) 0.174<br>(296) 0.173<br>(298) 0.133<br>(299) 0.123<br>(300) 0.123<br>(301) 0.104<br>(302) 0.104<br>(303) 0.086  | $\begin{array}{c} (307) & 0.095 \\ (308) & 0.095 \\ (309) & 0.104 \\ (310) & 0.104 \\ (311) & 0.1132 \\ (312) & 0.1132 \\ (313) & 0.123 \\ (314) & 0.123 \\ (315) & 0.133 \\ (315) & 0.133 \\ (317) & 0.143 \\ (318) & 0.143 \\ (319) & 0.153 \\ (320) & 0.153 \\ (321) & 0.143 \end{array}$   | $ \begin{array}{c} (325) & 0.145 \\ (325) & 0.143 \\ (327) & 0.143 \\ (329) & 0.133 \\ (330) & 0.133 \\ (331) & 0.123 \\ (331) & 0.123 \\ (332) & 0.095 \\ (334) & 0.095 \\ (335) & 0.069 \\ (335) & 0.069 \\ (336) & 0.053 \\ (338) & 0.053 \\ (339) & 0.053 \end{array} $   | (343) 0.000                |
|   | $      \begin{array}{lllllllllllllllllllllllllllllll$   | (165) 0.229<br>(165) 0.229<br>(165) 0.229<br>(166) 0.229<br>(168) 0.229<br>(168) 0.229<br>(169) 0.218<br>(170) 0.218<br>(170) 0.218<br>(172) 0.218<br>(172) 0.218<br>(173) 0.206<br>(174) 0.206<br>(175) 0.206<br>(176) 0.206<br>(177) 0.195                |   | $\begin{array}{c} (289) & 0.195 \\ (290) & 0.195 \\ (291) & 0.195 \\ (292) & 0.195 \\ (292) & 0.185 \\ (293) & 0.185 \\ (294) & 0.185 \\ (295) & 0.174 \\ (294) & 0.174 \\ (297) & 0.153 \\ (298) & 0.133 \\ (298) & 0.123 \\ (300) & 0.123 \\ (301) & 0.104 \\ (302) & 0.104 \\ (303) & 0.086 \\ (304) & 0.086 \end{array}$ | $\begin{array}{c} (307) & 0.099 \\ (308) & 0.095 \\ (509) & 0.104 \\ (310) & 0.104 \\ (311) & 0.1152 \\ (312) & 0.1152 \\ (313) & 0.123 \\ (314) & 0.123 \\ (315) & 0.123 \\ (315) & 0.133 \\ (317) & 0.143 \\ (319) & 0.143 \\ (319) & 0.153 \\ (320) & 0.143 \\ (322) & 0.143 \end{array}$   | $\begin{array}{c} (325) & 0.145 \\ (325) & 0.143 \\ (327) & 0.143 \\ (329) & 0.133 \\ (330) & 0.133 \\ (331) & 0.123 \\ (331) & 0.123 \\ (332) & 0.095 \\ (334) & 0.095 \\ (335) & 0.069 \\ (336) & 0.053 \\ (339) & 0.063 \\ (339) & 0.063 \\ (340) & 0.053 \\ (340) & 0.053 \\ \end{array}$   | (343) 0.000                |
|   | $      \begin{array}{lllllllllllllllllllllllllllllll$   | (165) 0.229<br>(165) 0.229<br>(165) 0.229<br>(166) 0.229<br>(166) 0.229<br>(168) 0.229<br>(169) 0.218<br>(170) 0.218<br>(171) 0.218<br>(171) 0.218<br>(172) 0.218<br>(173) 0.206<br>(174) 0.206<br>(176) 0.206<br>(177) 0.195<br>(178) 0.195                | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(292) 0.185<br>(293) 0.185<br>(294) 0.185<br>(295) 0.174<br>(296) 0.173<br>(298) 0.133<br>(299) 0.123<br>(300) 0.123<br>(301) 0.104<br>(302) 0.104<br>(303) 0.086  | $\begin{array}{c} (307) & 0.095 \\ (308) & 0.095 \\ (309) & 0.104 \\ (310) & 0.104 \\ (311) & 0.1132 \\ (312) & 0.1132 \\ (313) & 0.123 \\ (314) & 0.123 \\ (314) & 0.123 \\ (314) & 0.133 \\ (314) & 0.133 \\ (314) & 0.143 \\ (318) & 0.143 \\ (319) & 0.153 \\ (320) & 0.153 \\ (321) & 0.143 \\ (322) & 0.143 \\ (323) & 0.143 \end{array}$                  | $\begin{array}{c} (325) & 0.143 \\ (325) & 0.143 \\ (327) & 0.143 \\ (329) & 0.133 \\ (330) & 0.133 \\ (331) & 0.123 \\ (332) & 0.123 \\ (332) & 0.095 \\ (333) & 0.095 \\ (334) & 0.095 \\ (335) & 0.069 \\ (335) & 0.069 \\ (337) & 0.053 \\ (338) & 0.053 \\ (339) & 0.053 \\ (339) & 0.053 \\ (339) & 0.053 \\ (341) & 0.061 \end{array}$   | (343) 0.000                |
|   | $      \begin{array}{lllllllllllllllllllllllllllllll$   | (165) 0.229<br>(165) 0.229<br>(165) 0.229<br>(165) 0.229<br>(167) 0.229<br>(167) 0.218<br>(170) 0.218<br>(170) 0.218<br>(171) 0.218<br>(172) 0.218<br>(172) 0.206<br>(174) 0.206<br>(175) 0.206<br>(176) 0.206<br>(177) 0.195<br>(178) 0.195<br>(179) 0.195 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(292) 0.185<br>(293) 0.185<br>(294) 0.185<br>(295) 0.174<br>(297) 0.153<br>(298) 0.133<br>(297) 0.123<br>(300) 0.123<br>(301) 0.104<br>(302) 0.104<br>(303) 0.086<br>(304) 0.085<br>(305) 0.095  | $\begin{array}{c} (307) & 0.099 \\ (308) & 0.095 \\ (309) & 0.104 \\ (310) & 0.104 \\ (311) & 0.1132 \\ (312) & 0.1132 \\ (313) & 0.123 \\ (314) & 0.123 \\ (315) & 0.133 \\ (315) & 0.133 \\ (315) & 0.143 \\ (317) & 0.143 \\ (319) & 0.153 \\ (320) & 0.153 \\ (321) & 0.143 \\ (323) & 0.143 \\ (323) & 0.143 \\ (324) & 0.143 \\ (324) & 0.143 \end{array}$ | $\begin{array}{c} (325) & 0.145 \\ (325) & 0.143 \\ (327) & 0.143 \\ (329) & 0.133 \\ (329) & 0.133 \\ (330) & 0.133 \\ (331) & 0.123 \\ (332) & 0.123 \\ (332) & 0.095 \\ (334) & 0.095 \\ (335) & 0.069 \\ (336) & 0.069 \\ (337) & 0.053 \\ (338) & 0.053 \\ (339) & 0.053 \\ (339) & 0.053 \\ (339) & 0.053 \\ (340) & 0.053 \\ (341) & 0.061 \\ (342) & 0.061 \\ (342) & 0.061 \\ \end{array}$ | (343) 0.036                |
|   | $ \begin{array}{c} (127) \ 0.24 \\ (145) \ 0.22 \\ (128) \ 0.24 \\ (146) \ 0.229 \\ (127) \ 0.229 \\ (147) \ 0.218 \\ (130) \ 0.229 \\ (148) \ 0.218 \\ (131) \ 0.229 \\ (149) \ 0.229 \\ (149) \ 0.229 \\ (151) \ 0.229 \\ (151) \ 0.229 \\ (151) \ 0.229 \\ (151) \ 0.229 \\ (151) \ 0.229 \\ (151) \ 0.229 \\ (153) \ 0.218 \\ (153) \ 0.229 \\ (153) \ 0.218 \\ (155) \ 0.229 \\ (136) \ 0.218 \\ (155) \ 0.229 \\ (137) \ 0.218 \\ (155) \ 0.229 \\ (138) \ 0.218 \\ (155) \ 0.229 \\ (139) \ 0.229 \\ (157) \ 0.229 \\ (140) \ 0.229 \\ (157) \ 0.229 \\ (141) \ 0.229 \\ (140) \ 0.229 \\ (140) \ 0.229 \\ (140) \ 0.229 \\ (140) \ 0.229 \\ (140) \ 0.229 \\ (140) \ 0.229 \\ (140) \ 0.229 \\ (141) \ 0.229 \\ (140) \ 0.229 \\ (141) \ 0.29 \\ (141) \ 0.29 \\ (141) \ 0.29 \\ (141) \ 0.29$ | (165) 0.229<br>(165) 0.229<br>(165) 0.229<br>(166) 0.229<br>(166) 0.229<br>(166) 0.218<br>(170) 0.218<br>(170) 0.218<br>(172) 0.218<br>(173) 0.206<br>(174) 0.206<br>(175) 0.206<br>(175) 0.206<br>(176) 0.206<br>(177) 0.195<br>(179) 0.195<br>(179) 0.195 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(292) 0.185<br>(293) 0.185<br>(294) 0.185<br>(295) 0.174<br>(297) 0.153<br>(298) 0.133<br>(297) 0.123<br>(300) 0.123<br>(301) 0.104<br>(302) 0.104<br>(303) 0.086<br>(304) 0.085<br>(305) 0.095  | $\begin{array}{c} (307) & 0.095 \\ (308) & 0.095 \\ (309) & 0.104 \\ (310) & 0.104 \\ (311) & 0.1132 \\ (312) & 0.1132 \\ (313) & 0.123 \\ (314) & 0.123 \\ (314) & 0.123 \\ (314) & 0.133 \\ (314) & 0.133 \\ (314) & 0.143 \\ (318) & 0.143 \\ (319) & 0.153 \\ (320) & 0.153 \\ (321) & 0.143 \\ (322) & 0.143 \\ (323) & 0.143 \end{array}$                  | $\begin{array}{c} (325) & 0.145 \\ (325) & 0.143 \\ (327) & 0.143 \\ (329) & 0.133 \\ (329) & 0.133 \\ (330) & 0.133 \\ (331) & 0.123 \\ (332) & 0.123 \\ (332) & 0.095 \\ (334) & 0.095 \\ (335) & 0.069 \\ (336) & 0.069 \\ (337) & 0.053 \\ (338) & 0.053 \\ (339) & 0.053 \\ (339) & 0.053 \\ (339) & 0.053 \\ (340) & 0.053 \\ (341) & 0.061 \\ (342) & 0.061 \\ (342) & 0.061 \\ \end{array}$ | (343) 0.036                |

.

١

### River discharge data at 12-hourly intervals for Station: PSTW Period : 4

.

Variable: PARLSTW4.pstwq12\_4 (length = 344)

|   |   |   |  |  | (131) 0.086   | (199) 0.104   | (217) 0.113  | (235) 0.133  | (253) 0.143  |       |
|---|---|---|--|--|---|---|--|--|--|-------|
| 1) 0.086  | (19) 0.095  | ( 37) 0,123   | ( 55) 0.0607   | ( /)) 0.093  | (182) 0.086   | (200) 0.104   | (218) 0.113  | (136) 0.133  | (254) 0.143  |       |
| 2) 0.086  | ( 20) 0.095   | ( 38) 0.123   | ( 56) 0.0607   | (74) 0.095   | (183) 0.085   | (201) 0.104   | (219) 0.110  | (237) 0.143  | (255) 0.143  |       |
| 3) 0.095  | ( 21) 0.086   | ( 39) 0.123   | ( 57) 0,061  | (75) 0.095   | (184) 0.086   | (202) 0.104   | (220) 0.113  | (208) 0.145  | (256) 0.143  |       |
| 4) 0.095  | ( 22) 0.086   | (40) 0.123  | ( 58) 0.061  | ( 76) 0.095  | (185) 0.095   | (203) 0.104   | (221) 0.113  | (239) 0.143  | (257) 0.140  |       |
|   | (23) 0.084  | (41) 0.123  | ( 59) 0.069  | ( 77) 0.095  |   | (203) 0.104   | (222) 0.113  | (240) 0.143  | (258) 0 143  |       |
| 6) 0.104  | ( 24) 0.086   | (42) 0.123  | ( 60) 0.069  | ( 78) 0.095  | (186) 0.095   | (205) 0.104   | (223) 0.104  | (241) 0.143  | (259) 0.143  |       |
| 7) 0,133  | ( 25) 0.0687  | ( 43) 0.113   | ( 61) 0.113  | ( 79) 0.095  | (187) 0.095   |   | (224) 0.104  | (242) 0.143  | (260) 0.143  |       |
| · 8) 0.133  | ( 26) 0.0687  | (44) 0.113  | ( 62) 0.113  | (80)0.095  | (188) 0.095   | (206) 0.104   | (225) 0.104  | (243) 0.143  | (261) 0.143  |       |
|   | (27) 0.086  | ( 45) 0,104   | ( 63) 0.086  | ( 81) 0.095  | (189) 0.095   | (207) 0.104   | (225) 0.104  | (244) 0.143  | (262) 0.143  |       |
| 9) 0,241  | (28) 0.085  | (46) 0.104  | ( 64) 0.085  | ( 82) 0.095  | (190) 0.095   | (208) 0.104   |  | (245) 0.153  | (263) 0.143  |       |
| 10) 0.241   | (29) 0.095  | (47) 0.086  | ( 65) 0.095  | ( 93) 0.095  | (191) 0.095   | (209) 0.104   | (227) 0.104  | (246) 0.153  | (264) 0.143  |       |
| 11) 0.104   |   | (48) 0.086  | ( 66) 0.095  | ( 84) 0.095  | (192) 0.095   | (210) 0.104   | (228) 0.104  |  | (265) 0.143  |       |
| 12) 0.104   | ( 30) 0.095   | 1 49) 0 049   | ( 67) 0.095  | (85) 0.095   | (193) 0.104   | (211) 0.104   | (229) 0.113  | (247) 0.153  | (244) 0 143  |       |
| 13) 0.104   | ( 31) 0.104   | ( 80) 0 049   | ( 48) 0.095  | ( 84) 0.095  | (194) 0.104   | (212) 0.104   | (230) 0.113  | (248) 0.153  | (LOO) (147<br>1017) (147   |       |
| 14) 0.104   | ( 32) 0.104   |   | ( 49) 0.095  | (87) 0.104   | (195) 0.104   | (213) 0.113   | (231) 0.123  | (247) 0.153  |  |       |
| 15) 0.104   | (33) 0.113  | ( 51) 0.0607  | ( 70) 0 095  | ( 88) 0.104  | (196) 0.104   | (214) 0.113   | (232) 0.123  | (250) 0.153  | (268) 0.143  |       |
| 16) 0.104   | (34) 0.113  | ( 52) 0.0607  | (70) 0.075   | ( 89) 0.113  | (194) 0.104<br>(195) 0.104<br>(194) 0.104<br>(197) 0.104<br>(198) 0.104   | (215) 0.113   | (233) 0.133  | (251) 0.153  | (264) 0.143  |       |
| 17) 0.104   | ( 35) 0.113   | ( 53) 0.0607  | ( 71) 0.075  | ( 80) 0 113  | (198) 0.104   | (216) 0.113   | (234) 0.133  | (252) 0.153  | (270) 0.143  |       |
| 18) 0.104   | ( 34) 0.113   | ( 54) 0.0607  | (72) 0.045   | ( 707 0.110  |   |   |  |  |  | -     |
|   | · · · · · · · · · · · · · · · · · · ·   |   |  |  |   |   |  |  |  |       |
|   |   |   |  |  |   |   |  |  |  |       |
|   |   |   | (145) 0.104  | (163) 0.069  | (271) 0.143   | (289) 0.153   | (307) 0,143  | (725) 0.153  |  |       |
| 91) 0.104   | (109) 0.068   | (127) 0.053   | (145) 0.104<br>(146) 0.104   | (163) 0.069<br>(164) 0.069   | (271) 0.143<br>(272) 0.143  | (289) 0.153<br>(290) 0.163  | (307) 0.143<br>(308) 0.163   | (325) 0.153<br>(326) 0.153   | (343) 0.195<br>(344) 0.185   |       |
| 91) 0.104<br>92) 0.104  | (109) 0.06B<br>(110) 0.06B  |   | (145) 0.104<br>(146) 0.104<br>(147) 0.095  | (163) 0.069<br>(164) 0.069<br>(165) 0.123  | (271) 0.143<br>(272) 0.143<br>(273) 0.143   | (289) 0.153<br>(290) 0.153<br>(291) 0.153   | (307) 0.143<br>(308) 0.143<br>(309) 0.143  | (725) 0.153<br>(726) 0.153<br>(327) 0.163  | (343) 0.185  |       |
| 91) 0.104<br>92) 0.104<br>93) 0.104   | (109) 0.06B<br>(110) 0.06B<br>(111) 0.061   | (127) 0.053<br>(128) 0.053<br>(129) 0.053   | (145) 0.104<br>(146) 0.104   | (163) 0.069<br>(164) 0.069<br>(165) 0.123<br>(166) 0.123   | (271) 0.143<br>(272) 0.143<br>(273) 0.143<br>(273) 0.143<br>(274) 0.143   | (289) 0.153<br>(290) 0.153<br>(291) 0.163<br>(292) 0.163  | (307) 0.143<br>(308) 0.163<br>(309) 0.163<br>(310) 0.163   | (725) 0.153<br>(726) 0.153<br>(327) 0.163<br>(328) 0.163   | (243) 0.185<br>(244) 0.185<br>(345) 0.185<br>(346) 0.185   | <br>2 |
| 91) 0.104<br>92) 0.104<br>93) 0.104<br>94) 0.104  | (109) 0.06B<br>(110) 0.06B<br>(111) 0.061<br>(112) 0.061  | (127) 0.053<br>(128) 0.053<br>(129) 0.053<br>(130) 0.053  | (145) 0.104<br>(146) 0.104<br>(147) 0.095  | (163) 0.069<br>(164) 0.069<br>(165) 0.123<br>(166) 0.123<br>(167) 0.113  | (271) 0.143<br>(272) 0.143<br>(273) 0.143<br>(274) 0.143<br>(275) 0.143   | (289) 0.153<br>(290) 0.153<br>(291) 0.163<br>(292) 0.163<br>(293) 0.163   | (307) 0.163<br>(308) 0.163<br>(309) 0.163<br>(310) 0.165<br>(311) 0.153  | (525) 0.153<br>(526) 0.153<br>(327) 0.163<br>(329) 0.163<br>(329) 0.163  | (543) 0.185<br>(544) 0.185<br>(345) 0.185<br>(346) 0.185<br>(347) 0.185  | <br>Į |
| 91) 0.104<br>92) 0.104<br>93) 0.104<br>94) 0.104<br>95) 0.104   | (109) 0.06B<br>(110) 0.06B<br>(111) 0.061<br>(112) 0.061<br>(113) 0.053   | (127) 0.053<br>(129) 0.053<br>(129) 0.053<br>(129) 0.053<br>(131) 0.061   | (145) 0.104<br>(146) 0.104<br>(147) 0.095<br>(148) 0.095   | (163) 0.069<br>(164) 0.069<br>(165) 0.123<br>(165) 0.123<br>(167) 0.113<br>(168) 0.113   | (271) 0.143<br>(272) 0.143<br>(273) 0.143<br>(274) 0.143<br>(275) 0.143<br>(275) 0.143  | (289) 0.153<br>(290) 0.153<br>(291) 0.163<br>(292) 0.163<br>(293) 0.163<br>(293) 0.163  | (307) 0.143<br>(308) 0.163<br>(309) 0.163<br>(310) 0.163<br>(311) 0.153<br>(312) 0.153   | (525) 0.153<br>(526) 0.153<br>(327) 0.163<br>(328) 0.163<br>(329) 0.163<br>(330) 0.163   | (343) 0.185<br>(344) 0.185<br>(345) 0.185<br>(346) 0.185<br>(347) 0.185<br>(348) 0.185   | <br>2 |
| 91) 0.104<br>92) 0.104<br>93) 0.104<br>94) 0.104<br>95) 0.104<br>95) 0.104  | (109) 0.068<br>(110) 0.068<br>(111) 0.061<br>(112) 0.061<br>(113) 0.053<br>(114) 0.053  | (127) 0.053<br>(129) 0.053<br>(129) 0.053<br>(130) 0.053<br>(131) 0.061<br>(132) 0.061  | (145) 0.104<br>(146) 0.104<br>(147) 0.095<br>(148) 0.095<br>(149) 0.095  | (163) 0.069<br>(164) 0.069<br>(165) 0.123<br>(166) 0.123<br>(166) 0.113<br>(168) 0.113<br>(169) 0.113  | $\begin{array}{c} (271) & 0.143 \\ (272) & 0.143 \\ (273) & 0.143 \\ (274) & 0.143 \\ (275) & 0.143 \\ (275) & 0.143 \\ (276) & 0.143 \\ (277) & 0.153 \end{array}$   | (287) 0.153<br>(270) 0.153<br>(271) 0.163<br>(292) 0.163<br>(293) 0.163<br>(294) 0.163<br>(295) 0.174   | (307) 0.143<br>(308) 0.163<br>(309) 0.163<br>(310) 0.163<br>(311) 0.153<br>(312) 0.153<br>(313) 0.143  | (725) 0.153<br>(726) 0.153<br>(327) 0.163<br>(328) 0.163<br>(329) 0.163<br>(330) 0.163<br>(331) 0.163  | (243) 0.195<br>(244) 0.185<br>(345) 0.185<br>(346) 0.185<br>(347) 0.185<br>(347) 0.185<br>(349) 0.185  | <br>2 |
| 91) 0.104<br>92) 0.104<br>93) 0.104<br>94) 0.104<br>95) 0.104<br>96) 0.104<br>97) 0.095   | (109) 0.06B<br>(110) 0.06B<br>(111) 0.061<br>(112) 0.061<br>(113) 0.053<br>(114) 0.053<br>(115) 0.045   | (127) 0.053<br>(128) 0.053<br>(129) 0.053<br>(130) 0.053<br>(131) 0.061<br>(132) 0.064<br>(133) 0.068   | (145) 0.104<br>(146) 0.104<br>(147) 0.095<br>(148) 0.095<br>(149) 0.095<br>(150) 0.095<br>(151) 0.095  | (163) 0.069<br>(164) 0.069<br>(165) 0.123<br>(165) 0.123<br>(167) 0.113<br>(168) 0.113   | $\begin{array}{c} (271) & 0.143 \\ (272) & 0.143 \\ (273) & 0.143 \\ (274) & 0.143 \\ (275) & 0.143 \\ (276) & 0.143 \\ (276) & 0.143 \\ (277) & 0.153 \\ (278) & 0.153 \end{array}$  | (289) 0.153<br>(290) 0.153<br>(291) 0.163<br>(292) 0.163<br>(293) 0.163<br>(294) 0.163<br>(294) 0.174<br>(296) 0.174  | $\begin{array}{c} (307) & 0.143\\ (308) & 0.163\\ (309) & 0.163\\ (310) & 0.163\\ (311) & 0.163\\ (312) & 0.153\\ (312) & 0.143\\ (314) & 0.143 \end{array}$   | (325) 0.153<br>(526) 0.153<br>(327) 0.163<br>(329) 0.163<br>(329) 0.163<br>(330) 0.163<br>(331) 0.163<br>(332) 0.163   | (243) 0.185<br>(244) 0.185<br>(345) 0.185<br>(346) 0.185<br>(347) 0.185<br>(347) 0.185<br>(349) 0.185<br>(350) 0.185   | <br>Į |
| 91) 0.104<br>92) 0.104<br>93) 0.104<br>94) 0.104<br>95) 0.104<br>96) 0.104<br>97) 0.095<br>98) 0.095  | (109) 0.048<br>(110) 0.048<br>(111) 0.041<br>(112) 0.041<br>(113) 0.053<br>(114) 0.053<br>(115) 0.045<br>(116) 0.045  | (127) 0.053<br>(128) 0.053<br>(129) 0.053<br>(130) 0.053<br>(131) 0.061<br>(132) 0.061<br>(133) 0.068<br>(134) 0.068  | (145) 0.104<br>(145) 0.104<br>(147) 0.095<br>(148) 0.095<br>(149) 0.095<br>(150) 0.095<br>(151) 0.095<br>(152) 0.095   | (163) 0.069<br>(164) 0.069<br>(165) 0.123<br>(166) 0.123<br>(166) 0.113<br>(168) 0.113<br>(169) 0.113  | $\begin{array}{c} (271) & 0.143 \\ (272) & 0.143 \\ (273) & 0.143 \\ (273) & 0.143 \\ (275) & 0.143 \\ (275) & 0.143 \\ (276) & 0.143 \\ (277) & 0.153 \\ (279) & 0.153 \\ (279) & 0.153 \end{array}$   | (289) 0.153<br>(290) 0.163<br>(291) 0.163<br>(292) 0.163<br>(293) 0.163<br>(293) 0.163<br>(294) 0.163<br>(295) 0.174<br>(296) 0.174   | (307) 0.163<br>(308) 0.163<br>(309) 0.163<br>(310) 0.163<br>(311) 0.163<br>(312) 0.153<br>(312) 0.143<br>(313) 0.143<br>(314) 0.143<br>(314) 0.143   | (725) 0.153<br>(526) 0.153<br>(327) 0.163<br>(329) 0.163<br>(329) 0.163<br>(330) 0.163<br>(331) 0.163<br>(332) 0.163<br>(332) 0.163<br>(333) 0.174   | (243) 0.185<br>(244) 0.185<br>(345) 0.185<br>(346) 0.185<br>(347) 0.185<br>(347) 0.185<br>(348) 0.185<br>(349) 0.185<br>(359) 0.185<br>(351) 0.195   | <br>2 |
| 91) 0.104<br>92) 0.104<br>93) 0.104<br>94) 0.104<br>95) 0.104<br>96) 0.104<br>97) 0.095<br>98) 0.095<br>99) 0.086   | (109) 0.06B<br>(110) 0.06B<br>(111) 0.061<br>(112) 0.061<br>(113) 0.053<br>(114) 0.053<br>(114) 0.053<br>(115) 0.045<br>(116) 0.045<br>(116) 0.03B  | (127) 0.053<br>(128) 0.053<br>(129) 0.053<br>(130) 0.053<br>(131) 0.061<br>(132) 0.064<br>(133) 0.068<br>(134) 0.068<br>(135) 0.086   | (145) 0.104<br>(146) 0.104<br>(147) 0.075<br>(148) 0.075<br>(149) 0.095<br>(150) 0.095<br>(151) 0.095<br>(151) 0.095<br>(153) 0.095  | (163) 0.069<br>(164) 0.069<br>(165) 0.123<br>(166) 0.123<br>(167) 0.113<br>(169) 0.113<br>(169) 0.113<br>(170) 0.113   | $\begin{array}{c} (271) & 0.143 \\ (272) & 0.143 \\ (273) & 0.143 \\ (274) & 0.143 \\ (275) & 0.143 \\ (276) & 0.143 \\ (277) & 0.153 \\ (278) & 0.153 \\ (279) & 0.153 \\ (290) & 0.153 \end{array}$   | (289) 0.153<br>(290) 0.153<br>(291) 0.163<br>(292) 0.163<br>(293) 0.163<br>(294) 0.163<br>(295) 0.174<br>(296) 0.174<br>(296) 0.174<br>(298) 0.174  | (307) 0.163<br>(308) 0.163<br>(309) 0.163<br>(310) 0.163<br>(311) 0.163<br>(312) 0.153<br>(312) 0.153<br>(313) 0.143<br>(314) 0.143<br>(315) 0.133<br>(316) 0.133  | (525) 0.153<br>(526) 0.153<br>(327) 0.163<br>(329) 0.163<br>(329) 0.163<br>(330) 0.163<br>(331) 0.163<br>(331) 0.163<br>(333) 0.174<br>(334) 0.174   | (343) 0.185<br>(344) 0.185<br>(345) 0.185<br>(346) 0.185<br>(347) 0.185<br>(347) 0.185<br>(348) 0.185<br>(349) 0.185<br>(350) 0.185<br>(351) 0.195<br>(352) 0.195  | <br>2 |
| 91) 0.104<br>92) 0.104<br>93) 0.104<br>93) 0.104<br>95) 0.104<br>95) 0.104<br>95) 0.104<br>97) 0.095<br>98) 0.095<br>98) 0.095<br>99) 0.086   | (109) 0.068<br>(110) 0.068<br>(111) 0.061<br>(112) 0.061<br>(113) 0.053<br>(114) 0.053<br>(115) 0.045<br>(116) 0.045<br>(116) 0.038<br>(118) 0.038  | (127) 0.053<br>(129) 0.053<br>(129) 0.053<br>(130) 0.053<br>(131) 0.061<br>(132) 0.064<br>(133) 0.068<br>(134) 0.068<br>(135) 0.086<br>(136) 0.086  | (145) 0.104<br>(146) 0.104<br>(147) 0.095<br>(148) 0.095<br>(149) 0.095<br>(150) 0.095<br>(151) 0.095<br>(152) 0.095<br>(153) 0.095<br>(154) 0.095   | (163) 0.069<br>(164) 0.069<br>(165) 0.123<br>(166) 0.123<br>(167) 0.113<br>(158) 0.113<br>(158) 0.113<br>(170) 0.113<br>(171) 0.104  | $\begin{array}{c} (271) & 0.143 \\ (272) & 0.143 \\ (273) & 0.143 \\ (273) & 0.143 \\ (275) & 0.143 \\ (276) & 0.143 \\ (277) & 0.153 \\ (278) & 0.153 \\ (279) & 0.153 \\ (290) & 0.153 \\ (291) & 0.153 \end{array}$  | (289) 0.153<br>(290) 0.163<br>(291) 0.163<br>(293) 0.163<br>(293) 0.163<br>(294) 0.163<br>(295) 0.174<br>(296) 0.174<br>(297) 0.174<br>(296) 0.174  | $\begin{array}{c} (307) & 0.143\\ (308) & 0.163\\ (309) & 0.163\\ (310) & 0.163\\ (311) & 0.163\\ (312) & 0.153\\ (312) & 0.153\\ (313) & 0.143\\ (314) & 0.143\\ (315) & 0.133\\ (316) & 0.133\\ (317) & 0.133\end{array}$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (343) 0.195<br>(344) 0.185<br>(345) 0.185<br>(346) 0.185<br>(347) 0.185<br>(348) 0.185<br>(348) 0.185<br>(349) 0.185<br>(351) 0.185<br>(351) 0.195<br>(352) 0.195<br>(353) 0.185                               | <br>Į |
| 91) 0.104<br>92) 0.104<br>93) 0.104<br>94) 0.104<br>95) 0.104<br>95) 0.104<br>97) 0.095<br>98) 0.095<br>98) 0.095<br>99) 0.086<br>100) 0.086  | (109) 0.068<br>(110) 0.068<br>(111) 0.061<br>(112) 0.061<br>(113) 0.053<br>(114) 0.053<br>(115) 0.045<br>(115) 0.045<br>(116) 0.038<br>(118) 0.038<br>(119) 0.032   | (127) 0.053<br>(128) 0.053<br>(129) 0.053<br>(130) 0.053<br>(131) 0.061<br>(132) 0.061<br>(133) 0.068<br>(134) 0.068<br>(135) 0.086<br>(135) 0.084<br>(137) 0.095   | (145) 0.104<br>(146) 0.104<br>(147) 0.095<br>(148) 0.095<br>(150) 0.095<br>(151) 0.095<br>(152) 0.095<br>(153) 0.095<br>(153) 0.095<br>(154) 0.095<br>(155) 0.086  |  | $\begin{array}{c} (271) & 0.143 \\ (272) & 0.143 \\ (273) & 0.143 \\ (274) & 0.143 \\ (275) & 0.143 \\ (276) & 0.143 \\ (277) & 0.153 \\ (278) & 0.153 \\ (279) & 0.153 \\ (290) & 0.153 \end{array}$   | (289) 0.153<br>(290) 0.153<br>(291) 0.163<br>(292) 0.163<br>(293) 0.163<br>(294) 0.163<br>(294) 0.163<br>(295) 0.174<br>(296) 0.174<br>(297) 0.174<br>(299) 0.174<br>(299) 0.174  | $\begin{array}{c} (307) & 0.143\\ (308) & 0.163\\ (309) & 0.163\\ (310) & 0.163\\ (311) & 0.163\\ (312) & 0.153\\ (312) & 0.153\\ (313) & 0.143\\ (314) & 0.143\\ (315) & 0.133\\ (316) & 0.133\\ (316) & 0.133\end{array}$  | (525) 0.153<br>(526) 0.153<br>(327) 0.163<br>(329) 0.163<br>(329) 0.163<br>(330) 0.163<br>(331) 0.163<br>(331) 0.163<br>(332) 0.163<br>(333) 0.174<br>(334) 0.174<br>(335) 0.174   | (343) 0.185<br>(344) 0.185<br>(345) 0.185<br>(346) 0.185<br>(347) 0.185<br>(347) 0.185<br>(349) 0.185<br>(354) 0.185<br>(351) 0.195<br>(352) 0.185<br>(353) 0.185<br>(354) 0.185                               | <br>Į |
| 91) 0.104<br>92) 0.104<br>93) 0.104<br>94) 0.104<br>95) 0.104<br>95) 0.104<br>97) 0.095<br>98) 0.095<br>98) 0.095<br>99) 0.086<br>101) 0.086<br>101) 0.086  | (109) 0.048(110) 0.048(111) 0.041(112) 0.041(113) 0.053(114) 0.053(115) 0.045(116) 0.045(117) 0.038(118) 0.038(119) 0.032(120) 0.032  | (127) 0.053<br>(129) 0.053<br>(129) 0.053<br>(130) 0.053<br>(131) 0.061<br>(132) 0.061<br>(133) 0.068<br>(134) 0.068<br>(134) 0.086<br>(134) 0.086<br>(136) 0.095   | (145) 0.104<br>(145) 0.104<br>(147) 0.095<br>(148) 0.095<br>(149) 0.095<br>(150) 0.095<br>(151) 0.095<br>(152) 0.095<br>(153) 0.095<br>(154) 0.095<br>(155) 0.086<br>(156) 0.086                                 | (163) 0.069<br>(164) 0.069<br>(165) 0.123<br>(166) 0.123<br>(166) 0.113<br>(169) 0.113<br>(169) 0.113<br>(170) 0.113<br>(171) 0.104<br>(172) 0.104<br>(173) 0.095<br>(174) 0.095   | $\begin{array}{c} (271) & 0.143 \\ (272) & 0.143 \\ (273) & 0.143 \\ (273) & 0.143 \\ (275) & 0.143 \\ (276) & 0.143 \\ (277) & 0.153 \\ (278) & 0.153 \\ (279) & 0.153 \\ (290) & 0.153 \\ (291) & 0.153 \end{array}$  | (289) 0.153<br>(290) 0.163<br>(291) 0.163<br>(292) 0.163<br>(293) 0.163<br>(293) 0.163<br>(294) 0.163<br>(295) 0.174<br>(296) 0.174<br>(296) 0.174<br>(297) 0.174<br>(299) 0.174<br>(300) 0.174   | $\begin{array}{c} (307) & 0.163\\ (508) & 0.163\\ (509) & 0.163\\ (310) & 0.163\\ (311) & 0.163\\ (312) & 0.163\\ (312) & 0.143\\ (313) & 0.143\\ (314) & 0.143\\ (315) & 0.133\\ (316) & 0.133\\ (318) & 0.133\\ (318) & 0.133\\ (319) & 0.143\end{array}$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (343) 0.185<br>(344) 0.185<br>(345) 0.185<br>(346) 0.185<br>(347) 0.185<br>(347) 0.185<br>(348) 0.185<br>(349) 0.185<br>(350) 0.185<br>(351) 0.185<br>(352) 0.195<br>(353) 0.185<br>(355) 0.174                | <br>Į |
| 91) 0.104<br>92) 0.104<br>93) 0.104<br>94) 0.104<br>95) 0.104<br>95) 0.104<br>97) 0.095<br>98) 0.095<br>98) 0.095<br>99) 0.086<br>100) 0.086<br>101) 0.086<br>102) 0.086                              | (109) 0.068<br>(110) 0.068<br>(111) 0.061<br>(112) 0.061<br>(113) 0.053<br>(114) 0.053<br>(114) 0.045<br>(116) 0.045<br>(116) 0.038<br>(118) 0.038<br>(119) 0.032<br>(120) 0.032<br>(121) 0.038                               | (127) 0.053<br>(129) 0.053<br>(129) 0.053<br>(130) 0.053<br>(131) 0.061<br>(132) 0.0641<br>(133) 0.068<br>(134) 0.068<br>(135) 0.086<br>(135) 0.095<br>(139) 0.095  | (145) 0.104(146) 0.104(147) 0.075(148) 0.075(148) 0.095(150) 0.095(151) 0.095(151) 0.095(153) 0.095(153) 0.095(155) 0.086(156) 0.086(157) 0.0771   | $      \begin{array}{c} (163) & 0.069 \\ (164) & 0.069 \\ (165) & 0.123 \\ (166) & 0.123 \\ (167) & 0.113 \\ (158) & 0.113 \\ (158) & 0.113 \\ (170) & 0.113 \\ (171) & 0.104 \\ (172) & 0.104 \\ (172) & 0.104 \\ (172) & 0.095 \\ (174) & 0.095 \\ (175) & 0.095 \\ \end{array}    $                                   | $\begin{array}{c} (271) & 0.143 \\ (272) & 0.143 \\ (273) & 0.143 \\ (273) & 0.143 \\ (275) & 0.143 \\ (275) & 0.143 \\ (276) & 0.143 \\ (277) & 0.153 \\ (278) & 0.153 \\ (279) & 0.153 \\ (280) & 0.153 \\ (241) & 0.153 \\ (242) & 0.183 \\ \end{array}$   | (289) 0.153<br>(290) 0.153<br>(291) 0.163<br>(292) 0.163<br>(293) 0.163<br>(294) 0.163<br>(294) 0.163<br>(295) 0.174<br>(296) 0.174<br>(297) 0.174<br>(299) 0.174<br>(299) 0.174  | $\begin{array}{c} (507) & 0.163 \\ (508) & 0.163 \\ (509) & 0.163 \\ (310) & 0.163 \\ (311) & 0.163 \\ (312) & 0.153 \\ (312) & 0.143 \\ (313) & 0.143 \\ (314) & 0.143 \\ (516) & 0.133 \\ (516) & 0.133 \\ (318) & 0.133 \\ (319) & 0.134 \\ (319) & 0.143 \\ (520) & 0.143 \end{array}$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (343) 0.185<br>(344) 0.185<br>(345) 0.185<br>(346) 0.185<br>(347) 0.185<br>(347) 0.185<br>(349) 0.185<br>(350) 0.185<br>(351) 0.185<br>(352) 0.195<br>(352) 0.185<br>(353) 0.185<br>(355) 0.174<br>(356) 0.174 | <br>2 |
| 91) 0.104<br>92) 0.104<br>93) 0.104<br>94) 0.104<br>95) 0.104<br>95) 0.104<br>95) 0.104<br>97) 0.095<br>98) 0.095<br>99) 0.086<br>100) 0.086<br>101) 0.086<br>101) 0.086<br>103) 0.0771               | (109) 0.068<br>(110) 0.068<br>(111) 0.064<br>(112) 0.064<br>(112) 0.063<br>(114) 0.053<br>(114) 0.053<br>(115) 0.045<br>(116) 0.045<br>(116) 0.045<br>(118) 0.038<br>(119) 0.032<br>(120) 0.032<br>(121) 0.038<br>(122) 0.038 | $\begin{array}{c} (127) & 0.053 \\ (129) & 0.053 \\ (129) & 0.053 \\ (130) & 0.053 \\ (131) & 0.061 \\ (132) & 0.061 \\ (133) & 0.068 \\ (134) & 0.068 \\ (135) & 0.086 \\ (135) & 0.086 \\ (136) & 0.095 \\ (138) & 0.095 \\ (139) & 0.095 \\ (140) & 0.095 \end{array}$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $      \begin{array}{c} (163) & 0.069 \\ (164) & 0.069 \\ (165) & 0.123 \\ (165) & 0.123 \\ (167) & 0.113 \\ (158) & 0.113 \\ (158) & 0.113 \\ (159) & 0.113 \\ (170) & 0.113 \\ (171) & 0.104 \\ (172) & 0.104 \\ (172) & 0.104 \\ (173) & 0.095 \\ (174) & 0.095 \\ (175) & 0.095 \\ (175) & 0.095 \\ \end{array}    $ | $\begin{array}{c} (271) & 0.143 \\ (272) & 0.143 \\ (273) & 0.143 \\ (273) & 0.143 \\ (275) & 0.143 \\ (275) & 0.143 \\ (276) & 0.153 \\ (279) & 0.153 \\ (279) & 0.153 \\ (290) & 0.153 \\ (291) & 0.153 \\ (291) & 0.153 \\ (293) & 0.183 \\ (284) & 0.153 \\ (284) & 0.153 \end{array}$  | (289) 0.153<br>(290) 0.163<br>(291) 0.163<br>(292) 0.163<br>(293) 0.163<br>(293) 0.163<br>(294) 0.163<br>(295) 0.174<br>(296) 0.174<br>(296) 0.174<br>(297) 0.174<br>(299) 0.174<br>(300) 0.174   | $\begin{array}{c} (307) & 0.163 \\ (308) & 0.163 \\ (309) & 0.163 \\ (310) & 0.163 \\ (311) & 0.163 \\ (312) & 0.153 \\ (312) & 0.153 \\ (313) & 0.143 \\ (313) & 0.133 \\ (314) & 0.133 \\ (316) & 0.133 \\ (318) & 0.133 \\ (318) & 0.133 \\ (319) & 0.143 \\ (520) & 0.143 \\ (521) & 0.143 \\ \end{array}$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | <br>Į |
| 91) 0.104<br>92) 0.104<br>93) 0.104<br>94) 0.104<br>95) 0.104<br>95) 0.104<br>97) 0.095<br>98) 0.095<br>99) 0.086<br>100) 0.086<br>101) 0.086<br>102) 0.086<br>103) 0.0771<br>104) 0.0771             | (109) 0.068<br>(110) 0.068<br>(111) 0.061<br>(112) 0.061<br>(113) 0.053<br>(114) 0.053<br>(115) 0.045<br>(116) 0.045<br>(116) 0.038<br>(117) 0.038<br>(119) 0.032<br>(120) 0.032<br>(121) 0.038<br>(122) 0.038<br>(123) 0.045 | (127) 0.053<br>(128) 0.053<br>(129) 0.053<br>(130) 0.053<br>(131) 0.061<br>(132) 0.061<br>(133) 0.068<br>(134) 0.068<br>(135) 0.086<br>(136) 0.084<br>(137) 0.095<br>(138) 0.095<br>(139) 0.095<br>(140) 0.095<br>(141) 0.104   | (145) 0.104<br>(146) 0.104<br>(147) 0.095<br>(148) 0.095<br>(150) 0.095<br>(151) 0.095<br>(152) 0.095<br>(153) 0.095<br>(153) 0.095<br>(154) 0.095<br>(155) 0.086<br>(156) 0.086<br>(157) 0.0771<br>(159) 0.0771 |  | $\begin{array}{c} (271) & 0.143 \\ (272) & 0.143 \\ (273) & 0.143 \\ (274) & 0.143 \\ (275) & 0.143 \\ (275) & 0.143 \\ (276) & 0.143 \\ (277) & 0.153 \\ (279) & 0.153 \\ (279) & 0.153 \\ (290) & 0.153 \\ (291) & 0.153 \\ (291) & 0.153 \\ (293) & 0.153 \\ (293) & 0.153 \\ (295) & 0.153 \\ (295) & 0.153 \\ \end{array}$   | (289) 0.153<br>(290) 0.163<br>(291) 0.163<br>(292) 0.163<br>(293) 0.163<br>(293) 0.163<br>(295) 0.174<br>(296) 0.174<br>(296) 0.174<br>(297) 0.174<br>(299) 0.174<br>(300) 0.174<br>(301) 0.174<br>(302) 0.174  | $\begin{array}{c} (307) & 0.143\\ (308) & 0.163\\ (309) & 0.163\\ (310) & 0.163\\ (311) & 0.163\\ (312) & 0.153\\ (313) & 0.143\\ (313) & 0.143\\ (314) & 0.133\\ (314) & 0.133\\ (316) & 0.133\\ (318) & 0.133\\ (318) & 0.133\\ (318) & 0.133\\ (319) & 0.143\\ (319) & 0.143\\ (321) & 0.143\\ (321) & 0.143\\ (322) & 0.143\end{array}$                    | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (343) 0.185<br>(344) 0.185<br>(345) 0.185<br>(346) 0.185<br>(347) 0.185<br>(347) 0.185<br>(349) 0.185<br>(351) 0.185<br>(351) 0.185<br>(352) 0.195<br>(353) 0.185<br>(354) 0.185<br>(755) 0.174<br>(356) 0.174 | <br>2 |
| 91) 0.104<br>92) 0.104<br>93) 0.104<br>94) 0.104<br>95) 0.104<br>96) 0.104<br>97) 0.095<br>98) 0.095<br>98) 0.095<br>99) 0.086<br>100) 0.086<br>101) 0.086<br>103) 0.0771<br>105) 0.086               | (109) 0.068<br>(110) 0.068<br>(111) 0.061<br>(112) 0.061<br>(113) 0.053<br>(114) 0.053<br>(115) 0.045<br>(116) 0.045<br>(117) 0.038<br>(117) 0.038<br>(119) 0.032<br>(120) 0.038<br>(121) 0.038<br>(122) 0.045                | (127) 0.053<br>(128) 0.053<br>(129) 0.053<br>(130) 0.053<br>(131) 0.061<br>(132) 0.061<br>(133) 0.068<br>(134) 0.068<br>(134) 0.068<br>(135) 0.086<br>(136) 0.084<br>(137) 0.095<br>(138) 0.095<br>(139) 0.095<br>(140) 0.095<br>(141) 0.104                              | (145) 0.104<br>(146) 0.104<br>(147) 0.095<br>(148) 0.095<br>(150) 0.095<br>(151) 0.095<br>(152) 0.095<br>(152) 0.095<br>(153) 0.095<br>(155) 0.086<br>(155) 0.086<br>(157) 0.0771<br>(159) 0.025<br>(160) 0.025  |  | $\begin{array}{c} (271) & 0.143 \\ (272) & 0.143 \\ (273) & 0.143 \\ (274) & 0.143 \\ (275) & 0.143 \\ (275) & 0.143 \\ (276) & 0.143 \\ (277) & 0.153 \\ (279) & 0.153 \\ (279) & 0.153 \\ (290) & 0.153 \\ (291) & 0.153 \\ (291) & 0.153 \\ (293) & 0.153 \\ (293) & 0.153 \\ (295) & 0.153 \\ (295) & 0.153 \\ \end{array}$   | $\begin{array}{c} (289) & 0.153 \\ (290) & 0.153 \\ (291) & 0.163 \\ (292) & 0.163 \\ (292) & 0.163 \\ (293) & 0.163 \\ (294) & 0.163 \\ (295) & 0.174 \\ (296) & 0.174 \\ (297) & 0.174 \\ (299) & 0.174 \\ (299) & 0.174 \\ (300) & 0.174 \\ (301) & 0.174 \\ (302) & 0.174 \\ (303) & 0.163 \\ (304) & 0.163 \end{array}$                  | $\begin{array}{c} (307) & 0.143\\ (508) & 0.163\\ (509) & 0.163\\ (310) & 0.163\\ (311) & 0.163\\ (312) & 0.153\\ (312) & 0.153\\ (313) & 0.143\\ (314) & 0.145\\ (315) & 0.133\\ (316) & 0.133\\ (318) & 0.133\\ (319) & 0.133\\ (319) & 0.143\\ (320) & 0.143\\ (520) & 0.143\\ (521) & 0.143\\ (322) & 0.143\\ (323) & 0.153\\ \end{array}$                 | (725) 0.153<br>(726) 0.153<br>(327) 0.163<br>(329) 0.163<br>(329) 0.163<br>(330) 0.163<br>(331) 0.163<br>(332) 0.163<br>(333) 0.174<br>(334) 0.174<br>(335) 0.174<br>(336) 0.174<br>(337) 0.174<br>(339) 0.174<br>(339) 0.174<br>(339) 0.185 | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  |       |
| 91) 0.104<br>92) 0.104<br>93) 0.104<br>94) 0.104<br>95) 0.104<br>96) 0.104<br>96) 0.104<br>97) 0.095<br>98) 0.095<br>99) 0.086<br>100) 0.086<br>101) 0.086<br>102) 0.086<br>103) 0.0771<br>105) 0.086 | (109) 0.068<br>(110) 0.068<br>(111) 0.061<br>(112) 0.061<br>(113) 0.053<br>(114) 0.053<br>(115) 0.045<br>(116) 0.045<br>(116) 0.038<br>(117) 0.038<br>(119) 0.032<br>(120) 0.032<br>(121) 0.038<br>(122) 0.038<br>(123) 0.045 | (127) 0.053<br>(128) 0.053<br>(129) 0.053<br>(130) 0.053<br>(131) 0.061<br>(132) 0.061<br>(133) 0.068<br>(134) 0.068<br>(135) 0.086<br>(136) 0.084<br>(137) 0.095<br>(138) 0.095<br>(139) 0.095<br>(140) 0.095<br>(141) 0.104   | (145) 0.104<br>(146) 0.104<br>(147) 0.095<br>(148) 0.095<br>(150) 0.095<br>(151) 0.095<br>(152) 0.095<br>(153) 0.095<br>(153) 0.095<br>(154) 0.095<br>(155) 0.086<br>(156) 0.086<br>(157) 0.0771<br>(159) 0.0771 |  | $\begin{array}{c} (271) & 0.143 \\ (272) & 0.143 \\ (272) & 0.143 \\ (273) & 0.143 \\ (274) & 0.143 \\ (275) & 0.143 \\ (276) & 0.143 \\ (277) & 0.153 \\ (278) & 0.153 \\ (279) & 0.153 \\ (290) & 0.153 \\ (291) & 0.153 \\ (291) & 0.153 \\ (292) & 0.153 \\ (284) &$ | $\begin{array}{c} (289) & 0.153 \\ (270) & 0.163 \\ (291) & 0.163 \\ (292) & 0.163 \\ (292) & 0.163 \\ (293) & 0.163 \\ (295) & 0.174 \\ (296) & 0.174 \\ (296) & 0.174 \\ (297) & 0.174 \\ (300) & 0.174 \\ (300) & 0.174 \\ (301) & 0.174 \\ (302) & 0.174 \\ (303) & 0.163 \\ (304) & 0.163 \\ (305) & 0.163 \\ (305) & 0.163 \end{array}$ | $\begin{array}{c} (307) & 0.163 \\ (308) & 0.163 \\ (309) & 0.163 \\ (310) & 0.163 \\ (311) & 0.163 \\ (312) & 0.153 \\ (312) & 0.153 \\ (313) & 0.143 \\ (314) & 0.143 \\ (315) & 0.135 \\ (316) & 0.135 \\ (317) & 0.135 \\ (319) & 0.143 \\ (320) & 0.143 \\ (321) & 0.143 \\ (322) & 0.143 \\ (322) & 0.143 \\ (323) & 0.153 \\ (574) & 0.153 \end{array}$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (343) 0.185<br>(344) 0.185<br>(345) 0.185<br>(346) 0.185<br>(347) 0.185<br>(347) 0.185<br>(349) 0.185<br>(351) 0.185<br>(351) 0.185<br>(352) 0.195<br>(353) 0.185<br>(354) 0.185<br>(755) 0.174<br>(356) 0.174 |       |

River discharge data at 12-hourly intervals for Station: PSTW Period : 5

Phosphorus transport Berg River

1 4

TR 143 March 1989

| (17) 0.163  | (19) 0.1738  (20) 0.1738  (21) 0.18  (21) 0.18  (22) 0.18  (23) 0.19  (24) 0.18  (25) 0.18  (26) 0.18  (27) 0.18  (29) 0.18  (30) 0.184  (30) 0.184  (31) 0.163  (32) 0.163  (33) 0.174  (34) 0.174  (35) 0.184  (36) 0.184 | ( 37) 0.184<br>( 38) 0.184<br>( 39) 0.19<br>( 40) 0.19<br>( 41) 0.195<br>( 42) 0.195<br>( 42) 0.195<br>( 43) 0.195<br>( 44) 0.195<br>( 45) 0.2<br>( 46) 0.2<br>( 46) 0.2<br>( 46) 0.2<br>( 47) 0.184<br>( 48) 0.184<br>( 50) 0.184<br>( 50) 0.184<br>( 51) 0.18<br>( 52) 0.18<br>( 53) 0.174<br>( 54) 0.174 | (71) 0.174<br>(72) 0.174  | ( 73) 0.174<br>( 74) 0.174<br>( 75) 0.184<br>( 76) 0.184<br>( 77) 0.195<br>( 78) 0.195<br>( 80) 0.195<br>( 80) 0.195<br>( 81) 0.2<br>( 82) 0.2<br>( 83) 0.2<br>( 83) 0.2<br>( 83) 0.2<br>( 85) 0.195<br>( 86) 0.195<br>( 96) 0.206<br>( 89) 0.206<br>( 89) 0.206 |   | (200) 0.173<br>(201) 0.174<br>(202) 0.174<br>(202) 0.174<br>(203) 0.19<br>(204) 0.195<br>(205) 0.195<br>(205) 0.195<br>(207) 0.195<br>(209) 0.195<br>(210) 0.195<br>(211) 0.206<br>(212) 0.206<br>(213) 0.195<br>(214) 0.195<br>(215) 0.195<br>(216) | $      \begin{array}{lllllllllllllllllllllllllllllll$  | (236) 0.206<br>(237) 0.206<br>(238) 0.206<br>(240) 0.206<br>(240) 0.206<br>(241) 0.206<br>(242) 0.205<br>(243) 0.206<br>(244) 0.206<br>(244) 0.206<br>(244) 0.206<br>(245) 0.195<br>(247) 0.19<br>(248) 0.19<br>(248) 0.19<br>(249) 0.184<br>(250) 0.184<br>(251) 0.184 | $\begin{array}{c} (254) & 0.184 \\ (255) & 0.184 \\ (255) & 0.184 \\ (257) & 0.19 \\ (256) & 0.19 \\ (259) & 0.206 \\ (260) & 0.206 \\ (261) & 0.206 \\ (262) & 0.206 \\ (263) & 0.206 \\ (263) & 0.206 \\ (264) & 0.206 \\ (265) & 0.206 \\ (264) & 0.206 \\ (264) & 0.206 \\ (267) & 0.206 \\ (269) & 0$ |
|---|---|---|---|--|---|--|--|---|---|
|   |   |   |   |  |   |  |  |   |   |
|   |   | (177) () 218  | (145) 9.73  | (153) 0.200  | (271) 0.206   | (28°) V 145  | (307) 0.206  | (325) 0.185   | (343) 0.095   |
| ( 91) 0.218   | (109) 0.195   | (127) 0,218   | (145) 0.23<br>(146) 0.23  | (154) 0.205  | (271) 0.208<br>(272) 0.208  | (289) 0.145<br>(290) 0.195   | (307) 0.204<br>(308) 0.204   | (325) 0.185<br>(326) 0.185  | (343) 0.095<br>(344) 0.095<br>(345) 0.086   |
| (91) 0.218<br>(92) 0.218  | (109) 0.195<br>(110) 0.195<br>(111) 0.195   | (127) 0.218<br>(128) 0.218<br>(129) 0.205   | (145) 0.23<br>(146) 0.23<br>(147) 0.24  | (153) 0.108<br>(154) 0.206<br>(155) 0.206  | (271) 0.208<br>(272) 0.208<br>(273) 0.208   | (289) 0.195<br>(290) 0.195<br>(291) 0.195  | (307) 0.204<br>(308) 0.204<br>(309) 0.195  | (325) 0.185   | (345) 0.095<br>(344) 0.095<br>(345) 0.086<br>(345) 0.086  |
| ( 91) 0.218<br>( 92) 0.218<br>( 93) 0.229   | (109) 0.195<br>(110) 0.195  | (127) 0.218<br>(128) 0.218<br>(129) 0.205<br>(130) 0.205  | (145) 0.23<br>(146) 0.23<br>(147) 0.24<br>(148) 0.24  | (153) 0.208<br>(154) 0.208<br>(155) 0.208<br>(156) 0.208   | (271) 0.208<br>(272) 0.208<br>(272) 0.208<br>(273) 0.208<br>(274) 0.208   | (289) 0.195<br>(290) 0.195<br>(271) 0.195<br>(292) 0.195   | (307) 0.204<br>(308) 0.204   | (325) 0.185<br>(326) 0.185<br>(327) 0.185   | (343) 0.045<br>(344) 0.045<br>(345) 0.036<br>(345) 0.086<br>(347) 0.086   |
| (91) 0.218<br>(92) 0.218  | (109) 0.195<br>(110) 0.195<br>(111) 0.195<br>(112) 0.195<br>(112) 0.195<br>(113) 0.206  | (127) 0.218<br>(128) 0.218<br>(129) 0.205<br>(130) 0.206<br>(131) 0.206   | (145) 0.25<br>(146) 0.23<br>(147) 0.24<br>(148) 0.24<br>(148) 0.24<br>(149) 0.23  | (153) 0.206<br>(164) 0.206<br>(165) 0.206<br>(166) 0.206<br>(167) 0.205  | (271) 0.208<br>(272) 0.208<br>(273) 0.208<br>(273) 0.208<br>(274) 0.208<br>(275) 0.208  | (289) 0.145<br>(290) 0.175<br>(271) 0.195<br>(292) 0.175<br>(292) 0.175<br>(293) 0.195   | (307) 0.204<br>(308) 0.204<br>(307) 0.195<br>(310) 0.195   | (325) 0.185<br>(325) 0.185<br>(327) 0.185<br>(329) 0.185<br>(329) 0.135<br>(329) 0.174<br>(330) 0.174   | (343) 0.095<br>(344) 0.095<br>(345) 0.086<br>(345) 0.086<br>(347) 0.086<br>(348) 0.086  |
| ( 91) 0.218<br>( 92) 0.218<br>( 93) 0.229<br>( 94) 0.229<br>( 95) 0.218<br>( 96) 0.218  | (109) 0.195<br>(110) 0.195<br>(111) 0.195<br>(112) 0.195<br>(112) 0.206<br>(113) 0.206<br>(114) 0.206   | (127) 0.218<br>(128) 0.218<br>(129) 0.205<br>(130) 0.206<br>(131) 0.206<br>(132) 0.206  | (145) 0.23<br>(144) 0.23<br>(147) 0.24<br>(148) 0.24<br>(148) 0.24<br>(149) 0.23<br>(150) 0.23  | (153) 0.205<br>(154) 0.205<br>(155) 0.205<br>(156) 0.205<br>(157) 0.205<br>(158) 0.205   | (271) 0.208<br>(272) 0.208<br>(273) 0.208<br>(274) 0.208<br>(275) 0.208<br>(275) 0.208  | (289) 0.195<br>(290) 0.195<br>(271) 0.195<br>(292) 0.195   | $\begin{array}{c} (507) & 0.204 \\ (509) & 0.204 \\ (509) & 0.195 \\ (310) & 0.195 \\ (311) & 0.195 \\ (312) & 0.195 \\ (312) & 0.195 \\ (313) & 0.195 \end{array}$  | (325) 0.185<br>(326) 0.185<br>(327) 0.185<br>(328) 0.135<br>(329) 0.174<br>(330) 0.174<br>(331) 0.174   | (343) 0.095<br>(344) 0.095<br>(345) 0.086<br>(345) 0.086<br>(347) 0.086<br>(348) 0.086<br>(348) 0.086   |
| ( 91) 0.218<br>( 92) 0.218<br>( 93) 0.229<br>( 94) 0.229<br>( 95) 0.218   | (109) 0.195<br>(110) 0.195<br>(111) 0.195<br>(112) 0.195<br>(113) 0.206<br>(114) 0.206<br>(115) 0.206   | (127) 0.218<br>(128) 0.218<br>(129) 0.205<br>(130) 0.204<br>(131) 0.206<br>(132) 0.206<br>(132) 0.206<br>(133) 0.195  | (145) 0.25<br>(146) 0.23<br>(147) 0.24<br>(148) 0.24<br>(149) 0.23<br>(150) 0.23<br>(151) 0.23  | (153) 0.206<br>(154) 0.206<br>(155) 0.206<br>(156) 0.205<br>(157) 0.205<br>(158) 0.205<br>(159) 0.205  | (271) 0.208<br>(272) 0.206<br>(273) 0.206<br>(274) 0.206<br>(275) 0.206<br>(276) 0.206<br>(276) 0.206   | (289) 0.195<br>(290) 0.195<br>(292) 0.195<br>(292) 0.195<br>(293) 0.195<br>(294) 0.195<br>(295) 0.195  | $\begin{array}{c} (307) & 6,204 \\ (308) & 0,205 \\ (309) & 0,195 \\ (310) & 0,195 \\ (311) & 0,195 \\ (312) & 0,195 \\ (312) & 0,195 \\ (313) & 0,195 \\ (314) & 0,195 \end{array}$   | (325) 0.185<br>(326) 0.185<br>(327) 0.185<br>(329) 0.135<br>(329) 0.174<br>(330) 0.174<br>(331) 0.174<br>(332) 0.174  | (345) 0.095<br>(344) 0.095<br>(345) 0.086<br>(348) 0.086<br>(348) 0.086<br>(349) 0.086<br>(349) 0.086   |
| ( 91) 0.218<br>( 92) 0.218<br>( 93) 0.229<br>( 94) 0.229<br>( 95) 0.218<br>( 96) 0.218<br>( 97) 0.218<br>( 98) 0.218  | (109) 0.195<br>(110) 0.195<br>(111) 0.195<br>(112) 0.195<br>(112) 0.206<br>(114) 0.206<br>(115) 0.206<br>(116) 0.206  | (127) 0.218<br>(128) 0.218<br>(129) 0.205<br>(130) 0.204<br>(131) 0.206<br>(132) 0.204<br>(133) 0.195<br>(134) 0.195  | (145) 0.25<br>(146) 0.23<br>(147) 0.24<br>(148) 0.24<br>(149) 0.23<br>(150) 0.23<br>(151) 0.23<br>(152) 0.23  |  | (271) 0.206<br>(272) 0.206<br>(273) 0.206<br>(274) 0.206<br>(275) 0.206<br>(276) 0.206<br>(277) 0.206<br>(278) 0.206  | (289) 0.195<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(292) 0.195<br>(293) 0.195<br>(294) 0.195  | $\begin{array}{c} (307) & 0.204 \\ (308) & 0.204 \\ (309) & 0.195 \\ (310) & 0.195 \\ (311) & 0.195 \\ (312) & 0.195 \\ (312) & 0.195 \\ (313) & 0.195 \\ (314) & 0.195 \\ (315) & 0.195 \end{array}$  | (325) 0.185<br>(326) 0.185<br>(327) 0.185<br>(329) 0.135<br>(329) 0.174<br>(330) 0.174<br>(331) 0.174<br>(332) 0.174<br>(332) 0.163   | (343) 0.095<br>(344) 0.095<br>(345) 0.086<br>(348) 0.086<br>(347) 0.086<br>(349) 0.086<br>(350) 0.086<br>(351) 0.086  |
| ( 91) 0.218<br>( 92) 0.218<br>( 93) 0.229<br>( 94) 0.229<br>( 95) 0.218<br>( 96) 0.218<br>( 97) 0.218<br>( 98) 0.218<br>( 99) 0.218   | (109) 0.195<br>(110) 0.195<br>(111) 0.195<br>(112) 0.195<br>(112) 0.206<br>(113) 0.206<br>(114) 0.206<br>(115) 0.206<br>(116) 0.206<br>(117) 0.206  | (127) 0.218<br>(128) 0.218<br>(129) 0.206<br>(130) 0.204<br>(131) 0.206<br>(132) 0.206<br>(132) 0.206<br>(133) 0.195<br>(134) 0.195<br>(135) 0.206  | (145) 0.23<br>(146) 0.23<br>(147) 0.24<br>(148) 0.23<br>(149) 0.23<br>(150) 0.23<br>(151) 0.23<br>(152) 0.23<br>(153) 0.24  | (153) 0.205<br>(153) 0.205<br>(155) 0.205<br>(156) 0.205<br>(157) 0.205<br>(157) 0.205<br>(157) 0.205<br>(157) 0.205<br>(171) 0.206<br>(171) 0.205   | $\begin{array}{c} (271) & 0.204 \\ (272) & 0.206 \\ (273) & 0.206 \\ (274) & 0.206 \\ (275) & 0.206 \\ (275) & 0.206 \\ (277) & 0.206 \\ (279) & 0.206 \\ (279) & 0.206 \\ (279) & 0.206 \end{array}$   | $\begin{array}{c} (289) & 0.145 \\ (270) & 0.175 \\ (271) & 0.195 \\ (292) & 0.175 \\ (292) & 0.195 \\ (293) & 0.195 \\ (294) & 0.195 \\ (295) & 0.195 \\ (296) & 0.195 \end{array}$   | $\begin{array}{c} (307) & 0.204 \\ (308) & 0.204 \\ (309) & 0.195 \\ (310) & 0.195 \\ (311) & 0.195 \\ (312) & 0.195 \\ (312) & 0.195 \\ (314) & 0.195 \\ (315) & 0.195 \\ (314) & 0.195 \\ (314) & 0.195 \end{array}$   | (325) 0.185<br>(326) 0.185<br>(327) 0.185<br>(329) 0.135<br>(529) 0.174<br>(330) 0.174<br>(331) 0.174<br>(332) 0.163<br>(334) 0.163   | (343) 0.095<br>(344) 0.095<br>(345) 0.086<br>(348) 0.086<br>(348) 0.086<br>(349) 0.086<br>(349) 0.086<br>(350) 0.086<br>(352) 0.086   |
| ( 91) 0.218<br>( 92) 0.218<br>( 93) 0.229<br>( 94) 0.229<br>( 95) 0.218<br>( 96) 0.218<br>( 97) 0.218<br>( 97) 0.218<br>( 99) 0.218<br>( 99) 0.218  | (109) 0.195<br>(110) 0.195<br>(111) 0.195<br>(112) 0.195<br>(113) 0.206<br>(114) 0.206<br>(115) 0.206<br>(116) 0.206<br>(117) 0.206<br>(118) 0.206  | (127) 0.218<br>(129) 0.218<br>(129) 0.205<br>(130) 0.206<br>(131) 0.206<br>(132) 0.206<br>(132) 0.195<br>(133) 0.195<br>(135) 0.206<br>(136) 0.206  | (145) 0.25<br>(146) 0.23<br>(147) 0.24<br>(148) 0.23<br>(150) 0.23<br>(150) 0.23<br>(151) 0.23<br>(152) 0.23<br>(153) 0.24<br>(154) 0.24  | (153) 0.205<br>(164) 0.205<br>(165) 0.205<br>(166) 0.205<br>(167) 0.205<br>(167) 0.205<br>(167) 0.206<br>(170) 0.206<br>(171) 0.206  | (271) 0.204<br>(272) 0.206<br>(273) 0.206<br>(274) 0.206<br>(275) 0.206<br>(275) 0.206<br>(277) 0.206<br>(278) 0.206<br>(279) 0.206<br>(280) 0.206  | (289) 0.145<br>(290) 0.175<br>(291) 0.195<br>(292) 0.195<br>(292) 0.195<br>(294) 0.195<br>(294) 0.195<br>(296) 0.195<br>(296) 0.195  | $\begin{array}{c} (307) & 0.204 \\ (309) & 0.204 \\ (309) & 0.195 \\ (310) & 0.195 \\ (311) & 0.195 \\ (312) & 0.195 \\ (312) & 0.195 \\ (314) & 0.195 \\ (314) & 0.195 \\ (314) & 0.195 \\ (314) & 0.195 \\ (317) & 0.195 \end{array}$  | (325) 0.185<br>(326) 0.185<br>(327) 0.185<br>(329) 0.185<br>(329) 0.174<br>(330) 0.174<br>(331) 0.174<br>(332) 0.174<br>(333) 0.163<br>(334) 0.153  | (345) 0.095<br>(345) 0.035<br>(345) 0.035<br>(345) 0.086<br>(347) 0.086<br>(347) 0.086<br>(349) 0.086<br>(350) 0.086<br>(351) 0.086   |
| (91) 0.218<br>(92) 0.218<br>(93) 0.229<br>(94) 0.229<br>(95) 0.218<br>(96) 0.218<br>(97) 0.218<br>(97) 0.218<br>(99) 0.218<br>(100) 0.218<br>(101) 0.218  | (109) 0.195<br>(110) 0.195<br>(111) 0.195<br>(112) 0.195<br>(113) 0.206<br>(114) 0.206<br>(114) 0.206<br>(116) 0.206<br>(116) 0.206<br>(117) 0.206<br>(118) 0.206   | (127) 0.218<br>(129) 0.218<br>(129) 0.205<br>(130) 0.206<br>(131) 0.206<br>(132) 0.206<br>(132) 0.206<br>(133) 0.195<br>(135) 0.206<br>(136) 0.206<br>(137) 0.206   | (145) 0.25(146) 0.23(147) 0.24(148) 0.24(149) 0.23(150) 0.23(151) 0.23(151) 0.23(152) 0.24(155) 0.218   |  | (271) 0.208<br>(272) 0.206<br>(273) 0.206<br>(274) 0.206<br>(275) 0.206<br>(275) 0.206<br>(277) 0.206<br>(277) 0.206<br>(279) 0.206<br>(279) 0.206<br>(280) 0.206<br>(281) 0.206  | (289) 0.145<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(292) 0.195<br>(294) 0.195<br>(294) 0.195<br>(296) 0.195<br>(296) 0.195<br>(298) 0.195   | $\begin{array}{c} (307) & 6.204 \\ (308) & 0.205 \\ (309) & 0.195 \\ (310) & 0.195 \\ (311) & 0.195 \\ (312) & 0.195 \\ (313) & 0.195 \\ (313) & 0.195 \\ (314) & 0.195 \\ (315) & 0.195 \\ (316) & 0.195 \\ (317) & 0.195 \\ (319) & 0.125 \end{array}$   | (325) 0.185<br>(326) 0.185<br>(327) 0.185<br>(329) 0.135<br>(329) 0.174<br>(331) 0.174<br>(332) 0.174<br>(333) 0.163<br>(334) 0.163<br>(335) 0.153  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| ( 91) 0.218<br>( 92) 0.218<br>( 93) 0.229<br>( 94) 0.229<br>( 95) 0.218<br>( 96) 0.218<br>( 97) 0.219   | (109) 0.195<br>(110) 0.195<br>(111) 0.195<br>(112) 0.195<br>(112) 0.195<br>(113) 0.206<br>(114) 0.206<br>(116) 0.206<br>(116) 0.206<br>(118) 0.206<br>(118) 0.206<br>(119) 0.206  | (127) 0.218<br>(128) 0.208<br>(129) 0.206<br>(130) 0.204<br>(131) 0.206<br>(132) 0.204<br>(133) 0.195<br>(134) 0.195<br>(134) 0.206<br>(136) 0.206<br>(138) 0.206   | (145) 0.25<br>(146) 0.23<br>(147) 0.24<br>(148) 0.24<br>(149) 0.23<br>(150) 0.23<br>(151) 0.23<br>(151) 0.23<br>(152) 0.23<br>(153) 0.24<br>(155) 0.218<br>(156) 0.218                                |  | (271) 0.208<br>(272) 0.206<br>(272) 0.206<br>(274) 0.206<br>(275) 0.206<br>(275) 0.206<br>(277) 0.206<br>(279) 0.206<br>(279) 0.206<br>(280) 0.206<br>(281) 0.206<br>(281) 0.206  | (289) 0.145<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(292) 0.195<br>(294) 0.195<br>(294) 0.195<br>(296) 0.195<br>(296) 0.195<br>(297) 0.195<br>(299) 0.195  | $\begin{array}{c} (307) & 0.204 \\ (309) & 0.204 \\ (309) & 0.195 \\ (310) & 0.195 \\ (311) & 0.195 \\ (312) & 0.195 \\ (312) & 0.195 \\ (314) & 0.195 \\ (314) & 0.195 \\ (314) & 0.195 \\ (314) & 0.195 \\ (317) & 0.195 \end{array}$  | (325) 0.185<br>(326) 0.185<br>(327) 0.185<br>(329) 0.135<br>(329) 0.174<br>(330) 0.174<br>(331) 0.174<br>(332) 0.174<br>(335) 0.163<br>(334) 0.153<br>(336) 0.153<br>(336) 0.153  | (345) 0.095<br>(344) 0.095<br>(345) 0.036<br>(348) 0.086<br>(347) 0.086<br>(349) 0.086<br>(350) 0.086<br>(351) 0.086<br>(352) 0.086<br>(353) 0.086<br>(355) 0.086<br>(355) 0.086  |
| (91) 0.218<br>(92) 0.218<br>(93) 0.229<br>(94) 0.229<br>(95) 0.218<br>(96) 0.218<br>(97) 0.218<br>(99) 0.218<br>(100) 0.218<br>(101) 0.218  | (109) 0.195<br>(110) 0.195<br>(111) 0.195<br>(112) 0.195<br>(112) 0.195<br>(113) 0.206<br>(114) 0.206<br>(116) 0.206<br>(116) 0.206<br>(117) 0.206<br>(119) 0.206<br>(120) 0.206<br>(121) 0.21                              | (127) 0.218<br>(128) 0.206<br>(130) 0.206<br>(131) 0.206<br>(131) 0.206<br>(132) 0.206<br>(132) 0.206<br>(133) 0.195<br>(134) 0.195<br>(135) 0.206<br>(136) 0.206<br>(137) 0.206<br>(139) 0.206   | (145) 0.25<br>(146) 0.23<br>(147) 0.24<br>(148) 0.24<br>(149) 0.23<br>(150) 0.23<br>(151) 0.23<br>(152) 0.23<br>(152) 0.23<br>(153) 0.24<br>(154) 0.218<br>(156) 0.218<br>(157) 0.218                 |  | $\begin{array}{c} (271) & 0.204 \\ (272) & 0.206 \\ (272) & 0.206 \\ (274) & 0.206 \\ (275) & 0.206 \\ (275) & 0.206 \\ (277) & 0.206 \\ (279) & 0.206 \\ (279) & 0.206 \\ (280) & 0.206 \\ (280) & 0.206 \\ (281) & 0.206 \\ (280) & 0.206 \\ (280) & 0.2 \end{array}$   | (289) 0.145<br>(270) 0.195<br>(271) 0.195<br>(292) 0.195<br>(293) 0.195<br>(294) 0.195<br>(295) 0.195<br>(296) 0.195<br>(296) 0.195<br>(298) 0.195<br>(299) 0.195<br>(300) 0.195   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (325) 0.185<br>(326) 0.185<br>(327) 0.185<br>(329) 0.135<br>(329) 0.174<br>(330) 0.174<br>(331) 0.174<br>(332) 0.174<br>(332) 0.163<br>(334) 0.163<br>(335) 0.153<br>(336) 0.133<br>(338) 0.133   | (343) 0.095<br>(344) 0.095<br>(345) 0.096<br>(348) 0.096<br>(347) 0.086<br>(349) 0.086<br>(350) 0.086<br>(351) 0.086<br>(352) 0.086<br>(354) 0.086<br>(355) 0.086<br>(355) 0.086  |
| ( 91) 0.218<br>( 92) 0.218<br>( 93) 0.229<br>( 94) 0.229<br>( 94) 0.218<br>( 96) 0.218<br>( 97) 0.218<br>( 97) 0.218<br>( 99) 0.218<br>( 100) 0.218<br>(101) 0.218  | (109) 0.195<br>(110) 0.195<br>(111) 0.195<br>(112) 0.195<br>(112) 0.206<br>(113) 0.206<br>(114) 0.206<br>(116) 0.206<br>(116) 0.206<br>(117) 0.206<br>(119) 0.206<br>(119) 0.206<br>(120) 0.201<br>(122) 0.21               | (127) 0.218<br>(128) 0.218<br>(129) 0.205<br>(130) 0.204<br>(131) 0.206<br>(132) 0.206<br>(132) 0.206<br>(133) 0.195<br>(134) 0.195<br>(135) 0.206<br>(137) 0.206<br>(138) 0.206<br>(139) 0.206<br>(140) 0.206  | (145) 0.25<br>(146) 0.23<br>(147) 0.24<br>(149) 0.23<br>(150) 0.23<br>(151) 0.23<br>(152) 0.23<br>(152) 0.23<br>(153) 0.24<br>(154) 0.24<br>(155) 0.218<br>(156) 0.218<br>(157) 0.218                 |  | $\begin{array}{c} (271) & 0.204 \\ (272) & 0.206 \\ (272) & 0.206 \\ (275) & 0.206 \\ (275) & 0.206 \\ (275) & 0.206 \\ (277) & 0.206 \\ (279) & 0.206 \\ (279) & 0.206 \\ (280) & 0.206 \\ (281) & 0.206 \\ (282) & 0.206 \\ (282) & 0.2 \\ (284) & 0.2 \\ (284) & 0.2 \\ \end{array}$   | (129) 0.145<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(293) 0.195<br>(294) 0.195<br>(294) 0.195<br>(296) 0.195<br>(297) 0.195<br>(298) 0.195<br>(299) 0.195<br>(300) 0.195<br>(301) 0.195<br>(302) 0.195   | $\begin{array}{c} (307) & 6.204 \\ (308) & 0.204 \\ (309) & 0.195 \\ (310) & 0.195 \\ (311) & 0.195 \\ (312) & 0.195 \\ (312) & 0.195 \\ (313) & 0.195 \\ (314) & 0.195 \\ (315) & 0.195 \\ (316) & 0.195 \\ (317) & 0.195 \\ (318) & 0.175 \\ (319) & 0.17 \end{array}$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (343) 0.095<br>(344) 0.095<br>(345) 0.086<br>(347) 0.086<br>(347) 0.086<br>(349) 0.086<br>(350) 0.086<br>(351) 0.086<br>(352) 0.086<br>(353) 0.086<br>(355) 0.086<br>(355) 0.086<br>(357) 0.1   |
| ( 91) 0.213<br>( 92) 0.218<br>( 92) 0.229<br>( 93) 0.229<br>( 95) 0.218<br>( 96) 0.218<br>( 97) 0.218<br>( 97) 0.218<br>( 100) 0.218<br>( 100) 0.218<br>( 101) 0.218<br>( 102) 0.218<br>( 102) 0.218                                | (109) 0.195<br>(110) 0.195<br>(111) 0.195<br>(112) 0.195<br>(113) 0.206<br>(114) 0.206<br>(114) 0.206<br>(116) 0.206<br>(117) 0.206<br>(117) 0.206<br>(119) 0.206<br>(120) 0.206<br>(121) 0.21<br>(122) 0.21<br>(123) 0.218 | (127) 0.218<br>(128) 0.218<br>(129) 0.205<br>(130) 0.206<br>(131) 0.206<br>(132) 0.206<br>(132) 0.206<br>(133) 0.195<br>(134) 0.206<br>(135) 0.206<br>(137) 0.206<br>(139) 0.206<br>(139) 0.206<br>(141) 0.218  | (145) 0.25(145) 0.23(147) 0.24(148) 0.24(149) 0.23(150) 0.23(151) 0.23(151) 0.23(152) 0.23(153) 0.24(155) 0.218(155) 0.218(156) 0.218(158) 0.218(159) 0.218   |  | $\begin{array}{c} (271) & 0.204 \\ (272) & 0.206 \\ (272) & 0.206 \\ (275) & 0.206 \\ (275) & 0.206 \\ (275) & 0.206 \\ (277) & 0.206 \\ (279) & 0.206 \\ (279) & 0.206 \\ (280) & 0.206 \\ (280) & 0.206 \\ (281) & 0.206 \\ (282) & 0.206 \\ (282) & 0.206 \\ (283) & 0.2 \\ (284) & 0.2 \\ (284) & 0.2 \\ (285) & 0.195 \end{array}$ | (129) 0.145<br>(1290) 0.195<br>(1290) 0.195<br>(1292) 0.195<br>(1292) 0.195<br>(1292) 0.195<br>(1294) 0.195<br>(1296) 0.195<br>(1296) 0.195<br>(1298) 0.195<br>(1299) 0.195<br>(1301) 0.195<br>(1302) 0.195  | $\begin{array}{c} (507) & 0.204 \\ (508) & 0.204 \\ (509) & 0.195 \\ (510) & 0.195 \\ (511) & 0.195 \\ (511) & 0.195 \\ (512) & 0.195 \\ (513) & 0.195 \\ (514) & 0.195 \\ (515) & 0.195 \\ (516) & 0.195 \\ (518) & 0.195 \\ (519) & 0.17 \\ (520) & 0.17 \\ \end{array}$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| ( 91) 0.218<br>( 92) 0.218<br>( 92) 0.218<br>( 93) 0.229<br>( 95) 0.218<br>( 96) 0.218<br>( 97) 0.218<br>( 97) 0.218<br>( 98) 0.218<br>( 100) 0.218<br>( 101) 0.218<br>( 101) 0.218<br>( 102) 0.218<br>( 103) 0.205<br>( 104) 0.206 | (109) 0.195(110) 0.195(111) 0.195(112) 0.195(112) 0.195(113) 0.206(114) 0.206(116) 0.206(117) 0.206(117) 0.206(118) 0.206(120) 0.206(120) 0.206(121) 0.21(122) 0.218(124) 0.218   | (127) 0.218<br>(128) 0.218<br>(129) 0.205<br>(130) 0.204<br>(131) 0.206<br>(132) 0.204<br>(133) 0.195<br>(134) 0.195<br>(135) 0.206<br>(136) 0.206<br>(136) 0.206<br>(139) 0.206<br>(139) 0.206<br>(140) 0.218  | (145) 0.25<br>(146) 0.23<br>(147) 0.24<br>(149) 0.23<br>(150) 0.23<br>(151) 0.23<br>(151) 0.23<br>(152) 0.23<br>(153) 0.24<br>(155) 0.218<br>(156) 0.218<br>(159) 0.218<br>(159) 0.218<br>(159) 0.218 |  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{c} (189) & 0.145 \\ (270) & 0.175 \\ (271) & 0.195 \\ (292) & 0.195 \\ (292) & 0.195 \\ (293) & 0.195 \\ (294) & 0.195 \\ (294) & 0.195 \\ (294) & 0.195 \\ (298) & 0.195 \\ (298) & 0.195 \\ (300) & 0.195 \\ (301) & 0.195 \\ (302) & 0.195 \\ (302) & 0.195 \\ (304) & 0.195 \end{array}$  | $\begin{array}{c} (307) & 0.204 \\ (308) & 0.204 \\ (309) & 0.195 \\ (310) & 0.195 \\ (311) & 0.195 \\ (312) & 0.195 \\ (312) & 0.195 \\ (313) & 0.195 \\ (314) & 0.195 \\ (314) & 0.195 \\ (316) & 0.195 \\ (316) & 0.195 \\ (317) & 0.195 \\ (319) & 0.17 \\ (320) & 0.17 \\ (321) & 0.19 \end{array}$                                     | (325) 0.185<br>(326) 0.185<br>(327) 0.185<br>(329) 0.135<br>(329) 0.174<br>(331) 0.174<br>(331) 0.174<br>(332) 0.163<br>(334) 0.163<br>(335) 0.153<br>(336) 0.153<br>(337) 0.133<br>(339) 0.122<br>(340) 0.122<br>(341) 0.113   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| (91) 0.218<br>(92) 0.218<br>(93) 0.229<br>(94) 0.229<br>(95) 0.218<br>(96) 0.218<br>(97) 0.218<br>(97) 0.218<br>(100) 0.218<br>(100) 0.218<br>(101) 0.218<br>(102) 0.218<br>(102) 0.218<br>(103) 0.206<br>(104) 0.206               | (109) 0.195<br>(110) 0.195<br>(111) 0.195<br>(112) 0.195<br>(113) 0.206<br>(114) 0.206<br>(114) 0.206<br>(116) 0.206<br>(117) 0.206<br>(117) 0.206<br>(119) 0.206<br>(120) 0.206<br>(121) 0.21<br>(122) 0.21<br>(123) 0.218 | (127) 0.218<br>(128) 0.218<br>(129) 0.205<br>(130) 0.206<br>(131) 0.206<br>(132) 0.206<br>(132) 0.206<br>(133) 0.195<br>(134) 0.206<br>(135) 0.206<br>(137) 0.206<br>(139) 0.206<br>(139) 0.206<br>(141) 0.218  | (145) 0.25(145) 0.23(147) 0.24(148) 0.24(149) 0.23(150) 0.23(151) 0.23(151) 0.23(152) 0.23(153) 0.24(155) 0.218(155) 0.218(156) 0.218(158) 0.218(159) 0.218   |  | (271) 0.204<br>(272) 0.206<br>(272) 0.206<br>(274) 0.206<br>(275) 0.206<br>(275) 0.206<br>(277) 0.206<br>(277) 0.206<br>(279) 0.206<br>(280) 0.206<br>(280) 0.206<br>(280) 0.206<br>(281) 0.206<br>(282) 0.206<br>(283) 0.2<br>(284) 0.2<br>(284) 0.2<br>(285) 0.195<br>(287) 0.195<br>(287) 0.195                                      | (129) 0.143<br>(290) 0.195<br>(291) 0.195<br>(292) 0.195<br>(292) 0.195<br>(293) 0.195<br>(294) 0.195<br>(295) 0.195<br>(296) 0.195<br>(297) 0.195<br>(298) 0.195<br>(299) 0.195<br>(300) 0.195<br>(301) 0.195<br>(302) 0.195<br>(302) 0.195<br>(304) 0.195<br>(304) 0.195<br>(105) 0.195  | $\begin{array}{c} (507) & 0.204 \\ (509) & 0.204 \\ (509) & 0.204 \\ (509) & 0.195 \\ (511) & 0.195 \\ (511) & 0.195 \\ (512) & 0.195 \\ (513) & 0.195 \\ (514) & 0.195 \\ (515) & 0.195 \\ (515) & 0.195 \\ (516) & 0.195 \\ (519) & 0.19 \\ (520) & 0.19 \\ (522) & 0.19 \\ (522) & 0.18 \\ (524) & 0.185 \\ (524) & 0.185 \\ \end{array}$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (343) 0.095<br>(344) 0.095<br>(345) 0.086<br>(347) 0.086<br>(347) 0.086<br>(347) 0.086<br>(357) 0.086<br>(351) 0.086<br>(353) 0.086<br>(355) 0.086<br>(355) 0.086<br>(355) 0.086<br>(355) 0.086<br>(357) 0.1<br>(358) 0.1<br>(359) 0.113<br>(360) 0.113   |

\_\_\_\_

( 73) 0.174

\_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_

(55)0.143

\_\_\_\_\_

(199) 0.173

(181) 0.195

(217) 0.195

(218) 0.195

River discharge data at 12-hourly intervals for Station: PSTW Period : 6

.

Variable: PARLSTW6.pstwq12\_6 (length = 360)

( 19) 0.1738 ( 37) 0.184

\_\_\_\_\_

(253) 0.184

(254) 0.184

(235) 0.204

(236) 0.204

|   |  |   |  |  |  |   |  |  | 1 A .  |
|---|--|---|--|--|--|---|--|--|--|
| ariable: WSTWD  | 1.wstwq12_1 (  | length = 360)   |  |  |  |   |  |  |  |
| 1) 0,0284   | ( 19) 0.018  | ( 37) 0.018   | ( 55) 0.018  | (73) 0.018   |  | 1   |  |  |  |
| 2) 0.0284   | (20) 0.018   | (38)0.018   | ( 56) 0.018  | ( 74) 0.018  |  |   |  |  |  |
| 3) 0,0232   | (21) 0.018   | ( 39) 0.0198  | ( 57) 0.018  | ( 75) 0.018  | (181) 0.0137   | (199) 0.0182  | (217) 0.02   | (235) 0.0284   | (200) 0.0202   |
| 4) 0.0232   | (22) 0.018   | ( 40) 0.0198  | ( 58) 0.018  | ( 76) 0.018  | (182) 0.0137   | (200) 0.0182  | (218) 0.02   | (206) 0.0284   | (254) 0.0232   |
| 5) 0.0232   | (23) 0.018   | ( 41) 0.018   | ( 59) 0.018  | ( 77) 0.018  | (183) 0.0182   | (201) 0.0132  | (219) 0.02   | (207) 9.7E-3   | (255) 0.0137   |
| 6) 0.0232   | (24) 0.018   | (42) 0.018  | ( 60) 0.018  | (78) 0.018 ·   |  | (202) 0.0182  | (220) 0.02   | (238) 9.7E-3   | (256) 0.0137   |
| 7) 0.0232   | (25) 0.018   | (43) 0.018  | ( 61) 0.018  | ( 79) 0.018  | (184) 0.0182   | (205) 0.0182  | (221) 0.02   | (239) 0.0284   | (257) 0.0284   |
| a) 0.0232   | (26) 0.018   | (44) 0.018  | ( 62) 0.018  | ( 80) 0.018  | (185) 0.0182   | (203) 0.0182<br>(204) 0.0182  | (222) 0.02   | (240) 0.0284   | (258) 0.0284   |
|   | (27) 0.018   | (45) 0.01B  | ( 63) 0.018  | ( 81) 0.012  | (186) 0.0182   | (205) 0.0182  | (223) 0.032  | (241) 0.0137   | (259) 0.0284   |
| 9) 0.018  | (28) 0.019   | ( 46) 0.018   | ( 64) 0.018  | (02)0.012  | (187) 0.0182   | (205) 0.0182  | (224) 0.032  | (242) 0.0137   | (260) 0.0284   |
| 10) 0.018   | (29) 0.018   | ( 47) 0.0189  | ( 65) 0.018  | ( 83) 0,012  | (188) 0.0182   |   | (225) 0.02   | (245) 0.0284   | (261) 0.0284   |
| 11) 0.018   | ( 30) 0.018  | (48) 0.0187   | ( 66) 0.018  | ( 84) 0.012  | (189) 0.0182   | (207) 0.0182  | (226) 0.02   | (244) 0.0284   | (262) 0.0284   |
| 12) 0.018   |  | (49) 0.018  | ( 67) 0.019  | ( 85) 0,012  | (190) 0.0182   | (208) 0.0182  | (227) 0.02   | (245) 0.0284   | (263) 0.0284   |
| 13) 0.018   | (31) 0.018   | ( 50) 0.018   | (68) 0.018   | ( 86) 0.012  | (191) 0.0182   | (209) 0.0232  | (228) 0.02   | (246) 0.0284   | (264) 0.0284   |
| 14) 0.019   | ( 32) 0.018  | ( 51) Q.01B   | ( 69) 0.018  | ( 87) 0.0132   | (192) 0.0182   | (210) 0.0232  |  | (247) 0.0284   | (265) 0.0182   |
| 15) 0.018   | ( 33) 0.018  | (51)0.018   | ( 70) 0.010  | (88) 0.0132  | (193) 0.0182   | (211) 0.0232  | (229) 0.02   | (248) 0.0284   | (265) 0.0182   |
| 16) 0.018   | (34) 0.018   | (53) 0.018  | (71) 0.018   | (89) 0.012   | (194) 0.0182   | (212) 0.0232  | (230) 0.02   | (248) 0.0284   | (267) 0.0137   |
| 17) 0.018   | (35) 0.018   | ( 53) 0.018   | ( 72) 0,018  | ( 90) 0.012  | (195) 0.0182   | (213) 0.02  | (231) 0.02   | (250) 0.0284   | (268) 0.0137   |
| 18) 0.018   | ( 36) 0.018  |   |  |  |  | (214) 0.02  | (232) 0.02   |  | (259) 0.013  |
|   |  |   |  |  | (197) 0.0182   | (215) 0.02  | (233) 0  | (251) 0.0232<br>(252) 0.0232   | (270) 0.013  |
|   |  |   |  |  |  |   | 10741  | - (252) (D.D.C.) Z   | (2/0) 0.010  |
|   |  |   | •  |  | (198) 0.0182   | (216) 0.02  | (234) 0  | (202) 010214   |  |
|   |  | (127) 0.014   | (145) 0.0342   | (163) 0.0284   | (198) 0.0182   |   |  |  |  |
| 91) 0.01  | (109) 0.01   | (127) 0.014<br>(128) 0.014  | (145) 0.0342<br>(146) 0.0342   | (163) 0.0284   | (198) 0.0182   |   |  |  |  |
| 91) 0.01<br>92) 0.01  | (109) 0.01<br>(110) 0.01   | (127) 0.014   | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0232   | (163) 0.0284<br>(155) 0.0284   | (198) 0.0182   |   |  |  | (343) 0.0135   |
| 91) 0.01<br>92) 0.01<br>93) 0.01  | (109) 0.01<br>(110) 0.01<br>(111) 0.01   | (127) 0.014<br>(128) 0.014<br>(129) 0.02  | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0232<br>(148) 0.0232                               | (165) 0.0294<br>(155) 0.0294<br>(155) 0.0294   | (198) 0.0182<br>(198) 0.0182<br>(2/1) 0.013  | (289) 0.013   | (307) 0.013  | (325) 0.0135   | (343) 0.0135<br>(344) 0.0135   |
| 91) 0.01<br>92) 0.01<br>93) 0.01<br>94) 0.01  | $\begin{array}{c} (109) & 0.01 \\ (110) & 0.01 \\ (111) & 0.01 \\ (112) & 0.01 \end{array}$  | (127) 0.014<br>(128) 0.014<br>(127) 0.02<br>(130) 0.02  | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0232<br>(148) 0.0232<br>(149) 0.013                | (163) 0.0284<br>(164) 0.0284<br>(155) 0.0284<br>(165) 0.0284<br>(167) 0.0137   | (198) 0.0182<br>(198) 0.0182<br>(2/1) 0.013<br>(272) 0.013   | (289) 0.013<br>(290) 0.013  | (367) 0.013<br>(368) 0.013   | (325) 0.0105<br>(326) 0.0105   | (343) 0.0135<br>(344) 0.0135<br>(344) 0.0135   |
| 91) 0.01<br>92) 0.01<br>93) 0.01<br>94) 0.01<br>(95) 0.01   | $\begin{array}{c} (109) & 0.01 \\ (110) & 0.01 \\ (111) & 0.01 \\ (112) & 0.01 \\ (113) & 0.01 \end{array}$                                  | (127) 0.014<br>(128) 0.014<br>(129) 0.02<br>(130) 0.02<br>(131) 0.03  | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0232<br>(148) 0.0232<br>(149) 0.013<br>(150) 0.013 | (163) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(167) 0.0137<br>(168) 0.0137   | (198) 0.0182<br>(2/1) 0.013<br>(2/2) 0.013<br>(2/2) 0.013  | (289) 0.013<br>(290) 0.015<br>(291) 0.0213  | (307) 0.013<br>(308) 0.013<br>(309) 0.0135   | (325) 0.0105<br>(326) 0.0105<br>(327) 0.0105<br>(327) 0.013  | (343) 0.0135<br>(344) 0.0135<br>(344) 0.0135<br>(344) 0.0135   |
| (91) 0.01<br>92) 0.01<br>93) 0.01<br>94) 0.01<br>(95) 0.01<br>(95) 0.01   | $\begin{array}{c} (109) & 0.01 \\ (110) & 0.01 \\ (111) & 0.01 \\ (112) & 0.01 \\ (113) & 0.01 \\ (114) & 0.01 \end{array}$                  | (127) 0.014 (128) 0.014 (129) 0.02 (130) 0.02 (131) 0.03 (132) 0.03 (132) 0.03  |  | (163) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(167) 0.0137<br>(168) 0.0137<br>(168) 0.0137   | (198) 0.0182<br>(2/1) 0.013<br>(272) 0.013<br>(273) 0.013<br>(273) 0.013   | (289) 0.013<br>(290) 0.013<br>(291) 0.0213<br>(292) 0.0213  | (367) 0.013<br>(369) 0.013<br>(309) 0.0135<br>(310) 0.0135   | (325) 0.0115<br>(526) 0.0105<br>(527) 0.013<br>(328) 0.013   | (343) 0.0135<br>(344) 0.0135<br>(344) 0.0135<br>(344) 0.0135   |
| 91) 0.01<br>92) 0.01<br>93) 0.01<br>94) 0.01<br>(95) 0.01<br>(96) 0.01<br>(97) 0.01   | (109) 0.01(110) 0.01(111) 0.01(112) 0.01(113) 0.01(113) 0.01(114) 0.01(115) $3E-3$   | (127) 0.014 (128) 0.014 (129) 0.02 (130) 0.02 (131) 0.03 (132) 0.03 (133) 0.034   | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0232<br>(148) 0.0232<br>(149) 0.013                | (163) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(167) 0.0137<br>(168) 0.0137<br>(169) 0.0137<br>(170) 0.0137   | (198) 0.0182<br>(2/1) 0.013<br>(272) 0.013<br>(273) 0.013<br>(274) 0.013<br>(275) 0.0137   | (289) 0.013<br>(290) 0.013<br>(291) 0.0213<br>(292) 0.0213<br>(293) 0.0135  | (307) 0.013<br>(308) 0.013<br>(309) 0.0135<br>(310) 0.0135<br>(311) 0.0135   | (325) 0.0135<br>(326) 0.0135<br>(327) 0.013<br>(328) 0.013<br>(329) 0.0135   | (343) 0.0135<br>(344) 0.0135<br>(344) 0.0135   |
| (91) 0.01<br>92) 0.01<br>93) 0.01<br>94) 0.01<br>(95) 0.01<br>(95) 0.01<br>(97) 0.01<br>(94) 0.01   | (109) 0.01(110) 0.01(111) 0.01(112) 0.01(113) 0.01(113) 3E-3(114) 3E-3   | (127) 0.014 (128) 0.014 (129) 0.02 (130) 0.02 (131) 0.03 (132) 0.03 (135) 0.034 (134) 0.034   |  | (163) 0.0284<br>(164) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(167) 0.0137<br>(168) 0.0137<br>(179) 0.0137<br>(171) 0.0137   | (198) 0.0182<br>(2/1) 0.013<br>(272) 0.013<br>(273) 0.013<br>(274) 0.013<br>(275) 0.0137<br>(276) 0.0137   | (289) 0.013<br>(290) 0.015<br>(291) 0.0213<br>(292) 0.0213<br>(293) 0.0135<br>(294) 0.0135  | (307) 0.013<br>(308) 0.013<br>(309) 0.0135<br>(310) 0.0135<br>(311) 0.0135<br>(312) 0.0135   | (325) 0.0155<br>(326) 0.0155<br>(327) 0.013<br>(328) 0.013<br>(329) 0.0135<br>(330) 0.0135   | (343) 0.0135<br>(344) 0.0135<br>(346) 0.0135<br>(346) 0.0135<br>(346) 0.0135<br>(347) 0.0135   |
| (91) 0.01<br>92) 0.01<br>93) 0.01<br>93) 0.01<br>(95) 0.01<br>(95) 0.01<br>(96) 0.01<br>(97) 0.01<br>(99) 0.01  |  | (127) 0.014<br>(128) 0.014<br>(129) 0.02<br>(130) 0.02<br>(131) 0.03<br>(132) 0.03<br>(133) 0.034<br>(134) 0.034<br>(135) 0.03 、  |  | (163) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(167) 0.0137<br>(168) 0.0137<br>(169) 0.0137<br>(170) 0.0137   | (198) 0.0182<br>(2/1) 0.013<br>(272) 0.013<br>(273) 0.013<br>(274) 0.013<br>(275) 0.0137<br>(276) 0.0137<br>(277) 0.0135   | (289) 0.013<br>(290) 0.015<br>(291) 0.0213<br>(292) 0.0213<br>(293) 0.0135<br>(294) 0.0135<br>(295) 0.0135  | (307) 0.013<br>(308) 0.013<br>(309) 0.0135<br>(310) 0.0135<br>(311) 0.0135<br>(312) 0.0135<br>(313) 0.0135   | (325) 0.0105<br>(326) 0.0105<br>(327) 0.013<br>(328) 0.013<br>(329) 0.0135<br>(330) 0.0135<br>(331) 0.013  | (343) 0.0125<br>(344) 0.0135<br>(342) 0.0135<br>(346) 0.0135<br>(346) 0.0135<br>(347) 0.0135<br>(348) 0.0135<br>(349) 0.013  |
| <ul> <li>91) 0.01</li> <li>92) 0.01</li> <li>93) 0.01</li> <li>94) 0.01</li> <li>95) 0.01</li> <li>96) 0.01</li> <li>97) 0.01</li> <li>99) 0.01</li> <li>99) 0.01</li> <li>100) 0.01</li> </ul>   |  | (127) 0.014<br>(128) 0.014<br>(129) 0.02<br>(130) 0.02<br>(131) 0.03<br>(132) 0.03<br>(133) 0.034<br>(134) 0.03<br>(135) 0.03<br>(136) 0.03   |  | (163) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(167) 0.0137<br>(168) 0.0137<br>(169) 0.0137<br>(170) 0.0137<br>(171) 0.0137<br>(172) 0.0137<br>(173) 0.0137   | (198) 0.0182<br>(2/1) 0.013<br>(272) 0.013<br>(273) 0.013<br>(274) 0.013<br>(274) 0.0137<br>(276) 0.0137<br>(277) 0.0135<br>(278) 0.0135   | (287) 0.013<br>(290) 0.015<br>(291) 0.0213<br>(292) 0.0213<br>(293) 0.0135<br>(294) 0.0135<br>(295) 0.0135<br>(296) 0.0135  | (307) 0.013<br>(308) 0.013<br>(508) 0.0135<br>(310) 0.0135<br>(311) 0.0135<br>(312) 0.0135<br>(313) 0.0135<br>(314) 0.0135   | (325) 0.0105<br>(526) 0.0105<br>(527) 0.013<br>(528) 0.013<br>(329) 0.0135<br>(330) 0.0135<br>(331) 0.013<br>(332) 0.013   | (343) 0.0135<br>(344) 0.0135<br>(344) 0.0135<br>(346) 0.0135<br>(346) 0.0135<br>(347) 0.0135<br>(348) 0.013<br>(349) 0.013<br>(350) 0.013  |
| <ul> <li>91) 0.01</li> <li>92) 0.01</li> <li>93) 0.01</li> <li>94) 0.01</li> <li>95) 0.01</li> <li>95) 0.01</li> <li>97) 0.01</li> <li>97) 0.01</li> <li>99) 0.01</li> <li>99) 0.01</li> <li>100) 0.01</li> <li>1100) 0.01</li> </ul>   |  | $(127) 0.014 \\ (128) 0.014 \\ (129) 0.02 \\ (130) 0.02 \\ (131) 0.03 \\ (132) 0.03 \\ (132) 0.03 \\ (133) 0.034 \\ (134) 0.034 \\ (135) 0.03 \\ (136) 0.03 \\ (137) 0.03 \\$ |  | (163) 0.0284<br>(164) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(167) 0.0137<br>(168) 0.0137<br>(170) 0.0137<br>(171) 0.0137<br>(172) 0.0137   | (198) 0.0182<br>(2/1) 0.013<br>(272) 0.013<br>(273) 0.013<br>(274) 0.013<br>(274) 0.0137<br>(276) 0.0137<br>(277) 0.0135<br>(278) 0.0135<br>(279) 0.0135   | (289) 0.013<br>(290) 0.013<br>(291) 0.0213<br>(292) 0.0213<br>(293) 0.0135<br>(294) 0.0135<br>(295) 0.0135<br>(296) 0.0135<br>(297) 0.0135  | (367) 0.013<br>(369) 0.013<br>(309) 0.0135<br>(310) 0.0135<br>(311) 0.0135<br>(312) 0.0135<br>(314) 0.0135<br>(314) 0.0135<br>(315) 0.01354  | $\begin{array}{c} (325) & 0.0115 \\ (524) & 0.0105 \\ (527) & 0.013 \\ (328) & 0.013 \\ (329) & 0.0135 \\ (330) & 0.0135 \\ (331) & 0.013 \\ (332) & 0.013 \\ (332) & 0.0135 \end{array}$  | (343) 0.0135<br>(344) 0.0135<br>(344) 0.0135<br>(346) 0.0135<br>(347) 0.0135<br>(348) 0.0135<br>(348) 0.013<br>(350) 0.013<br>(351) 0.013  |
| 91) 0.01<br>92) 0.01<br>93) 0.01<br>93) 0.01<br>(95) 0.01<br>(95) 0.01<br>(95) 0.01<br>(97) 0.01<br>(97) 0.01<br>(99) 0.01<br>(100) 0.01<br>(101) 0.01  | (109) 0.01(110) 0.01(111) 0.01(112) 0.01(113) 0.01(113) 3E-3(114) 3E-3(115) 3E-3(116) 3E-3(117) 0.03(118) 0.03(119) 0.03(119) 0.03           | $(127) 0.014 \\ (128) 0.014 \\ (129) 0.02 \\ (130) 0.02 \\ (131) 0.03 \\ (132) 0.03 \\ (133) 0.034 \\ (134) 0.034 \\ (135) 0.03 \\ (136) 0.03 \\ (137) 0.03 \\ (137) 0.03 \\ (138) 0.03 \\$ |  | (163) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(167) 0.0137<br>(168) 0.0137<br>(169) 0.0137<br>(170) 0.0137<br>(171) 0.0137<br>(172) 0.0137<br>(173) 0.0137<br>(174) 0.0137<br>(175) 0.0137   | (198) 0.0182<br>(2/1) 0.013<br>(272) 0.013<br>(273) 0.013<br>(274) 0.013<br>(275) 0.0137<br>(276) 0.0137<br>(277) 0.0135<br>(278) 0.0135<br>(278) 0.0135<br>(290) 0.0135   | (289) 0.013<br>(290) 0.013<br>(291) 0.0213<br>(292) 0.0213<br>(293) 0.0135<br>(294) 0.0135<br>(295) 0.0135<br>(295) 0.0135<br>(297) 0.0135<br>(297) 0.0135  | $\begin{array}{c} (307) & 0.013 \\ (308) & 0.013 \\ (509) & 0.0135 \\ (310) & 0.0135 \\ (311) & 0.0135 \\ (312) & 0.0135 \\ (312) & 0.0135 \\ (314) & 0.01354 \\ (315) & 0.01354 \\ (316) & 0.01354 \end{array}$   | $\begin{array}{c} (325) & 0.0135 \\ (324) & 0.0135 \\ (327) & 0.013 \\ (328) & 0.013 \\ (329) & 0.0135 \\ (330) & 0.0135 \\ (331) & 0.0135 \\ (332) & 0.0135 \\ (332) & 0.0135 \\ (334) & 0.0135 \end{array}$  | (343) 0.0135<br>(344) 0.0135<br>(344) 0.0135<br>(346) 0.0135<br>(347) 0.0135<br>(348) 0.0135<br>(349) 0.013<br>(350) 0.013<br>(351) 0.013<br>(352) 0.013   |
| 91)       0.01         92)       0.01         93)       0.01         94)       0.01         (95)       0.01         (95)       0.01         (97)       0.01         (97)       0.01         (97)       0.01         (100)       0.01         (101)       0.01         (102)       0.01         (103)       0.01 | (109) 0.01(110) 0.01(111) 0.01(112) 0.01(113) 0.01(113) 3E-3(114) 3E-3(116) 3E-3(117) 0.03(118) 0.03(119) 0.03(119) 0.03(120) 0.04           | (127) 0.014<br>(128) 0.014<br>(129) 0.02<br>(130) 0.02<br>(131) 0.03<br>(132) 0.03<br>(133) 0.034<br>(134) 0.034<br>(135) 0.03<br>(136) 0.03<br>(137) 0.03<br>(139) 0.03  |  | (163) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(167) 0.0137<br>(168) 0.0137<br>(169) 0.0137<br>(170) 0.0137<br>(171) 0.0137<br>(172) 0.0137<br>(173) 0.0137<br>(174) 0.0137<br>(175) 0.0137   | (198) 0.0182<br>(2/1) 0.013<br>(272) 0.013<br>(273) 0.013<br>(274) 0.013<br>(274) 0.0137<br>(276) 0.0137<br>(277) 0.0135<br>(278) 0.0135<br>(278) 0.0135<br>(279) 0.0135<br>(280) 0.0135   | (289) 0.013<br>(290) 0.015<br>(291) 0.0213<br>(292) 0.0213<br>(293) 0.0135<br>(294) 0.0135<br>(294) 0.0135<br>(294) 0.0135<br>(296) 0.0135<br>(298) 0.0135<br>(298) 0.0135  | $\begin{array}{c} (307) & 0.013 \\ (308) & 0.013 \\ (309) & 0.0135 \\ (310) & 0.0135 \\ (311) & 0.0135 \\ (312) & 0.0135 \\ (313) & 0.0135 \\ (314) & 0.0135 \\ (315) & 0.01354 \\ (316) & 0.01354 \\ (317) & 0.0135 \end{array}$  | $\begin{array}{c} (325) & 0.0115 \\ (326) & 0.0105 \\ (326) & 0.013 \\ (329) & 0.013 \\ (329) & 0.0135 \\ (330) & 0.0135 \\ (331) & 0.013 \\ (332) & 0.013 \\ (332) & 0.013 \\ (3334) & 0.0135 \\ (334) & 0.013 \\ (335) & 0.013 \end{array}$  | (343) 0.0125<br>(344) 0.0135<br>(344) 0.0135<br>(345) 0.0125<br>(346) 0.0125<br>(348) 0.0135<br>(349) 0.0135<br>(349) 0.013<br>(350) 0.013<br>(351) 0.013<br>(352) 0.013   |
| 91) 0.01<br>92) 0.01<br>93) 0.01<br>94) 0.01<br>(95) 0.01<br>(95) 0.01<br>(95) 0.01<br>(97) 0.01<br>(97) 0.01<br>(100) 0.01<br>(100) 0.01<br>(101) 0.01<br>(103) 0.01   | (109) 0.01(110) 0.01(111) 0.01(112) 0.01(113) 0.01(113) 3E-3(114) 3E-3(116) 3E-3(117) 0.03(118) 0.03(119) 0.03(120) 0.03(121) 0.04(122) 0.04 | (127) 0.014<br>(128) 0.014<br>(129) 0.02<br>(130) 0.02<br>(131) 0.03<br>(132) 0.03<br>(133) 0.034<br>(134) 0.034<br>(135) 0.03<br>(135) 0.03<br>(137) 0.03<br>(138) 0.03<br>(139) 0.03<br>(139) 0.03<br>(140) 0.03  |  | (163) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(165) 0.0137<br>(168) 0.0137<br>(168) 0.0137<br>(170) 0.0137<br>(171) 0.0137<br>(172) 0.0137<br>(172) 0.0137<br>(174) 0.0137   | (198) 0.0182<br>(2/1) 0.013<br>(272) 0.013<br>(273) 0.013<br>(274) 0.013<br>(275) 0.0137<br>(276) 0.0137<br>(277) 0.0135<br>(278) 0.0135<br>(278) 0.0135<br>(290) 0.0135   | $\begin{array}{c} (289) & 0.013 \\ (290) & 0.015 \\ (291) & 0.0213 \\ (292) & 0.0213 \\ (293) & 0.0135 \\ (293) & 0.0135 \\ (294) & 0.0135 \\ (294) & 0.0135 \\ (296) & 0.0135 \\ (297) & 0.0135 \\ (299) & 0.0135 \\ (300) & 0.0135 \end{array}$   | $ \begin{array}{c} (307) & 0.013 \\ (308) & 0.013 \\ (509) & 0.0135 \\ (310) & 0.0135 \\ (311) & 0.0135 \\ (312) & 0.0135 \\ (312) & 0.0135 \\ (314) & 0.0135 \\ (315) & 0.01354 \\ (315) & 0.01354 \\ (316) & 0.0135 \\ (318) & 0.0135 \end{array} $  | $\begin{array}{c} (325) & 0.0115 \\ (526) & 0.0135 \\ (527) & 0.013 \\ (528) & 0.013 \\ (528) & 0.0135 \\ (330) & 0.0135 \\ (331) & 0.015 \\ (331) & 0.013 \\ (332) & 0.013 \\ (334) & 0.0135 \\ (334) & 0.013 \\ (336) & 0.013 \end{array}$   | (343) 0.0125<br>(344) 0.0125<br>(344) 0.0125<br>(345) 0.0125<br>(346) 0.0125<br>(347) 0.0125<br>(349) 0.013<br>(350) 0.013<br>(350) 0.013<br>(351) 0.013<br>(352) 0.013<br>(354) 0.013   |
| (91) 0.01<br>92) 0.01<br>93) 0.01<br>94) 0.01<br>(95) 0.01<br>(94) 0.01<br>(94) 0.01<br>(97) 0.01<br>(97) 0.01<br>(100) 0.01<br>(101) 0.01<br>(102) 0.01<br>(104) 0.01<br>(105) 0.01  |  | (127) 0.014<br>(128) 0.014<br>(129) 0.02<br>(130) 0.02<br>(131) 0.03<br>(132) 0.03<br>(133) 0.034<br>(135) 0.03<br>(136) 0.03<br>(137) 0.03<br>(139) 0.03<br>(139) 0.03<br>(140) 0.03<br>(141) 0.0137   |  | (163) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(167) 0.0137<br>(168) 0.0137<br>(170) 0.0137<br>(170) 0.0137<br>(171) 0.0137<br>(172) 0.0137<br>(173) 0.0137<br>(175) 0.0137<br>(176) 0.0137<br>(177) 0.0137   | (198) 0.0182<br>(2/1) 0.013<br>(272) 0.013<br>(273) 0.013<br>(274) 0.013<br>(274) 0.0137<br>(276) 0.0137<br>(277) 0.0135<br>(278) 0.0135<br>(278) 0.0135<br>(279) 0.0135<br>(280) 0.0135   | $\begin{array}{c} (289) & 0.013 \\ (290) & 0.013 \\ (290) & 0.0213 \\ (291) & 0.0213 \\ (293) & 0.0135 \\ (294) & 0.0135 \\ (294) & 0.0135 \\ (294) & 0.0135 \\ (294) & 0.0135 \\ (299) & 0.0135 \\ (299) & 0.0135 \\ (300) & 0.0135 \\ (301) & 0.0135 \end{array}$                                     | $ \begin{array}{c} (367) & 0.013 \\ (308) & 0.013 \\ (509) & 0.0135 \\ (310) & 0.0135 \\ (311) & 0.0135 \\ (312) & 0.0135 \\ (313) & 0.0135 \\ (314) & 0.0135 \\ (315) & 0.01354 \\ (516) & 0.01354 \\ (517) & 0.0135 \\ (318) & 0.0135 \\ (318) & 0.0135 \\ (319) & 0.0135 \\ \end{array} $   | $\begin{array}{c} (325) & 0.0113 \\ (526) & 0.0135 \\ (527) & 0.013 \\ (528) & 0.013 \\ (528) & 0.0135 \\ (330) & 0.0135 \\ (331) & 0.013 \\ (332) & 0.013 \\ (333) & 0.0135 \\ (334) & 0.0135 \\ (335) & 0.013 \\ (336) & 0.013 \\ (337) & 0.013 \end{array}$   | (343) 0.0125<br>(344) 0.0135<br>(344) 0.0125<br>(346) 0.0125<br>(347) 0.0125<br>(348) 0.0135<br>(349) 0.013<br>(350) 0.013<br>(351) 0.013<br>(352) 0.013<br>(353) 0.013<br>(354) 0.013   |
| 91) 0.01<br>92) 0.01<br>93) 0.01<br>94) 0.01<br>(95) 0.01<br>(95) 0.01<br>(95) 0.01<br>(97) 0.01<br>(97) 0.01<br>(100) 0.01<br>(100) 0.01<br>(101) 0.01<br>(103) 0.01   |  | (127) 0.014<br>(128) 0.014<br>(129) 0.02<br>(130) 0.02<br>(131) 0.03<br>(132) 0.03<br>(135) 0.034<br>(134) 0.034<br>(135) 0.03<br>(136) 0.03<br>(137) 0.03<br>(138) 0.03<br>(139) 0.03<br>(140) 0.0137<br>(142) 0.0137  |  | (163) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(167) 0.0137<br>(168) 0.0137<br>(169) 0.0137<br>(170) 0.0137<br>(171) 0.0137<br>(172) 0.0137<br>(173) 0.0137<br>(174) 0.0137<br>(176) 0.0137<br>(177) 0.0137                                 | (198) 0.0182<br>(2/1) 0.013<br>(272) 0.013<br>(272) 0.013<br>(273) 0.013<br>(274) 0.013<br>(274) 0.0137<br>(276) 0.0137<br>(277) 0.0135<br>(278) 0.0135<br>(279) 0.0135<br>(280) 0.0135<br>(282) 0.0135<br>(283) 0.0135                | $\begin{array}{c} (289) & 0.013 \\ (290) & 0.013 \\ (291) & 0.0213 \\ (292) & 0.0213 \\ (292) & 0.0213 \\ (293) & 0.0135 \\ (294) & 0.0135 \\ (294) & 0.0135 \\ (297) & 0.0135 \\ (297) & 0.0135 \\ (299) & 0.0135 \\ (301) & 0.0135 \\ (302) & 0.0135 \end{array}$                                     | $\begin{array}{c} (307) & 0.013 \\ (308) & 0.013 \\ (509) & 0.0135 \\ (310) & 0.0135 \\ (311) & 0.0135 \\ (312) & 0.0135 \\ (313) & 0.0135 \\ (314) & 0.0135 \\ (315) & 0.01354 \\ (316) & 0.01354 \\ (317) & 0.0135 \\ (318) & 0.0135 \\ (318) & 0.0135 \\ (320) & 0.0135 \\ (320) & 0.0135 \end{array}$  | $\begin{array}{c} (325) & 0.0115\\ (326) & 0.0105\\ (326) & 0.013\\ (328) & 0.013\\ (329) & 0.0135\\ (330) & 0.0135\\ (331) & 0.013\\ (332) & 0.013\\ (333) & 0.0135\\ (334) & 0.013\\ (334) & 0.013\\ (336) & 0.013\\ (337) & 0.013\\ (338) & 0.013\\ (338) & 0.013\\ \end{array}$  | (343) 0.0125<br>(344) 0.0135<br>(344) 0.0135<br>(345) 0.0125<br>(348) 0.0135<br>(348) 0.0135<br>(349) 0.013<br>(350) 0.013<br>(350) 0.013<br>(351) 0.013<br>(353) 0.013<br>(354) 0.013<br>(355) 0.013<br>(355) 0.013                                 |
| (91) 0.01<br>92) 0.01<br>93) 0.01<br>94) 0.01<br>(95) 0.01<br>(94) 0.01<br>(94) 0.01<br>(97) 0.01<br>(97) 0.01<br>(100) 0.01<br>(101) 0.01<br>(102) 0.01<br>(104) 0.01<br>(105) 0.01  |  | (127) 0.014<br>(128) 0.014<br>(129) 0.02<br>(130) 0.02<br>(131) 0.03<br>(132) 0.03<br>(133) 0.034<br>(134) 0.034<br>(135) 0.03<br>(136) 0.03<br>(137) 0.03<br>(138) 0.03<br>(139) 0.03<br>(140) 0.03<br>(141) 0.0137<br>(142) 0.0137  |  | (163) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(167) 0.0137<br>(168) 0.0137<br>(170) 0.0137<br>(170) 0.0137<br>(171) 0.0137<br>(172) 0.0137<br>(173) 0.0137<br>(175) 0.0137<br>(176) 0.0137<br>(177) 0.0137<br>(177) 0.0137<br>(179) 0.0137 | (198) 0.0182<br>(2/1) 0.013<br>(272) 0.013<br>(273) 0.013<br>(274) 0.013<br>(275) 0.0137<br>(276) 0.0137<br>(277) 0.0135<br>(278) 0.0135<br>(278) 0.0135<br>(280) 0.0135<br>(281) 0.0135<br>(282) 0.0135<br>(284) 0.0135               | $\begin{array}{c} (289) & 0.013 \\ (290) & 0.013 \\ (290) & 0.0213 \\ (291) & 0.0213 \\ (293) & 0.0135 \\ (294) & 0.0135 \\ (294) & 0.0135 \\ (294) & 0.0135 \\ (294) & 0.0135 \\ (299) & 0.0135 \\ (299) & 0.0135 \\ (300) & 0.0135 \\ (301) & 0.0135 \end{array}$                                     | $\begin{array}{c} (307) & 0.013 \\ (308) & 0.013 \\ (309) & 0.0135 \\ (310) & 0.0135 \\ (312) & 0.0135 \\ (312) & 0.0135 \\ (313) & 0.0135 \\ (313) & 0.0135 \\ (315) & 0.01354 \\ (316) & 0.01354 \\ (316) & 0.0135 \\ (318) & 0.0135 \\ (318) & 0.0135 \\ (319) & 0.0135 \\ (320) & 0.0135 \\ (321) & 0.0135 \end{array}$  | $\begin{array}{c} (325) & 0.0115 \\ (326) & 0.0135 \\ (326) & 0.0135 \\ (327) & 0.013 \\ (328) & 0.0135 \\ (330) & 0.0135 \\ (331) & 0.0135 \\ (332) & 0.0135 \\ (334) & 0.0135 \\ (334) & 0.0135 \\ (335) & 0.013 \\ (335) & 0.013 \\ (336) & 0.013 \\ (338) & 0.013 \\ (338) & 0.013 \\ (339) & 0.013 \\ (359) & 0.013 \\ \end{array}$ | (343) 0.0125<br>(344) 0.0135<br>(344) 0.0135<br>(345) 0.0125<br>(346) 0.0135<br>(348) 0.0135<br>(349) 0.0135<br>(350) 0.013<br>(350) 0.013<br>(352) 0.013<br>(353) 0.013<br>(355) 0.013<br>(355) 0.013<br>(355) 0.013                                |
| $\begin{array}{c} 91) & 0.01 \\ 92) & 0.01 \\ 93) & 0.01 \\ 93) & 0.01 \\ 94) & 0.01 \\ (95) & 0.01 \\ (95) & 0.01 \\ (96) & 0.01 \\ (97) & 0.01 \\ (97) & 0.01 \\ (100) & 0.01 \\ (101) & 0.01 \\ (102) & 0.01 \\ (103) & 0.01 \\ (104) & 0.01 \\ (105) & 0.01 \\ (106) & 0.01 \end{array}$                    |  | (127) 0.014<br>(128) 0.014<br>(129) 0.02<br>(130) 0.02<br>(131) 0.03<br>(132) 0.03<br>(135) 0.034<br>(134) 0.034<br>(135) 0.03<br>(136) 0.03<br>(137) 0.03<br>(138) 0.03<br>(139) 0.03<br>(140) 0.0137<br>(142) 0.0137  |  | (163) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(167) 0.0137<br>(168) 0.0137<br>(170) 0.0137<br>(170) 0.0137<br>(171) 0.0137<br>(172) 0.0137<br>(173) 0.0137<br>(174) 0.0137<br>(176) 0.0137<br>(177) 0.0137                                 | (198) 0.0182<br>(2/1) 0.013<br>(272) 0.013<br>(272) 0.013<br>(273) 0.013<br>(274) 0.013<br>(275) 0.0137<br>(276) 0.0137<br>(277) 0.0135<br>(278) 0.0135<br>(278) 0.0135<br>(280) 0.0135<br>(281) 0.0135<br>(283) 0.0135<br>(285) 0.013 | $\begin{array}{c} (289) & 0.013 \\ (290) & 0.013 \\ (291) & 0.0213 \\ (292) & 0.0213 \\ (292) & 0.0213 \\ (293) & 0.0135 \\ (294) & 0.0135 \\ (294) & 0.0135 \\ (296) & 0.0135 \\ (297) & 0.0135 \\ (299) & 0.0135 \\ (301) & 0.0135 \\ (302) & 0.0135 \end{array}$                                     | $ \begin{array}{c} (307) & 0.013 \\ (508) & 0.013 \\ (509) & 0.0135 \\ (310) & 0.0135 \\ (311) & 0.0135 \\ (312) & 0.0135 \\ (312) & 0.0135 \\ (313) & 0.0135 \\ (315) & 0.0135 \\ (315) & 0.0135 \\ (316) & 0.0135 \\ (318) & 0.0135 \\ (318) & 0.0135 \\ (320) & 0.0135 \\ (320) & 0.0135 \\ (321) & 0.0135 \\ (322) & 0.0135 \\ $ | $\begin{array}{c} (325) & 0.0115 \\ (326) & 0.0135 \\ (324) & 0.013 \\ (328) & 0.013 \\ (329) & 0.0135 \\ (330) & 0.0135 \\ (331) & 0.013 \\ (332) & 0.013 \\ (332) & 0.013 \\ (334) & 0.013 \\ (334) & 0.013 \\ (336) & 0.013 \\ (337) & 0.013 \\ (338) & 0.013 \\ (339) & 0.013 \\ (340) & 0.013 \\ \end{array}$                       | (343) 0.0125<br>(344) 0.0135<br>(344) 0.0135<br>(345) 0.0125<br>(346) 0.0125<br>(347) 0.0125<br>(349) 0.013<br>(350) 0.013<br>(351) 0.013<br>(352) 0.013<br>(355) 0.013<br>(355) 0.013<br>(355) 0.013<br>(355) 0.013<br>(357) 0.0213<br>(358) 0.0213 |
| $\begin{array}{c} 91) \ 0.01 \\ 92) \ 0.01 \\ 93) \ 0.01 \\ 93) \ 0.01 \\ 94) \ 0.01 \\ (95) \ 0.01 \\ (95) \ 0.01 \\ (97) \ 0.01 \\ (97) \ 0.01 \\ (100) \ 0.01 \\ (100) \ 0.01 \\ (101) \ 0.01 \\ (103) \ 0.01 \\ (104) \ 0.01 \\ (105) \ 0.01 \\ (107) \ 0.01 \end{array}$                                   |  | (127) 0.014<br>(128) 0.014<br>(129) 0.02<br>(130) 0.02<br>(131) 0.03<br>(132) 0.03<br>(133) 0.034<br>(134) 0.034<br>(135) 0.03<br>(136) 0.03<br>(137) 0.03<br>(138) 0.03<br>(139) 0.03<br>(140) 0.03<br>(141) 0.0137<br>(142) 0.0137  |  | (163) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(165) 0.0284<br>(167) 0.0137<br>(168) 0.0137<br>(170) 0.0137<br>(170) 0.0137<br>(171) 0.0137<br>(172) 0.0137<br>(173) 0.0137<br>(175) 0.0137<br>(176) 0.0137<br>(177) 0.0137<br>(179) 0.0137                 | (198) 0.0182<br>(2/1) 0.013<br>(272) 0.013<br>(273) 0.013<br>(274) 0.013<br>(275) 0.0137<br>(276) 0.0137<br>(277) 0.0135<br>(278) 0.0135<br>(278) 0.0135<br>(280) 0.0135<br>(281) 0.0135<br>(282) 0.0135<br>(284) 0.0135               | $\begin{array}{c} (289) & 0.013 \\ (290) & 0.015 \\ (291) & 0.0213 \\ (292) & 0.0213 \\ (293) & 0.0135 \\ (293) & 0.0135 \\ (294) & 0.0135 \\ (294) & 0.0135 \\ (294) & 0.0135 \\ (294) & 0.0135 \\ (299) & 0.0135 \\ (300) & 0.0135 \\ (302) & 0.0135 \\ (302) & 0.0135 \\ (303) & 0.0135 \end{array}$ | $\begin{array}{c} (307) & 0.013 \\ (308) & 0.013 \\ (309) & 0.0135 \\ (310) & 0.0135 \\ (312) & 0.0135 \\ (312) & 0.0135 \\ (313) & 0.0135 \\ (313) & 0.0135 \\ (315) & 0.01354 \\ (316) & 0.01354 \\ (316) & 0.0135 \\ (318) & 0.0135 \\ (318) & 0.0135 \\ (319) & 0.0135 \\ (320) & 0.0135 \\ (321) & 0.0135 \end{array}$  | $\begin{array}{c} (325) & 0.0115 \\ (326) & 0.0135 \\ (326) & 0.0135 \\ (327) & 0.013 \\ (328) & 0.0135 \\ (330) & 0.0135 \\ (331) & 0.0135 \\ (332) & 0.0135 \\ (334) & 0.0135 \\ (334) & 0.0135 \\ (335) & 0.013 \\ (335) & 0.013 \\ (336) & 0.013 \\ (338) & 0.013 \\ (338) & 0.013 \\ (339) & 0.013 \\ (359) & 0.013 \\ \end{array}$ | (343) 0.0125<br>(344) 0.0135<br>(344) 0.0135<br>(345) 0.0125<br>(346) 0.0135<br>(348) 0.0135<br>(349) 0.0135<br>(350) 0.013<br>(350) 0.013<br>(352) 0.013<br>(353) 0.013<br>(355) 0.013<br>(355) 0.013<br>(355) 0.013                                |

River discharge data at 12-hourly intervals for Station: WSTW Period : 1

 $\sim \sim \sim$ 

Phosphorus transport Berg River

ţ

;

TR 143 March 1989

|             |               |            |              | ( 80) 0.04<br>( 81) 0.04<br>( 82) 0.04<br>( 83) 0.04<br>( 84) 0.04<br>( 85) 0.04<br>( 85) 0.04<br>( 87) 0.04<br>( 87) 0.04<br>( 89) 0.04<br>( 89) 0.04<br>( 90) 0.04 |              |                              | (224) 0.0342<br>(225) 0.0466<br>(226) 0.0466<br>(227) 0.0402<br>(228) 0.0402<br>(229) 0.0342<br>(230) 0.0342<br>(231) 0.0342<br>(232) 0.0342<br>(235) 0.0284<br>(234) 0.0284 |                              |                              |    |
|-------------|---------------|------------|--------------|--|--------------|------------------------------|--|------------------------------|------------------------------|----|
| ( 91) 0.04  | (109) 0.04    | (127) 0.04 | (145) 0.04   | (155) 0.0524   | (271) 0.046b | (289) 0.0184                 | (207) 0.0182<br>(308) 0.0182   | (325) 0.0232<br>(326) 0.0232 | (343) 0.0182<br>(344) 0.0182 |    |
| ( 92) 0.04  | (110) 0.04    | (128) 0.04 | (146) 0.04   | (154) 0.0534   | (2/2) 0.0466 | (270) 0.0184                 | (309) 0.0232   | (328) 0.0232                 | (345) 0.0182                 | A3 |
| (93) 0.04   | (111) 0.04    | (129) 0.04 | (147) 0.04   | (165) 0.0534   | (275) 0.0604 | (291) 0.0182<br>(292) 0.0182 | (310) 0.0232   | (328) 0.0232                 | (346) 0.0182                 | •  |
| ( 94) 0.04  | (112) 0.04    | (130) 0.04 | (148) 0.04   | (166) 0.0534   | (274) 0.0604 |                              | (311) 0.0232   | (529) 0.0232                 | (347) 0.0182                 |    |
| ( 95) 0.045 | (113) 0.04    | (131) 0.04 | (149) 0.04   | (157) 0.0342   | (275) 0.0342 | (293) 0.0284<br>(293) 0.0284 | (312) 0.0202   | (330) 0.0232                 | (348) 0.0182                 |    |
| ( 96) 0.045 | (114) 0.04    | (132) 0.04 | (150) 0.04   | (158) 0.0342   | (275) 0.0342 | (294) 0.0284                 | (313) 0.0232   | (331) 0.0232                 | (349) 9.7E-3                 |    |
| ( 97) 0.04  | (115) 0.04    | (133) 0.04 | (151) 0.04   | (169) 0.0342   | (277) 0.0342 | (295) 9.7E-3                 | (314) 0.0232   | (332) 0.0232                 | (350) 9.7E-3                 |    |
| ( 98) 0.04  | (115) 0.04    | (134) 0.04 | • (152) 0.04 | (170) 0.0342   | (278) 0.0342 | (296) 9.7E-3                 | (315) 0.0232   | (333) 0.0182                 | (351) 0.0182                 |    |
| ( 99) 0.04  | (117) 0.045   | (135) 0.04 | (153) 0.0402 | (171) 0.0284   | (279) 0.0342 | (297) 0.0284                 | (316) 0.0232   | (334) 0.0182                 | (352) 0.0182                 |    |
| (100) 0.04  | (118) 0.045   | (136) 0.04 | (154) 0.0402 | (172) 0.0284   | (280) 0.0342 | (298) 0.0284<br>(299) 0.0284 | (313) 0.0182<br>(317) 0.0182   | (335) 0.0182                 | (353) 0.0182                 |    |
| (101) 0.05  | (119) 0.045   | (137) 0.04 | (155) 0.0402 | (173) 0.0284   | (281) 0.0342 |                              | (318) 0.0182   | (336) 0.0182                 | (354) 0.0182                 |    |
| (102) 0.05  | (120) 0.045   | (138) 0.04 | (156) 0.0402 | (174) 0.0284   | (282) 0.0342 | (300) 0.0284                 | (314) 0.0182   | (337) 0.0137                 | (355) 0.0182                 |    |
| (103) 0.05  | (121) 0.045   | (139) 0.04 | (137) 0.0466 | (175) 0.0284   | (283) 0.0182 | (301) 0.0284<br>(700) 0.0284 | (320) 0,0182   | (338) 0.0137                 | (355) 0.0182                 |    |
| (104) 0.05  | (122) 0.045   | (140) 0.04 | (158) Ŭ.Ū466 | (176) 0.0284   | (284) 0.0182 | (302) 0.0284                 | (321) 0.0232   | (739) 0.0137                 | (357) 0.0232                 |    |
| (105) 0.05  | (123) 0.045   | (141) 0.04 | (159) 0.0534 | (177) 0.028  | (285) 0.0284 | (303) 0.0284                 | (322) 0.0232   | (340) 0.0137                 | (358) 0.0232                 |    |
| (106) 0.05  | (124) 0.045   | (142) 0.04 | (160) 0.0534 | (178) 0.028  | (286) 0.0284 | (304) 0.0284                 | (323) 0.0232<br>(323) 0.0232   | (341) 0.0137                 | (359) 0.0232                 |    |
| (107) 0.04  | (125) 0.0466  | (143) 0.04 | (161) 0.0534 | (179) 0.028  | (287) 0.0232 | (305) 0.0284                 | (324) 0.0232   | (342) 0.0137                 | (360) 0.0232                 |    |
| (108) 0.04  | (126) 0.0466  | (144) 0.04 | (142) 0.0534 | (180) 0.028  | (288) 0.0232 | (305) 0.0284                 | (324) 0.0232   |                              |                              |    |
| (100) 0.04  | (2007 000 000 |            |              |  |              |                              |  |                              |                              |    |

( 73) 0.04

( 74) 0.04

( 75) 0.04

( 76) 0.04

( 77) 0.04

( 78) 0.04

( 79) 0.04

(55)0.04

( 55) 0.04

( 57) 0.04

( 58) 0.04

( 59) 0.04

( 60) 0.04

( 61) 0.054

River discharge data at 12-hourly intervals for Station: WSTW

(length = 360)

\_\_\_\_\_

( 37) 0.04

( 38) 0.04

( 39) 0.04

( 40) 0.04

( 41) 0.04

( 42) 0.04

( 43) 0.04

Period : 2

Variable: WSTWU2.wstwq12\_2

( 1) 0.04

( 2) 0.04

( 3) 0.04

( 4) 0.04

( 5) 0.04

( 6) 0.04

( 7) 0.04

\_\_\_\_

( 19) 0.04

( 20) 0.04

( 21) 0.04

( 22) 0.04

( 23) 0.041

( 24) 0.041

( 25) 0,04

(253) 0.0284

(254) 0.0284

(255) 0.0284

(256) 0.0284

(257) 0.0284

(258) 0.0284

(259) 0.0232

(260) 0.0232

(235) 0.0284

(236) 0.0284

(237) 0.0342

(238) 0.0342

(239) 0.0342

(240) 0.0342

(241) 0.0342

(042) 0.0342

(217) 0,0402

(218) 0.0402

(219) 0.0534

(220) 0.0534

(221) 0.0466

(222) 0.0465

(223) 0.0342

(224) 0.0342

(199) 0.0284

(200) 0.0284

(201) 0.0284

(202) 0.0284

(203) 0.0232

(204) 0.0232

(205) 0.0232

(206) 0.0232

(181) 0.028

(182) 0.028

(183) 0.023

(184) 0.023

(185) 0.023

(196) 0.023

(187) 0.023

| 1) 0.0137  | ( 19) 0.0232   | ( 37) 0.0182   | ( 55) 0.0182   | ( 73) 0.0182   | (181) 0.0182   | (199) 0.0137  | (217) 0.0232<br>(219) 0.0232  | (235) 0.0342<br>(236) 0.0342   | (253) 0.0137<br>(254) 0.0137  |
|--|--|--|--|--|--|---|---|--|---|
| 2) 0.0137  | (20) 0.0232  | ( 38) 0.0182   | ( 56) 0.0182   | ( 74) 0.0182   |  | (200) 0.0137  | (219) 0.0252<br>(219) 0.0182  | (237) 0.0284   | (255) 9.78-3  |
| 3) 0.0137  | (21) 0.0232  | ( 39) 0.0182   | ( 57) 0.0182   | ( 75) 0.0182   | (183) 0.0182   | (201) 0.0137  | (219) 0.0182<br>(220) 0.0182  | (238) 0.0284   | (256) 9.7E-3  |
| 4) 0.0137  | (22) 0.0232  | ( 40) 0.0182   | ( 58) 0.0182   | ( 76) 0.0182   | (184) 0.0182   | (202) 0.0137  | (221) 0.0132<br>(221) 0.0137  | (239) 0.02184  | (257) 1E-3  |
| 5) 0.0182  | (23) 0.0137  | (41) 0.0182  | ( 59) 0.0284   | ( 77) 0.0137   | (185) 0.0182   | (203) 0.0137  | (221) 0.0157<br>(222) 0.0157  | (240) 0.02184  | (258) 1E-3  |
| 6) 0.0182  | (24) 0.0137  | ( 42) 0.0182   | ( 60) 0.0284   | ( 78) 0.0137   | (186) 0.0182   | (204) 0.0107  | (222) 0.0137<br>(223) 0.0232  | (241) 0.0402   | (259) 16-3  |
|  | ( 25) 9.7E-3   | (43) 0.0137  | ( 61) 0.0284   | ( 79) 9.7E-3   | (187) 9.7E-3   | (205) 0.0182  | (223) 0.0232<br>(224) 0.0232  | (242) 0.0402   | (260) 1E-3  |
| 7) 6.2E-3<br>8) 6.2E-3   | (26) 9.7E-3  | (44) 0.0137  | ( 62) 0.0284   | ( 80) 9.7E-3   | (188) 9.7E-3   | (206) 0.0182  | (224) 0.0132<br>(225) 0.0132  | (243) 0.0284   | (261) 1E~3  |
| 9) 0.0137  | (27) 0.0182  | ( 45) 0.0137   | (63) 0.0402  | ( 81) 0.0137   | (189) S.2E-3   | (207) 0.0402  | (225) 0.0132<br>(226) 0.0182  | (244) 0.0284   | (262) 1E-3  |
| 10) 0.0137   | (29) 0.0182  | (46) 0.0137  | ( 64) 0.0402   | ( 82) 0.0137   | (190) 6.2E-3   | (208) 0.0402  | (227) 0.0182<br>(227) 0.0232  | (245) 0.0232   | (263) 18-3  |
| 11) 0.0192   | (29) 0.0232  | (47) 6.2E-3  | ( 65) 0.0284   | ( H3) 0.0137   | (191) 3.3E-3   | (209) 0.0342  |   | (246) 0.0232   | (264) 1E-3  |
| 12) 0.0182   | ( 30) 0.0232   | (48) 6.2E-3  | ( 66) 0.0284   | ( 84) 0.0137   | (192) 3.3E-3   | (210) 0.0342  | (228) 0.0232  | (247) 0.0232   | (265) 1E-3  |
| 13) 0.0182   | ( 31) 0.0294   | ( 49) 6.2E-3   | ( 67) 0.0222   | ( 85) 0.0182   | (193) 0.0182   | (211) 0.0284  | (229) 0.0182  | (248) 0.0232   | (266) 1E-J  |
| 14) 0.0182   | ( 32) 0.0284   | ( 50) 6.2E-3   | ( 68) 0,0222   | ( 86) 0.0182   | (194) 0.0182   | (212) 0.0284  | (230) 0.0182  | (248) 0.0202 (249) 0.0182  | (267) 1E-3  |
| 15).0.0202   | ( 33) 0.0284   | ( 51) 9.7E-3   | ( 69) 0.0182   | ( 87) 0.0232   | (195) 0.0182   | (213) 0.0284  | (231) 0.0182  | (250) 0.0182   | (268) 18-3  |
| 16) 0.0232   | ( 34) 0.0284   | ( 52) 9.7E-3   | ( 70) 0.0182   | 1 88) 0.0232   | (196) 0,0182   | (214) 0.0284  | (202) 0,0182  | (251) 0.0137   | (269) 1E-3  |
| 17) 0.0232   | ( 35) 0.0232   | ( 53) 0.0137   | ( 71) 0.0182   | ( 87) 0.0182   | (197) 0.0182   | (215) 0.0232  | (233) 0,0342  | (252) 0.0137   | (270) 1E-3  |
| 101 0 0070   | 1 743 0 0232   | ( 54) 0.0137   | (72) 0.0182  | ( 90) 0.0182   | (198) Q.0182   | (216) 0.0232  | (234) 0.0342  | (232) 0.0157   |   |
|  |  |  |  |  | . –  |   |   |  |   |
|  |  |  |  |  |  | (789) () ()(80)   | (307) 0.0182  | (325) 0.0182   | (344) 0.018.  |
|  | (109) <b>9.7E-</b> 3   | (127) 0.0137   | (145) 0.0182   | (163) 0.0104   | (271) 3.3E-3   | (289) 0.0182  | (307) 0.0182  | (325) 0.0182<br>(326) 0.0182   | (343) 0.0182<br>(344) 0.0183  |
| 91) 0.0182   | (109) 9.7E-3<br>(110) 9.7E-3   | (127) 0.0137<br>(128) 0.0137   | (145) 0.0182<br>(146) 0.0182   | (183) 0.0182<br>(184) 0.0182   | (271) 3.3 <b>E~3</b><br>(272) 3.3 <b>E</b> ~3  | (289) 0.0182<br>(290) 0.0182  | (307) 0.0182<br>(308) 0.0182  | (325) 0.0182   | (343) 0.0182<br>(344) 0.0182<br>(345) 0.0182  |
| 91) 0.0182<br>92) 0.0182   | (109) 9.7E-3<br>(110) 9.7E-3<br>(111) 0.0137   | (127) 0.0137<br>(128) 0.0137<br>(129) 6.2E-3   | (145) 0.0182<br>(146) 0.0182<br>(147) 9.7E+3   | (183) 0.0182<br>(184) 0.0182<br>(185) 0.0137   | (271) 3.3 <b>E-3</b><br>(272) 3.3 <b>E-</b> 3<br>(273) 0.0137  | (289) 0.0182<br>(290) 0.0182<br>(291) 0.0182  | (307) 0.0182  | (325) 0.0182<br>(326) 0.0182<br>(327) 0.0232<br>(328) 0.0232   | (343) 0.0182<br>(344) 0.0182<br>(348) 0.0182<br>(346) 0.0182  |
| 91) 0.0182<br>92) 0.0182<br>93) 9.7E~3   | (109) 9.7E-3<br>(110) 9.7E-3<br>(111) 0.0137<br>(112) 0.0137   | (127) 0.0137<br>(128) 0.0137<br>(129) 6.2E-3<br>(130) 6.2E-3   | (145) 0.0182<br>(146) 0.0182<br>(147) 9.7E-3<br>(148) 9.7E-3   | (153) 0.0182<br>(154) 0.0182<br>(155) 0.0137<br>(155) 0.0137   | (271) 3.3E-3<br>(272) 3.3E-3<br>(273) 0.0137<br>(274) 0.0137   | (289) 0.0182<br>(290) 0.0182<br>(291) 0.0182<br>(291) 0.0182<br>(292) 0.0182  | (307) 0.0182<br>(308) 0.0182<br>(309) 0.0342  | (325) 0.0182<br>(326) 0.0182<br>(327) 0.0232<br>(328) 0.0232<br>(328) 0.0232<br>(329) 0.0182   | (342) 0.013.<br>(344) 0.0182<br>(345) 0.0182<br>(346) 0.0182<br>(346) 0.0182<br>(347) 0.0182  |
| 91) 0.0182<br>92) 0.0182<br>93) 9.78~3<br>94) 9.76~3<br>95) 6.26~3   | (109) 9.7E-3<br>(110) 9.7E-3<br>(111) 0.0137<br>(112) 0.0137<br>(112) 0.0137<br>(113) 0.0232   | (127) 0.0137<br>(128) 0.0137<br>(129) 6.2E-3<br>(130) 6.2E-3<br>(131) 6.2E-3   | (145) 0.0182<br>(146) 0.0182<br>(147) 9.7E-3<br>(148) 9.7E-3<br>(149) 9.7E-3   | (163) 0.0162<br>(164) 0.0182<br>(165) 0.0137<br>(166) 0.0137<br>(167) 0.0182   | (271) 3.3E-3<br>(272) 3.3E-3<br>(273) 0.0137<br>(274) 0.0137<br>(275) 0.0137   | (289) 0.0182<br>(290) 0.0182<br>(291) 0.0182<br>(292) 0.0182<br>(293) 0.0182  | (307) 0.0182<br>(308) 0.0182<br>(309) 0.0342<br>(310) 0.0342  | (325) 0.0182<br>(326) 0.0182<br>(327) 0.0232<br>(328) 0.0232<br>(329) 0.0182<br>(330) 0.0182   | $\begin{array}{c} (143) & 0.0133 \\ (344) & 0.0183 \\ (345) & 0.0183 \\ (346) & 0.0183 \\ (346) & 0.0183 \\ (347) & 0.0183 \\ (348) & 0.0183 \end{array}$   |
| 91) 0.0182<br>92) 0.0182<br>93) 9.7E~3<br>94) 9.7E~3<br>95) 6.2E~3   | (109) 9.7E-3<br>(110) 9.7E-3<br>(111) 0.0137<br>(112) 0.0137<br>(113) 0.0232<br>(114) 0.0232   | (127) 0.0137<br>(128) 0.0137<br>(129) 6.2E-3<br>(130) 6.2E-3<br>(131) 6.2E-3<br>(132) 6.2E-3   | (145) 0.0182<br>(144) 0.0182<br>(147) 9.7E-3<br>(148) 9.7E-3<br>(149) 9.7E-3<br>(150) 9.7E-3   | (163) 0.0182<br>(164) 0.0182<br>(165) 0.0137<br>(166) 0.0137<br>(167) 0.0182<br>(169) 0.0182   | (271) 3.3E-3<br>(272) 3.3E-3<br>(275) 0.0137<br>(274) 0.0137<br>(275) 0.0137<br>(276) 0.0137   | (289) 0.0182<br>(290) 0.0182<br>(291) 0.0182<br>(292) 0.0182<br>(292) 0.0182<br>(293) 0.0182<br>(294) 0.0182  | $\begin{array}{c} (307) & 0.0182 \\ (308) & 0.0182 \\ (309) & 0.0342 \\ (310) & 0.0342 \\ (311) & 0.0402 \end{array}$   | (325) 0.0182<br>(326) 0.0182<br>(327) 0.0232<br>(328) 0.0232<br>(329) 0.0182<br>(330) 0.0182<br>(331) 0.0182   | $\begin{array}{c} (143) & 0.013, \\ (344) & 0.0183, \\ (345) & 0.0183, \\ (346) & 0.0183, \\ (346) & 0.0183, \\ (347) & 0.0183, \\ (348) & 0.0183, \\ (349) & 0.0183, \\ \end{array}$   |
| 91) 0.0182<br>92) 0.0182<br>93) 9.7E~3<br>94) 9.7E~3<br>95) 6.2E~3<br>96) 6.2E~3   | (109) 9.7E-3<br>(110) 9.7E-3<br>(111) 0.0137<br>(112) 0.0137<br>(113) 0.0232<br>(114) 0.0232<br>(115) 0.0232   | (127) 0.0137<br>(128) 0.0137<br>(129) 6.2E-3<br>(130) 6.2E-3<br>(131) 6.2E-3<br>(132) 6.2E-3<br>(132) 6.2E-3<br>(133) 3.3E-3   | (145) 0.0182<br>(144) 0.0182<br>(147) 9.7E-3<br>(148) 9.7E-3<br>(150) 9.7E-3<br>(150) 9.7E-3   | (163) 0.0182<br>(164) 0.0182<br>(155) 0.0137<br>(166) 0.0137<br>(167) 0.0182<br>(169) 0.0182<br>(169) 0.0232   | (271) 3.3E-3<br>(272) 3.3E-3<br>(275) 0.0137<br>(274) 0.0137<br>(276) 0.0137<br>(276) 0.0137<br>(277) 0.0182   | (289) 0.0182<br>(290) 0.0162<br>(291) 0.0182<br>(292) 0.0182<br>(293) 0.0182<br>(293) 0.0182<br>(294) 0.0182  | $\begin{array}{c} (307) & 0.0182 \\ (308) & 0.0182 \\ (709) & 0.0342 \\ (710) & 0.0342 \\ (311) & 0.0402 \\ (312) & 0.0402 \end{array}$   | $\begin{array}{c} (325) & 0.0182 \\ (326) & 0.0182 \\ (327) & 0.0232 \\ (328) & 0.0232 \\ (329) & 0.0182 \\ (330) & 0.0182 \\ (331) & 0.0182 \\ (332) & 0.0182 \end{array}$  | $\begin{array}{c} (143) & 0.0183 \\ (344) & 0.0183 \\ (345) & 0.0183 \\ (346) & 0.0183 \\ (347) & 0.0183 \\ (347) & 0.0183 \\ (348) & 0.0183 \\ (349) & 0.0183 \\ (350) & 0.0153 \end{array}$   |
| 91) 0.0182<br>92) 0.0182<br>93) 9.7E-3<br>94) 9.7E-3<br>95) 6.2E-3<br>96) 6.2E-3<br>97) 0.0137<br>98) 0.0137   | $      \begin{array}{l} (109) \ 9.7E-3 \\ (110) \ 9.7E-3 \\ (111) \ 0.0137 \\ (112) \ 0.0137 \\ (112) \ 0.0137 \\ (113) \ 0.0232 \\ (114) \ 0.0232 \\ (115) \ 0.0232 \\ (116) \ 0.0232 \end{array} $                         | (127) 0.0137<br>(128) 0.0137<br>(129) 6.2E-3<br>(130) 6.2E-3<br>(131) 6.2E-3<br>(131) 6.2E-3<br>(132) 6.2E-3<br>(132) 6.2E-3<br>(133) 3.3E-3<br>(134) 3.3E-3   | (145) 0.0182<br>(146) 0.0182<br>(147) 9.7E-3<br>(148) 9.7E-3<br>(149) 9.7E-3<br>(150) 9.7E-3<br>(151) 9.7E-3<br>(152) 9.7E-3   | (163) 0.0182<br>(164) 0.0182<br>(155) 0.0137<br>(166) 0.0137<br>(167) 0.0182<br>(169) 0.0182<br>(169) 0.0232<br>(170) 0.0232   | (271) 3.3E-3<br>(272) 3.3E-3<br>(273) 0.0137<br>(274) 0.0137<br>(275) 0.0137<br>(276) 0.0137<br>(277) 0.0182<br>(278) 0.0182   | (289) 0.0182<br>(290) 0.0182<br>(291) 0.0182<br>(292) 0.0182<br>(292) 0.0182<br>(293) 0.0182<br>(294) 0.0182<br>(295) 0.0182  | $\begin{array}{c} (307) & 0.0182 \\ (308) & 0.0182 \\ (309) & 0.0342 \\ (310) & 0.0342 \\ (311) & 0.0402 \\ (312) & 0.0402 \\ (312) & 0.0462 \\ (513) & 0.0342 \end{array}$   | $\begin{array}{c} (325) & 0.0182 \\ (326) & 0.0182 \\ (327) & 0.0232 \\ (328) & 0.0232 \\ (329) & 0.0182 \\ (330) & 0.0182 \\ (331) & 0.0182 \\ (332) & 0.0182 \\ (332) & 0.0182 \\ (333) & 0.0182 \end{array}$  | $\begin{array}{c} (143) & 0.013, \\ (344) & 0.018, \\ (345) & 0.018, \\ (346) & 0.018, \\ (347) & 0.018, \\ (348) & 0.018, \\ (348) & 0.018, \\ (349) & 0.018, \\ (350) & 0.013, \\ (351) & 0.013, \end{array}$   |
| 91) 0.0182<br>92) 0.0182<br>93) 9.7E-3<br>94) 9.7E-3<br>95) 6.2E-3<br>96) 6.2E-3<br>97) 0.0137<br>98) 0.0137<br>99) 0.0232   | (109) 9.7E-3<br>(110) 9.7E-3<br>(111) 0.0137<br>(112) 0.0137<br>(113) 0.0232<br>(114) 0.0232<br>(114) 0.0232<br>(115) 0.0232<br>(116) 0.0232<br>(116) 0.7E-3   | (127) 0.0137<br>(128) 0.0137<br>(129) 6.2E-3<br>(130) 6.2E-3<br>(131) 6.2E-3<br>(132) 6.2E-3<br>(132) 6.2E-3<br>(133) 3.3E-3<br>(134) 3.3E-3<br>(135) 1.1E-3   | (145) 0.0182<br>(146) 0.0182<br>(147) 9.7E-3<br>(148) 9.7E-3<br>(149) 9.7E-3<br>(150) 9.7E-3<br>(151) 9.7E-3<br>(152) 9.7E-3<br>(153) 0.0182   | (183) 0.0182<br>(185) 0.0182<br>(185) 0.0137<br>(166) 0.0137<br>(167) 0.0182<br>(168) 0.0182<br>(169) 0.0232<br>(170) 0.0232<br>(171) 0.0182   | (271) 3.3E-3<br>(272) 3.3E-3<br>(273) 0.0137<br>(274) 0.0137<br>(275) 0.0137<br>(276) 0.0137<br>(277) 0.0182<br>(278) 0.0182<br>(278) 0.0232   | (289) 0.0182<br>(290) 0.0182<br>(291) 0.0182<br>(292) 0.0182<br>(293) 0.0182<br>(293) 0.0182<br>(294) 0.0182<br>(295) 0.0182<br>(296) 0.0182  | $\begin{array}{c} (307) & 0.0182 \\ (308) & 0.0182 \\ (309) & 0.0342 \\ (310) & 0.0342 \\ (311) & 0.0402 \\ (312) & 0.0402 \\ (312) & 0.0342 \\ (313) & 0.0342 \\ (314) & 0.0284 \\ (316) & 0.0284 \end{array}$   | $\begin{array}{c} (325) & 0.0182 \\ (326) & 0.0182 \\ (327) & 0.0232 \\ (328) & 0.0232 \\ (329) & 0.0182 \\ (330) & 0.0182 \\ (331) & 0.0182 \\ (332) & 0.0182 \\ (332) & 0.0182 \\ (334) & 0.0182 \end{array}$  | $\begin{array}{c} (143) & 0.013, \\ (344) & 0.018, \\ (345) & 0.018, \\ (346) & 0.018, \\ (347) & 0.018, \\ (348) & 0.018, \\ (348) & 0.018, \\ (359) & 0.015, \\ (350) & 0.015, \\ (351) & 0.013, \\ (352) & 0.013, \\ \end{array}$  |
| 91) 0.0182<br>92) 0.0182<br>93) 9.7E-3<br>94) 9.7E-3<br>95) 6.2E-3<br>96) 6.2E-3<br>97) 0.0137<br>98) 0.0137<br>98) 0.0232   | (109) 9.7E-3<br>(110) 9.7E-3<br>(111) 0.0137<br>(112) 0.0137<br>(113) 0.0232<br>(114) 0.0232<br>(114) 0.0232<br>(115) 0.0232<br>(116) 0.0232<br>(116) 0.0232<br>(117) 9.7E-3<br>(118) 9.7E-3                                 | (127) 0.0137<br>(128) 0.0137<br>(129) 6.2E-3<br>(130) 6.2E-3<br>(131) 6.2E-3<br>(132) 6.2E-3<br>(132) 6.2E-3<br>(133) 3.3E-3<br>(134) 3.3E-3<br>(135) 1.1E-3<br>(136) 1.1E-3   | (145) 0.0182<br>(146) 0.0182<br>(147) 9.72-3<br>(148) 9.72-3<br>(149) 9.72-3<br>(150) 9.72-3<br>(151) 9.72-3<br>(152) 9.72-3<br>(153) 0.0182<br>(154) 0.0182   | (183) 0.0182<br>(185) 0.0182<br>(185) 0.0137<br>(186) 0.0137<br>(186) 0.0182<br>(188) 0.0182<br>(189) 0.0232<br>(170) 0.0232<br>(171) 0.0182<br>(172) 0.0182   | (271) 3.3E-3<br>(272) 3.3E-3<br>(272) 0.0137<br>(274) 0.0137<br>(274) 0.0137<br>(276) 0.0137<br>(277) 0.0182<br>(278) 0.0182<br>(279) 0.0232<br>(280) 0.0232   | (289) 0.0182<br>(290) 0.0182<br>(291) 0.0182<br>(292) 0.0182<br>(293) 0.0182<br>(293) 0.0182<br>(294) 0.0182<br>(295) 0.0182<br>(296) 0.0182<br>(298) 0.0182  | $\begin{array}{c} (307) & 0.0182 \\ (308) & 0.0182 \\ (309) & 0.0342 \\ (510) & 0.0342 \\ (511) & 0.0402 \\ (512) & 0.0402 \\ (513) & 0.0342 \\ (314) & 0.0342 \\ (314) & 0.0342 \\ (315) & 0.0284 \\ (316) & 0.0284 \\ (317) & 0.0232 \end{array}$   | $\begin{array}{c} (325) & 0.0182 \\ (326) & 0.0182 \\ (327) & 0.0232 \\ (328) & 0.0232 \\ (329) & 0.0182 \\ (330) & 0.0182 \\ (331) & 0.0182 \\ (332) & 0.0182 \\ (332) & 0.0182 \\ (334) & 0.0182 \\ (335) & 0.0182 \end{array}$  | $\begin{array}{c} (143) 0.013, \\ (344) 0.0183, \\ (345) 0.0183, \\ (346) 0.0183, \\ (347) 0.0183, \\ (348) 0.0183, \\ (348) 0.0183, \\ (348) 0.0183, \\ (350) 0.0183, \\ (351) 0.0133, \\ (351) 0.0133, \\ (352) 0.0133, \\ (353) 0.0183, \\ (353) 0.$ |
| 91) 0.0182<br>92) 0.0182<br>93) 9.7E-3<br>94) 9.7E-3<br>95) 6.2E-3<br>96) 6.2E-3<br>97) 0.0137<br>98) 0.0137<br>99) 0.0232<br>100) 0.0232<br>100) 6.2E-3   | (109) 9.7E-3<br>(110) 9.7E-3<br>(111) 0.0137<br>(112) 0.0137<br>(113) 0.0232<br>(114) 0.0232<br>(114) 0.0232<br>(115) 0.0232<br>(116) 0.0232<br>(117) 9.7E-3<br>(118) 9.7E-3<br>(119) 9.7E-3                                 | (127) 0.0137<br>(128) 0.0137<br>(129) 6.2E-3<br>(130) 6.2E-3<br>(131) 6.2E-3<br>(132) 6.2E-3<br>(132) 6.2E-3<br>(133) 3.3E-3<br>(134) 3.3E-3<br>(135) 1.1E-3<br>(135) 1.1E-3<br>(137) 0.0137   | $\begin{array}{c} (145) & 0.0182 \\ (146) & 0.0182 \\ (147) & 9.7E-3 \\ (148) & 9.7E-3 \\ (149) & 9.7E-3 \\ (150) & 9.7E-3 \\ (151) & 9.7E-3 \\ (152) & 9.7E-3 \\ (152) & 9.7E-3 \\ (153) & 0.0182 \\ (154) & 0.0182 \\ (155) & 0.0232 \end{array}$  | (163) 0.0182<br>(165) 0.0182<br>(165) 0.0137<br>(166) 0.0137<br>(167) 0.0182<br>(168) 0.0182<br>(169) 0.0232<br>(170) 0.0232<br>(171) 0.0182<br>(172) 0.0137   | (271) 3.3E-3<br>(272) 3.3E-3<br>(275) 0.0137<br>(274) 0.0137<br>(275) 0.0137<br>(276) 0.0137<br>(276) 0.0182<br>(278) 0.0182<br>(279) 0.0232<br>(280) 0.0232<br>(281) 0.0182   | (289) 0.0182<br>(290) 0.0182<br>(291) 0.0182<br>(292) 0.0182<br>(293) 0.0182<br>(294) 0.0182<br>(295) 0.0182<br>(295) 0.0182<br>(296) 0.0182<br>(297) 0.0182<br>(298) 0.0182  | $\begin{array}{c} (307) & 0.0182 \\ (308) & 0.0182 \\ (309) & 0.0342 \\ (710) & 0.0342 \\ (312) & 0.0402 \\ (312) & 0.0402 \\ (312) & 0.0342 \\ (314) & 0.0342 \\ (314) & 0.0284 \\ (316) & 0.0284 \\ (317) & 0.0232 \\ (318) & 0.0232 \end{array}$   | $\begin{array}{c} (325) & 0.0182 \\ (326) & 0.0182 \\ (327) & 0.0232 \\ (329) & 0.0232 \\ (329) & 0.0182 \\ (330) & 0.0182 \\ (331) & 0.0182 \\ (331) & 0.0182 \\ (332) & 0.0182 \\ (334) & 0.0182 \\ (335) & 0.0182 \\ (336) & 0.0182 \end{array}$  | $\begin{array}{c} (143) \ 0,013, \\ (344) \ 0,018, \\ (345) \ 0,018, \\ (345) \ 0,018, \\ (347) \ 0,018, \\ (347) \ 0,018, \\ (348) \ 0,018, \\ (348) \ 0,018, \\ (348) \ 0,018, \\ (348) \ 0,018, \\ (350) \ 0,015, \\ (351) \ 0,013, \\ (352) \ 0,013, \\ (352) \ 0,018, \\ (353) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (352) \ 0,018, \\$        |
| 91) 0.0182<br>92) 0.0182<br>93) 9.7E-3<br>94) 9.7E-3<br>95) 6.2E-3<br>96) 6.2E-3<br>97) 0.0137<br>98) 0.0137<br>98) 0.0137<br>99) 0.0232<br>100) 0.0232<br>100) 0.0232<br>101) 6.2E-3<br>102) 6.2E-3                               | (109) 9.7E-3<br>(110) 9.7E-3<br>(111) 0.0137<br>(112) 0.0137<br>(113) 0.0232<br>(114) 0.0232<br>(115) 0.0232<br>(116) 0.0232<br>(116) 0.0232<br>(117) 9.7E-3<br>(118) 9.7E-3<br>(119) 9.7E-3                                 | (127) 0.0137 (128) 0.0137 (129) 6.2E-3 (130) 6.2E-3 (131) 6.2E-3 (132) 6.2E-3 (133) 3.3E-3 (134) 3.3E-3 (135) 1.1E-3 (136) 1.1E-3 (137) 0.0137 (138) 0.0137  | (145) 0.0182<br>(146) 0.0182<br>(147) 9.7E-3<br>(148) 9.7E-3<br>(150) 9.7E-3<br>(151) 9.7E-3<br>(152) 9.7E-3<br>(152) 9.7E-3<br>(153) 0.0182<br>(154) 0.0232   | (163) 0.0182<br>(164) 0.0182<br>(165) 0.0137<br>(166) 0.0137<br>(167) 0.0182<br>(169) 0.0232<br>(170) 0.0232<br>(171) 0.0182<br>(172) 0.0182<br>(173) 0.0137<br>(174) 0.0137   | (271) 3.3E-3<br>(272) 3.3E-3<br>(272) 0.0137<br>(274) 0.0137<br>(275) 0.0137<br>(276) 0.0137<br>(276) 0.0182<br>(278) 0.0182<br>(279) 0.0232<br>(280) 0.0232<br>(281) 0.0182<br>(282) 0.0192   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{c} (307) & 0.0182 \\ (308) & 0.0182 \\ (309) & 0.0342 \\ (310) & 0.0342 \\ (311) & 0.0402 \\ (312) & 0.0402 \\ (312) & 0.0342 \\ (313) & 0.0342 \\ (314) & 0.0342 \\ (315) & 0.0284 \\ (316) & 0.0284 \\ (317) & 0.0232 \\ (318) & 0.0232 \\ (319) & 0.0232 \end{array}$   | $\begin{array}{c} (325) & 0.0182 \\ (326) & 0.0182 \\ (327) & 0.0232 \\ (328) & 0.0232 \\ (329) & 0.0182 \\ (331) & 0.0182 \\ (331) & 0.0182 \\ (332) & 0.0182 \\ (332) & 0.0182 \\ (333) & 0.0182 \\ (334) & 0.0182 \\ (335) & 0.0182 \\ (335) & 0.0182 \\ (337) & 0.0182 \\ \end{array}$   | $\begin{array}{c} (143) \ 0,013, \\ (344) \ 0,018, \\ (345) \ 0,018, \\ (346) \ 0,018, \\ (347) \ 0,018, \\ (347) \ 0,018, \\ (349) \ 0,018, \\ (349) \ 0,018, \\ (350) \ 0,018, \\ (351) \ 0,013, \\ (351) \ 0,013, \\ (352) \ 0,013, \\ (352) \ 0,013, \\ (352) \ 0,013, \\ (353) \ 0,018, \\ (355) \ 0,018, \\$        |
| 91) 0.0182<br>92) 0.0182<br>93) 9.7E-3<br>94) 9.7E-3<br>95) 6.2E-3<br>96) 6.2E-3<br>97) 0.0137<br>98) 0.0137<br>98) 0.0137<br>99) 0.0232<br>100) 0.0232<br>101) 6.2E-3<br>102) 6.2E-3<br>103) 9.7E-3                               | (109) 9.7E-3<br>(110) 9.7E-3<br>(111) 0.0137<br>(112) 0.0137<br>(113) 0.0232<br>(114) 0.0232<br>(114) 0.0232<br>(115) 0.0232<br>(116) 0.0232<br>(117) 9.7E-3<br>(118) 9.7E-3<br>(119) 9.7E-3<br>(120) 9.7E-3<br>(121) 9.7E-3 | $(127) 0.0137 (128) 0.0137 (129) 6.2E-3 (130) 6.2E-3 (131) 6.2E-3 (132) 6.2E-3 (132) 6.2E-3 (133) 3.3E-3 (134) 3.3E-3 (135) 1.1E-3 (135) 1.1E-3 (136) 1.1E-3 (137) 0.0137 (139) 0.0137 \\$ | (145) 0.0182<br>(146) 0.0182<br>(147) 9.7E-3<br>(148) 9.7E-3<br>(150) 9.7E-3<br>(151) 9.7E-3<br>(152) 9.7E-3<br>(152) 9.7E-3<br>(153) 0.0182<br>(154) 0.0182<br>(155) 0.0232<br>(155) 0.0232<br>(157) 0.0182   | (163) 0.0182<br>(164) 0.0182<br>(165) 0.0137<br>(166) 0.0137<br>(167) 0.0182<br>(169) 0.0232<br>(170) 0.0232<br>(171) 0.0182<br>(172) 0.0182<br>(173) 0.0137<br>(174) 0.0137<br>(175) 6.2E-3   | (271) 3.3E-3<br>(272) 3.3E-3<br>(273) 0.0137<br>(274) 0.0137<br>(275) 0.0137<br>(276) 0.0182<br>(276) 0.0182<br>(278) 0.0182<br>(279) 0.0232<br>(280) 0.0232<br>(281) 0.0182<br>(282) 0.0192<br>(283) 0.0182                                 | (289) 0.0182<br>(290) 0.0182<br>(291) 0.0182<br>(292) 0.0182<br>(293) 0.0182<br>(294) 0.0182<br>(295) 0.0182<br>(295) 0.0182<br>(296) 0.0182<br>(297) 0.0182<br>(298) 0.0182  | $\begin{array}{c} (307) & 0.0182 \\ (308) & 0.0182 \\ (509) & 0.0342 \\ (510) & 0.0342 \\ (511) & 0.0402 \\ (512) & 0.0402 \\ (513) & 0.0342 \\ (513) & 0.0342 \\ (513) & 0.0242 \\ (514) & 0.0284 \\ (515) & 0.0284 \\ (517) & 0.0232 \\ (518) & 0.0232 \\ (519) & 0.0232 \\ (519) & 0.0232 \\ (520) & 0.0232 \end{array}$   | $\begin{array}{c} (325) & 0.0182 \\ (326) & 0.0182 \\ (327) & 0.0232 \\ (328) & 0.0232 \\ (329) & 0.0182 \\ (330) & 0.0182 \\ (331) & 0.0182 \\ (332) & 0.0182 \\ (332) & 0.0182 \\ (333) & 0.0182 \\ (334) & 0.0182 \\ (335) & 0.0182 \\ (337) & 0.0182 \\ (338) & 0.0182 \\ \end{array}$   | $\begin{array}{c} (143) \ 0,013, \\ (344) \ 0,018, \\ (345) \ 0,018, \\ (346) \ 0,018, \\ (347) \ 0,018, \\ (348) \ 0,018, \\ (348) \ 0,018, \\ (350) \ 0,018, \\ (350) \ 0,018, \\ (351) \ 0,013, \\ (352) \ 0,013, \\ (352) \ 0,013, \\ (352) \ 0,018, \\ (353) \ 0,018, \\ (355) \ 0,018, \\ (355) \ 0,018, \\ (356) \ 0,018, \\$        |
| 91) 0.0182<br>92) 0.0182<br>93) 9.7E-3<br>94) 9.7E-3<br>95) 6.2E-3<br>96) 6.2E-3<br>97) 0.0137<br>98) 0.0137<br>98) 0.0232<br>100) 0.0232<br>101) 6.2E-3<br>102) 6.2E-3<br>103) 9.7E-3   | (109) 9.7E-3<br>(110) 9.7E-3<br>(111) 0.0137<br>(112) 0.0137<br>(113) 0.0232<br>(114) 0.0232<br>(115) 0.0232<br>(115) 0.0232<br>(115) 0.0232<br>(117) 9.7E-3<br>(118) 9.7E-3<br>(119) 9.7E-3<br>(120) 9.7E-3<br>(121) 9.7E-3 | (127) 0.0137<br>(128) 0.0137<br>(129) 6.2E-3<br>(130) 6.2E-3<br>(131) 6.2E-3<br>(132) 6.2E-3<br>(132) 6.2E-3<br>(133) 3.3E-3<br>(134) 3.3E-3<br>(135) 1.1E-3<br>(135) 1.1E-3<br>(135) 1.1E-3<br>(137) 0.0137<br>(138) 0.0137<br>(139) 0.0137   | $      \begin{array}{lllllllllllllllllllllllllllllll$  | (183) 0.0182<br>(164) 0.0182<br>(165) 0.0137<br>(166) 0.0137<br>(167) 0.0182<br>(169) 0.02182<br>(169) 0.0232<br>(170) 0.0232<br>(171) 0.0182<br>(172) 0.0182<br>(173) 0.0137<br>(174) 0.0137<br>(174) 6.2E-3<br>(176) 6.2E-3                                | (271) 3.3E-3<br>(272) 3.3E-3<br>(272) 0.0137<br>(274) 0.0137<br>(275) 0.0137<br>(276) 0.0137<br>(277) 0.0182<br>(278) 0.0182<br>(279) 0.0232<br>(280) 0.0232<br>(280) 0.0232<br>(281) 0.0182<br>(282) 0.0182<br>(284) 0.0182                 | $\begin{array}{c} (289) & 6.0182 \\ (290) & 0.0182 \\ (291) & 0.0182 \\ (292) & 0.0182 \\ (292) & 0.0182 \\ (293) & 0.0182 \\ (294) & 0.0182 \\ (295) & 0.0182 \\ (296) & 0.0182 \\ (297) & 0.0182 \\ (298) & 0.0182 \\ (299) & 0.0182 \\ (300) & 0.0182 \\ (301) & 0.0182 \end{array}$                                     | $\begin{array}{c} (307) & 0.0182 \\ (308) & 0.0182 \\ (309) & 0.0342 \\ (310) & 0.0342 \\ (311) & 0.0402 \\ (312) & 0.0402 \\ (312) & 0.0402 \\ (313) & 0.0342 \\ (314) & 0.0342 \\ (314) & 0.0284 \\ (316) & 0.0284 \\ (317) & 0.0232 \\ (318) & 0.0232 \\ (318) & 0.0232 \\ (319) & 0.0232 \\ (320) & 0.0232 \\ (321) & 0.0232 \\ (321) & 0.0232 \end{array}$                   | $ \begin{array}{c} (325) & 0.0182 \\ (326) & 0.0182 \\ (327) & 0.0232 \\ (328) & 0.0232 \\ (329) & 0.0182 \\ (330) & 0.0182 \\ (331) & 0.0182 \\ (332) & 0.0182 \\ (332) & 0.0182 \\ (334) & 0.0182 \\ (334) & 0.0182 \\ (335) & 0.0182 \\ (337) & 0.0182 \\ (338) & 0.0182 \\ (338) & 0.0182 \\ (339) & 0.0182 \\ (339) & 0.0182 \\ \end{array} $   | $\begin{array}{c} (143) \ 0.013, \\ (344) \ 0.018, \\ (345) \ 0.018, \\ (346) \ 0.018, \\ (347) \ 0.018, \\ (347) \ 0.018, \\ (348) \ 0.018, \\ (348) \ 0.018, \\ (350) \ 0.018, \\ (351) \ 0.018, \\ (351) \ 0.018, \\ (352) \ 0.018, \\ (352) \ 0.018, \\ (355) \ 0.018, \\ (355) \ 0.018, \\ (356) \ 0.018, \\ (356) \ 0.018, \\ (356) \ 0.018, \\ (356) \ 0.018, \\ (357) \ 0.018, \\ (357) \ 0.018, \\ (357) \ 0.018, \\ (357) \ 0.018, \\ (357) \ 0.018, \\ (357) \ 0.018, \\ (357) \ 0.018, \\ (357) \ 0.018, \\ (357) \ 0.018, \\ (357) \ 0.018, \\ (357) \ 0.018, \\ (357) \ 0.018, \\ (357) \ 0.018, \\ (357) \ 0.018, \\ (357) \ 0.018, \\ (357) \ 0.018, \\ (357) \ 0.018, \\ (356) \ 0.018, \\ (357) \ 0.018, \\ (356) \ 0.018, \\$        |
| 91) 0.0182<br>92) 0.0182<br>93) 9.7E-3<br>94) 9.7E-3<br>95) 6.2E-3<br>96) 6.2E-3<br>97) 0.0137<br>98) 0.0137<br>99) 0.0232<br>100) 0.0232<br>101) 6.2E-3<br>102) 6.2E-3<br>103) 9.7E-3<br>104) 9.7E-3                              | $      \begin{array}{lllllllllllllllllllllllllllllll$  | (127) 0.0137<br>(128) 0.0137<br>(129) 6.2E-3<br>(150) 6.2E-3<br>(131) 6.2E-3<br>(132) 6.2E-3<br>(132) 6.2E-3<br>(133) 3.3E-3<br>(134) 3.3E-3<br>(135) 1.1E-3<br>(135) 1.1E-3<br>(135) 1.1E-3<br>(137) 0.0137<br>(138) 0.0137<br>(140) 0.0137<br>(141) 0.0137   | $      \begin{array}{lllllllllllllllllllllllllllllll$  |  | (271) 3.3E-3<br>(272) 3.3E-3<br>(272) 0.0137<br>(274) 0.0137<br>(275) 0.0137<br>(276) 0.0137<br>(277) 0.0182<br>(278) 0.0182<br>(278) 0.0232<br>(280) 0.0232<br>(280) 0.0232<br>(281) 0.0182<br>(282) 0.0182<br>(283) 0.0182<br>(284) 0.0182 | $\begin{array}{c} (289) & 0.0182 \\ (290) & 0.0182 \\ (291) & 0.0182 \\ (292) & 0.0182 \\ (293) & 0.0182 \\ (295) & 0.0182 \\ (295) & 0.0182 \\ (296) & 0.0182 \\ (297) & 0.0182 \\ (297) & 0.0182 \\ (298) & 0.0182 \\ (299) & 0.0182 \\ (300) & 0.0182 \\ (301) & 0.0182 \\ (302) & 0.0182 \end{array}$                   | $\begin{array}{c} (307) & 0.0182 \\ (308) & 0.0182 \\ (309) & 0.0342 \\ (310) & 0.0342 \\ (312) & 0.0402 \\ (312) & 0.0342 \\ (313) & 0.0342 \\ (314) & 0.0342 \\ (314) & 0.0284 \\ (316) & 0.0284 \\ (317) & 0.0232 \\ (318) & 0.0232 \\ (319) & 0.0232 \\ (320) & 0.0232 \\ (321) & 0.0232 \\ (321) & 0.0232 \\ (321) & 0.0232 \\ (321) & 0.0232 \\ (322) & 0.0232 \end{array}$ | $\begin{array}{c} (325) & 0.0182 \\ (326) & 0.0182 \\ (327) & 0.0232 \\ (329) & 0.0232 \\ (329) & 0.0182 \\ (331) & 0.0182 \\ (331) & 0.0182 \\ (332) & 0.0182 \\ (332) & 0.0182 \\ (333) & 0.0182 \\ (334) & 0.0192 \\ (335) & 0.0182 \\ (337) & 0.0182 \\ (337) & 0.0182 \\ (339) & 0.0182 \\ (339) & 0.0182 \\ (339) & 0.0182 \\ (340) & 0.0182 \end{array}$  | $\begin{array}{c} (145) \ 0.013, \\ (344) \ 0.018; \\ (345) \ 0.018; \\ (345) \ 0.018; \\ (347) \ 0.018; \\ (347) \ 0.018; \\ (348) \ 0.018; \\ (348) \ 0.018; \\ (350) \ 0.018; \\ (351) \ 0.018; \\ (352) \ 0.013; \\ (352) \ 0.013; \\ (352) \ 0.018; \\ (353) \ 0.018; \\ (354) \ 0.018; \\ (357) \ 0.018; \\ (357) \ 0.018; \\ (357) \ 0.018; \\ (357) \ 0.018; \\ (358) \ 0.018; \\$        |
| 91) 0.0182<br>92) 0.0182<br>93) 9.7E-3<br>94) 9.7E-3<br>95) 6.2E-3<br>96) 6.2E-3<br>97) 0.0137<br>98) 0.0137<br>98) 0.0137<br>99) 0.0232<br>100) 0.0232<br>101) 6.2E-3<br>102) 6.2E-3<br>103) 9.7E-3<br>104) 9.7E-3<br>106) 9.7E-3 | $      \begin{array}{lllllllllllllllllllllllllllllll$  | $      \begin{array}{lllllllllllllllllllllllllllllll$  | $ \begin{array}{c} (145) & 0.0182 \\ (146) & 0.0182 \\ (147) & 9.7E-3 \\ (148) & 9.7E-3 \\ (150) & 9.7E-3 \\ (151) & 9.7E-3 \\ (152) & 9.7E-3 \\ (152) & 9.7E-3 \\ (153) & 0.0182 \\ (154) & 0.0182 \\ (154) & 0.0232 \\ (154) & 0.0182 \\ (158) & 0.0182 \\ (158) & 9.7E-3 \\ (150) & 9.7E-3 \\ (150) & 9.7E-3 \\ (150) & 9.7E-3 \\ \end{array} $ | (163) 0.0182<br>(165) 0.0182<br>(165) 0.0137<br>(166) 0.0137<br>(164) 0.0182<br>(169) 0.0182<br>(169) 0.0232<br>(170) 0.0232<br>(171) 0.0182<br>(172) 0.0182<br>(173) 0.0137<br>(174) 0.0137<br>(175) 6.2E-3<br>(176) 6.2E-3<br>(177) 9.7E-3<br>(178) 9.7E-3 | (271) 3.3E-3<br>(272) 3.3E-3<br>(272) 0.0137<br>(274) 0.0137<br>(275) 0.0137<br>(276) 0.0137<br>(277) 0.0182<br>(277) 0.0182<br>(277) 0.0182<br>(279) 0.0232<br>(280) 0.0232<br>(281) 0.0182<br>(282) 0.0182<br>(283) 0.0182<br>(284) 0.0182 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{c} (307) & 0.0182 \\ (308) & 0.0182 \\ (309) & 0.0342 \\ (310) & 0.0342 \\ (311) & 0.0402 \\ (312) & 0.0402 \\ (312) & 0.0342 \\ (313) & 0.0342 \\ (314) & 0.0342 \\ (315) & 0.0284 \\ (316) & 0.0284 \\ (317) & 0.0232 \\ (318) & 0.0232 \\ (319) & 0.0232 \\ (320) & 0.0232 \\ (322) & 0.0232 \\ (323) & 0.0232 \\ (323) & 0.0232 \end{array}$                   | $\begin{array}{c} (325) & 0.0182 \\ (326) & 0.0182 \\ (327) & 0.0232 \\ (328) & 0.0232 \\ (329) & 0.0182 \\ (330) & 0.0182 \\ (331) & 0.0182 \\ (332) & 0.0182 \\ (333) & 0.0182 \\ (334) & 0.0182 \\ (335) & 0.0182 \\ (335) & 0.0182 \\ (336) & 0.0182 \\ (337) & 0.0182 \\ (338) & 0.0182 \\ (338) & 0.0182 \\ (339) & 0.0182 \\ (339) & 0.0182 \\ (340) & 0.0182 \\ (341) & 0.0137 \\ \end{array}$ | $\begin{array}{c} (143) \ 0,013, \\ (344) \ 0,018, \\ (345) \ 0,018, \\ (345) \ 0,018, \\ (347) \ 0,018, \\ (347) \ 0,018, \\ (347) \ 0,018, \\ (347) \ 0,018, \\ (350) \ 0,018, \\ (351) \ 0,013, \\ (351) \ 0,013, \\ (352) \ 0,013, \\ (352) \ 0,013, \\ (353) \ 0,018, \\ (353) \ 0,018, \\ (354) \ 0,018, \\ (354) \ 0,018, \\ (357) \ 0,018, \\ (358) \ 0,018, \\ (358) \ 0,018, \\ (358) \ 0,018, \\ (359) \ 0,018, \\ (358) \ 0,018, \\$        |
| 91) 0.0182<br>92) 0.0182<br>93) 9.7E-3<br>94) 9.7E-3<br>95) 6.2E-3<br>96) 6.2E-3<br>97) 0.0137<br>98) 0.0137<br>98) 0.0232<br>100) 0.0232<br>101) 6.2E-3<br>102) 6.2E-3<br>103) 9.7E-3<br>105) 9.7E-3                              | $      \begin{array}{lllllllllllllllllllllllllllllll$  | (127) 0.0137<br>(128) 0.0137<br>(129) 6.2E-3<br>(150) 6.2E-3<br>(131) 6.2E-3<br>(132) 6.2E-3<br>(132) 6.2E-3<br>(133) 3.3E-3<br>(134) 3.3E-3<br>(135) 1.1E-3<br>(135) 1.1E-3<br>(135) 1.1E-3<br>(137) 0.0137<br>(138) 0.0137<br>(140) 0.0137<br>(141) 0.0137   | $      \begin{array}{lllllllllllllllllllllllllllllll$  |  | (271) 3.3E-3<br>(272) 3.3E-3<br>(272) 0.0137<br>(274) 0.0137<br>(275) 0.0137<br>(276) 0.0137<br>(277) 0.0182<br>(278) 0.0182<br>(278) 0.0232<br>(280) 0.0232<br>(280) 0.0232<br>(281) 0.0182<br>(282) 0.0182<br>(283) 0.0182<br>(284) 0.0182 | $\begin{array}{c} (289) & 0.0182 \\ (290) & 0.0182 \\ (291) & 0.0182 \\ (292) & 0.0182 \\ (293) & 0.0182 \\ (293) & 0.0182 \\ (294) & 0.0182 \\ (295) & 0.0182 \\ (296) & 0.0182 \\ (297) & 0.0182 \\ (297) & 0.0182 \\ (299) & 0.0182 \\ (300) & 0.0182 \\ (301) & 0.0182 \\ (302) & 0.0182 \\ (303) & 0.0182 \end{array}$ | $\begin{array}{c} (307) & 0.0182 \\ (308) & 0.0182 \\ (309) & 0.0342 \\ (310) & 0.0342 \\ (312) & 0.0402 \\ (312) & 0.0342 \\ (313) & 0.0342 \\ (314) & 0.0342 \\ (314) & 0.0284 \\ (316) & 0.0284 \\ (317) & 0.0232 \\ (318) & 0.0232 \\ (319) & 0.0232 \\ (320) & 0.0232 \\ (321) & 0.0232 \\ (321) & 0.0232 \\ (321) & 0.0232 \\ (321) & 0.0232 \\ (322) & 0.0232 \end{array}$ | $\begin{array}{c} (325) & 0.0182 \\ (326) & 0.0182 \\ (327) & 0.0232 \\ (329) & 0.0232 \\ (329) & 0.0182 \\ (331) & 0.0182 \\ (331) & 0.0182 \\ (332) & 0.0182 \\ (332) & 0.0182 \\ (333) & 0.0182 \\ (334) & 0.0192 \\ (335) & 0.0182 \\ (337) & 0.0182 \\ (337) & 0.0182 \\ (339) & 0.0182 \\ (339) & 0.0182 \\ (339) & 0.0182 \\ (340) & 0.0182 \end{array}$  | $\begin{array}{c} (543) \ 0,013,\\ (544) \ 0,018;\\ (345) \ 0,018;\\ (345) \ 0,018;\\ (347) \ 0,018;\\ (347) \ 0,018;\\ (348) \ 0,018;\\ (348) \ 0,018;\\ (350) \ 0,018;\\ (351) \ 0,013;\\ (352) \ 0,013;\\ (352) \ 0,013;\\ (355) \ 0,018;\\ (355) \ 0,018;\\ (357) \ 0,018;\\ (357) \ 0,018;\\ (358) \$ |

## River discharge data at 12-hourly intervals for Station: WSTW Period : 3

Phosphorus transport Berg River

\$

1

1

| /ariable: WSTW   | 104.wstwq12_4  | (length = 344)   |  |  |  |  | (217) 0.0284   | (235) 0.0232   | (253) 0.0232                 |
|--|--|--|--|--|--|--|--|--|------------------------------|
|  | ( 19) 0.0232   | ( 37) 0.0137   | ( 55) 0.0342   | ( 73) 0,0534   | (181) 0.0604   | (199) 0.0342   | (218) 0.0284   | (236) 0.0232   | (254) 0.0232                 |
| 1) 0.0137  | (20) 0.0232  | ( 38) 0.0137   | ( 56) 0.0342   | ( 74) 0.0534   | (182) 0.0604   | (200) 0.0342   |  | (237) 0.0232   | (255) 0.0232                 |
| 2) 0.0137  |  | ( 39) 0.0137   | ( 57) 0.0534   | ( 75) 0.0534   | (183) 0.0534   | (201) 0.0402   | (219) 0.0232   | (238) 0.0232   | (256) 0.0232                 |
| 3) 0.0137  |  | ( 40) 0.0137   | ( 58) 0.0534   | ( 76) 0.0534   | (184) 0.0534   | (202) 0.0402   | (220) 0.0232   | (239) 0.0284   | (257) 0.0232                 |
| 4) 0,0137  | ( 22) 0.0182   | ( 41) 0.0137   | ( 59) 0.0834   | ( 77) 0.0466   | (185) 0.0534   | (203) 0.0402   | (221) 0.0232   |  | (258) 0.0232                 |
| 5) 0.0137  | (23) 0.0182  |  | ( 60) 0.0834   | ( 78) 0.0466   | (186) 0.0534   | (204) 0.0402   | (222) 0.0232   | (240) 0.0284   | (259) 0.0132                 |
| 6) 0.0137  | ( 24) 0.0182   | ( 42) 0.0137   | ( 61) 0.0677   | ( 79) 0.0342   | (187) 0.0466   | (205) 0.0284   | (223) 0.0284   | (241) 0.0342   | (260) 0.0132                 |
| 7) 0.0182  | ( 25) 0.0182   | ( 43) 0.0182   | ( 62) 0.0677   | ( 80) 0.0342   | (188) 0.0446   | (206) 0.0294   | (224) 0.0284   | (242) 0.0342   |                              |
| 8) 0.0182  | ( 26) 0.0182   | ( 44) 0,0182   |  | ( 81) 0.0342   | (187) 0.0466   | (207) 0.0284   | (225) 0.0284   | (243) 0.0342   | (261) 0.0182                 |
| 9) 0.0182  | ( 27) 0.0284   | ( 45) 0.0182   | ( 63) 0.0604   | ( 82) 0.0342   | (190) 0.0466   | (208) 0.0284   | (226) 0.0284   | (244) 0.0342   | (262) 0.0182                 |
| 10) 0.0182   | ( 28) 0.0284   | ( 46) 0.0182   | ( 64) 0.0604   |  | (191) 0.0402   | (207) 0.0342   | (227) 0.0284   | (245) 0.0342   | (263) 0                      |
| 11) 0.0232   | (29) 0.0232  | ( 47) 0.0182   | ( 65) 0.0916   | (83) 0.0402  | (192) 0.0402   | (210) 0.0342   | (228) 0.0284   | (246) 0.0342   | (264) 0                      |
| 12) 0.0232   | ( 30) 0.0232   | (40)0.0182   | ( 66) 0.0916   | ( 84) 0.0402   |  | (211) 0.0342   | (229) 0.0232   | (247) 0.0232   | (265) 0.0284                 |
| 13) 0.0232   | ( 31) 0.0182   | ( 49) 0.0182   | ( 67) 0.0677   | (85) 0,0342  | (193) 0.0342   | (212) 0.0342   | (230) 0.0232   | (248) 0.0232   | (266) 0.0284                 |
| 14) 0.0232   | ( 32) 0.0182   | ( 50) 0.0182   | ( 68) 0.0677   | ( 86) 0,0342   | (194) 0.0342   | (213) 0.0342   | (231) 0.0232   | (249) 0.0232   | (267) 0.0284                 |
| 15) 0.0284   | ( 33) 0.0182   | ( 51) 0.0182   | ( 69) 0.0677   | ( 87) 0,0342   | (195) 0.0402   | (213) 0.0342   | (232) 0.0232   | (250) 0.0232   | (268) 0.0284                 |
| 16) 0.0284   | ( 34) 0.0182   | ( 52) 0.0182   | 1 701 0.0677   | ( 88) 0.0342   | (196) 0.0402   |  | (233) 0.0232   | (251) 0.0232   | (269) 0.0284                 |
|  | ( 35) 0.0182   | ( 53) 0.0182   | (71) 0.0604  | ( 89) 0.0342<br>( 90) 0.0342   | (197) 0.0342   | (215) 0.0342<br>(216) 0.0342   | (234) 0.0232   | (252) 0.0232   | (270) 0.0284                 |
|  |  |  |  |  |  |  |  |  |                              |
|  | 741 0 0192   | ( 54) 0.01B2   | ( 72) 0.0604   | (90) 0.0342  | (198) 0.0342   | (110) 000000   |  |  |                              |
| 18) 0.0284   | ( 36) 0.0182   |  |  |  |  |  |  |  |                              |
| 18) 0.0284   | ( 36) 0.0182   |  |  |  | (271) 0.0284   | (287) 0.0284   | (307) 9.7E-3   | (325) 9.7E-3   | (343) 9.7E-3                 |
| 18) 0.0284<br>91) 0.0284   | ( 36) 0.0182   | (127) 0.0402   | (145) 0.0342   | (163) 0.0402   | (271) 0.0284<br>(272) 0.0284   | (289) 0.0284<br>(290) 0.0284   | (307) 9.7E-3<br>(308) 9.7E-3   | (325) 9.7E-3<br>(326) 9.7E-3   |                              |
| 18) 0.0284<br>91) 0.0284<br>92) 0.0284   | ( 36) 0.0182<br>(109) 0.0834<br>(110) 0.0834   | (127) 0.0402<br>(128) 0.0402   | (145) 0.0342<br>(146) 0.0342   |  | (271) 0.0284<br>(272) 0.0284<br>(273) 0.0232   | (287) 0.0284<br>(290) 0.0284<br>(291) 0.0232   | (307) 9.7E-3<br>(308) 9.7E-3<br>(309) 9.7E-3   | (325) 9.7E-3<br>(326) 9.7E-3<br>(327) 0.0137   | (343) 9.7E-3                 |
| 18) 0.0284<br>91) 0.0284<br>92) 0.0284<br>93) 0.0232   | ( 36) 0.0182<br>(107) 0.0834<br>(110) 0.0834<br>(111) 0.0734   | (127) 0.0402<br>(128) 0.0402<br>(128) 0.0402<br>(127) 0.0402   | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0342   | (163) 0.0402<br>(164) 0.0402<br>(165) 0.0342   | (271) 0.0284<br>(272) 0.0284<br>(273) 0.0232<br>(274) 0.0232   | (289) 0.0284<br>(290) 0.0284<br>(291) 0.0232<br>(292) 0.0232   | (307) 9.7E-3<br>(308) 9.7E-3<br>(309) 9.7E-3<br>(310) 9.7E-3   | (325) 9.7E-3<br>(326) 9.7E-3<br>(327) 0.0137<br>(328) 0.0137   | (343) 9.7E-3                 |
| 18) 0.0284<br>91) 0.0284<br>92) 0.0284<br>93) 0.0232<br>94) 0.0232   | ( 36) 0.0182<br>(107) 0.0834<br>(110) 0.0834<br>(111) 0.0754<br>(112) 0.0754   | (127) 0.0402<br>(129) 0.0402<br>(129) 0.0402<br>(127) 0.0402<br>(130) 0.0402   | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0342<br>(147) 0.0342<br>(148) 0.0342   | (163) 0.0402<br>(164) 0.0402<br>(165) 0.0342<br>(166) 0.0342   | (271) 0.0284<br>(272) 0.0284<br>(273) 0.0232<br>(274) 0.0232<br>(275) 0.0182   | (289) 0.0284<br>(290) 0.0284<br>(291) 0.0232<br>(292) 0.0232<br>(292) 0.0232<br>(293) 0.0232   | (307) 9.7E-3<br>(308) 9.7E-3<br>(309) 9.7E-3<br>(310) 9.7E-3<br>(311) 0.0284   | (325) 9.7E-3<br>(326) 9.7E-3<br>(327) 0.0137<br>(328) 0.0137<br>(329) 0.0232   | (343) 9.7E-3                 |
| 18) 0.0284<br>91) 0.0284<br>92) 0.0284<br>93) 0.0232<br>94) 0.0232<br>95) 0.0232   | (109) 0.0834<br>(110) 0.0834<br>(110) 0.0834<br>(111) 0.0754<br>(112) 0.0754<br>(113) 0.0604   | (127) 0.0402<br>(128) 0.0402<br>(127) 0.0402<br>(130) 0.0402<br>(131) 0.0402   | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0342<br>(148) 0.0342<br>(148) 0.0342<br>(149) 0.0284   | (163) 0.0402<br>(164) 0.0402<br>(165) 0.0342<br>(166) 0.0342<br>(167) 0.0466   | (271) 0.0284<br>(272) 0.0284<br>(273) 0.0232<br>(274) 0.0232<br>(275) 0.0182<br>(276) 0.0182   | (289) 0.0284<br>(290) 0.0284<br>(291) 0.0232<br>(292) 0.0232<br>(293) 0.0232<br>(294) 0.0232   | (307) 9.7E-3<br>(308) 9.7E-3<br>(309) 9.7E-3<br>(310) 9.7E-3<br>(311) 0.0284<br>(312) 0.0284   | (325) 9.7E-3<br>(326) 9.7E-3<br>(327) 0.0137<br>(329) 0.0137<br>(329) 0.0232<br>(330) 0.0232   | (343) 9.7E-3                 |
| 18) 0.0284<br>91) 0.0284<br>92) 0.0284<br>93) 0.0232<br>94) 0.0232<br>95) 0.0232<br>96) 0.0232   | (109) 0.0834<br>(110) 0.0834<br>(110) 0.0834<br>(111) 0.0754<br>(112) 0.0754<br>(113) 0.0604<br>(114) 0.0604   | (127) 0.0402<br>(128) 0.0402<br>(127) 0.0402<br>(130) 0.0402<br>(131) 0.0402<br>(131) 0.0402<br>(132) 0.0402   | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0342<br>(148) 0.0342<br>(149) 0.0284<br>(150) 0.0284   | (163) 0.0402<br>(164) 0.0402<br>(165) 0.0342<br>(165) 0.0342<br>(166) 0.0342<br>(166) 0.0466<br>(168) 0.0466   | (271) 0.0284<br>(272) 0.0284<br>(273) 0.0232<br>(274) 0.0232<br>(275) 0.0182<br>(276) 0.0182<br>(277) 0.0137   | (289) 0.0284<br>(290) 0.0284<br>(291) 0.0232<br>(292) 0.0232<br>(293) 0.0232<br>(294) 0.0232<br>(295) 0.0232   | (307) 9.7E-3<br>(308) 9.7E-3<br>(309) 9.7E-3<br>(310) 9.7E-3<br>(311) 0.0284<br>(312) 0.0284<br>(313) 0.0284   | (325) 9.7E-3<br>(326) 9.7E-3<br>(327) 0.0137<br>(328) 0.0137<br>(329) 0.0232<br>(330) 0.0232<br>(331) 0.0232   | (343) 9.7E-3                 |
| 18) 0.0284<br>91) 0.0284<br>92) 0.0284<br>93) 0.0232<br>94) 0.0232<br>95) 0.0232<br>96) 0.0232<br>97) 0.0284   | (109) 0.0834<br>(110) 0.0834<br>(110) 0.0834<br>(111) 0.0754<br>(112) 0.0754<br>(113) 0.0604<br>(114) 0.0604<br>(115) 0.0916   | (127) 0.0402<br>(128) 0.0402<br>(127) 0.0402<br>(130) 0.0402<br>(131) 0.0402<br>(132) 0.0402<br>(133) 0.0342   | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0342<br>(147) 0.0342<br>(149) 0.0284<br>(150) 0.0284<br>(151) 0.0232   | (163) 0.0402<br>(164) 0.0402<br>(165) 0.0342<br>(165) 0.0342<br>(166) 0.0466<br>(167) 0.0466<br>(169) 0.1  | (271) 0.0284<br>(272) 0.0284<br>(273) 0.0232<br>(274) 0.0232<br>(275) 0.0182<br>(276) 0.0182   | (287) 0.0284<br>(290) 0.0284<br>(291) 0.0232<br>(292) 0.0232<br>(293) 0.0232<br>(294) 0.0232<br>(295) 0.0232<br>(296) 0.0232   | (307) 9.7E-3<br>(308) 9.7E-3<br>(309) 9.7E-3<br>(310) 9.7E-3<br>(311) 0.0284<br>(312) 0.0284<br>(313) 0.0284<br>(314) 0.0284   | (325) 9.7E-3<br>(326) 9.7E-3<br>(327) 0.0137<br>(329) 0.0137<br>(329) 0.0232<br>(330) 0.0232<br>(331) 0.0232<br>(332) 0.0232   | (343) 9.7E-3                 |
| 18) 0.0284<br>91) 0.0284<br>92) 0.0284<br>93) 0.0232<br>94) 0.0232<br>95) 0.0232<br>95) 0.0232<br>96) 0.0232<br>97) 0.0284   | (109) 0.0834<br>(110) 0.0834<br>(111) 0.0834<br>(111) 0.0754<br>(112) 0.0754<br>(113) 0.0604<br>(113) 0.0604<br>(115) 0.0916   | (127) 0.0402<br>(128) 0.0402<br>(129) 0.0402<br>(130) 0.0402<br>(131) 0.0402<br>(131) 0.0402<br>(132) 0.0402<br>(133) 0.0342<br>(134) 0.0342   | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0342<br>(148) 0.0342<br>(149) 0.0284<br>(150) 0.0284<br>(151) 0.0232<br>(152) 0.0232   | (163) 0.0402<br>(164) 0.0402<br>(165) 0.0342<br>(166) 0.0342<br>(167) 0.0466<br>(168) 0.0466<br>(169) 0.1<br>(170) 0.1   | (271) 0.0284<br>(272) 0.0284<br>(273) 0.0232<br>(274) 0.0232<br>(275) 0.0182<br>(276) 0.0182<br>(277) 0.0137<br>(278) 0.0137<br>(279) 0.0232   | (269) 0.0284<br>(290) 0.0284<br>(291) 0.0232<br>(292) 0.0232<br>(293) 0.0232<br>(294) 0.0232<br>(295) 0.0232<br>(296) 0.0232<br>(297) 0.0232   | (307) 9.7E-3<br>(308) 9.7E-3<br>(309) 9.7E-3<br>(310) 9.7E-3<br>(311) 0.0284<br>(312) 0.0284<br>(313) 0.0284<br>(314) 0.0284<br>(315) 0.0284   | (325) 9.7E-3<br>(326) 9.7E-3<br>(327) 0.0137<br>(329) 0.0232<br>(330) 0.0232<br>(331) 0.0232<br>(332) 0.0232<br>(333) 0.0232   | (343) 9.7E-3                 |
| 18) 0.0284<br>91) 0.0284<br>92) 0.0284<br>93) 0.0232<br>94) 0.0232<br>95) 0.0232<br>95) 0.0232<br>97) 0.0284<br>96) 0.0284   | (109) 0.0834<br>(110) 0.0834<br>(111) 0.0754<br>(112) 0.0754<br>(113) 0.0604<br>(114) 0.0916<br>(116) 0.0916<br>(116) 0.0916<br>(117) 0.0754   | (127) 0.0402<br>(129) 0.0402<br>(129) 0.0402<br>(130) 0.0402<br>(131) 0.0402<br>(131) 0.0402<br>(132) 0.0402<br>(133) 0.0342<br>(134) 0.0342<br>(135) 0.0284   | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0342<br>(148) 0.0342<br>(149) 0.0284<br>(150) 0.0284<br>(151) 0.0232<br>(152) 0.0232<br>(153) 0.0342   | (163) 0.0402<br>(164) 0.0402<br>(165) 0.0342<br>(166) 0.0342<br>(166) 0.0466<br>(169) 0.1<br>(170) 0.1<br>(171) 0.0834   | (271) 0.0284<br>(272) 0.0284<br>(273) 0.0232<br>(274) 0.0232<br>(275) 0.0182<br>(276) 0.0182<br>(277) 0.0137<br>(278) 0.0137<br>(279) 0.0232   | (289) 0.0284<br>(290) 0.0284<br>(291) 0.0232<br>(292) 0.0232<br>(293) 0.0232<br>(294) 0.0232<br>(295) 0.0232<br>(296) 0.0232<br>(296) 0.0232<br>(296) 0.0232   | (307) 9.7E-3<br>(308) 9.7E-3<br>(309) 9.7E-3<br>(310) 9.7E-3<br>(311) 0.0284<br>(312) 0.0284<br>(313) 0.0284<br>(314) 0.0284<br>(315) 0.0284<br>(316) 0.0284   | (325) 9.7E-3<br>(326) 9.7E-3<br>(327) 0.0137<br>(329) 0.0232<br>(330) 0.0232<br>(331) 0.0232<br>(331) 0.0232<br>(333) 0.0232<br>(333) 0.0232<br>(334) 0.0232   | (343) 9.7E-3                 |
| 18) 0.0284<br>91) 0.0284<br>92) 0.0284<br>93) 0.0232<br>94) 0.0232<br>95) 0.0232<br>94) 0.0232<br>97) 0.0284<br>96) 0.0284<br>96) 0.0284<br>97] 0.0284   | ( 36) 0.0182<br>(109) 0.0834<br>(110) 0.0834<br>(111) 0.0754<br>(112) 0.0754<br>(113) 0.0604<br>(114) 0.0604<br>(115) 0.0916<br>(116) 0.0754<br>(118) 0.0754   | (127) 0.0402<br>(128) 0.0402<br>(129) 0.0402<br>(130) 0.0402<br>(131) 0.0402<br>(131) 0.0402<br>(132) 0.0402<br>(133) 0.0342<br>(134) 0.0342<br>(135) 0.0284<br>(136) 0.0284   | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0342<br>(148) 0.0342<br>(149) 0.0284<br>(150) 0.0284<br>(151) 0.0232<br>(152) 0.0232<br>(153) 0.0342<br>(154) 0.0342   | (163) 0.0402<br>(164) 0.0402<br>(165) 0.0342<br>(165) 0.0342<br>(166) 0.0342<br>(167) 0.0466<br>(168) 0.0466<br>(169) 0.1<br>(170) 0.1<br>(171) 0.0834<br>(172) 0.0834   | (271) 0.0284<br>(272) 0.0284<br>(273) 0.0232<br>(274) 0.0232<br>(275) 0.0182<br>(276) 0.0182<br>(277) 0.0137<br>(278) 0.0137   | (289) 0.0284<br>(290) 0.0284<br>(291) 0.0232<br>(292) 0.0232<br>(293) 0.0232<br>(294) 0.0232<br>(295) 0.0232<br>(296) 0.0232<br>(297) 0.0232<br>(299) 0.0232   | (307) 9.7E-3<br>(308) 9.7E-3<br>(309) 9.7E-3<br>(310) 9.7E-3<br>(311) 0.0284<br>(312) 0.0284<br>(313) 0.0284<br>(314) 0.0284<br>(315) 0.0284<br>(316) 0.0284<br>(317) 0.0284   | (325) 9.7E-3<br>(326) 9.7E-3<br>(327) 0.0137<br>(328) 0.0137<br>(329) 0.0232<br>(330) 0.0232<br>(331) 0.0232<br>(332) 0.0232<br>(333) 0.0232<br>(333) 0.0232<br>(334) 0.0232<br>(335) 9.7E-3   | (343) 9.7E-3                 |
| 18) 0.0284<br>91) 0.0284<br>92) 0.0284<br>93) 0.0232<br>94) 0.0232<br>95) 0.0232<br>95) 0.0232<br>95) 0.0232<br>97) 0.0284<br>98) 0.0284<br>99] 0.0284<br>100) 0.0284  | (109) 0.0834<br>(110) 0.0834<br>(110) 0.0834<br>(111) 0.0754<br>(112) 0.0754<br>(113) 0.0604<br>(114) 0.0604<br>(114) 0.0604<br>(115) 0.0916<br>(115) 0.0916<br>(117) 0.0754<br>(118) 0.0754<br>(119) 0.0604   | (127) 0.0402<br>(128) 0.0402<br>(128) 0.0402<br>(130) 0.0402<br>(131) 0.0402<br>(132) 0.0402<br>(133) 0.0402<br>(133) 0.0402<br>(133) 0.0342<br>(134) 0.0342<br>(135) 0.0284<br>(136) 0.0284   | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0342<br>(147) 0.0342<br>(149) 0.0284<br>(150) 0.0284<br>(151) 0.0232<br>(152) 0.0232<br>(152) 0.0342<br>(154) 0.0342<br>(155) 0.0342   | (163) 0.0402<br>(164) 0.0402<br>(165) 0.0342<br>(165) 0.0342<br>(166) 0.0342<br>(167) 0.0466<br>(169) 0.1<br>(170) 0.1<br>(170) 0.1<br>(171) 0.0834<br>(172) 0.0834<br>(173) 0.109   | (271) 0.0284<br>(272) 0.0284<br>(273) 0.0232<br>(274) 0.0232<br>(275) 0.0182<br>(276) 0.0182<br>(277) 0.0137<br>(278) 0.0137<br>(278) 0.0137<br>(279) 0.0232<br>(280) 0.0232<br>(281) 0.0182   | (289) 0.0284<br>(290) 0.0284<br>(291) 0.0232<br>(292) 0.0232<br>(293) 0.0232<br>(294) 0.0232<br>(295) 0.0232<br>(296) 0.0232<br>(296) 0.0232<br>(296) 0.0232   | (307) 9.7E-3<br>(308) 9.7E-3<br>(309) 9.7E-3<br>(310) 9.7E-3<br>(311) 0.0284<br>(312) 0.0284<br>(313) 0.0284<br>(314) 0.0284<br>(315) 0.0284<br>(316) 0.0284<br>(317) 0.0284   | (325) 9.7E-3<br>(326) 9.7E-3<br>(327) 0.0137<br>(329) 0.0137<br>(329) 0.0232<br>(330) 0.0232<br>(331) 0.0232<br>(332) 0.0232<br>(333) 0.0232<br>(333) 0.0232<br>(334) 0.0232<br>(335) 9.7E-3   | (343) 9.7E-3                 |
| 18) 0.0284<br>91) 0.0284<br>92) 0.0284<br>93) 0.0232<br>94) 0.0232<br>95) 0.0232<br>95) 0.0232<br>96) 0.0232<br>97) 0.0284<br>98) 0.0284<br>99) 0.0284<br>100) 0.0284<br>100) 0.0284   | (107) 0.0834<br>(110) 0.0834<br>(111) 0.0834<br>(111) 0.0754<br>(112) 0.0754<br>(113) 0.0604<br>(114) 0.0604<br>(115) 0.0916<br>(117) 0.0754<br>(116) 0.0754<br>(117) 0.0604<br>(119) 0.0604   | (127) 0.0402<br>(128) 0.0402<br>(128) 0.0402<br>(130) 0.0402<br>(131) 0.0402<br>(131) 0.0402<br>(133) 0.0402<br>(133) 0.0342<br>(134) 0.0342<br>(135) 0.0284<br>(135) 0.0284<br>(137) 0.0284<br>(135) 0.0284                                 | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0342<br>(147) 0.0342<br>(149) 0.0284<br>(150) 0.0284<br>(151) 0.0232<br>(152) 0.0232<br>(153) 0.0342<br>(154) 0.0342<br>(155) 0.0342   | (163) 0.0402<br>(164) 0.0402<br>(165) 0.0342<br>(165) 0.0342<br>(167) 0.0466<br>(167) 0.1<br>(167) 0.1<br>(170) 0.1<br>(171) 0.0834<br>(172) 0.0834<br>(173) 0.109<br>(174) 0.109  | (271) 0.0284<br>(272) 0.0284<br>(273) 0.0232<br>(274) 0.0232<br>(275) 0.0182<br>(275) 0.0182<br>(277) 0.0137<br>(278) 0.0137<br>(278) 0.0137<br>(279) 0.0232<br>(280) 0.0232<br>(281) 0.0182<br>(282) 0.0182   | (289) 0.0284<br>(290) 0.0284<br>(291) 0.0232<br>(292) 0.0232<br>(293) 0.0232<br>(294) 0.0232<br>(295) 0.0232<br>(296) 0.0232<br>(297) 0.0232<br>(299) 0.0232   | (307) 9.7E-3<br>(308) 9.7E-3<br>(309) 9.7E-3<br>(310) 9.7E-3<br>(311) 0.0284<br>(312) 0.0284<br>(313) 0.0284<br>(314) 0.0284<br>(315) 0.0284<br>(316) 0.0284<br>(316) 0.0284<br>(318) 0.0284   | (325) 9.7E-3<br>(326) 9.7E-3<br>(327) 0.0137<br>(329) 0.0232<br>(330) 0.0232<br>(331) 0.0232<br>(332) 0.0232<br>(333) 0.0232<br>(333) 0.0232<br>(335) 9.7E-3<br>(336) 9.7E-3<br>(337) 6.2E-3   | (343) 9.7E-3                 |
| 18) 0.0284<br>91) 0.0284<br>92) 0.0284<br>93) 0.0232<br>94) 0.0232<br>95) 0.0232<br>94) 0.0232<br>94) 0.0232<br>94) 0.0284<br>98) 0.0284<br>98) 0.0284<br>100) 0.0284<br>100) 0.0284<br>100) 0.0284<br>100) 0.0404   | (109) 0.0834<br>(110) 0.0834<br>(110) 0.0834<br>(111) 0.0754<br>(112) 0.0754<br>(113) 0.0604<br>(114) 0.0604<br>(114) 0.0604<br>(115) 0.0916<br>(115) 0.0916<br>(117) 0.0754<br>(118) 0.0754<br>(119) 0.0604   | (127) 0.0402<br>(128) 0.0402<br>(129) 0.0402<br>(130) 0.0402<br>(131) 0.0402<br>(131) 0.0402<br>(133) 0.0402<br>(133) 0.0342<br>(134) 0.0342<br>(135) 0.0284<br>(136) 0.0284<br>(136) 0.0284<br>(138) 0.0284                                 | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0342<br>(147) 0.0342<br>(149) 0.0284<br>(150) 0.0284<br>(151) 0.0232<br>(152) 0.0232<br>(152) 0.0232<br>(153) 0.0342<br>(155) 0.0342<br>(155) 0.0342<br>(157) 0.0402                                 | (163) 0.0402<br>(164) 0.0402<br>(165) 0.0342<br>(165) 0.0342<br>(166) 0.0466<br>(169) 0.0466<br>(169) 0.1<br>(170) 0.1<br>(171) 0.0834<br>(172) 0.0834<br>(173) 0.109<br>(175) 0.0834  | (271) 0.0284<br>(272) 0.0284<br>(273) 0.0232<br>(274) 0.0232<br>(275) 0.0182<br>(276) 0.0182<br>(277) 0.0137<br>(278) 0.0137<br>(278) 0.0137<br>(279) 0.0232<br>(280) 0.0232<br>(281) 0.0182<br>(282) 0.0182<br>(283) 0.0182   | (287) 0.0284<br>(290) 0.0284<br>(291) 0.0232<br>(292) 0.0232<br>(293) 0.0232<br>(294) 0.0232<br>(296) 0.0232<br>(296) 0.0232<br>(297) 0.0232<br>(296) 0.0232<br>(297) 0.0232<br>(300) 0.0232<br>(301) 0.0182   | (307) 9.7E-3<br>(308) 9.7E-3<br>(309) 9.7E-3<br>(310) 9.7E-3<br>(311) 0.0284<br>(312) 0.0284<br>(313) 0.0284<br>(314) 0.0284<br>(315) 0.0284<br>(316) 0.0284<br>(317) 0.0284   | (325) 9.7E-3<br>(326) 9.7E-3<br>(327) 0.0137<br>(329) 0.0232<br>(330) 0.0232<br>(331) 0.0232<br>(331) 0.0232<br>(333) 0.0232<br>(333) 0.0232<br>(335) 9.7E-3<br>(335) 9.7E-3<br>(336) 9.7E-3<br>(336) 4.2E-3   | (343) 9.7E-3                 |
| 18) 0.0284<br>91) 0.0284<br>92) 0.0284<br>93) 0.0232<br>94) 0.0232<br>95) 0.0232<br>95) 0.0232<br>96) 0.0232<br>97) 0.0284<br>98) 0.0284<br>100) 0.0284<br>100) 0.0284<br>100) 0.0284<br>101) 0.0404<br>102) 0.0404<br>103) 0.1  | ( 36) 0.0182<br>(109) 0.0834<br>(110) 0.0834<br>(111) 0.0754<br>(112) 0.0754<br>(113) 0.0604<br>(114) 0.0604<br>(115) 0.0916<br>(117) 0.0754<br>(118) 0.0754<br>(119) 0.0604<br>(119) 0.0604<br>(120) 0.0604<br>(121) 0.0402<br>(122) 0.0402                 | (127) 0.0402<br>(128) 0.0402<br>(128) 0.0402<br>(130) 0.0402<br>(131) 0.0402<br>(131) 0.0402<br>(133) 0.0342<br>(135) 0.0342<br>(135) 0.0284<br>(135) 0.0284<br>(136) 0.0284<br>(137) 0.0284<br>(139) 0.0342                                 | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0342<br>(148) 0.0342<br>(149) 0.0284<br>(150) 0.0284<br>(151) 0.0232<br>(152) 0.0232<br>(152) 0.0232<br>(153) 0.0342<br>(155) 0.0342<br>(155) 0.0342<br>(155) 0.0342<br>(157) 0.0402<br>(158) 0.0402 | (163) 0.0402<br>(164) 0.0402<br>(165) 0.0342<br>(165) 0.0342<br>(166) 0.0342<br>(167) 0.0466<br>(168) 0.0466<br>(169) 0.1<br>(170) 0.1<br>(171) 0.0834<br>(172) 0.0834<br>(173) 0.109<br>(174) 0.109<br>(175) 0.0834<br>(176) 0.0834   | (271) 0.0284<br>(272) 0.0284<br>(273) 0.0232<br>(274) 0.0232<br>(275) 0.0182<br>(275) 0.0182<br>(277) 0.0137<br>(278) 0.0137<br>(278) 0.0137<br>(279) 0.0232<br>(280) 0.0232<br>(281) 0.0182<br>(282) 0.0182<br>(283) 0.0182   | (287) 0.0284<br>(290) 0.0284<br>(291) 0.0232<br>(292) 0.0232<br>(293) 0.0232<br>(293) 0.0232<br>(294) 0.0232<br>(296) 0.0232<br>(296) 0.0232<br>(297) 0.0232<br>(297) 0.0232<br>(297) 0.0232<br>(300) 0.0232   | (307) 9.7E-3<br>(308) 9.7E-3<br>(309) 9.7E-3<br>(310) 9.7E-3<br>(311) 0.0284<br>(312) 0.0284<br>(313) 0.0284<br>(314) 0.0284<br>(315) 0.0284<br>(315) 0.0284<br>(317) 0.0284<br>(316) 0.0284<br>(319) 0.0284<br>(320) 0.0284<br>(321) 0.0284   | (325) 9.7E-3<br>(326) 9.7E-3<br>(327) 0.0137<br>(328) 0.0137<br>(329) 0.0232<br>(330) 0.0232<br>(331) 0.0232<br>(331) 0.0232<br>(333) 0.0232<br>(335) 9.7E-3<br>(336) 9.7E-3<br>(337) 6.2E-3<br>(337) 6.2E-3<br>(339) 0.0232                                 | (343) 9.7E-3                 |
| 18) 0.0284<br>91) 0.0284<br>92) 0.0284<br>93) 0.0232<br>94) 0.0232<br>95) 0.0232<br>94) 0.0232<br>95) 0.0232<br>94) 0.0284<br>96) 0.0284<br>100) 0.0284<br>100) 0.0284<br>101) 0.0404<br>102) 0.0404<br>103) 0.1<br>(104) 0.1  | (109) 0.0834<br>(110) 0.0834<br>(111) 0.0754<br>(111) 0.0754<br>(112) 0.0754<br>(113) 0.0604<br>(114) 0.0604<br>(115) 0.0916<br>(116) 0.0754<br>(117) 0.0754<br>(118) 0.0754<br>(119) 0.0604<br>(120) 0.0604<br>(121) 0.0402                                 | (127) 0.0402<br>(128) 0.0402<br>(128) 0.0402<br>(130) 0.0402<br>(131) 0.0402<br>(132) 0.0402<br>(133) 0.0342<br>(134) 0.0342<br>(135) 0.0284<br>(136) 0.0284<br>(137) 0.0284<br>(137) 0.0342<br>(140) 0.0342                                 | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0342<br>(147) 0.0342<br>(149) 0.0284<br>(150) 0.0284<br>(151) 0.0232<br>(152) 0.0232<br>(153) 0.0342<br>(153) 0.0342<br>(155) 0.0342<br>(155) 0.0402<br>(158) 0.0402<br>(159) 0.0465                 | (163) 0.0402<br>(164) 0.0402<br>(165) 0.0342<br>(165) 0.0342<br>(166) 0.0342<br>(167) 0.0466<br>(169) 0.1<br>(170) 0.1<br>(171) 0.0834<br>(173) 0.109<br>(174) 0.109<br>(175) 0.0834<br>(175) 0.0834<br>(176) 0.0834<br>(177) 0.0334   | (271) 0.0284<br>(272) 0.0284<br>(273) 0.0232<br>(274) 0.0232<br>(275) 0.0182<br>(276) 0.0182<br>(276) 0.0137<br>(278) 0.0137<br>(279) 0.0232<br>(280) 0.0232<br>(281) 0.0182<br>(281) 0.0182<br>(283) 0.0182<br>(284) 0.0182<br>(285) 0.0284   | (289) 0.0284<br>(290) 0.0284<br>(291) 0.0232<br>(292) 0.0232<br>(293) 0.0232<br>(294) 0.0232<br>(295) 0.0232<br>(296) 0.0232<br>(296) 0.0232<br>(297) 0.0232<br>(299) 0.0232<br>(300) 0.0232<br>(300) 0.0182<br>(303) 0.0187   | (307) 9.7E-3<br>(308) 9.7E-3<br>(309) 9.7E-3<br>(310) 9.7E-3<br>(311) 0.0284<br>(312) 0.0284<br>(313) 0.0284<br>(315) 0.0284<br>(315) 0.0284<br>(316) 0.0284<br>(316) 0.0284<br>(319) 0.0284<br>(320) 0.0284<br>(321) 0.0284<br>(322) 0.0284   | (325) 9.7E-3<br>(326) 9.7E-3<br>(327) 0.0137<br>(328) 0.0137<br>(329) 0.0232<br>(330) 0.0232<br>(331) 0.0232<br>(332) 0.0232<br>(333) 0.0232<br>(335) 9.7E-3<br>(336) 9.7E-3<br>(337) 6.2E-3<br>(337) 6.2E-3<br>(337) 0.0232<br>(340) 0.0232                 | (343) 9.7E-3                 |
| ( 91) 0.0284<br>( 92) 0.0284<br>( 92) 0.0284<br>( 93) 0.0232<br>( 94) 0.0232<br>( 95) 0.0232<br>( 96) 0.0232<br>( 97) 0.0284<br>( 98) 0.0284<br>( 98) 0.0284<br>( 99) 0.0284<br>( 100) 0.0284<br>( 101) 0.0284<br>( 101) 0.0404<br>( 102) 0.0404<br>( 103) 0.1<br>( 104) 0.1 | ( 36) 0.0182<br>(109) 0.0834<br>(110) 0.0834<br>(111) 0.0754<br>(112) 0.0754<br>(113) 0.0604<br>(114) 0.0604<br>(115) 0.0916<br>(117) 0.0754<br>(118) 0.0754<br>(118) 0.0754<br>(119) 0.0604<br>(120) 0.0604<br>(121) 0.0402<br>(122) 0.0402                 | (127) 0.0402<br>(128) 0.0402<br>(129) 0.0402<br>(130) 0.0402<br>(131) 0.0402<br>(132) 0.0402<br>(133) 0.0342<br>(135) 0.0342<br>(135) 0.0284<br>(136) 0.0284<br>(137) 0.0284<br>(139) 0.0342<br>(140) 0.0342<br>(141) 0.0342<br>(142) 0.0342 | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0342<br>(147) 0.0342<br>(149) 0.0284<br>(150) 0.0284<br>(151) 0.0232<br>(152) 0.0232<br>(153) 0.0342<br>(155) 0.0342<br>(155) 0.0342<br>(155) 0.0342<br>(157) 0.0402<br>(158) 0.0402<br>(159) 0.0466 | (163) 0.0402<br>(164) 0.0402<br>(165) 0.0342<br>(165) 0.0342<br>(166) 0.0342<br>(167) 0.0466<br>(169) 0.1<br>(170) 0.1<br>(171) 0.0834<br>(172) 0.0834<br>(172) 0.0834<br>(175) 0.0834<br>(175) 0.0834<br>(176) 0.0834<br>(177) 0.0534 | (271) 0.0284<br>(272) 0.0284<br>(273) 0.0232<br>(274) 0.0232<br>(275) 0.0182<br>(275) 0.0182<br>(277) 0.0137<br>(278) 0.0137<br>(278) 0.0137<br>(279) 0.0232<br>(280) 0.0232<br>(281) 0.0182<br>(282) 0.0182<br>(283) 0.0182<br>(285) 0.0284<br>(286) 0.0284   | (287) 0.0284<br>(290) 0.0284<br>(291) 0.0232<br>(292) 0.0232<br>(293) 0.0232<br>(294) 0.0232<br>(295) 0.0232<br>(296) 0.0232<br>(297) 0.0232<br>(297) 0.0232<br>(297) 0.0232<br>(300) 0.0232<br>(300) 0.0232<br>(301) 0.0182<br>(302) 0.0182<br>(303) 0.0137<br>(304) 0.0137 | (307) 9.7E-3<br>(308) 9.7E-3<br>(309) 9.7E-3<br>(310) 9.7E-3<br>(311) 0.0284<br>(312) 0.0284<br>(313) 0.0284<br>(315) 0.0284<br>(315) 0.0284<br>(316) 0.0284<br>(316) 0.0284<br>(319) 0.0284<br>(320) 0.0284<br>(321) 0.0284<br>(322) 0.0284   | (325) 9.7E-3<br>(326) 9.7E-3<br>(327) 0.0137<br>(328) 0.0137<br>(329) 0.0232<br>(330) 0.0232<br>(331) 0.0232<br>(331) 0.0232<br>(333) 0.0232<br>(335) 9.7E-3<br>(336) 9.7E-3<br>(337) 6.2E-3<br>(337) 6.2E-3<br>(339) 0.0232                                 | (343) 9.7E-3                 |
| (18) 0.0284<br>(91) 0.0284<br>(92) 0.0284<br>(93) 0.0232<br>(94) 0.0232<br>(94) 0.0232<br>(97) 0.0284<br>(98) 0.0284<br>(99) 0.0284<br>(100) 0.0284<br>(101) 0.0604<br>(102) 0.0604<br>(103) 0.1<br>(104) 0.1  | (109) 0.0834<br>(110) 0.0834<br>(110) 0.0834<br>(111) 0.0754<br>(112) 0.0754<br>(113) 0.0604<br>(114) 0.0604<br>(114) 0.0604<br>(115) 0.0916<br>(116) 0.0754<br>(117) 0.0754<br>(119) 0.0604<br>(120) 0.0604<br>(121) 0.0402<br>(122) 0.0402<br>(123) 0.0342 | (127) 0.0402<br>(128) 0.0402<br>(128) 0.0402<br>(130) 0.0402<br>(131) 0.0402<br>(132) 0.0402<br>(133) 0.0342<br>(134) 0.0342<br>(135) 0.0284<br>(136) 0.0284<br>(137) 0.0284<br>(137) 0.0342<br>(140) 0.0342                                 | (145) 0.0342<br>(146) 0.0342<br>(147) 0.0342<br>(147) 0.0342<br>(149) 0.0284<br>(150) 0.0284<br>(151) 0.0232<br>(152) 0.0232<br>(153) 0.0342<br>(153) 0.0342<br>(155) 0.0342<br>(155) 0.0402<br>(158) 0.0402<br>(159) 0.0465                 | (163) 0.0402<br>(164) 0.0402<br>(165) 0.0342<br>(165) 0.0342<br>(166) 0.0342<br>(167) 0.0466<br>(169) 0.1<br>(170) 0.1<br>(171) 0.0834<br>(173) 0.109<br>(174) 0.109<br>(175) 0.0834<br>(175) 0.0834<br>(176) 0.0834<br>(177) 0.0334   | (271) 0.0284<br>(272) 0.0284<br>(273) 0.0232<br>(274) 0.0232<br>(275) 0.0182<br>(275) 0.0182<br>(276) 0.0182<br>(277) 0.0137<br>(278) 0.0137<br>(279) 0.0232<br>(280) 0.0232<br>(281) 0.0182<br>(282) 0.0182<br>(283) 0.0182<br>(283) 0.0182<br>(284) 0.0182<br>(285) 0.0284<br>(287) 0.0284<br>(287) 0.0284 | (289) 0.0284<br>(290) 0.0284<br>(291) 0.0232<br>(292) 0.0232<br>(293) 0.0232<br>(294) 0.0232<br>(295) 0.0232<br>(296) 0.0232<br>(296) 0.0232<br>(297) 0.0232<br>(299) 0.0232<br>(300) 0.0232<br>(300) 0.0182<br>(303) 0.0187   | (307) 9.7E-3<br>(308) 9.7E-3<br>(309) 9.7E-3<br>(310) 9.7E-3<br>(311) 0.02B4<br>(312) 0.02B4<br>(313) 0.02B4<br>(314) 0.02B4<br>(315) 0.02B4<br>(316) 0.02B4<br>(317) 0.02B4<br>(317) 0.02B4<br>(319) 0.02B4<br>(320) 0.02B4<br>(321) 0.02B4<br>(322) 0.02B4<br>(323) 0.02B4<br>(324) 0.02B4 | (325) 9.7E-3<br>(326) 9.7E-3<br>(327) 0.0137<br>(329) 0.0137<br>(329) 0.0232<br>(330) 0.0232<br>(331) 0.0232<br>(331) 0.0232<br>(333) 0.0232<br>(335) 9.7E-3<br>(336) 9.7E-3<br>(336) 9.7E-3<br>(337) 0.0232<br>(340) 0.0232<br>(340) 0.0232<br>(341) 9.7E-3 | (343) 9.7E-3<br>(344) 9.7E-3 |

River discharge data at 12-hourly intervals for Station: WSTW Period : 4

Phosphorus transport Berg River

.

,

| $ \begin{pmatrix} 9 \\ 0.0284 \\ (10) 0.0284 \\ (28) 0.0137 \\ (46) 0.0232 \\ (47) 0.0182 \\ (47) 0.0182 \\ (47) 0.0182 \\ (47) 0.0182 \\ (48) 0.0232 \\ (88) 9.7E-3 \\ (191) 0.0232 \\ (192) 0.0232 \\ (209) 0.0284 \\ (27) 9.7E-3 \\ (243) 9.7E-3 \\ (245) 9.7E-3 \\ (246) 9.7E-3 \\ (247) 0.0232 \\ (246) 3.3E-3 \\ (13) 0.0232 \\ (31) 0.0137 \\ (50) 0.0137 \\ (50) 0.0137 \\ (60) 0.02321 \\ (86) 9.7E-3 \\ (194) 0.0232 \\ (212) 9.7E-3 \\ (230) 9.7E-3 \\ (230) 9.7E-3 \\ (248) 0.0232 \\ (248) 0.0232 \\ (246) 3.3E-3 \\ (246) 3.3E-3 \\ (247) 0.0232 \\ (249) 3.3E-3 \\ (247) 0.0232 \\ (249) 3.3E-3 \\ (247) 0.0232 \\ (249) 3.3E-3 \\ (249) 0.0232 \\ (249) 3.3E-3 \\ (24$   |              |
|--|--------------|
| $ \begin{pmatrix} 2 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$   | -            |
| $ \begin{pmatrix} 21 \\ 0.0137 \\ (21) \\ 0.0232 \\ (21) \\ 0.0232 \\ (22) \\ 0.0232 \\ (21) \\ 0.0232 \\ (22) \\ 0.0232 \\ (22) \\ 0.0232 \\ (22) \\ 0.0137 \\ (22) \\ 0.0232 \\ (22) \\ 0.0137 \\ (22) \\ 0.0232 \\ (23) \\ 0.0232 \\ (23) \\ 0.0232 \\ (23) \\ 0.0232 \\ (23) \\ 0.0232 \\ (23) \\ 0.0232 \\ (24) \\ 0.0137 \\ (25) \\ 0.0137 \\ (25) \\ 0.0137 \\ (25) \\ 0.0137 \\ (25) \\ 0.0137 \\ (25) \\ 0.0137 \\ (25) \\ 0.0137 \\ (25) \\ 0.0137 \\ (25) \\ 0.0137 \\ (25) \\ 0.0137 \\ (25) \\ 0.0137 \\ (25) \\ 0.0137 \\ (25) \\ 0.0137 \\ (25) \\ 0.0137 \\ (25) \\ 0.0137 \\ (25) \\ 0.0137 \\ (25) \\ 0.0137 \\ (25) \\ 0.0182 \\ (24) \\ 0.0232 \\ (24) \\ 0.0232 \\ (24) \\ 0.0232 \\ (22) \\ 0.0232 \\ (24) \\ 0.0137 \\ (24) \\ 0.0232 \\ (24) \\ 0.02$  |              |
| $ \begin{pmatrix} 3 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$   |              |
| ( 4)       0.0232       ( 23)       0.0232       ( 41)       0.0182       ( 59)       0.0182       ( 77)       0.0232       ( 185)       0.0232       ( 221)       0.0232       ( 241)       0.0137       ( 258)       3.3E-3         ( 6)       0.0232       ( 24)       0.0232       ( 42)       0.0132       ( 186)       0.0232       ( 221)       0.02  |              |
| ( 5) 0.0232       ( 24) 0.0232       ( 42) 0.0182       ( 40) 0.0182       ( 78) 0.0232       ( 186) 0.0284       ( 204) 0.0232       ( 221) 0.0232       ( 240) 0.0232       ( 250) 0.0232         ( 7) 0.0182       ( 25) 0.0182       ( 43) 0.0232       ( 61) 3.3E-3       ( 79) 0.0232       ( 187) 0.0232       ( 205) 0.0232       ( 223) 0.0284       ( 241) 0.0232       ( 250) 0.0232         ( 8) 0.0182       ( 26) 0.0182       ( 44) 0.0232       ( 62) 3.3E-3       ( 80) 0.0232       ( 187) 0.0232       ( 205) 0.0232       ( 223) 0.0284       ( 241) 0.0232       ( 260) 0.0232         ( 8) 0.0182       ( 26) 0.0182       ( 44) 0.0232       ( 62) 3.3E-3       ( 80) 0.0232       ( 187) 0.0232       ( 205) 0.0232       ( 226) 9.7E-3       ( 244) 0.0137       ( 264) 0.0284         ( 10) 0.0284       ( 27) 0.0137       ( 46) 0.0232       ( 81) 0.0232       ( 187) 0.0232       ( 209) 0.0284       ( 227) 9.7E-3       ( 244) 0.0137       ( 264) 9.7E-3         ( 11) 0.0284       ( 29) 0.0162       ( 47) 0.0182       ( 65) 0.0232       ( 81) 9.7E-3       ( 191) 0.0232       ( 209) 0.0284       ( 227) 9.7E-3       ( 244) 9.7E-3       ( 245) 9.7E-3       ( 246) 9.7  |              |
| $ \begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0$   |              |
| $ \begin{pmatrix} 7 \\ 0.0182 \\ (25) 0.0182 \\ (26) 0.0182 \\ (26) 0.0182 \\ (26) 0.0182 \\ (27) 0.0137 \\ (45) 0.0232 \\ (45) 0.0232 \\ (63) 0.0232 \\ (81) 0.0232 \\ (187) 0.0232 \\ (187) 0.0232 \\ (207) 0.0232 \\ (225) 9.7E-3 \\ (243) 0.0137 \\ (243) 0.0137 \\ (243) 0.0137 \\ (243) 0.0137 \\ (243) 0.0137 \\ (243) 0.0137 \\ (243) 0.0137 \\ (243) 0.0137 \\ (243) 0.0137 \\ (243) 0.0137 \\ (243) 0.0137 \\ (243) 0.0137 \\ (243) 9.7E-3 \\ (244) 9.7E-3 \\ (244) 9.7E-3 \\ (245) 9.7E-3 \\ (246) 9.7E-3$  |              |
| $ \left\{ \begin{array}{c} 8 \end{array} \right\} 0.0182 \\ \left\{ \begin{array}{c} 28 \end{array} \right\} 0.0182 \\ \left\{ \begin{array}{c} 28 \end{array} \right\} 0.0182 \\ \left\{ \begin{array}{c} 45 \end{array} \right\} 0.0232 \\ \left\{ \begin{array}{c} 45 \end{array} \right\} 0.0232 \\ \left\{ \begin{array}{c} 81 \end{array} 0.0232 \\ \left\{ \begin{array}{c} 207 \end{array} 0.0232 \\ \left\{ \begin{array}{c} 225 \end{matrix} 9.7E-3 \\ \left\{ \begin{array}{c} 225 \end{matrix} 9.7E-3 \\ \left\{ \begin{array}{c} 244 \end{matrix} 0.0137 \\ \left\{ \begin{array}{c} 243 \end{matrix} 0.0137 \\ \left\{ \begin{array}{c} 262 \end{matrix} 0.0284 \\ \left\{ \begin{array}{c} 208 \end{array} 0.0232 \\ \left\{ \begin{array}{c} 208 \end{matrix} 0.0232 \\ \left\{ \begin{array}{c} 208 \end{matrix} 0.0232 \\ \left\{ \begin{array}{c} 208 \end{matrix} 0.0232 \\ \left\{ \begin{array}{c} 226 \end{matrix} 9.7E-3 \\ \left\{ \begin{array}{c} 244 \end{matrix} 0.0137 \\ \left\{ \begin{array}{c} 244 \end{matrix} 0.0137 \\ \left\{ \begin{array}{c} 262 \end{matrix} 0.0284 \\ \left\{ \begin{array}{c} 208 \end{matrix} 0.0232 \\ \left\{ \begin{array}{c} 208 \end{matrix} 0.0232 \\ \left\{ \begin{array}{c} 208 \end{matrix} 0.0232 \\ \left\{ \begin{array}{c} 226 \end{matrix} 9.7E-3 \\ \left\{ \begin{array}{c} 244 \end{matrix} 0.0137 \\ \left\{ \begin{array}{c} 243 \end{matrix} 9.7E-3 \\ \left\{ \begin{array}{c} 263 \end{matrix} 9.7E-3 \\ \left\{ \begin{array}{c} 264 \end{matrix} 9.7E-3 \\ 0.7E-3 \\ \left\{ \begin{array}{c} 264 \end{matrix} 9.7E-3 \\ 0.7E-3 \\ \left\{ \begin{array}{c} 264 \end{matrix} 9.7E-3 \\ 0.7E-3 \\ \left\{ \begin{array}{c} 264 \end{matrix}$ |              |
| $ \begin{pmatrix} 9 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$   |              |
| $ \begin{pmatrix} 10 \\ 0.0284 \\ (11) \\ 0.0284 \\ (29) \\ 0.0182 \\ (11) \\ 0.0284 \\ (29) \\ 0.0182 \\ (12) \\ 0.0284 \\ (29) \\ 0.0182 \\ (12) \\ 0.0284 \\ (29) \\ 0.0182 \\ (12) \\ 0.0284 \\ (20) \\ 0.0182 \\ (20) \\ 0.0284 \\ (220) \\ 0.0284 \\ (220) \\ 0.0284 \\ (220) \\ 0.0284 \\ (220) \\ 0.7E-3 \\ (240) \\ 0.7E-3 \\ (264) \\ 9.7E-3 \\ (211) \\ 9.7E-3 \\ (212) \\ 9.7E-3 \\ (212) \\ 9.7E-3 \\ (213) \\ 0.0284 \\ (233) \\ 0.0182 \\ (231) \\ 0.0182 \\ (251) \\ 0.0232 \\ (250) \\ 3.3E-3 \\ (268) \\ 0.0232 \\ (269) \\ 3.3E-3 \\ (268) \\ 0.0232 \\ (270) \\ 3.3E-3 \\ (216) \\ 0.0284 \\ (234) \\ 0.0182 \\ (234) \\ 0.0182 \\ (252) \\ 0.0232 \\ (270) \\ 3.3E-3 $  | 1.5.8        |
| $ \begin{array}{c} (11) \ 0.0284 & (29) \ 0.0182 & (49) \ 0.0182 & (49) \ 0.0182 & (49) \ 0.0182 & (49) \ 0.0232 & (84) \ 9.7E-3 & (192) \ 0.0232 & (210) \ 0.0284 & (228) \ 9.7E-3 & (246) \ 9.7E-3 & (264) \ 9.7E-3 & (264) \ 9.7E-3 & (264) \ 9.7E-3 & (265) \ 3.3E-3 & (13) \ 0.0232 & (31) \ 0.0137 & (50) \ 0.0137 & (50) \ 0.0137 & (50) \ 0.0137 & (50) \ 0.0137 & (50) \ 0.0182 & (80) \ 9.7E-3 & (194) \ 0.0232 & (212) \ 9.7E-3 & (230) \ 9.7E-3 & (240) \ 0.0232 & (246) \ 3.3E-3 & (14) \ 0.0232 & (33) \ 0.0137 & (51) \ 0.0182 & (66) \ 0.0182 & (87) \ 9.7E-3 & (195) \ 0.0137 & (213) \ 0.0284 & (231) \ 0.0232 & (250) \ 3.3E-3 & (268) \ 0.0232 & (269) \ 3.3E-3 & (267) \ 0.0232 & (269) \ 3.3E-3 & (267) \ 0.0232 & (269) \ 3.3E-3 & (268) \ 0.0232 & (269) \ 3.3E-3 & (269) \ 0.0232 & (269) \ 3.3E-3 & ($   |              |
| $ \begin{pmatrix} 12 \\ 0.0284 \\ (30 \\ 0.0182 \\ (31 \\ 0.0232 \\ (31 \\ 0.0137 \\ (49 \\ 0.0137 \\ (49 \\ 0.0137 \\ (49 \\ 0.0137 \\ (51 \\ 0.0182 \\ (19 \\ 0.0182 \\ (19 \\ 0.0182 \\ (19 \\ 0.0182 \\ (19 \\ 0.0182 \\ (19 \\ 0.0182 \\ (19 \\ 0.0182 \\ (19 \\ 0.0182 \\ (19 \\ 0.0182 \\ (19 \\ 0.0182 \\ (19 \\ 0.0182 \\ (19 \\ 0.0137 \\ (19 \\ 0.0232 \\ (19 \\ 0.0232 \\ (211 \\ 0.0232 \\ (229 \\ 0.7E-3 \\ (229 \\ 0.0232 \\ (220 \\ 0.0232 \\$   | -            |
| $ \begin{pmatrix} 13 \\ 0.0232 \\ (14) \\ 0.0232 \\ (32) \\ 0.0137 \\ (51) \\ 0.0137 \\ (51) \\ 0.0137 \\ (51) \\ 0.0182 \\ (15) \\ 0.0284 \\ (23) \\ 0.0182 \\ (25) \\ 0.0232 \\ (26) \\ 3.8-3 \\ (16) \\ 0.0232 \\ (27) \\ 3.3E-3 \\ (17) \\ 0.0182 \\ (15) \\ 0.0284 \\ (23) \\ 0.0182 \\ (23) \\ 0.0182 \\ (25) \\ 0.0232 \\ (27) \\ 3.3E-3 \\ (17) \\ 0.0232 \\ (23) \\ 0.0232 \\ (25) \\ 0.0232 \\ (27) \\ 3.3E-3 \\ (26) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 3.3E-3 \\ (28) \\ 0.0232 \\ (27) \\ 3.3E-3 \\ (28) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 3.3E-3 \\ (28) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 3.3E-3 \\ (28) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 0.0232 \\ (27) \\ 0.023$  |              |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  |              |
| (15) 0.0182 (33) 0.0137 (51) 0.0182 (70) 0.0182 (70) 0.0162 (86) 9.7E-3 (174) 0.0137 (214) 0.0284 (232) 0.0232 (250) 3.3E-3 (268) 0.0232 (16) 0.0182 (34) 0.0137 (52) 0.0182 (70) 0.0162 (86) 9.7E-3 (177) 9.7E-3 (215) 0.0284 (233) 0.0182 (251) 0.0232 (249) 3.3E-3 (177) 0.0182 (35) 0.0137 (53) 0.0232 (71) 9.7E-3 (90) 9.7E-3 (197) 9.7E-3 (216) 0.0284 (234) 0.0182 (252) 0.0232 (270) 3.3E-3 (178) 0.0182 (351) 0.0137 (53) 0.0232 (72) 9.7E-3 (90) 9.7E-3 (198) 9.7E-3 (216) 0.0284 (234) 0.0182 (252) 0.0232 (270) 3.3E-3   |              |
| (16) 0.0182 (34) 0.0137 (52) 0.0182 (70) 9.7E-3 (89) 9.7E-3 (197) 9.7E-3 (215) 0.0284 (233) 0.0182 (251) 0.0232 (269) 3.3E-3<br>(17) 0.0182 (35) 0.0137 (53) 0.0232 (71) 9.7E-3 (89) 9.7E-3 (197) 9.7E-3 (215) 0.0284 (234) 0.0182 (252) 0.0232 (270) 3.3E-3   | · · · .      |
| (17) 0.0182 (35) 0.0137 (53) 0.0232 (72) 9.7E-3 (90) 9.7E-3 (198) 9.7E-3 (216) 0.0284 (234) 0.0182 (252) 0.0232 (270) 3.3E-3   |              |
|  |              |
|  |              |
|  |              |
|  |              |
|  | 1.4          |
|  |              |
| (271) 8 75-7 (289) 0.0284 (307) 0.0284 (325) 0.0284 (343) 0.0232   |              |
| 108) 4 2E-3 (127) 0.0192 (145) 9.7E-3 (163) 0.0182 (2/1) 4.7E-3 (287) 0.0204 (307) 0.0204 (307)  |              |
| (91) 0.0137 (100) 0.0284 (308) 0.0232 (328) 0.0284 (308) 0.0232 (328) 0.0284 (308) 0.0232 (328) 0.0284 (308) 0.0232  | -            |
| ( 72) 0.0127 (111) 0.0137 (112) 0.0182 (147) 0.0182 (165) 3.3E-3 (273) 0.0284 (291) 0.0284 (309) 0.0232 (327) 0.0342 (343) 0.0232  | A3           |
| (73) $(.0182)$ $(111)$ $(.0182)$ $(148)$ $(.0182)$ $(148)$ $(.0182)$ $(146)$ $(.0284)$ $(.028$   |              |
| ( 74) 0.0182 (112) 0.0182 (111) 0.0182 (149) 0.0182 (167) 6.2E-3 (275) 0.0284 (293) 0.0232 (311) 0.0284 (327) 0.0342 (347) 0.0182  | <b>(4)</b> , |
| ( 45) 0.0182 (113) 0.0182 (113) 0.0182 (150) 0.0182 (168) 6.2E-3 (276) 0.0284 (294) 0.0232 (312) 0.0284 (330) 0.0342 (348) 0.0182  | ~            |
| (96) 0.0182 (114) 0.0287 (113) 0.0237 (151) 3.3E-3 (169) 6.2E-3 (277) 9.9E-3 (295) 0.0137 (313) 0.0284 (331) 0.0284 (349) 0.0182   |              |
|  |              |
| (98) 9.7E-3 (118) 0.0137 (134) 0.0232 (151) 0.0232 (171) 4.2E-3 (279) 0.0232 (297) 0.0232 (315) 0.0232 (333) 0.0232 (351) 0.0232   |              |
| (99) 0.0232 (117) 0.0182 (133) 0.0182 (133) 0.0232 (135) 0.0232 (135) 0.0232 (316) 0.0232 (334) 0.0232 (352) 0.0232  |              |
| (100) 0.0232 (118) 0.0182 (138) 0.0182 (138) 0.0182 (173) 8 7E-3 (281) 0.0232 (299) 0.0232 (317) 0.0232 (335) 0.0184 (353) 0.0284  |              |
| (101) 0.0182 (117) 0.0182 (137) 0.0184 (137)   | · · ·        |
| (102) 0.0182 (120) 0.0182 (138) 0.0182 (138) 0.0182 (137) 0.0182 (137) 0.0232 (301) 0.0232 (319) 0.0342 (337) 0.0232 (355) 0.0284  |              |
| (103) 0.0182 (121) 0.0182 (134) 0.0232 (137) 0.0232 (177) 0.0182 (1784) 0.0232 (302) 0.0232 (320) 0.0342 (338) 0.0232 (356) 0.0284   |              |
| (104) 0.0182 (122) 0.0182 (140) 0.0232 (158) 0.0232 (177) 0.0182 (178) 0.0232 (303) 0.0232 (321) 0.0342 (339) 0.0284 (357) 0.0232  |              |
| (105) 0.0182 (123) 0.0182 (141) 9.7E-3 (159) 0.0232 (177) 0.0182 (159) 0.0232 (304) 0.0232 (322) 0.0342 (340) 0.0284 (358) 0.0232  |              |
| (106) 0.0182 (124) 0.0182 (142) 9.7E-3 (160) 0.0232 (178) 0.0182 (286) 0.0232 (309) 0.0232 (341) 0.0284 (359) 0.0232   |              |
| (107) 0.0182 (125) 0.0182 (143) 0.0232 (161) 0.0232 (177) 6.25-3 (287) 0.0182 (304) 0.0232 (324) 0.0342 (342) 0.0284 (360) 0.0232  |              |
| (107) 0.0182 (126) 0.0182 (144) 0.0232 (162) 0.0232 (180) 6.2E-3 (288) 0.0182 (306) 0.0232 (324) 0.0342 (342) 0.0284 (380) 0.0232 (108) 0.0232   | -            |

· · · · ·

River discharge data at 12-hourly intervals for Station: WSTW Period : 5

Phosphorus transport Berg River

.

TR 143 March 1989

| $ \begin{array}{c} (1) 0.023 & (19) 0.023 & (37) 0.024 & (23) 0.025 & (74) 0.034 & (182) 0.025 & (720) 0.0466 & (227) 0.0466 & (227) 0.034 & (225) 0.03 \\ (3) 0.023 & (21) 0.023 & (37) 0.028 & (77) 0.028 & (78) 0.034 & (188) 0.033 & (202) 0.0466 & (227) 0.0466 & (238) 0.034 & (236) 0.03 \\ (3) 0.023 & (21) 0.023 & (41) 0.028 & (59) 0.0466 & (78) 0.044 & (188) 0.063 & (220) 0.0466 & (227) 0.0466 & (237) 0.034 & (259) 0.03 \\ (3) 0.023 & (23) 0.023 & (41) 0.028 & (59) 0.0466 & (78) 0.046 & (189) 0.058 & (220) 0.0466 & (227) 0.0466 & (227) 0.034 & (259) 0.03 \\ (3) 0.023 & (23) 0.023 & (43) 0.028 & (43) 0.046 & (78) 0.0466 & (189) 0.076 & (220) 0.066 & (224) 0.034 & (259) 0.03 \\ (3) 0.023 & (23) 0.023 & (43) 0.023 & (43) 0.046 & (21) 0.0466 & (189) 0.076 & (200) 0.053 & (223) 0.046 & (241) 0.034 & (259) 0.0 \\ (1) 0.023 & (22) 0.023 & (43) 0.023 & (43) 0.043 & (51) 0.043 & (51) 0.044 & (189) 0.076 & (200) 0.053 & (224) 0.034 & (240) 0.03 \\ (10) 0.023 & (22) 0.023 & (43) 0.023 & (44) 0.033 & (51) 0.043 & (51) 0.044 & (190) 0.076 & (209) 0.053 & (226) 0.034 & (241) 0.034 & (242) 0.03 \\ (10) 0.023 & (22) 0.023 & (43) 0.023 & (44) 0.034 & (51) 0.043 & (51) 0.044 & (191) 0.066 & (209) 0.035 & (226) 0.034 & (241) 0.034 & (220) 0.0 \\ (11) 0.023 & (28) 0.023 & (49) 0.023 & (49) 0.034 & (45) 0.04 & (192) 0.066 & (210) 0.0466 & (228) 0.034 & (240) 0.034 & (242) 0.03 \\ (12) 0.028 & (33) 0.023 & (50) 0.023 & (49) 0.034 & (45) 0.04 & (193) 0.0466 & (213) 0.04 & (237) 0.034 & (249) 0.03 & (247) 0.03 & (247) 0.03 & (247) 0.03 & (247) 0.03 & (247) 0.034 & (247) 0.03 & (247) 0.03 & (247) 0.03 & (247) 0.03 & (247) 0.03 & (240) 0.03 & (247)$  | Variable: WSTW   |   | (length = 360)  |  |  | (181) 0.034   | (199) 0.0466  | (217) 0.04  | (235) 0.04  | (253) 0.034   |
|---|--|---|---|--|--|---|---|---|---|---|
| 12) 0.023       (20) 0.023       (38) 0.034       (180) 0.034       (180) 0.034       (210) 0.034       (210) 0.034       (221) 0.034       (225) 0.03         13) 0.023       (221) 0.023       (40) 0.034       (157) 0.038       (71) 0.034       (180) 0.035       (221) 0.0446       (223) 0.046       (223) 0.034       (221)   | 1) 0.023   | ( 19) 0.023   | ( 37) 0.034   | ( 55) 0.023  | (73) 0.034   |   |   |   | (236) 0.04  | (234) 0.034   |
| 31       0.023       (21)       0.023       (39)       0.034       (25)       0.0445       (220)       0.0466       (220)       0.0466       (220)       0.0466       (221)       0.0466       (221)       0.0466       (221)       0.0466       (221)       0.0466       (221)       0.0466       (221)       0.0466       (221)       0.0466       (221)       0.0466       (221)       0.0466       (221)       0.0466       (221)       0.0466       (221)       0.0466       (221)       0.0466       (221)       0.0466       (221)       0.0466       (221)       0.0466       (221)       0.0466       (221)       0.031       (221)       0.032       (221)       0.032       (221)       0.032       (221)       0.032       (221)       0.032       (221)       0.034       (221)       0.034       (221)       0.034       (221)       0.034       (221)       0.034       (221)       0.034       (221)       0.034       (221)       0.034       (221)       0.034       (221)       0.034       (221)       0.034       (221)       0.034       (221)       0.034       (221)       0.034       (241)       0.034       (241)       0.034       (241)       0.034       (241)       0.034  |  | (20) 0.023  |   |  |  |   |   |   |   | '(255) 0.034  |
| $ \begin{array}{c} +1 & 0.023 \\ (22) & 0.023 \\ (23) & 0.023 \\ (24) & 0.024 \\ (22) & 0.034 \\ (224) & 0.03 \\ (221) & 0.034 \\ (224) & 0.03 \\ (221) & 0.034 \\ (224) & 0.03 \\ (221) & 0.034 \\ (224) & 0.03 \\ (221) & 0.034 \\ (224) & 0.03 \\ (221) & 0.034 \\ (224) & 0.03 \\ (221) & 0.034 \\ (224) & 0.03 \\ (221) & 0.034 \\ (221) & 0.034 \\ (224) & 0.034 \\ (224) & 0.034 \\ (224) & 0.034 \\ (224) & 0.034 \\ (224) & 0.034 \\ (224) & 0.034 \\ (224) & 0.034 \\ (225) & 0.034 \\ (231) & 0.033 \\ (221) & 0.034 \\ (221) & 0.034 \\ (221) & 0.034 \\ (221) & 0.034 \\ (221) & 0.034 \\ (221) & 0.034 \\ (221) & 0.034 \\ (221) $  |  | (21) 0.023  | ( 39) 0.034   |  |  |   |   |   |   | (256) 0.034   |
| 31         0.023         (23)         0.023         (41)         0.028         (57)         0.046         (77)         0.046         (189)         0.033         (222)         0.046         (241)         0.034         (239)<   |  |   | ( 40) 0.034   | ( 58) 0.0285   |  |   |   |   |   | (257) 0.0372  |
| $ \begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$   |  |   | ( 41) 0.0285  | ( 59) 0.0466   |  |   |   |   |   | (258) 0.0372  |
| $ \begin{array}{c} (7) 0.023 & (23) 0.023 & (43) 0.028 & (41) 0.04 & (79) 0.0466 & (189) 0.076 & (202) 0.034 & (223) 0.034 & (224) 0.034 & $  |  |   |   | ( 60) 0.0466   |  |   |   |   |   | (259) 0.076   |
| 1/1       0.023       1/2/1       0.034       1/2/1       0.034       1   |  |   |   | ( 61) 0.04   |  |   |   |   |   | (260) 0.076   |
| $ \begin{array}{c} (9) 0.023 & (27) 0.023 & (43) 0.023 & (43) 0.023 & (43) 0.043 & (B1) 0.044 & (190) 0.076 & (209) 0.046 & (271) 0.034 & (249) 0.034 & (262) 0.054 \\ (10) 0.023 & (28) 0.023 & (44) 0.023 & (44) 0.033 & (B1) 0.043 & (B2) 0.04 & (191) 0.076 & (209) 0.046 & (272) 0.034 & (249) 0.034 & (262) 0.054 \\ (12) 0.028 & (30) 0.023 & (48) 0.023 & (46) 0.034 & (B3) 0.034 & (191) 0.076 & (229) 0.046 & (271) 0.034 & (249) 0.034 & (264) 0.034 &$  |  |   |   |  |  |   |   |   |   |   |
| $ \begin{array}{c} (1) 0 & 0.23 \\ (11) 0 & 0.24 \\ (12) 0 $   |  |   |   | ( 63) 0.043  | (81) 0.04  |   |   |   |   |   |
| $ \begin{array}{c} 100 \ 0.025 \ (27) \ 0.025 \ (27) \ 0.025 \ (47) \ 0.028 \ (47) \ 0.046 \ (212) \ 0.04 \ (223) \ 0.034 \ (224) \ 0.034 \ (224) \ 0.034 \ (226) \ 0.034 \ (226) \ 0.034 \ (226) \ 0.034 \ (226) \ 0.034 \ (226) \ 0.034 \ (226) \ 0.034 \ (226) \ 0.034 \ (226) \ 0.034 \ (226) \ 0.034 \ (226) \ 0.034 \ (226) \ 0.034 \ (226) \ 0.034 \ (226) \ 0.034 \ (226) \ 0.034 \ (226) \ 0.034 \ (226) \ 0.046 \ (216) \ 0.046 \ (216) \ 0.046 \ (2216) \ 0.04 \ (223) \ 0.04 \ (2216) \$  |  |   |   | ( 64) 0.043  | ( 82) 0.04   |   |   |   |   |   |
| $ \begin{array}{c} (12) \ 0.023 \\ (12) \ 0.023 \\ (13) \ 0.023 \\ (13) \ 0.023 \\ (14) \ 0.023 \\ (15) \ 0.023 \\ (17) \ 0.023 \\ (17) \ 0.023 \\ (17) \ 0.023 \\ (17) \ 0.023 \\ (17) \ 0.023 \\ (17) \ 0.023 \\ (17) \ 0.023 \\ (17) \ 0.023 \\ (17) \ 0.023 \\ (17) \ 0.023 \\ (17) \ 0.023 \\ (17) \ 0.023 \\ (17) \ 0.023 \\ (17) \ 0.023 \\ (17) \ 0.023 \\ (17) \ 0.024 \\ (17) \ 0.046 \\ (17) \ 0.04 \\ (17) \ 0$  |  |   |   |  | ( 83) 0.034  |   |   |   |   |   |
| $ \begin{array}{c} 120, 0.228 & (31), 0.023 & (49), 0.023 & (49), 0.024 & (89), 0.0285 & (193), 0.0466 & (211), 0.04 & (223), 0.034 & (2246), 0.034 & (2264), 0.034 & (22$  |  |   |   |  | (84) 0.034   |   |   |   |   |   |
| $ \begin{array}{c} (13) \ 0.028 \ (31) \ 0.023 \ (30) \ 0.023 \ (40) \ 0.0285 \ (47) \ 0.0285 \ (47) \ 0.0285 \ (174) \ 0.0466 \ (212) \ 0.04 \ (231) \ 0.034 \ (234) \ 0.034 \ (235) \ 0.04 \ (231) \ 0.04 \ (231) \ 0.04 \ (231) \ 0.04 \ (231) \ 0.054 \ (232) \ 0.054$  |  |   |   |  | ( 85) 0.0285   |   |   |   |   |   |
| $ \begin{array}{c} (14) 0.028 & (32) 0.024 & (23) 0.024 & (23) 0.024 & (23) 0.034 & (230) 0.034 & (220) 0.034 &$  |  |   |   |  |  |   |   |   |   |   |
| $ \begin{array}{c} (19) \ 0.023 & (33) \ 0.026 & (232) \ 0.034 & (231) \ 0.0285 & (71) \ 0.0285 & (92) \ 0.066 & (197) \ 0.0466 & (214) \ 0.04 & (232) \ 0.034 & (251) \ 0.034 & (252) \ 0.034 & (251) \ 0.034 & (252) \ 0.034 & (251) \ 0.034 & (252) \ 0.034 & (251) \ 0.034 & (252) \ 0.034 & (251) \ 0.034 & (252) \ 0.034 & (251) \ 0.034 & (252) \ 0.028 & (253) \ 0.028 & (273) \ 0.028 & (273) \ 0.028 & (273) \ 0.034 & (212) \ 0.023 & (233) \ 9E^{-3} & (344) \ 0.028 & (341) \ 0.028 & (353) $  | (14) 0.028   |   |   |  |  |   |   |   |   |   |
| $ \begin{array}{c} (15) \ 0.023 \ (35) \ 0.026 \ (25) \ 0.026 \ (25) \ 0.026 \ (27) \ 0.0265 \ (90) \ 0.068 \ (199) \ 0.0466 \ (215) \ 0.04 \ (233) \ 0.04 \ (233) \ 0.04 \ (232) \ 0.034 \ (252) \ 0.034 \ (270) \ 0.0466 \ (216) \ 0.04 \ (234) \ 0.04 \ (252) \ 0.034 \ (270) \ 0.0466 \ (271) \ 0.053 \ (271) \ 0.056 \ (271) \ 0.056 \ (271) \ 0.056 \ (271) \ 0.056 \ (271) \ 0.056 \ (271) \ 0.056 \ (271) \ 0.056 \ (271) \ 0.056 \ (271) \ 0.056 \ (271) \ 0.056 \ (271) \ 0.056 \ (271) \ 0.056 \ (271) \ 0.056 \ (271) \ 0.056 \ (271) \ 0.056 \ (271) \ 0.056 \ (271) \ 0.056 \ (272) \ 0.056 \ (274) \ 0.057$  |  |   |   |  |  |   |   |   |   |   |
| $ \begin{array}{c} (17) 0.023 & (35) 0.034 & (31) 0.0285 & (72) 0.0285 & (90) 0.068 \\ (18) 0.023 & (35) 0.034 & (31) 0.0285 & (145) 0.0285 & (163) 0.06 \\ (19) 0.023 & (35) 0.034 & (127) 0.0285 & (145) 0.068 & (163) 0.06 \\ (19) 0.034 & (129) 0.034 & (127) 0.0285 & (145) 0.068 & (163) 0.06 \\ (19) 0.034 & (129) 0.034 & (129) 0.0285 & (145) 0.068 & (163) 0.06 \\ (110) 0.034 & (129) 0.034 & (129) 0.0285 & (146) 0.068 & (163) 0.06 \\ (111) 0.03 & (129) 0.034 & (129) 0.0285 & (144) 0.068 & (163) 0.065 \\ (147) 0.076 & (163) 0.065 & (127) 0.033 & (309) 0.023 & (327) 9E-3 & (344) 6E-3 \\ (19) 0.06 & (111) 0.03 & (129) 0.06 & (1149) 0.06 & (167) 0.053 & (271) 0.033 & (291) 0.034 & (309) 0.023 & (322) 9E-3 & (344) 0.06 \\ (149) 0.06 & (112) 0.03 & (1330) 0.06 & (148) 0.076 & (164) 0.065 & (274) 0.033 & (291) 0.034 & (311) 0.023 & (329) 9E-3 & (346) 0.00 \\ (19) 0.06 & (113) 0.0285 & (131) 0.068 & (150) 0.08 & (167) 0.053 & (275) 0.0466 & (274) 0.034 & (311) 0.023 & (329) 9E-3 & (347) 0.00 \\ (19) 0.0466 & (114) 0.0255 & (133) 0.068 & (150) 0.08 & (167) 0.053 & (276) 0.034 & (311) 0.023 & (339) 9E-3 & (349) 0.00 \\ (19) 0.0466 & (114) 0.033 & (133) 0.033 & (131) 0.068 & (170) 0.0466 & (279) 0.0466 & (274) 0.034 & (312) 0.023 & (333) 0.0285 & (350) 0.00 \\ (100) 0.0372 & (114) 0.023 & (133) 0.033 & (1171) 0.04 & (279) 0.04 & (276) 0.034 & (313) 9E-3 & (333) 0.0285 & (351) 0.00 \\ (100) 0.0372 & (114) 0.033 & (135) 0.04 & (173) 0.034 & (128) 0.034 & (316) 9E-3 & (333) 0.0285 & (351) 0.00 \\ (100) 0.0372 & (114) 0.003 & (137) 0.003 & (117) 0.04 & (229) 0.034 & (310) 0.034 & (316) 9E-3 & (333) 0.0285 & (351) 0.00 \\ (100) 0.0372 & (118) 0.003 & (135) 0.04 & (177) 0.04 & (229) 0.034 & (300) 0.034 & (316) 9E-3 & (333) 0.0285 & (353) 0.00 \\ (100) 0.04 & (121) 0.04 & (137) 0.083 & (135) 0.04 & (173) 0.034 & (281) 0.034 & (310) 0.034 & (318) 0.023 & (336) 6E-3 & (353) 0.00 \\ (100) 0.04 & (122) 0.04 & (139) 0.057 & (135) 0.04 & (175) 0.04 & (280) 0.034 & (300) 0.034 & (319) 0.023 & (336) 6E-3 & (353) 0.00 \\ (103) 0.04 & (122) 0.04 & (1430) 0.057 & (135) 0$   |  |   |   |  |  |   |   |   |   |   |
| $ \begin{array}{c} (19) \ 0.023 \ (139) \ 0.034 \ (127) \ 0.0285 \ (145) \ 0.068 \ (163) \ 0.06 \ (271) \ 0.053 \ (289) \ 0.034 \ (307) \ 0.0285 \ (325) \ 9E-3 \ (343) \ 6E-7 \ (343) \ 0.053 \ (109) \ 0.034 \ (109) \ 0.034 \ (128) \ 0.0285 \ (146) \ 0.068 \ (144) \ 0.06 \ (272) \ 0.053 \ (279) \ 0.034 \ (309) \ 0.0285 \ (326) \ 9E-3 \ (344) \ 6E-6 \ (273) \ 0.053 \ (279) \ 0.034 \ (309) \ 0.0285 \ (326) \ 9E-3 \ (343) \ 6E-7 \ (343) \ 0.053 \ (110) \ 0.034 \ (129) \ 0.06 \ (112) \ 0.053 \ (129) \ 0.053 \ (271) \ 0.054 \ (309) \ 0.0285 \ (327) \ 9E-3 \ (344) \ 6E-6 \ (273) \ 0.053 \ (271) \ 0.053 \ (272) \ 0.054 \ (309) \ 0.028 \ (327) \ 9E-3 \ (346) \ 0.05 \ (273) \ 0.053 \ (272) \ 0.054 \ (310) \ 0.028 \ (327) \ 9E-3 \ (346) \ 0.05 \ (733) \ 0.066 \ (111) \ 0.055 \ (127) \ 0.046 \ (272) \ 0.054 \ (310) \ 0.023 \ (329) \ 9E-3 \ (347) \ 0.05 \ (73) \ 0.066 \ (111) \ 0.055 \ (127) \ 0.046 \ (127) \ 0.046 \ (127) \ 0.046 \ (127) \ 0.046 \ (127) \ 0.046 \ (131) \ 0.023 \ (331) \ 0.028 \ (331) \ 0.028 \ (347) \ 0.05 \ (777) \ 0.04 \ (127) \ 0.046 \ (1314) \ 9E-3 \ (331) \ 0.028 \ (331) \ 0.028 \ (331) \ 0.028 \ (331) \ 0.028 \ (331) \ 0.028 \ (331) \ 0.028 \ (331) \ 0.028 \ (331) \ 0.028 \ (331) \ 0.028 \ (331) \ 0.028 \ (331) \ 0.028 \ (331) \ 0.028 \ (331) \ 0.028 \ (331) \ 0.028 \ (331) \ 0.028 \ (331) \ 0.028 \ (332) \ 0.028 \ (333)$  |  |   |   |  |  | (198) 0.0466  | (216) 0.04  |   |   | •   |
| $ \begin{array}{c} (91) 0.05 & (109) 0.034 & (127) 0.0285 & (145) 0.068 & (163) 0.06 & (271) 0.053 & (289) 0.034 & (307) 0.0285 & (325) 9E-3 & (343) E-3 \\ (92) 0.05 & (110) 0.034 & (128) 0.0285 & (144) 0.068 & (146) 0.06 & (272) 0.053 & (290) 0.034 & (309) 0.023 & (327) 9E-3 & (345) 0.00 \\ (93) 0.06 & (111) 0.03 & (129) 0.06 & (147) 0.076 & (165) 0.065 & (274) 0.053 & (291) 0.034 & (310) 0.023 & (329) 9E-3 & (346) 0.00 \\ (94) 0.06 & (112) 0.03 & (130) 0.06 & (148) 0.076 & (166) 0.065 & (274) 0.053 & (292) 0.034 & (310) 0.023 & (329) 9E-3 & (346) 0.00 \\ (94) 0.09 & (113) 0.0285 & (131) 0.068 & (149) 0.08 & (167) 0.053 & (275) 0.0466 & (279) 0.034 & (311) 0.023 & (329) 9E-3 & (348) 0.00 \\ (94) 0.09 & (114) 0.0285 & (132) 0.068 & (150) 0.08 & (169) 0.0466 & (277) 0.0466 & (279) 0.034 & (311) 0.023 & (330) 9E-3 & (348) 0.00 \\ (94) 0.09 & (114) 0.0285 & (132) 0.068 & (150) 0.06 & (169) 0.0466 & (278) 0.04 & (295) 0.034 & (311) 9E-3 & (331) 0.0285 & (349) 0.00 \\ (97) 0.0466 & (115) 0.053 & (133) 0.053 & (151) 0.06 & (169) 0.0466 & (278) 0.04 & (296) 0.034 & (314) 9E-3 & (333) 0.0285 & (350) 0.00 \\ (97) 0.0372 & (117) 0.053 & (135) 0.104 & (153) 0.053 & (171) 0.04 & (279) 0.04 & (297) 0.034 & (316) 9E-3 & (334) 0.0285 & (352) 0.0 \\ (100) 0.0372 & (118) 0.053 & (135) 0.104 & (153) 0.034 & (172) 0.034 & (281) 0.034 & (316) 9E-3 & (334) 0.0285 & (352) 0.0 \\ (100) 0.0372 & (118) 0.053 & (135) 0.04 & (173) 0.034 & (281) 0.034 & (316) 9E-3 & (334) 0.0285 & (352) 0.0 \\ (100) 0.0372 & (118) 0.04 & (157) 0.083 & (1174) 0.034 & (281) 0.034 & (300) 0.034 & (316) 9E-3 & (335) 6E-3 & (354) 0.0 \\ (102) 0.04 & (129) 0.04 & (139) 0.057 & (157) 0.04 & (178) 0.034 & (281) 0.034 & (300) 0.034 & (319) 0.023 & (335) 6E-3 & (354) 0.0 \\ (103) 0.04 & (122) 0.04 & (140) 0.057 & (157) 0.04 & (176) 0.04 & (281) 0.034 & (300) 0.034 & (320) 0.023 & (337) 0.04 & (355) 0.0 \\ (103) 0.04 & (122) 0.04 & (140) 0.075 & (157) 0.04 & (176) 0.04 & (286) 0.034 & (300) 0.034 & (321) 0.023 & (337) 0.028 & (355) 0.0 \\ (104) 0.04 & (122) 0.04 & (142) 0.076 & (159) 0.0466 $   |  |   |   |  |  |   |   |   |   |   |
| $ \begin{pmatrix} 911 \ 0.05 \\ (92) \ 0.05 \\ (111) \ 0.034 \\ (112) \ 0.0285 \\ (112) \ 0.0285 \\ (112) \ 0.068 \\ (146) \ 0.068 \\ (146) \ 0.068 \\ (146) \ 0.065 \\ (146) \ 0.065 \\ (273) \ 0.053 \\ (273) \ 0.053 \\ (271) \ 0.034 \\ (309) \ 0.023 \\ (329) \ 9E-3 \\ (320) \ 9E-3 \\ (344) \ 9E-3 \\ (344) \ 9E-3 \\ (346) \ 0.02 \\ (93) \ 0.06 \\ (111) \ 0.03 \\ (129) \ 0.05 \\ (111) \ 0.034 \\ (129) \ 0.06 \\ (148) \ 0.076 \\ (148) \ 0.076 \\ (146) \ 0.065 \\ (273) \ 0.053 \\ (274) \ 0.053 \\ (272) \ 0.034 \\ (310) \ 0.023 \\ (311) \ 0.023 \\ (329) \ 9E-3 \\ (346) \ 0.02 \\ (94) \ 0.06 \\ (148) \ 0.076 \\ (148) \ 0.076 \\ (148) \ 0.076 \\ (148) \ 0.076 \\ (146) \ 0.065 \\ (273) \ 0.034 \\ (311) \ 0.023 \\ (311) \ 0.023 \\ (329) \ 9E-3 \\ (346) \ 0.02 \\ (74) \ 0.053 \\ (275) \ 0.0466 \\ (273) \ 0.034 \\ (311) \ 0.023 \\ (313) \ 9E-3 \\ (331) \ 0.028 \\ (331) \ 0.023 \\ (331) \ 0.028$  |  |   |   |  |  |   |   |   |   |   |
| $ \begin{pmatrix} 92 \\ 0, 05 \\ 0, 06 \\ 0, 06 \\ 0, 06 \\ 0, 06 \\ 0, 07 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 07 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 07 \\ 0, 06 \\ 0, 07 \\ 0, 0$             |  |   |   |  |  |   |   | (307) 0.0285  | (325) 9E-3  | (343) 6E-3  |
| $ \begin{pmatrix} 93 \\ 0.06 \\ (111) \\ 0.03 \\ (129) \\ 0.06 \\ (112) \\ 0.03 \\ (130) \\ 0.06 \\ (113) \\ 0.025 \\ (131) \\ 0.06 \\ (148) \\ 0.06 \\ (149) \\ 0.06 \\ (149) \\ 0.08 \\ (147) \\ 0.053 \\ (147) \\ 0.053 \\ (274) \\ 0.053 \\ (274) \\ 0.046 \\ (273) \\ 0.034 \\ (274) \\ 0.034 \\ (311) \\ 0.023 \\ (311) \\ 0.023 \\ (329) \\ 9E-3 \\ (346) \\ 0.00 \\ (347) \\ 0.03 \\ (131) \\ 0.023 \\ (329) \\ 9E-3 \\ (346) \\ 0.00 \\ (347) \\ 0.03 \\ (131) \\ 0.023 \\ (311) \\ 0.023 \\ (329) \\ 9E-3 \\ (331) \\ 0.023 \\ (329) \\ 9E-3 \\ (349) \\ 0.03 \\ (131) \\ 0.023 \\ (311) \\ 0.023 $           |  | (109) 0.034   | (127) 0.0285  | (145) 0.058  | (102) 0.00   | (271) 0.053   | (289) 0.034   | (307) 0.0285<br>(308) 0.0285  | (325) 9E-3<br>(326) 9E-3  | (343) 6E-3<br>(344) 6E-3  |
| $ \begin{pmatrix} 94 \\ 0.06 \\ (112) \\ 0.03 \\ (93) \\ 0.09 \\ (113) \\ 0.0285 \\ (131) \\ 0.0285 \\ (132) \\ 0.068 \\ (149) \\ 0.08 \\ (149) \\ 0.08 \\ (149) \\ 0.08 \\ (147) \\ 0.053 \\ (171) \\ 0.053 \\ (171) \\ 0.046 \\ (170) \\ 0.0466 \\ (170) \\ 0.0466 \\ (170) \\ 0.0466 \\ (170) \\ 0.0466 \\ (170) \\ 0.0466 \\ (170) \\ 0.0466 \\ (170) \\ 0.0466 \\ (170) \\ 0.0466 \\ (278) \\ 0.04 \\ (279) \\ 0.034 \\ (311) \\ 0.034 \\ (311) \\ 0.023 \\ (312) \\ 0.023 \\ (330) \\ 9E-3 \\ (331) \\ 0.0285 \\ (332) \\ 0.0285 \\ (332) \\ 0.0285 \\ (349) \\ 0.03 \\ (312) \\ 0.023 \\ (331) \\ 0.0285 \\ (332) \\ 0.0285 \\ (350) \\ 0.00 \\ (190) \\ 0.037 \\ (111) \\ 0.053 \\ (112) \\ 0.053 \\ (132) \\ 0.053 \\ (132) \\ 0.053 \\ (132) \\ 0.053 \\ (151) \\ 0.06 \\ (171) \\ 0.06 \\ (170) \\ 0.046 \\ (170) \\ 0.046 \\ (278) \\ 0.04 \\ (279) \\ 0.04 \\ (279) \\ 0.034 \\ (311) \\ 0.034 \\ (311) \\ 0.023 \\ (331) \\ 0.0285 \\ (333) \\ 0.0285 \\ (351) \\ 0.0 \\ (101) \\ 0.04 \\ (119) \\ 0.04 \\ (119) \\ 0.04 \\ (119) \\ 0.04 \\ (120) \\ 0.04 \\ (120) \\ 0.04 \\ (121) \\ 0.04 \\ (138) \\ 0.093 \\ (151) \\ 0.063 \\ (155) \\ 0.04 \\ (175) \\ 0.04 \\ (175) \\ 0.04 \\ (281) \\ 0.034 \\ (301) \\ 0.034 \\ (301) \\ 0.034 \\ (311) \\ 0.023 \\ (336) \\ 6=3 \\ (336) \\ 6=3 \\ (353) \\ 0.0 \\ (355) \\ 0.0 \\ (104) \\ 0.04 \\ (122) \\ 0.034 \\ (122) \\ 0.034 \\ (123) \\ 0.034 \\ (121) \\ 0.023 \\ (337) \\ 0.0285 \\ (157) \\ 0.0 \\ (159) \\ 0.0466 \\ (177) \\ 0.04 \\ (281) \\ 0.034 \\ (301) \\ 0.034 \\ (301) \\ 0.034 \\ (311) \\ 0.023 \\ (336) \\ 0.034 \\ (337) \\ 0.023 \\ (337) \\ 0.0285 \\ (358) \\ 0.0 \\ (104) \\ 0.04 \\ (122) \\ 0.034 \\ (122) \\ 0.034 \\ (303) \\ 0.034 \\ (303) \\ 0.034 \\ (321) \\ 0.023 \\ (337) \\ 0.023 \\ (337) \\ 0.0285 \\ (358) \\ 0.0 \\ (106) \\ 0.04 \\ (128) \\ 0.034 \\ (304) \\ 0.034 \\ (303) \\ 0.034 \\ (322) \\ 0.023 \\ (337) \\ 0.023 \\ (337) \\ 0.028 \\ (358) \\ 0.0 \\ (106) \\ 0.04 \\ (128) \\ 0.034 \\ (301) \\ 0.034 \\ (301) \\ 0.034 \\ (321) \\ 0.023 \\ (337) \\ 0.023 \\ (337) \\ 0.023 \\ (337) \\ 0.028 \\ (358) \\ 0.0 \\ (106) \\ 0.04 \\ (281) \\ 0.034 \\ (301) \\ 0.034 \\ (301) \\ 0.034 \\ (302) \\ 0.034 \\ (321) \\ 0.023 \\ (337) \\ 0.023 \\ (337) \\ 0.023 \\ (337) \\ 0.028 \\ (358) \\ 0.0 \\ 0.034 \\ (304) \\ 0.034 \\ (303) \\ 0.034 \\ (304) \\ 0.034 \\ (322) \\ 0.023 \\ (337$         | ( 91) 0.05   | (109) 0.034<br>(110) 0.034  | (127) 0.0285<br>(128) 0.0285  | (145) 0.068<br>(146) 0.068   | (164) 0.05   | (271) 0.053<br>(272) 0.053  | (289) 0.034<br>(290) 0.034  | (307) 0.0285<br>(308) 0.0285<br>(309) 0.023   | (325) 9E-3<br>(326) 9E-3<br>(327) 9E-3  | (343) 88-3<br>(344) 68-3<br>(345) 0.0285  |
| $ \begin{pmatrix} 93 \\ 0.09 \\ (113) \\ 0.0285 \\ (131) \\ 0.0285 \\ (132) \\ 0.068 \\ (132) \\ 0.068 \\ (151) \\ 0.068 \\ (151) \\ 0.068 \\ (151) \\ 0.068 \\ (151) \\ 0.08 \\ (161) \\ 0.09 \\ (114) \\ 0.0285 \\ (132) \\ 0.0285 \\ (132) \\ 0.068 \\ (151) \\ 0.068 \\ (151) \\ 0.068 \\ (151) \\ 0.068 \\ (151) \\ 0.068 \\ (151) \\ 0.068 \\ (161) \\ 0.0466 \\ (171) \\ 0.0466 \\ (171) \\ 0.0466 \\ (278) \\ 0.04 \\ (278) \\ 0.04 \\ (279) \\ 0.04 \\ (279) \\ 0.034 \\ (311) \\ 9E-3 \\ (331) \\ 9E-3 \\ (332) \\ 0.0285 \\ (332) \\ 0.0285 \\ (351) \\ 0.00 \\ (351) \\ 0.0285 \\ (351) \\ 0.00 \\ (101) \\ 0.04 \\ (117) \\ 0.053 \\ (113) \\ 0.053 \\ (134) \\ 0.053 \\ (151) \\ 0.06 \\ (171) \\ 0.04 \\ (171) \\ 0.04 \\ (172) \\ 0.04 \\ (281) \\ 0.034 \\ (281) \\ 0.034 \\ (301) \\ 0.034 \\ (311) \\ 0.023 \\ (336) \\ 6E-3 \\ (335) \\ 6E-3 \\ (352) \\ 0.0 \\ (101) \\ 0.04 \\ (119) \\ 0.04 \\ (121) \\ 0.04 \\ (122) \\ 0.04 \\ (139) \\ 0.057 \\ (157) \\ 0.04 \\ (177) \\ 0.04 \\ (174) \\ 0.034 \\ (284) \\ 0.034 \\ (301) \\ 0.034 \\ (301) \\ 0.034 \\ (311) \\ 0.023 \\ (336) \\ 6E-3 \\ (335) \\ 6E-3 \\ (355) \\ 0.0 \\ (101) \\ 0.04 \\ (121) \\ 0.04 \\ (122) \\ 0.04 \\ (122) \\ 0.04 \\ (139) \\ 0.023 \\ (336) \\ 6E-3 \\ (351) \\ 0.0 \\ (104) \\ 0.04 \\ (121) \\ 0.04 \\ (122) \\ 0.04 \\ (122) \\ 0.04 \\ (121) \\ 0.04 \\ (121) \\ 0.04 \\ (121) \\ 0.04 \\ (121) \\ 0.04 \\ (121) \\ 0.04 \\ (122) \\ 0.034 \\ (122) \\ 0.034 \\ (122) \\ 0.023 \\ (336) \\ 0.023 \\ (336) \\ 0.023 \\ (337) \\ 0.028 \\ (356) \\ 0.034 \\ (301) \\ 0.034 \\ (302) \\ 0.034 \\ (302) \\ 0.034 \\ (321) \\ 0.023 \\ (339) \\ 0.023 \\ (339) \\ 0.028 \\ (358) \\ 0.0 \\ (104) \\ 0.023 \\ (339) \\ 0.023 \\ (339) \\ 0.028 \\ (358) \\ 0.0 \\ (104) \\ 0.04 \\ (122) \\ 0.034 \\ (122) \\ 0.034 \\ (122) \\ 0.034 \\ (321) \\ 0.023 \\ (339) \\ 0.023 \\ (339) \\ 0.028 \\ (358) \\ 0.0 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (356) \\ 0.034 \\ (305) \\ 0.034 \\ (305) \\ 0.034 \\ (321) \\ 0.023 \\ (339) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (356) \\ 0.034 \\ (356) \\ 0.034 \\ (301) \\ 0.034 \\ (321) \\ 0.023 \\ (339) \\ 0.023 \\ (339) \\ 0.023 \\ (339) \\ 0.028 \\ (356) \\ 0.034 \\ (301) \\ 0.034 \\ (302) \\ 0.034 \\ (302) \\ 0.034 \\ (321) \\ 0.023 \\ (339) \\ 0.023 \\ (339) \\ 0.023 \\ (339) \\ 0.023 \\ (339) \\ 0.02$       | ( 91) 0.05<br>( 92) 0.05   | (109) 0.034<br>(110) 0.034<br>(111) 0.03  | (127) 0.0285<br>(128) 0.0285<br>(129) 0.06  | (145) 0.088<br>(146) 0.088<br>(147) 0.076  | (153) 0.05<br>(154) 0.05<br>(155) 0.055  | (271) 0.053<br>(272) 0.053<br>(273) 0.053   | (289) 0.034<br>(290) 0.034<br>(291) 0.034   | (307) 0.0285<br>(308) 0.0285<br>(309) 0.023<br>(310) 0.023  | (325) 9E-3<br>(326) 9E-3<br>(327) 9E-3<br>(328) 9E-3  | (343) 8E-3<br>(344) 6E-3<br>(345) 0.0285<br>(346) 0.0285  |
| $ \begin{pmatrix} 94 \\ 0.09 \\ (114) \\ 0.0285 \\ (132) \\ 0.033 \\ (131) \\ 0.053 \\ (131) \\ 0.053 \\ (131) \\ 0.053 \\ (131) \\ 0.053 \\ (131) \\ 0.053 \\ (131) \\ 0.053 \\ (131) \\ 0.053 \\ (131) \\ 0.053 \\ (151) \\ 0.06 \\ (170) \\ 0.0466 \\ (170) \\ 0.0466 \\ (279) \\ 0.04 \\ (279) \\ 0.04 \\ (279) \\ 0.04 \\ (279) \\ 0.04 \\ (279) \\ 0.034 \\ (279) \\ 0.034 \\ (279) \\ 0.034 \\ (311) \\ 9E-3 \\ (332) \\ 0.0285 \\ (332) \\ 0.0285 \\ (351) \\ 0.00 \\ (351) \\ 0.0285 \\ (351) \\ 0.00 \\ (351) \\ 0.0285 \\ (351) \\ 0.00 \\ (101) \\ 0.04 \\ (117) \\ 0.034 \\ (117) \\ 0.034 \\ (119) \\ 0.04 \\ (119) \\ 0.04 \\ (119) \\ 0.04 \\ (119) \\ 0.04 \\ (119) \\ 0.04 \\ (119) \\ 0.04 \\ (119) \\ 0.04 \\ (117) \\ 0.034 \\ (117) \\ 0.034 \\ (281) \\ 0.034 \\ (301) \\ 0.034 \\ (311) \\ 0.034 \\ (311) \\ 0.023 \\ (331) \\ 0.0285 \\ (332) \\ 0.0285 \\ (352) \\ 0.00 \\ (101) \\ 0.04 \\ (121) \\ 0.04 \\ (122) \\ 0.04 \\ (117) \\ 0.057 \\ (115) \\ 0.04 \\ (175) \\ 0.04 \\ (175) \\ 0.04 \\ (176) \\ 0.04 \\ (284) \\ 0.034 \\ (301) \\ 0.034 \\ (301) \\ 0.034 \\ (321) \\ 0.023 \\ (337) \\ 0.023 \\ (339) \\ 0.0285 \\ (351) \\ 0.0 \\ (105) \\ 0.04 \\ (123) \\ 0.034 \\ (124) \\ 0.034 \\ (141) \\ 0.076 \\ (159) \\ 0.0466 \\ (177) \\ 0.04 \\ (179) \\ 0.04 \\ (286) \\ 0.034 \\ (304) \\ 0.034 \\ (305) \\ 0.034 \\ (323) \\ 0.023 \\ (341) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.028 \\ (359) \\ 0.003 \\ (106) \\ 0.04 \\ (124) \\ 0.034 \\ (124) \\ 0.034 \\ (142) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.028 \\ (359) \\ 0.003 \\ (359) \\ 0.003 \\ (305) \\ 0.034 \\ (305) \\ 0.034 \\ (305) \\ 0.034 \\ (323) \\ 0.023 \\ (341) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.003 \\ (359) \\ 0.003 \\ (359) \\ 0.003 \\ (359) \\ 0.034 \\ (305) \\ 0.034 \\ (322) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.023 \\ (359) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ (106) \\ 0.003 \\ ($          | ( 91) 0.05<br>( 92) 0.05<br>( 93) 0.06   | (109) 0.034<br>(110) 0.034<br>(111) 0.03<br>(112) 0.03  | (127) 0.0285<br>(128) 0.0285<br>(129) 0.04<br>(130) 0.06  | (145) 0.088<br>(146) 0.068<br>(147) 0.076<br>(148) 0.076   | (153) 0.05<br>(154) 0.05<br>(153) 0.055<br>(155) 0.055   | (271) 0.053<br>(272) 0.053<br>(273) 0.053<br>(273) 0.053<br>(274) 0.053   | (289) 0.034<br>(290) 0.034<br>(291) 0.034<br>(292) 0.034  | (307) 0.0285<br>(308) 0.0285<br>(309) 0.023<br>(310) 0.023<br>(311) 0.023   | (325) 9E-3<br>(326) 9E-3<br>(327) 9E-3<br>(328) 9E-3<br>(329) 9E-3  | (343) 8E-3<br>(344) 6E-3<br>(345) 0.0285<br>(346) 0.0285<br>(347) 0.0285  |
| $ \begin{pmatrix} 971 & 0.0466 & (115) & 0.053 & (133) & 0.053 & (151) & 0.06 & (170) & 0.0466 & (278) & 0.04 & (296) & 0.034 & (314) & 9E-3 & (332) & 0.0285 & (350) & 0.06 & (190) & 0.0466 & (279) & 0.04 & (297) & 0.034 & (315) & 9E-3 & (333) & 0.0285 & (351) & 0.06 & (190) & 0.0372 & (116) & 0.053 & (1153) & 0.053 & (1153) & 0.053 & (1171) & 0.04 & (280) & 0.04 & (297) & 0.034 & (315) & 9E-3 & (333) & 0.0285 & (351) & 0.06 & (190) & 0.0372 & (118) & 0.053 & (1135) & 0.04 & (1154) & 0.053 & (1172) & 0.04 & (280) & 0.04 & (297) & 0.034 & (315) & 9E-3 & (333) & 0.0285 & (352) & 0.0 & (100) & 0.0372 & (118) & 0.053 & (1153) & 0.053 & (1172) & 0.04 & (280) & 0.04 & (297) & 0.034 & (315) & 9E-3 & (333) & 0.0285 & (353) & 0.0 & (101) & 0.04 & (1171) & 0.04 & (1173) & 0.053 & (1174) & 0.034 & (280) & 0.04 & (297) & 0.034 & (317) & 0.023 & (335) & 6E-3 & (353) & 0.0 & (101) & 0.04 & (1179) & 0.04 & (1173) & 0.034 & (281) & 0.034 & (300) & 0.034 & (318) & 0.023 & (336) & 6E-3 & (354) & 0.0 & (102) & 0.04 & (1120) & 0.04 & (1157) & 0.04 & (1175) & 0.04 & (282) & 0.034 & (301) & 0.034 & (319) & 0.023 & (337) & 0.04 & (355) & 0.0 & (103) & 0.04 & (122) & 0.04 & (137) & 0.057 & (157) & 0.04 & (175) & 0.04 & (284) & 0.034 & (302) & 0.034 & (320) & 0.023 & (339) & 0.0285 & (355) & 0.0 & (104) & 0.04 & (122) & 0.034 & (141) & 0.076 & (159) & 0.0466 & (177) & 0.04 & (286) & 0.034 & (304) & 0.034 & (322) & 0.023 & (340) & 0.0285 & (358) & 0.0 & (105) & 0.04 & (124) & 0.034 & (142) & 0.076 & (159) & 0.0466 & (177) & 0.04 & (286) & 0.034 & (304) & 0.034 & (322) & 0.023 & (341) & 0.023 & (359) & 0.0 & (106) & 0.046 & (127) & 0.04 & (286) & 0.034 & (304) & 0.034 & (322) & 0.023 & (341) & 0.023 & (358) & 0.0 & (106) & 0.046 & (177) & 0.04 & (286) & 0.034 & (304) & 0.034 & (322) & 0.023 & (341) & 0.023 & (359) & 0.0 & (105) & 0.034 & (122) & 0.034 & (142) & 0.076 & (159) & 0.046 & (177) & 0.04 & (286) & 0.034 & (305) & 0.034 & (323) & 0.023 & (341) & 0.023 & (359) & 0.0 & (106) & 0.046 & (177) & 0.04 & (286) & 0.034 & (305) & 0.034 & (323) & 0.02$  | ( 91) 0.05<br>( 92) 0.05<br>( 93) 0.04<br>( 94) 0.06   | (109) 0.034<br>(110) 0.034<br>(111) 0.03<br>(112) 0.03<br>(112) 0.03<br>(113) 0.0285  | (127) 0.0285<br>(128) 0.0285<br>(129) 0.06<br>(130) 0.06<br>(131) 0.068   | (145) 0.088<br>(146) 0.068<br>(147) 0.076<br>(148) 0.076<br>(148) 0.08   | (123) 0.08<br>(124) 0.06<br>(145) 0.045<br>(145) 0.045<br>(147) 0.053  | (271) 0.053<br>(272) 0.053<br>(273) 0.053<br>(274) 0.053<br>(274) 0.0466  | (289) 0.034<br>(290) 0.034<br>(291) 0.034<br>(291) 0.034<br>(292) 0.034<br>(293) 0.034  | (307) 0.0285<br>(308) 0.0285<br>(309) 0.023<br>(310) 0.023<br>(311) 0.023<br>(311) 0.023  | (325) 9E-3<br>(326) 9E-3<br>(327) 9E-3<br>(328) 9E-3<br>(329) 9E-3<br>(329) 9E-3  | (343) 6E-3<br>(344) 6E-3<br>(345) 0.0285<br>(346) 0.0285<br>(347) 0.0285<br>(348) 0.0285  |
| $ \begin{pmatrix} 98 \\ 0.0466 \\ (116) \\ 0.053 \\ (134) \\ 0.053 \\ (135) \\ 0.104 \\ (153) \\ 0.053 \\ (155) \\ 0.104 \\ (153) \\ 0.053 \\ (155) \\ 0.104 \\ (154) \\ 0.053 \\ (171) \\ 0.04 \\ (171) \\ 0.04 \\ (280) \\ 0.04 \\ (298) \\ 0.04 \\ (298) \\ 0.034 \\ (316) \\ 9E-3 \\ (315) \\ 9E-3 \\ (333) \\ 0.0285 \\ (333) \\ 0.0285 \\ (352) \\ 0.0 \\ (352) \\ 0.0 \\ (353) \\ 0.0285 \\ (352) \\ 0.0 \\ (353) \\ 0.0285 \\ (352) \\ 0.0 \\ (101) \\ 0.04 \\ (119) \\ 0.04 \\ (119) \\ 0.04 \\ (119) \\ 0.04 \\ (119) \\ 0.04 \\ (119) \\ 0.04 \\ (117) \\ 0.04 \\ (117) \\ 0.034 \\ (291) \\ 0.034 \\ (301) \\ 0.034 \\ (301) \\ 0.034 \\ (321) \\ 0.023 \\ (338) \\ 0.04 \\ (355) \\ 0.0 \\ (101) \\ 0.04 \\ (121) \\ 0.04 \\ (122) \\ 0.04 \\ (141) \\ 0.076 \\ (140) \\ 0.076 \\ (159) \\ 0.0466 \\ (177) \\ 0.04 \\ (178) \\ 0.04 \\ (281) \\ 0.034 \\ (303) \\ 0.034 \\ (303) \\ 0.034 \\ (321) \\ 0.034 \\ (322) \\ 0.023 \\ (339) \\ 0.0285 \\ (337) \\ 0.0285 \\ (357) \\ 0.0 \\ (106) \\ 0.04 \\ (126) \\ 0.04 \\ (128) \\ 0.034 \\ (303) \\ 0.034 \\ (321) \\ 0.023 \\ (339) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (106) \\ 0.04 \\ (126) \\ 0.04 \\ (126) \\ 0.034 \\ (305) \\ 0.034 \\ (323) \\ 0.023 \\ (341) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (364) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (364) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (364) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (364) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (364) \\ 0.034 \\ (305) \\ 0.034 \\ (305) \\ 0.034 \\ (305) \\ 0.034 \\ (321) \\ 0.023 \\ (341) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (361) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (361) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (361) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (361) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (361) \\ 0.034 \\ (361) \\ 0.023 \\ (337) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (341) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (341) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (359) \\ 0.0 \\ (359) \\ 0.0 \\ (359) \\ 0.0 \\ (359) \\ 0.0 \\ (359) \\ 0.0 \\ (359) \\ 0.0 \\ (359) \\ 0.0 \\ (359) \\ 0.0 \\ (359) \\ 0.0 \\ (359) \\ 0.0 \\ (359) \\ 0.0 \\ (359) \\ 0.0 \\ (359) \\ 0.0 \\ (350) \\ 0.0 \\ (350) \\ 0.0 \\ (350) \\ 0.0 \\ (350) \\$ | ( 91) 0.03<br>( 92) 0.03<br>( 93) 0.06<br>( 93) 0.06<br>( 93) 0.05<br>( 93) 0.09   | (109) 0.034<br>(110) 0.034<br>(111) 0.03<br>(112) 0.03<br>(113) 0.0285<br>(114) 0.0285  | (127) 0.0285<br>(128) 0.0285<br>(129) 0.04<br>(130) 0.06<br>(131) 0.068<br>(132) 0.048  | (145) 0.088<br>(144) 0.058<br>(147) 0.074<br>(148) 0.074<br>(149) 0.08<br>(150) 0.08   | (163) 0.06<br>(165) 0.065<br>(165) 0.065<br>(166) 0.065<br>(167) 0.053<br>(168) 0.053  | (271) 0.053<br>(272) 0.053<br>(273) 0.053<br>(274) 0.053<br>(275) 0.0466<br>(276) 0.0466  | (289) 0.034<br>(290) 0.034<br>(291) 0.034<br>(292) 0.034<br>(293) 0.034<br>(293) 0.034  | (307) 0.0285<br>(308) 0.0285<br>(309) 0.023<br>(310) 0.023<br>(311) 0.023<br>(312) 0.023<br>(313) 9E-3  | (325) 9E-3<br>(326) 9E-3<br>(327) 9E-3<br>(328) 9E-3<br>(329) 9E-3<br>(330) 9E-3<br>(331) 0.0285  | (343) 8E-3<br>(344) 6E-3<br>(345) 0.0285<br>(346) 0.0285<br>(346) 0.0285<br>(348) 0.0285<br>(348) 0.0285<br>(349) 0.023   |
| $ \begin{pmatrix} 99 \\ 0.0372 \\ (117) \\ 0.053 \\ (125) \\ 0.053 \\ (135) \\ 0.104 \\ (154) \\ 0.053 \\ (155) \\ 0.04 \\ (172) \\ 0.04 \\ (173) \\ 0.053 \\ (172) \\ 0.04 \\ (280) \\ 0.04 \\ (281) \\ 0.034 \\ (297) \\ 0.034 \\ (301) \\ 0.034 \\ (317) \\ 0.023 \\ (336) \\ 6E-3 \\ (336) \\ 6E-3 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (353) \\ 0.028 \\ (354) \\ 0.034 \\ (119) \\ 0.023 \\ (319) \\ 0.023 \\ (338) \\ 0.04 \\ (355) \\ 0.0 \\ (104) \\ 0.04 \\ (122) \\ 0.04 \\ (122) \\ 0.04 \\ (122) \\ 0.04 \\ (123) \\ 0.034 \\ (141) \\ 0.076 \\ (141) \\ 0.076 \\ (160) \\ 0.046 \\ (177) \\ 0.04 \\ (284) \\ 0.034 \\ (303) \\ 0.034 \\ (303) \\ 0.034 \\ (322) \\ 0.023 \\ (339) \\ 0.028 \\ (339) \\ 0.028 \\ (358) \\ 0.0 \\ (106) \\ 0.04 \\ (126) \\ 0.04 \\ (128) \\ 0.034 \\ (303) \\ 0.034 \\ (321) \\ 0.023 \\ (339) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (106) \\ 0.04 \\ (106) \\ 0.04 \\ (287) \\ 0.034 \\ (305) \\ 0.034 \\ (305) \\ 0.034 \\ (322) \\ 0.023 \\ (341) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (360) \\ 0.0 \\ (360) \\ 0.0 \\ (361) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (360) \\ 0.0 \\ (361) \\ 0.023 \\ (341) \\ 0.023 \\ (359) \\ 0.0 \\ (360) \\ 0.0 \\ (361) \\ 0.034 \\ (305) \\ 0.034 \\$        | ( 91) 0.05<br>( 92) 0.05<br>( 93) 0.06<br>( 93) 0.06<br>( 93) 0.09<br>( 93) 0.09<br>( 97) 0.0466   | (109) 0.034<br>(110) 0.034<br>(111) 0.03<br>(112) 0.03<br>(113) 0.0285<br>(114) 0.0285<br>(115) 0.053   | (127) 0.0285<br>(128) 0.0285<br>(129) 0.06<br>(130) 0.06<br>(131) 0.068<br>(132) 0.068<br>(133) 0.053   | (145) 0.088<br>(146) 0.058<br>(147) 0.056<br>(148) 0.076<br>(149) 0.08<br>(150) 0.08<br>(151) 0.06   | (163) 0.06<br>(163) 0.065<br>(163) 0.065<br>(166) 0.065<br>(167) 0.053<br>(168) 0.053<br>(167) 0.0466  | (271) 0.053<br>(272) 0.053<br>(273) 0.053<br>(274) 0.053<br>(275) 0.0466<br>(276) 0.0466<br>(277) 0.04  | (289) 0.034<br>(290) 0.034<br>(291) 0.034<br>(292) 0.034<br>(293) 0.034<br>(293) 0.034<br>(294) 0.034<br>(295) 0.034  | (307) 0.0285<br>(308) 0.0285<br>(309) 0.023<br>(310) 0.023<br>(311) 0.023<br>(312) 0.023<br>(313) 9E-3<br>(314) 9E-3  | (325) 9E-3<br>(326) 9E-3<br>(327) 9E-3<br>(329) 9E-3<br>(330) 9E-3<br>(330) 9E-3<br>(331) 0.0285<br>(332) 0.0285  | (343) $6E-3(344)$ $6E-3(345)$ $0.0285(346)$ $0.0285(347)$ $0.0285(348)$ $0.0285(348)$ $0.0285(349)$ $0.023$   |
| $ \begin{array}{c} (100) \ 0.0372 \\ (101) \ 0.04 \\ (119) \ 0.04 \\ (119) \ 0.04 \\ (117) \ 0.083 \\ (155) \ 0.04 \\ (173) \ 0.034 \\ (174) \ 0.034 \\ (281) \ 0.034 \\ (299) \ 0.034 \\ (300) \ 0.034 \\ (310) \ 0.034 \\ (310) \ 0.023 \\ (336) \ 6E-3 \\ (353) \ 0.04 \\ (353) \ 0.04 \\ (355) \ 0.04 \\ (102) \ 0.04 \\ (120) \ 0.04 \\ (120) \ 0.04 \\ (139) \ 0.057 \\ (157) \ 0.04 \\ (175) \ 0.04 \\ (175) \ 0.04 \\ (281) \ 0.034 \\ (301) \ 0.034 \\ (301) \ 0.034 \\ (321) \ 0.023 \\ (337) \ 0.023 \\ (338) \ 0.04 \\ (355) \ 0.00 \\ (104) \ 0.04 \\ (123) \ 0.034 \\ (141) \ 0.076 \\ (140) \ 0.046 \\ (176) \ 0.04 \\ (176) \ 0.04 \\ (286) \ 0.034 \\ (304) \ 0.034 \\ (321) \ 0.023 \\ (339) \ 0.0285 \\ (339) \ 0.0285 \\ (358) \ 0.0 \\ (104) \ 0.04 \\ (124) \ 0.034 \\ (142) \ 0.074 \\ (143) \ 0.092 \\ (161) \ 0.043 \\ (179) \ 0.04 \\ (287) \ 0.034 \\ (305) \ 0.034 \\ (323) \ 0.023 \\ (341) \ 0.023 \\ (354) \ 0.02 \\ (359) \ 0.0 \\ (354) \ 0.02 \\ (354) \ 0.0$   | ( 91) 0.03<br>( 92) 0.05<br>( 93) 0.06<br>( 94) 0.06<br>( 94) 0.09<br>( 96) 0.09<br>( 97) 0.0466<br>( 98) 0.0466   | (109) 0.034<br>(110) 0.034<br>(111) 0.03<br>(112) 0.03<br>(113) 0.0285<br>(114) 0.0285<br>(115) 0.053<br>(116) 0.053  | (127) 0.0285<br>(128) 0.0285<br>(129) 0.06<br>(130) 0.06<br>(131) 0.068<br>(132) 0.068<br>(133) 0.053<br>(134) 0.053  | (145) 0.088<br>(145) 0.088<br>(147) 0.076<br>(148) 0.076<br>(149) 0.08<br>(150) 0.08<br>(151) 0.06<br>(152) 0.06   | (163) 0.06<br>(163) 0.065<br>(163) 0.065<br>(164) 0.065<br>(167) 0.053<br>(168) 0.053<br>(168) 0.0466<br>(170) 0.0466  | (271) 0.053<br>(272) 0.053<br>(273) 0.053<br>(274) 0.053<br>(275) 0.0466<br>(276) 0.0466<br>(277) 0.04  | (289) 0.034<br>(290) 0.034<br>(291) 0.034<br>(292) 0.034<br>(293) 0.034<br>(293) 0.034<br>(295) 0.034<br>(295) 0.034  | (307) 0.0285<br>(308) 0.0285<br>(309) 0.023<br>(310) 0.023<br>(311) 0.023<br>(312) 0.023<br>(313) 9E-3<br>(314) 9E-3<br>(314) 9E-3  | (325) 9E-3<br>(326) 9E-3<br>(327) 9E-3<br>(329) 9E-3<br>(329) 9E-3<br>(330) 9E-3<br>(331) 0.0285<br>(332) 0.0285<br>(333) 0.0285  | (343) 6E-3<br>(344) 6E-3<br>(345) 0.0285<br>(346) 0.0285<br>(347) 0.0285<br>(348) 0.0285<br>(349) 0.023<br>(350) 0.023<br>(351) 0.018   |
| $ \begin{array}{c} (101) \ 0.04 \\ (119) \ 0.04 \\ (119) \ 0.04 \\ (120) \ 0.04 \\ (120) \ 0.04 \\ (137) \ 0.083 \\ (156) \ 0.04 \\ (174) \ 0.034 \\ (174) \ 0.034 \\ (174) \ 0.034 \\ (1283) \ 0.034 \\ (301) \ 0.034 \\ (319) \ 0.023 \\ (319) \ 0.023 \\ (337) \ 0.04 \\ (355) \ 0.04 \\ (356) \ 0.04 \\ (175) \ 0.04 \\ (175) \ 0.04 \\ (175) \ 0.04 \\ (175) \ 0.04 \\ (175) \ 0.04 \\ (1283) \ 0.034 \\ (301) \ 0.034 \\ (302) \ 0.034 \\ (321) \ 0.023 \\ (339) \ 0.0285 \\ (339) \ 0.0285 \\ (356) \ 0.04 \\ (105) \ 0.04 \\ (123) \ 0.034 \\ (123) \ 0.034 \\ (141) \ 0.076 \\ (140) \ 0.046 \\ (176) \ 0.04 \\ (178) \ 0.04 \\ (286) \ 0.034 \\ (304) \ 0.034 \\ (322) \ 0.023 \\ (340) \ 0.0285 \\ (359) \ 0.04 \\ (106) \ 0.046 \\ (178) \ 0.04 \\ (178) \ 0.04 \\ (1287) \ 0.034 \\ (305) \ 0.034 \\ (323) \ 0.023 \\ (341) \ 0.023 \\ (354) \ 0.02 \\ (359) \ 0.04 \\ (107) \ 0.04 \\ (1287) \ 0.034 \\ (305) \ 0.034 \\ (323) \ 0.023 \\ (341) \ 0.023 \\ (354) \ 0.02 \\ (359)$   | ( 91) 0.03<br>( 92) 0.05<br>( 93) 0.06<br>( 93) 0.06<br>( 93) 0.07<br>( 94) 0.09<br>( 97) 0.0466<br>( 98) 0.0466<br>( 99) 0.0372   | (109) 0.034<br>(110) 0.034<br>(111) 0.03<br>(112) 0.03<br>(113) 0.0285<br>(114) 0.0285<br>(115) 0.053<br>(116) 0.053<br>(117) 0.053   | (127) 0.0285<br>(128) 0.0285<br>(129) 0.06<br>(130) 0.06<br>(131) 0.068<br>(132) 0.068<br>(133) 0.053<br>(134) 0.053<br>(135) 0.104   | (145) 0.088<br>(144) 0.068<br>(147) 0.076<br>(148) 0.076<br>(149) 0.08<br>(150) 0.08<br>(151) 0.06<br>(152) 0.06<br>(152) 0.06   | (163) 0.06<br>(163) 0.065<br>(163) 0.065<br>(164) 0.065<br>(167) 0.053<br>(168) 0.053<br>(169) 0.0466<br>(170) 0.0466<br>(171) 0.04  | (271) 0.053<br>(272) 0.053<br>(273) 0.053<br>(274) 0.053<br>(275) 0.0466<br>(276) 0.0466<br>(277) 0.04<br>(278) 0.04  | (289) 0.034<br>(290) 0.034<br>(291) 0.034<br>(292) 0.034<br>(293) 0.034<br>(294) 0.034<br>(295) 0.034<br>(295) 0.034<br>(296) 0.034   | (307) 0.0285<br>(308) 0.0285<br>(309) 0.023<br>(311) 0.023<br>(312) 0.023<br>(312) 0.023<br>(313) 9E-3<br>(314) 9E-3<br>(315) 9E-3<br>(315) 9E-3  | (325) 9E-3<br>(326) 9E-3<br>(327) 9E-3<br>(329) 9E-3<br>(330) 9E-3<br>(331) 0.0285<br>(332) 0.0285<br>(333) 0.0285<br>(334) 0.0285  | (343) 6E-3<br>(344) 6E-3<br>(345) 0.0285<br>(346) 0.0285<br>(347) 0.0285<br>(348) 0.0285<br>(348) 0.0285<br>(349) 0.023<br>(350) 0.023<br>(351) 0.018<br>(352) 0.018  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | ( 91) 0.03<br>( 92) 0.05<br>( 93) 0.06<br>( 93) 0.06<br>( 95) 0.07<br>( 94) 0.09<br>( 97) 0.0466<br>( 98) 0.0466<br>( 99) 0.0372   | $(109) 0.034 (110) 0.034 (111) 0.03 (112) 0.03 (113) 0.0285 (114) 0.0285 (115) 0.053 (116) 0.053 (117) 0.053 (118) 0.053 (118) 0.053 \\(11$ | (127) 0.0285<br>(128) 0.0285<br>(129) 0.06<br>(130) 0.06<br>(131) 0.068<br>(132) 0.068<br>(133) 0.053<br>(133) 0.053<br>(135) 0.104<br>(136) 0.104  | (145) 0.088<br>(144) 0.088<br>(147) 0.076<br>(148) 0.076<br>(149) 0.08<br>(150) 0.08<br>(151) 0.06<br>(152) 0.06<br>(153) 0.053<br>(154) 0.053   | $ \begin{array}{c} (163) & 0.08 \\ (163) & 0.06 \\ (163) & 0.065 \\ (164) & 0.065 \\ (167) & 0.053 \\ (168) & 0.053 \\ (168) & 0.053 \\ (167) & 0.0466 \\ (170) & 0.0466 \\ (171) & 0.04 \\ (172) & 0.04 \end{array} $ | (271) 0.053<br>(272) 0.053<br>(273) 0.053<br>(274) 0.053<br>(275) 0.0466<br>(276) 0.0466<br>(277) 0.04<br>(278) 0.04<br>(279) 0.04<br>(280) 0.04  | (289) 0.034<br>(290) 0.034<br>(291) 0.034<br>(292) 0.034<br>(293) 0.034<br>(293) 0.034<br>(294) 0.034<br>(295) 0.034<br>(296) 0.034<br>(296) 0.034  | (307) 0.0285<br>(308) 0.0285<br>(309) 0.023<br>(310) 0.023<br>(311) 0.023<br>(312) 0.023<br>(312) 0.023<br>(313) 9E-3<br>(314) 9E-3<br>(315) 9E-3<br>(315) 9E-3<br>(317) 0.023  | (325) 9E-3<br>(326) 9E-3<br>(327) 9E-3<br>(329) 9E-3<br>(330) 9E-3<br>(331) 0.0285<br>(332) 0.0285<br>(333) 0.0285<br>(334) 0.0285<br>(335) 6E-3  | (343) $6E-3(344)$ $6E-3(345)$ $0.0285(346)$ $0.0285(348)$ $0.0285(348)$ $0.0285(348)$ $0.0285(349)$ $0.023(350)$ $0.023(351)$ $0.018(352)$ $0.018$  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | ( 91) 0.03<br>( 92) 0.05<br>( 93) 0.06<br>( 93) 0.06<br>( 93) 0.09<br>( 97) 0.0466<br>( 98) 0.0466<br>( 99) 0.0372<br>(100) 0.0372   | (109) 0.034 (110) 0.034 (111) 0.03 (112) 0.03 (113) 0.0285 (114) 0.0285 (115) 0.053 (116) 0.053 (116) 0.053 (118) 0.053 (119) 0.04  | (127) 0.0285<br>(128) 0.0285<br>(129) 0.06<br>(130) 0.06<br>(131) 0.068<br>(132) 0.053<br>(133) 0.053<br>(134) 0.053<br>(135) 0.104<br>(136) 0.104<br>(137) 0.083   | (145) 0.088<br>(144) 0.088<br>(147) 0.076<br>(148) 0.076<br>(150) 0.08<br>(151) 0.06<br>(151) 0.06<br>(152) 0.06<br>(153) 0.053<br>(154) 0.053<br>(155) 0.04   |  | (271) 0.053<br>(272) 0.053<br>(273) 0.053<br>(274) 0.053<br>(275) 0.0466<br>(276) 0.0466<br>(277) 0.04<br>(278) 0.04<br>(278) 0.04<br>(279) 0.04<br>(280) 0.04<br>(281) 0.034   | (289) 0.034<br>(290) 0.034<br>(291) 0.034<br>(292) 0.034<br>(293) 0.034<br>(294) 0.034<br>(295) 0.034<br>(296) 0.034<br>(296) 0.034<br>(298) 0.034  | (307) 0.0285<br>(308) 0.0285<br>(309) 0.023<br>(310) 0.023<br>(311) 0.023<br>(312) 0.023<br>(313) 9E-3<br>(314) 9E-3<br>(315) 9E-3<br>(316) 9E-3<br>(317) 0.023<br>(318) 0.023  | (325) 9E-3<br>(326) 9E-3<br>(327) 9E-3<br>(329) 9E-3<br>(330) 9E-3<br>(331) 0.0285<br>(332) 0.0285<br>(333) 0.0285<br>(333) 0.0285<br>(333) 6E-3<br>(336) 6E-3  | (343) $6E-3(344)$ $6E-3(345)$ $0.0285(346)$ $0.0285(347)$ $0.0285(349)$ $0.0285(349)$ $0.0233(350)$ $0.023(351)$ $0.018(352)$ $0.018(353)$ $0.018(354)$ $0.018$   |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | ( 91) 0.03<br>( 92) 0.05<br>( 93) 0.06<br>( 93) 0.06<br>( 94) 0.09<br>( 97) 0.0466<br>( 98) 0.0466<br>( 98) 0.0472<br>(100) 0.0372<br>(101) 0.04   | (109) 0.034 (110) 0.034 (111) 0.03 (112) 0.03 (113) 0.0285 (114) 0.0285 (115) 0.053 (116) 0.053 (117) 0.053 (118) 0.053 (119) 0.04 (120) 0.04   | (127) 0.0285<br>(128) 0.0285<br>(129) 0.06<br>(130) 0.06<br>(131) 0.068<br>(132) 0.068<br>(133) 0.053<br>(134) 0.053<br>(135) 0.104<br>(136) 0.083<br>(136) 0.083   |  |  | (271) 0.053<br>(272) 0.053<br>(273) 0.053<br>(274) 0.053<br>(275) 0.0466<br>(276) 0.0466<br>(277) 0.04<br>(278) 0.04<br>(278) 0.04<br>(279) 0.04<br>(280) 0.04<br>(281) 0.034<br>(282) 0.034  | (289) 0.034<br>(290) 0.034<br>(291) 0.034<br>(292) 0.034<br>(293) 0.034<br>(294) 0.034<br>(295) 0.034<br>(295) 0.034<br>(296) 0.034<br>(297) 0.034<br>(297) 0.034<br>(300) 0.034  | (307) 0.0285<br>(308) 0.0285<br>(309) 0.0285<br>(311) 0.023<br>(311) 0.023<br>(312) 0.023<br>(313) 9E-3<br>(314) 9E-3<br>(315) 9E-3<br>(316) 9E-3<br>(317) 0.023<br>(318) 0.023   | (325) 9E-3<br>(326) 9E-3<br>(327) 9E-3<br>(329) 9E-3<br>(330) 9E-3<br>(331) 0.0285<br>(332) 0.0285<br>(333) 0.0285<br>(335) 0.0285<br>(335) 6E-3<br>(335) 6E-3<br>(337) 0.04  | (343) $6E-3(344)$ $6E-3(345)$ $0.0285(346)$ $0.0285(347)$ $0.0285(349)$ $0.0285(349)$ $0.0235(350)$ $0.023(351)$ $0.018(353)$ $0.018(355)$ $0.018$  |
| $ \begin{array}{c} (105) \ 0.04 \\ (123) \ 0.034 \\ (124) \ 0.034 \\ (142) \ 0.034 \\ (142) \ 0.076 \\ (160) \ 0.046 \\ (178) \ 0.04 \\ (179) \ 0.04 \\ (287) \ 0.034 \\ (305) \ 0.034 \\ (323) \ 0.023 \\ (341) \ 0.023 \\ (341) \ 0.023 \\ (359) \ 0.034 \\ (359) \ 0.034 \\ (323) \ 0.023 \\ (341) \ 0.023 \\ (342) \ 0.023 \\ (359) \ 0.034 \\ (107) \ 0.04 \\ (107) \ 0.034 \\ (107) \ 0.$   | ( 91) 0.03<br>( 92) 0.05<br>( 93) 0.06<br>( 93) 0.06<br>( 93) 0.09<br>( 94) 0.09<br>( 97) 0.0466<br>( 98) 0.0466<br>( 98) 0.0372<br>(100) 0.0372<br>(101) 0.04<br>(102) 0.04   | (109) 0.034 (110) 0.034 (111) 0.03 (112) 0.03 (113) 0.0285 (114) 0.0285 (115) 0.0285 (116) 0.053 (116) 0.053 (117) 0.053 (118) 0.053 (119) 0.04 (121) 0.04  | (127) 0.0285<br>(128) 0.0285<br>(129) 0.06<br>(130) 0.06<br>(131) 0.068<br>(132) 0.068<br>(132) 0.053<br>(134) 0.053<br>(135) 0.104<br>(136) 0.104<br>(137) 0.083<br>(138) 0.083<br>(139) 0.057                               |  |  | (271) 0.053<br>(272) 0.053<br>(273) 0.053<br>(274) 0.053<br>(275) 0.0466<br>(276) 0.0466<br>(277) 0.04<br>(278) 0.04<br>(279) 0.04<br>(280) 0.04<br>(280) 0.04<br>(281) 0.034<br>(282) 0.034  | (289) 0.034<br>(290) 0.034<br>(291) 0.034<br>(292) 0.034<br>(293) 0.034<br>(294) 0.034<br>(295) 0.034<br>(295) 0.034<br>(296) 0.034<br>(297) 0.034<br>(299) 0.034<br>(300) 0.034  | $\begin{array}{c} (307) & 0.0285\\ (308) & 0.0285\\ (309) & 0.023\\ (311) & 0.023\\ (311) & 0.023\\ (312) & 0.023\\ (312) & 0.023\\ (313) & 9E-3\\ (314) & 9E-3\\ (315) & 9E-3\\ (315) & 9E-3\\ (316) & 9E-3\\ (317) & 0.023\\ (318) & 0.023\\ (319) & 0.023\\ (320) & 0.023\\ \end{array}$   | (325) 9E-3<br>(326) 9E-3<br>(327) 9E-3<br>(329) 9E-3<br>(330) 9E-3<br>(331) 0.0285<br>(332) 0.0285<br>(333) 0.0285<br>(333) 0.0285<br>(334) 0.0285<br>(335) 6E-3<br>(336) 6E-3<br>(337) 0.04<br>(338) 0.04                                | (343) 6E-3<br>(344) 6E-3<br>(345) 0.0285<br>(346) 0.0285<br>(347) 0.0285<br>(348) 0.0285<br>(349) 0.023<br>(350) 0.023<br>(351) 0.018<br>(352) 0.018<br>(354) 0.018<br>(354) 0.018                                  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | ( 91) 0.03<br>( 92) 0.05<br>( 93) 0.06<br>( 94) 0.06<br>( 95) 0.09<br>( 97) 0.0466<br>( 98) 0.0466<br>( 98) 0.0372<br>(100) 0.0372<br>(101) 0.04<br>(102) 0.04<br>(103) 0.04   | (109) 0.034<br>(110) 0.034<br>(111) 0.03<br>(112) 0.03<br>(113) 0.0285<br>(113) 0.0285<br>(114) 0.0285<br>(115) 0.053<br>(116) 0.053<br>(117) 0.053<br>(118) 0.053<br>(119) 0.04<br>(120) 0.04<br>(121) 0.04  | (127) 0.0285<br>(128) 0.0285<br>(129) 0.06<br>(130) 0.06<br>(131) 0.068<br>(132) 0.068<br>(133) 0.053<br>(134) 0.053<br>(135) 0.104<br>(136) 0.104<br>(137) 0.083<br>(138) 0.083<br>(138) 0.057<br>(140) 0.057                | (145) 0.088<br>(144) 0.068<br>(147) 0.076<br>(148) 0.076<br>(150) 0.08<br>(150) 0.08<br>(151) 0.06<br>(152) 0.06<br>(152) 0.06<br>(153) 0.053<br>(154) 0.053<br>(155) 0.04<br>(156) 0.04<br>(158) 0.04 |  | (271) 0.053<br>(272) 0.053<br>(273) 0.053<br>(274) 0.053<br>(275) 0.0466<br>(276) 0.0466<br>(277) 0.04<br>(278) 0.04<br>(278) 0.04<br>(280) 0.04<br>(280) 0.04<br>(281) 0.034<br>(282) 0.034<br>(284) 0.034   | $\begin{array}{c} (289) & 0.034 \\ (290) & 0.034 \\ (291) & 0.034 \\ (292) & 0.034 \\ (293) & 0.034 \\ (293) & 0.034 \\ (295) & 0.034 \\ (295) & 0.034 \\ (297) & 0.034 \\ (297) & 0.034 \\ (298) & 0.034 \\ (300) & 0.034 \\ (301) & 0.034 \\ (302) & 0.034 \end{array}$                                   | $ \begin{array}{ccccc} (307) & 0.0285 \\ (308) & 0.0285 \\ (309) & 0.023 \\ (311) & 0.023 \\ (311) & 0.023 \\ (312) & 0.023 \\ (312) & 0.023 \\ (313) & 9E-3 \\ (314) & 9E-3 \\ (315) & 9E-3 \\ (316) & 9E-3 \\ (316) & 0.023 \\ (319) & 0.023 \\ (320) & 0.023 \\ (321) & 0.023 \\ (321) & 0.023 \\ \end{array} $                          | (325) 9E-3<br>(326) 9E-3<br>(327) 9E-3<br>(329) 9E-3<br>(330) 9E-3<br>(330) 9E-3<br>(331) 0.0285<br>(332) 0.0285<br>(333) 0.0285<br>(334) 0.0285<br>(335) 6E-3<br>(336) 6E-3<br>(336) 6E-3<br>(337) 0.04<br>(338) 0.04<br>(339) 0.0285    | (343) 6E-3<br>(344) 6E-3<br>(345) 0.0285<br>(346) 0.0285<br>(347) 0.0285<br>(348) 0.0285<br>(348) 0.0285<br>(350) 0.023<br>(350) 0.023<br>(351) 0.018<br>(352) 0.018<br>(354) 0.018<br>(355) 0.018<br>(356) 0.018   |
| (107) 0.034 (125) 0.034 (143) 0.092 (1451) 0.040 (1777) 0.001 (1777) 0.074 (1751) 0.023 (1451)  | ( 91) 0.03<br>( 92) 0.05<br>( 93) 0.06<br>( 94) 0.06<br>( 95) 0.07<br>( 96) 0.07<br>( 97) 0.0466<br>( 98) 0.0466<br>( 99) 0.0372<br>(100) 0.0372<br>(101) 0.04<br>(102) 0.04<br>(103) 0.04<br>(105) 0.04                               | (109) 0.034 (110) 0.034 (111) 0.03 (112) 0.03 (113) 0.0285 (114) 0.0285 (115) 0.053 (116) 0.053 (117) 0.053 (118) 0.053 (119) 0.04 (120) 0.04 (121) 0.04 (122) 0.04 (123) 0.034   | (127) 0.0285<br>(128) 0.0285<br>(129) 0.06<br>(130) 0.06<br>(131) 0.068<br>(132) 0.068<br>(133) 0.053<br>(134) 0.053<br>(135) 0.104<br>(136) 0.104<br>(137) 0.083<br>(138) 0.083<br>(139) 0.057<br>(140) 0.057<br>(141) 0.076 |  |  | (271) 0.053<br>(272) 0.053<br>(273) 0.053<br>(274) 0.053<br>(275) 0.0466<br>(276) 0.0466<br>(277) 0.04<br>(278) 0.04<br>(279) 0.04<br>(280) 0.04<br>(280) 0.04<br>(281) 0.034<br>(283) 0.034<br>(285) 0.034   | (289) 0.034<br>(290) 0.034<br>(291) 0.034<br>(293) 0.034<br>(293) 0.034<br>(294) 0.034<br>(295) 0.034<br>(296) 0.034<br>(296) 0.034<br>(296) 0.034<br>(297) 0.034<br>(300) 0.034<br>(301) 0.034<br>(302) 0.034  | $\begin{array}{c} (307) & 0.0285 \\ (308) & 0.0285 \\ (309) & 0.023 \\ (310) & 0.023 \\ (311) & 0.023 \\ (312) & 0.023 \\ (312) & 0.023 \\ (313) & 9E-3 \\ (315) & 9E-3 \\ (315) & 9E-3 \\ (316) & 9E-3 \\ (317) & 0.023 \\ (319) & 0.023 \\ (319) & 0.023 \\ (320) & 0.023 \\ (321) & 0.023 \\ (321) & 0.023 \\ (322) & 0.023 \end{array}$ | (325) 9E-3<br>(326) 9E-3<br>(327) 9E-3<br>(329) 9E-3<br>(330) 9E-3<br>(331) 0.0285<br>(332) 0.0285<br>(333) 0.0285<br>(333) 0.0285<br>(334) 0.0285<br>(336) 6E-3<br>(337) 0.04<br>(338) 0.04<br>(339) 0.0285<br>(340) 0.0285              | $(343) \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$   |
| (107) 0.034 (126) 0.034 (144) 0.092 (162) 0.043 (180) 0.04 (288) 0.034 (306) 0.034 (324) 0.023 (342)  | ( 91) 0.05<br>( 92) 0.05<br>( 93) 0.06<br>( 94) 0.06<br>( 94) 0.09<br>( 97) 0.0466<br>( 98) 0.0466<br>( 98) 0.0466<br>( 98) 0.0372<br>(100) 0.0372<br>(101) 0.04<br>(102) 0.04<br>(102) 0.04<br>(103) 0.04<br>(105) 0.04<br>(106) 0.04 | (109) 0.034 (110) 0.034 (111) 0.03 (112) 0.03 (113) 0.0285 (114) 0.0285 (114) 0.0285 (115) 0.053 (116) 0.053 (117) 0.053 (118) 0.053 (119) 0.04 (120) 0.04 (121) 0.04 (122) 0.04 (122) 0.04 (123) 0.034 (124) 0.034   | (127) 0.0285<br>(128) 0.0285<br>(129) 0.06<br>(130) 0.06<br>(131) 0.068<br>(132) 0.068<br>(133) 0.053<br>(134) 0.053<br>(135) 0.104<br>(136) 0.104<br>(136) 0.083<br>(138) 0.083<br>(139) 0.057<br>(140) 0.057<br>(141) 0.076 |  |  | $\begin{array}{c} (271) 0.053 \\ (272) 0.053 \\ (273) 0.053 \\ (274) 0.053 \\ (275) 0.0466 \\ (276) 0.0466 \\ (277) 0.04 \\ (278) 0.04 \\ (278) 0.04 \\ (279) 0.04 \\ (280) 0.04 \\ (280) 0.04 \\ (281) 0.034 \\ (282) 0.034 \\ (283) 0.034 \\ (285) 0.034 \\ (286) 0.034 \\ (286) 0.034 \end{array}$ | $\begin{array}{c} (289) & 0.034 \\ (290) & 0.034 \\ (291) & 0.034 \\ (292) & 0.034 \\ (293) & 0.034 \\ (293) & 0.034 \\ (294) & 0.034 \\ (295) & 0.034 \\ (296) & 0.034 \\ (297) & 0.034 \\ (297) & 0.034 \\ (300) & 0.034 \\ (301) & 0.034 \\ (302) & 0.034 \\ (302) & 0.034 \\ (304) & 0.034 \end{array}$ | (307) 0.0285<br>(308) 0.0285<br>(309) 0.023<br>(311) 0.023<br>(311) 0.023<br>(312) 0.023<br>(313) 9E-3<br>(314) 9E-3<br>(315) 9E-3<br>(316) 0.023<br>(317) 0.023<br>(319) 0.023<br>(320) 0.023<br>(321) 0.023<br>(322) 0.023<br>(323) 0.023   | (325) 9E-3<br>(326) 9E-3<br>(327) 9E-3<br>(329) 9E-3<br>(330) 9E-3<br>(331) 0.0285<br>(332) 0.0285<br>(333) 0.0285<br>(333) 0.0285<br>(335) 6E-3<br>(335) 6E-3<br>(337) 0.04<br>(338) 0.04<br>(338) 0.0285<br>(340) 0.0285<br>(341) 0.023 | (343) $6E-3(344)$ $6E-3(345)$ $0.0285(346)$ $0.0285(347)$ $0.0285(349)$ $0.0285(349)$ $0.0235(350)$ $0.023(351)$ $0.018(352)$ $0.018(353)$ $0.018(355)$ $0.018(355)$ $0.018(356)$ $0.018(358)$ $0.018(359)$ $0.023$ |

Page 1

River discharge data at 12-hourly intervals for Station: WSTW Period : 6

| iable: KROM   |   |   |   |   |  |  |  | 0.021   | (181)   | <br>0   | (199)   |   | (217)  | 1.797  | (235)   | 0.046  | (253)   | 0.054   |
|---|---|---|---|---|--|--|--|---|---|---|---|---|--|--|---|--|---|---|
| 0.411   | ( 17)   | 0.054   | ( 37)   |   | ( 55)  |  | · · - /  |   | (192)   | ō   | (200)   | 9E-3  | (218)  | 0.537  | (236)   | 0.054  | (254)   | 0.026   |
| 0.305   | (20)  | 0.072   | (38)  | 0.054   | ( 56)  | 0.094  | (74)   | 0.021   | (183)   | ŏ   | (201)   | 0.046   | (219)  | 0.28   | (237)   | 0.054  | (255)   | 0,054   |
| 0.32  | (21)  | 0.07  | ( 39)   | 0.03B   | (57)   | 0.072  | (75)   | 0.054   | (184)   | ŏ   | (202)   | 5E-3  | (220)  | 0.218  | (238)   | 0.054  | (256)   | 0.038   |
| 4) 0.356  | (22)  | 0.094   | (40)  | 0.054   | (58)   | 0.094  | (76)   | 0.061   |   | 0 O   | (203)   | 0.038   | (221)  | 0.181  | (239)   | 0.064  | (257)   | 0.046   |
| 5) 0.26   | (20)  | 0.026   | ( 41)   | 0.038   | ( 59)  | 0.072  | ( 77)  | 0.07  | (185)   |   | •   | 5E-3  | (222)  | 0.148  | (240)   | 0.054  | (258)   | 0.074   |
| - · · -   | (24)  | 0.072   | (42)  | 0.054   | ( 60)  | 0.094  | (78)   | 0.072   | (185)   | 2E-3  | (204)   |   | (223)  | 0.119  | (241)   | 0.054  | (259)   | 0,106   |
| 6) 0.26   |   | 0.038   | (43)  | 0.038   | ( 61)  | 0.054  | ( 79)  | 0.07  | (187)   | 2E-3  | (205)   | 0.046   | (224)  | 0.119  | (242)   | 0.038  | (260)   | 0.054   |
| 7) 0.28   | (25)  | 0.072   | (44)  | 0.054   | ( 62)  | 0.094  | (80)   | 0.072   | (19B)   | 2E-3  | (206)   | 5E-3  |  |  | (243)   | 0.054  | (261)   | 0.026   |
| 8) 0.26   | (26)  |   | (45)  | 0.642   | ( 63)  | 0.13   | ( 81)  | 0.021   | (189)   | 2E-3  | (207)   | 3E3   | (225)  | 0.119  | (243)   | 0,072  | (262)   | 0.017   |
| 9) 0.181  | (27)  | 0.054   | •   |   | ( 64)  | 0.148  | (82)   | 0.017   | (190)   | 5E-3  | (208)   | 2E-3  | (226)  | 0.094  |   | 0,064  | (263)   | 0.026   |
| 0) 0.148  | (28)-   |   | (46)  | 0.338   | ( 65)  | 0.094  | (83)   | 0.013   | (191)   | 3E-3  | (209)   |   | (227)  | 0.094  | (245)   |  | (264)   | 9E-3  |
| 1) 0.094  | (~29)   | 0.072   | (47)  |   |  | 0.094  | ( 84)  | 0.013   | (192)   | 5E-3  | (210)   | 2E-3  | (228)  | 0.072  | (246)   | 0.411  |   |   |
| 2) 0.054  | (30)  | 0.094   | (48)  |   | ( 66)  | 0.117  | (85)   | 9E-3  | (193)   | 2E-3  | (211)   | 7E-3  | (229)  | 0.094  | (247)   | 0.094  | (265)   | 36-3  |
| 3) 0.083  | (31)  | 0.117   |   | 0.26  | ( 67)  |  | (86)   | 9E-3  | (194)   | 2E-3  | (212)   | 2E-3  | (230)  | 0.094  | (248)   | 0.148  | (266)   | 5E-3  |
| 4) 0,054  | ( 32)   | 0.094   |   | 0.218   | ( 68)  | 0.072  | (87)   | 0.026   | (195)   | 2E-3  | (213)   | 5E-3  | (231)  | 0.094  | (249)   | 0.305  | (267)   | 9E-3  |
| 5) 0.072  | (33)  | 0.083   | ( 51)   |   |  | 0.072  | • - ·  | 0.017   | (196)   | 2E-3  | (214)   | 2E-3  | (232)  | 0.072  | (250)   | 0.072  | (268)   | 9E-3  |
| 6) 0.054  | ( 34)   | 0.119   | ( 52)   |   |  | 0.072  | (88)   |   | (197)   |   | (215)   | 7E-3  | (233)  | 0.072  | (251)   | 0.094  | (259)   |   |
| 7) 0.062  | (35)  | 0.146   | (53)  | 0.094   | • • - •  | 0.061  | ( 89)  | 0.017   | (198)   |   |   | 9E-3  | (234)  | 0.038  | (252)   | 0.078  | (270)   | 9E-3  |
| 8) 0.094  | ( 36)   | 0.119   | (54)  | 0.218   |  | 0.061  | • • •  | 0.026   |   |   |   |   | ~  |  |   |  |   |   |
|   |   |   |   |   |  |  |  |   |   | -   |   |   |  |  |   |  |   |   |
|   |   |   |   |   |  |  |  |   |   |   |   |   |  |  |   |  | (747)   |   |
|   |   |   |   |   | ·  |  |  |   | (271)   | 0.017   | (289)   | 0.055   | (207)  | 0.218  | (325)   | 0.072  | (343)   | 9.19  |
| 91) 0.026   | (107)   | 0.013   | (127)   | \$E~3   | (145)  | 28-3   | (163)  |   |   | 0.017<br>9E-3   | (289)<br>(290)  | 0.055<br>0.038  | (307)<br>(308)   | 0.218<br>0.148   | (325)<br>(326)  | 0.072<br>0.181   | (343)<br>(344)  | 9.19  |
| 21) 0.026<br>2) 0.026   | (107)<br>(110)  | 0.013<br>5E-3   | (127)<br>(128)  | 5E-3<br>2E-3  | (145)<br>(146)   | 2E-3<br>2E-3   | (163)<br>(164)   | 2E-3<br>0   | (271)   | 0.017   | (289)<br>(290)<br>(291)   | 0.055<br>0.038<br>0.038   | (307)<br>(308)<br>(309)  | 0.218<br>0.148<br>0.094  | (325)<br>(326)<br>(327)   | 0.072<br>0.181<br>0.181  | (343)<br>(344)<br>(345)   | 9.19<br>10.55<br>6.42   |
| 91) 0.026<br>92) 0.026<br>93) 98-3  | (107)<br>(110)<br>(111)   | 0.013<br>5E-3<br>0.013  | (127)<br>(128)<br>(129)   | 5E-3<br>2E-3<br>2E-3  | (145)<br>(146)<br>(147)  | 2E-3<br>2E-3<br>2E-3<br>2E-3   | {163}<br>(164)<br>(165)  | 2E-3<br>0<br>1E-3   | (271)<br>(272)  | 0.017<br>9E-3   | (289)<br>(290)<br>(291)<br>(292)  | 0.055<br>0.038<br>0.038<br>0.054  | (307)<br>(308)<br>(309)<br>(310)   | 0.218<br>0.148<br>0.094<br>0.054   | (325)<br>(326)<br>(327)<br>(328)  | 0.072<br>0.181<br>0.181<br>1.035   | (343)<br>(344)<br>(345)<br>(345)  | 9.19<br>10.55<br>6.42<br>7.85   |
| 21) 0.026<br>22) 0.026<br>33) 9E-3<br>24) 9E-3  | (107)<br>(110)<br>(111)<br>(112)  | 0.013<br>5E-3<br>0.013<br>0   | (127)<br>(128)<br>(129)<br>(130)  | 5E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3  | (145)<br>(146)<br>(147)<br>(148)   | 2E-3<br>2E-3<br>2E-3<br>2E-3   | (163)<br>(164)<br>(165)<br>(166)   | 2E-3<br>0<br>1E-3<br>0  | (271)<br>(272)<br>(273)   | 0.017<br>9E-3<br>9E-3   | (289)<br>(290)<br>(291)   | 0.055<br>0.038<br>0.038   | (307)<br>(308)<br>(309)<br>(310)<br>(311)  | 0.218<br>0.148<br>0.094<br>0.054<br>0.054  | (325)<br>(326)<br>(327)<br>(328)<br>(329)   | 0.072<br>0.181<br>0.181<br>1.035<br>0.471  | (343)<br>(344)<br>(345)<br>(345)<br>(346)<br>(347)  | 9.19<br>10.55<br>6.42<br>7.85<br>7.27   |
| 21) 0.026<br>2) 0.026<br>3) 9E-3<br>4) 9E-3<br>25) 2E-3   | (107)<br>(110)<br>(111)<br>(112)<br>(112)<br>(113)  | 0.013<br>5E-3<br>0.013<br>0<br>9E-3   | (127)<br>(128)<br>(129)<br>(130)<br>(131)   | 5E-3<br>2E-3<br>2E-3<br>2E-3<br>5E-3  | (145)<br>(146)<br>(147)<br>(148)<br>(148)<br>(147)   | 2E-3<br>2E-3<br>2E-3<br>2E-3<br>5E-3   | {163}<br>(164)<br>(165)<br>(166)<br>(167)  | 2E-3<br>0<br>1E-3<br>0<br>2E-3  | (271)<br>(272)<br>(273)<br>(274)<br>(275)   | 0.017<br>9E-3<br>9E-3<br>9E-3   | (289)<br>(290)<br>(291)<br>(292)  | 0.055<br>0.038<br>0.038<br>0.054<br>0.054   | (307)<br>(308)<br>(309)<br>(310)   | 0.218<br>0.148<br>0.094<br>0.054<br>0.054<br>0.054   | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)  | 0.072<br>0.181<br>0.181<br>1.035<br>0.471<br>0.356   | (343)<br>(344)<br>(345)<br>(345)<br>(345)<br>(347)<br>(348)   | 9.19<br>10.55<br>6.422<br>7.854<br>7.278<br>7.278   |
| 21) 0.026<br>22) 0.026<br>33) 9E-3<br>24) 9E-3  | (107)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)  | 0.013<br>5E-3<br>0.013<br>0<br>9E-3<br>0  | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)  | 5E3<br>2E3<br>2E3<br>5E3<br>5E3<br>2E3  | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)   | 2E-3<br>2E-3<br>2E-3<br>2E-3<br>5E-3<br>2E-3   | <pre>{163}<br/>(164)<br/>(165)<br/>(166)<br/>(167)<br/>(168)</pre>   | 2E-3<br>0<br>1E-3<br>0<br>2E-3<br>2E-3  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)  | 0.017<br>9E-3<br>9E-3<br>9E-3<br>0.054<br>9E-3  | (289)<br>(290)<br>(291)<br>(292)<br>(293)   | 0.055<br>0.038<br>0.038<br>0.054<br>0.046<br>0.054  | (307)<br>(308)<br>(309)<br>(310)<br>(311)  | 0.218<br>0.148<br>0.094<br>0.054<br>0.054  | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(320)<br>(331)   | 0.072<br>0.181<br>0.181<br>1.035<br>0.471<br>0.356<br>0.26   | (343)<br>(344)<br>(345)<br>(345)<br>(347)<br>(348)<br>(348)   | 9.19<br>10.55<br>6.42<br>7.85<br>7.27<br>7.45<br>6.22   |
| 21) 0.026<br>(2) 0.026<br>(3) 9E-3<br>(4) 9E-3<br>(25) 2E-3   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)   | 0.013<br>5E-3<br>0.013<br>0<br>9E-3<br>0<br>7E-3  | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)   | 5E-3<br>2E-3<br>2E-3<br>5E-3<br>5E-3<br>2E-3<br>2E-3<br>2E-3                              | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)  | 2E-3<br>2E-3<br>2E-3<br>2E-3<br>5E-3<br>2E-3<br>2E-3<br>0,119  | <pre>{163} (164) (165) (166) (167) (168) (167)</pre>   | 2E-3<br>0<br>1E-3<br>0<br>2E-3<br>2E-3<br>2E-3<br>2E-3  | (271)<br>(272)<br>(273)<br>(274)<br>(276)<br>(276)<br>(277)   | 0.017<br>9E-3<br>9E-3<br>9E-3<br>0.054<br>9E-3<br>0.026   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)  | 0.055<br>0.038<br>0.038<br>0.054<br>0.046<br>0.054<br>0.054   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)   | 0.218<br>0.148<br>0.094<br>0.054<br>0.054<br>0.054<br>0.054  | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)  | 0.072<br>0.181<br>0.181<br>1.035<br>0.471<br>0.356<br>0.26<br>0.218  | (343)<br>(344)<br>(345)<br>(345)<br>(347)<br>(348)<br>(348)<br>(349)<br>(350)   | 9.19<br>10.55<br>6.42<br>7.85<br>7.27<br>7.45<br>6.22<br>6.63   |
| 21) 0.026<br>22) 0.026<br>33) 9E-3<br>94) 9E-3<br>95) 2E-3<br>96) 3E-3  | (107)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)  | 0.013<br>5E-3<br>0.013<br>0<br>9E-3<br>0<br>7E-3  | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)  | 5E-3<br>2E-3<br>2E-3<br>5E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3                      | (145)<br>(146)<br>(147)<br>(148)<br>(147)<br>(150)<br>(151)<br>(151)<br>(152)  | 2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>0.119<br>9E-3  | <pre>{163} (164) (165) (166) (167) (168) (168) (169) (170)</pre>   | 2E-3<br>0<br>1E-3<br>0<br>2E-3<br>2E-3<br>0   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(276)<br>(276)  | 0.017<br>9E-3<br>9E-3<br>9E-3<br>0.054<br>9E-3<br>0.026<br>7 9E-3   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(294)<br>(295)<br>(296)   | 0.055<br>0.038<br>0.038<br>0.054<br>0.054<br>0.054<br>0.054<br>0.026  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)  | 0.218<br>0.148<br>0.094<br>0.054<br>0.054<br>0.054<br>0.054<br>0.072<br>0.054  | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(320)<br>(331)   | 0.072<br>0.181<br>0.181<br>1.035<br>0.471<br>0.356<br>0.26   | (343)<br>(344)<br>(345)<br>(345)<br>(347)<br>(348)<br>(348)<br>(349)<br>(350)<br>(351)  | 9.19<br>10.55<br>6.42<br>7.85<br>7.27<br>7.45<br>6.22<br>6.63<br>6.42   |
| 0.026<br>(2) 0.026<br>(3) 9E-3<br>(4) 9E-3<br>(5) 2E-3<br>(6) 3E-3<br>(7) 7E-3<br>(8) 5E-3  | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)   | 0.013<br>SE-3<br>0.013<br>0<br>9E-3<br>0<br>7E-3<br>5E-3  | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)   | 5E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2                         | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(152)<br>(153)  | 2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>0.119<br>9E-3<br>9E-3  | <pre>{163} (164) (165) (166) (167) (168) (167) (168) (167) (170) (171)</pre>                               | 2E-3<br>0<br>1E-3<br>0<br>2E-3<br>2E-3<br>0<br>0  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(277)<br>(277)<br>(279)   | 0.017<br>9E-3<br>9E-3<br>0.054<br>9E-3<br>0.026<br>'9E-3<br>0.026   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(294)<br>(295)<br>(296)<br>(297)  | 0.055<br>0.038<br>0.038<br>0.054<br>0.054<br>0.054<br>0.054<br>0.026<br>0.054   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)   | 0.218<br>0.148<br>0.094<br>0.054<br>0.054<br>0.054<br>0.072<br>0.054<br>0.054  | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)  | 0.072<br>0.181<br>0.181<br>1.035<br>0.471<br>0.356<br>0.26<br>0.218<br>0.181   | (343)<br>(344)<br>(345)<br>(345)<br>(345)<br>(346)<br>(347)<br>(348)<br>(349)<br>(350)<br>(351)<br>(352)  | 9.19<br>10.55<br>6.42<br>7.85<br>7.27<br>7.45<br>6.22<br>6.63<br>6.42<br>4.68   |
| 21) 0.026<br>(2) 0.026<br>(3) 9E-3<br>(4) 9E-3<br>(5) 2E-3<br>(6) 3E-3<br>(7) 7E-3<br>(9) 5E-3<br>(9) 5E-3<br>(9) 0.054   | (107)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)   | 0.013<br>5E-3<br>0.013<br>0<br>9E-3<br>0<br>7E-3<br>5E-3<br>0.017   | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)  | 5E-3<br>2E-3<br>2E-3<br>5E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3                      | (145)<br>(146)<br>(147)<br>(148)<br>(147)<br>(150)<br>(151)<br>(151)<br>(152)  | 2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>0.119<br>9E-3<br>9E-3<br>9E-3  | <pre>{163} (164) (165) (166) (167) (168) (167) (168) (167) (170) (171) (172)</pre>                         | 2E-3<br>0<br>1E-3<br>0<br>2E-3<br>2E-3<br>2E-3<br>0<br>0<br>0   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)  | 0.017<br>9E-3<br>9E-3<br>0.054<br>9E-3<br>0.026<br>9E-3<br>0.026<br>0.026   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(294)<br>(295)<br>(296)<br>(297)<br>(298)   | 0.055<br>0.038<br>0.038<br>0.054<br>0.054<br>0.054<br>0.026<br>0.054<br>0.054<br>0.054  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)   | 0.218<br>0.148<br>0.094<br>0.054<br>0.054<br>0.054<br>0.072<br>0.054<br>0.054  | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)   | 0.072<br>0.181<br>0.181<br>1.035<br>0.471<br>0.354<br>0.26<br>0.218<br>0.181<br>0.305  | (343)<br>(344)<br>(345)<br>(345)<br>(347)<br>(348)<br>(348)<br>(349)<br>(350)<br>(351)  | 9.19<br>10.55<br>6.42<br>7.85<br>7.27<br>7.45<br>6.22<br>6.63<br>6.42<br>4.68   |
| 1)       0.026         2)       0.026         3)       9E-3         25)       2E-3         26)       3E-3         28)       5E-3         29)       0.054         20)       0.017  | (107)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(117)<br>(118)  | 0.013<br>5E-3<br>0.013<br>0<br>9E-3<br>0<br>7E-3<br>5E-3<br>0.017<br>9E-3   | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)   | 5E-3<br>2E-3<br>2E-3<br>2E-3<br>5E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3      | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(152)<br>(153)  | 2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>0.119<br>9E-3<br>9E-3<br>9E-3<br>5E-3                                | <pre>{163} (164) (165) (166) (167) (168) (167) (167) (170) (1770) (171) (172) (173)</pre>                  | 2E-3<br>0<br>1E-3<br>0<br>2E-3<br>2E-3<br>2E-3<br>0<br>0<br>0   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(277)<br>(279)<br>(279)<br>(280)<br>(281)  | 0.017<br>9E-3<br>9E-3<br>9E-3<br>0.054<br>9E-3<br>0.026<br>9E-3<br>0.026<br>0.026<br>0.017<br>0.032   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(295)<br>(297)<br>(298)<br>(299)   | 0.055<br>0.038<br>0.038<br>0.054<br>0.054<br>0.054<br>0.054<br>0.026<br>0.054<br>0.054<br>0.054   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)<br>(317)  | 0.218<br>0.148<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054   | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(331)<br>(331)<br>(333)<br>(333)<br>(333)<br>(334)  | 0.072<br>0.181<br>0.181<br>1.035<br>0.471<br>0.356<br>0.218<br>0.218<br>0.305<br>0.218   | (343)<br>(344)<br>(345)<br>(345)<br>(345)<br>(346)<br>(347)<br>(348)<br>(349)<br>(350)<br>(351)<br>(352)  | 9.19<br>10.55<br>6.42<br>7.85<br>7.27<br>7.45<br>6.22<br>6.63<br>6.42<br>4.68<br>3.98   |
| 21)       0.026         22)       0.026         33)       9E-3         94)       9E-3         95)       2E-3         97)       7E-3         98)       5E-3         99)       0.054         90)       0.017         91)       0.026  | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(119)                                     | 0.013<br>5E-3<br>0.013<br>0<br>9E-3<br>0<br>7E-3<br>5E-3<br>0.017<br>9E-3<br>0.023                                  | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)  | 5E-3<br>2E-3<br>2E-3<br>5E-3<br>5E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3              | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(151)<br>(153)<br>(153)<br>(154)  | 2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>0.119<br>9E-3<br>9E-3<br>9E-3  | <pre>{163} (164) (165) (166) (167) (167) (169) (170) (171) (172) (173) (174)</pre>                         | 2E-3<br>0<br>1E-3<br>0<br>2E-3<br>2E-3<br>0<br>0<br>0<br>0<br>0<br>0                                    | (271)<br>(272)<br>(273)<br>(274)<br>(276)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)<br>(281)<br>(282)  | 0.017<br>9E-3<br>9E-3<br>9E-3<br>0.054<br>9E-3<br>0.026<br>9E-3<br>0.026<br>9E-3<br>0.026<br>0.017  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(294)<br>(297)<br>(298)<br>(299)<br>(299)<br>(300)   | 0.055<br>0.038<br>0.039<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054   | (207)<br>(308)<br>(309)<br>(310)<br>(311)<br>(313)<br>(314)<br>(315)<br>(314)<br>(315)<br>(317)<br>(318)                                     | 0.218<br>0.148<br>0.094<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.356<br>0.119                            | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(320)<br>(331)<br>(333)<br>(333)<br>(334)<br>(335)<br>(334)                                     | 0.072<br>0.181<br>1.035<br>0.471<br>0.356<br>0.26<br>0.218<br>0.181<br>0.305<br>0.218<br>0.181   | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(348)<br>(349)<br>(350)<br>(351)<br>(352)<br>(383)   | 9.19<br>10.55<br>6.42<br>7.85<br>7.27<br>7.45<br>6.22<br>6.63<br>6.42<br>4.68<br>3.98<br>3.48   |
| 1) $0.026$<br>2) $0.026$<br>3) $9E-3$<br>4) $9E-3$<br>5) $2E-3$<br>6) $3E-3$<br>7) $7E-3$<br>8) $5E-3$<br>9) $0.054$<br>0) $0.017$<br>(2) $0.026$   | (107)<br>(110)<br>(111)<br>(112)<br>(114)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(119)<br>(120)                            | 0.013<br>SE-3<br>0.013<br>0<br>9E-3<br>5E-3<br>0.017<br>9E-3<br>0.023<br>9E-3                                       | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(133)<br>(133)<br>(134)<br>(135)<br>(136)<br>(137)<br>(138)                            | 5E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2                         | (145)<br>(146)<br>(147)<br>(148)<br>(150)<br>(151)<br>(152)<br>(153)<br>(154)<br>(155)   | 2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>9E-3<br>9E-3<br>9E-3<br>9E-3<br>2E-3<br>2E-3<br>2E-3                         | <pre>{163} (164) (165) (166) (167) (168) (167) (168) (170) (171) (172) (173) (174) (175)</pre>             | 2E-3<br>0<br>1E-3<br>0<br>2E-3<br>2E-3<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0                     | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(279)<br>(280)<br>(281)<br>(282)<br>(283)  | 0.017<br>9E-3<br>9E-3<br>9E-3<br>0.054<br>9E-3<br>0.026<br>9E-3<br>0.026<br>9E-3<br>0.026<br>9E-3<br>0.026<br>0.017<br>0.032<br>0.017           | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(294)<br>(294)<br>(297)<br>(297)<br>(299)<br>(300)<br>(301)   | 0.055<br>0.038<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054  | (207)<br>(308)<br>(309)<br>(310)<br>(311)<br>(313)<br>(314)<br>(315)<br>(314)<br>(315)<br>(316)<br>(319)                                     | 0.218<br>0.148<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.356<br>0.119<br>0.094                                     | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329)<br>(320)<br>(331)<br>(333)<br>(334)<br>(335)<br>(336)<br>(337)          | 0.072<br>0.181<br>1.035<br>0.471<br>0.354<br>0.26<br>0.218<br>0.181<br>0.218<br>0.181<br>0.218   | (343)<br>(344)<br>(344)<br>(345)<br>(345)<br>(348)<br>(349)<br>(349)<br>(351)<br>(351)<br>(353)<br>(353)<br>(354)                                     | 9.19<br>10.55<br>6.42<br>7.85<br>7.27<br>6.22<br>6.63<br>6.42<br>4.68<br>3.98<br>3.48<br>3.17   |
| 1)       0.026         2)       0.026         3)       9E-3         25)       2E-3         26)       3E-3         27)       7E-3         28)       5E-3         29)       0.054         20)       0.026         21)       0.026         23)       9E-3  | (107)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(119)<br>(120)<br>(121)                   | 0.013<br>5E-3<br>0.013<br>0<br>9E-3<br>0.017<br>9E-3<br>0.017<br>9E-3<br>0.023<br>9E-3<br>0.013                     | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(133)<br>(133)<br>(134)<br>(135)<br>(134)<br>(137)<br>(139)                            | 5E-3<br>2E-3<br>2E-3<br>5E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2 | (145)<br>(146)<br>(147)<br>(148)<br>(147)<br>(150)<br>(155)<br>(155)<br>(155)<br>(155)<br>(155)  | 2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>9E-3<br>9E-3<br>9E-3<br>9E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3         | <pre>{163} (164) (165) (166) (167) (167) (169) (170) (171) (172) (173) (174)</pre>                         | 2E-3<br>0<br>1E-3<br>0<br>2E-3<br>2E-3<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0                     | (271)<br>(272)<br>(273)<br>(274)<br>(276)<br>(276)<br>(277)<br>(278)<br>(280)<br>(280)<br>(281)<br>(282)<br>(283)<br>(284)                            | 0.017<br>9E-3<br>9E-3<br>9E-3<br>0.054<br>9E-3<br>0.026<br>9E-3<br>0.026<br>0.017<br>0.032<br>0.017<br>0.038<br>0.026                           | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(294)<br>(294)<br>(297)<br>(298)<br>(299)<br>(300)<br>(301)<br>(302)                                     | 0.055<br>0.038<br>0.058<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054                                     | (207)<br>(308)<br>(309)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(315)<br>(317)<br>(318)<br>(319)<br>(320)                            | 0.218<br>0.148<br>0.094<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.356<br>0.119<br>0.094                            | (325)<br>(326)<br>(327)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329)<br>(324)<br>(334)<br>(335)<br>(334)<br>(335)<br>(336)<br>(337)          | 0.072<br>0.181<br>1.035<br>0.471<br>0.356<br>0.26<br>0.218<br>0.181<br>0.305<br>0.218<br>0.181<br>0.218<br>0.471                                     | (343)<br>(344)<br>(344)<br>(346)<br>(347)<br>(348)<br>(349)<br>(350)<br>(351)<br>(352)<br>(353)<br>(353)<br>(354)                                     | 9.19<br>10.55<br>6.42<br>7.85<br>7.27<br>7.45<br>6.22<br>6.43<br>6.42<br>4.48<br>3.98<br>3.48<br>3.17<br>2.87   |
| 1)       0.026         2)       0.026         3)       9E-3         25)       2E-3         26)       3E-3         29)       0.054         20)       0.017         21)       0.026         22)       0.026   | (107)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(114)<br>(117)<br>(118)<br>(117)<br>(120)<br>(121)<br>(122) | 0.013<br>SE-3<br>0.013<br>0<br>9E-3<br>0.017<br>9E-3<br>0.017<br>9E-3<br>0.023<br>9E-3<br>0.013<br>2E-3             | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(134)<br>(135)<br>(136)<br>(137)<br>(139)<br>(140) | 5E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2                         | (145)<br>(146)<br>(147)<br>(148)<br>(150)<br>(151)<br>(152)<br>(153)<br>(153)<br>(154)<br>(155)<br>(156)<br>(157)<br>(158)                   | 2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>9E-3<br>9E-3<br>9E-3<br>9E-3<br>9E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3 | <pre>{163} (164) (165) (166) (167) (168) (167) (168) (170) (171) (172) (173) (174) (175)</pre>             | 2E-3<br>0<br>1E-3<br>0<br>2E-3<br>2E-3<br>2E-3<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0             | (271)<br>(272)<br>(273)<br>(274)<br>(276)<br>(276)<br>(277)<br>(278)<br>(280)<br>(280)<br>(281)<br>(281)<br>(283)<br>(283)<br>(285)                   | 0.017<br>9E-3<br>9E-3<br>0.054<br>9E-3<br>0.026<br>9E-3<br>0.026<br>0.017<br>0.032<br>0.017<br>0.038<br>0.026<br>0.218                          | (289)<br>(290)<br>(291)<br>(295)<br>(295)<br>(294)<br>(295)<br>(294)<br>(296)<br>(297)<br>(297)<br>(297)<br>(297)<br>(297)<br>(300)<br>(300)<br>(301)<br>(302)<br>(303) | 0.055<br>0.038<br>0.038<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054                   | (207)<br>(308)<br>(309)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(315)<br>(315)<br>(316)<br>(317)<br>(318)<br>(319)<br>(320)<br>(321) | 0.218<br>0.148<br>0.094<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.356<br>0.119<br>0.094<br>0.094          | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(329)<br>(329)<br>(320)<br>(334)<br>(334)<br>(335)<br>(334)<br>(335)<br>(336)<br>(337)<br>(338) | 0.072<br>0.181<br>1.035<br>0.471<br>0.356<br>0.26<br>0.28<br>0.181<br>0.305<br>0.218<br>0.181<br>0.218<br>0.181<br>0.218<br>0.471<br>4.325           | (343)<br>(344)<br>(344)<br>(345)<br>(347)<br>(348)<br>(349)<br>(350)<br>(350)<br>(351)<br>(352)<br>(353)<br>(353)<br>(353)<br>(355)<br>(355)<br>(355) | 9.19<br>10.55<br>6.42<br>7.85<br>7.27<br>6.22<br>6.43<br>6.42<br>4.48<br>3.98<br>3.47<br>2.87<br>2.58   |
| 1)       0.026         2)       0.026         3)       9E-3         24)       9E-3         25)       2E-3         26)       3E-3         27)       7E-3         28)       5E-3         29)       0.054         20)       0.026         21)       0.026         22)       0.026         23)       9E-3         24)       0.026         25)       0.038 | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(119)<br>(120)<br>(121)<br>(122)<br>(123) | 0.013<br>5E-3<br>0.013<br>0<br>9E-3<br>0<br>7E-3<br>5E-3<br>0.017<br>9E-3<br>0.023<br>9E-3<br>0.013<br>2E-3<br>7E-3 | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(137)<br>(138)<br>(139)<br>(140)<br>(141) | 5E-3<br>2E-3<br>2E-3<br>5E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2 | (145)<br>(146)<br>(147)<br>(148)<br>(150)<br>(151)<br>(152)<br>(153)<br>(154)<br>(155)<br>(156)<br>(156)<br>(157)<br>(158)                   | 2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>9E-3<br>9E-3<br>9E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>1E-3 | <pre>{163} (164) (166) (167) (168) (167) (168) (167) (170) (171) (172) (173) (174) (175) (175)</pre>       | 2E-3<br>0<br>1E-3<br>0<br>2E-3<br>2E-3<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | (271)<br>(272)<br>(273)<br>(274)<br>(276)<br>(276)<br>(277)<br>(278)<br>(280)<br>(280)<br>(281)<br>(284)<br>(284)<br>(285)<br>(285)<br>(285)          | 0.017<br>9E-3<br>9E-3<br>9E-3<br>0.054<br>9E-3<br>0.026<br>9E-3<br>0.026<br>9E-3<br>0.026<br>0.017<br>0.032<br>0.017<br>0.032<br>0.017<br>0.038 | (289)<br>(290)<br>(291)<br>(292)<br>(295)<br>(294)<br>(295)<br>(294)<br>(297)<br>(297)<br>(297)<br>(297)<br>(297)<br>(301)<br>(301)<br>(303)<br>(304)                   | 0.055<br>0.038<br>0.038<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054 | (207)<br>(208)<br>(209)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)<br>(315)<br>(317)<br>(318)<br>(319)<br>(320)<br>(322) | 0.218<br>0.094<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.356<br>0.119<br>0.094<br>0.094                   | (325)<br>(326)<br>(327)<br>(329)<br>(329)<br>(329)<br>(329)<br>(334)<br>(335)<br>(335)<br>(335)<br>(335)<br>(336)<br>(337)<br>(338)<br>(339)<br>(340) | 0.072<br>0.181<br>1.035<br>0.471<br>0.354<br>0.24<br>0.218<br>0.181<br>0.218<br>0.181<br>0.218<br>0.471<br>4.325<br>1.34                             | (343)<br>(344)<br>(345)<br>(345)<br>(347)<br>(347)<br>(347)<br>(350)<br>(351)<br>(352)<br>(353)<br>(353)<br>(354)<br>(355)<br>(355)<br>(356)          | 9.19<br>10.55<br>6.427<br>7.85<br>7.27<br>6.422<br>6.422<br>6.43<br>6.422<br>6.43<br>6.428<br>3.48<br>3.48<br>3.48<br>3.48<br>3.48<br>3.48<br>3.48<br>3.4 |
| 1)       0.026         2)       0.026         3)       9E-3         25)       2E-3         26)       3E-3         27)       7E-3         28)       5E-3         29)       0.054         20)       0.017         21)       0.026         22)       0.026   | (107)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(114)<br>(117)<br>(118)<br>(117)<br>(120)<br>(121)<br>(122) | 0.013<br>SE-3<br>0.013<br>0<br>9E-3<br>5E-3<br>0.017<br>9E-3<br>0.023<br>9E-3<br>0.013<br>2E-3<br>7E-3<br>2E-3      | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(134)<br>(135)<br>(136)<br>(137)<br>(139)<br>(140) | 5E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2                         | (145)<br>(146)<br>(147)<br>(148)<br>(150)<br>(151)<br>(152)<br>(153)<br>(153)<br>(155)<br>(156)<br>(156)<br>(157)<br>(158)<br>(159)<br>(160) | 2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>9E-3<br>9E-3<br>9E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>2E-3<br>1E-3 | <pre>{163} (164) (165) (166) (167) (168) (167) (170) (171) (172) (172) (173) (174) (175) (176) (177)</pre> | 2E-3<br>0<br>1E-3<br>0<br>2E-3<br>2E-3<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(279)<br>(280)<br>(281)<br>(282)<br>(283)<br>(284)<br>(284)<br>(285)<br>(285)<br>(287) | 0.017<br>9E-3<br>9E-3<br>0.054<br>9E-3<br>0.026<br>9E-3<br>0.026<br>0.017<br>0.032<br>0.017<br>0.038<br>0.026<br>0.218                          | (289)<br>(290)<br>(291)<br>(295)<br>(295)<br>(294)<br>(295)<br>(294)<br>(296)<br>(297)<br>(297)<br>(297)<br>(297)<br>(297)<br>(300)<br>(300)<br>(301)<br>(302)<br>(303) | 0.055<br>0.038<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>7E-3<br>2E-3<br>2E-3             | (207)<br>(308)<br>(309)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(315)<br>(315)<br>(316)<br>(317)<br>(318)<br>(319)<br>(320)<br>(321) | 0.218<br>0.148<br>0.094<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.119<br>0.094<br>0.094<br>0.072<br>0.072<br>0.072 | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(329)<br>(329)<br>(320)<br>(334)<br>(334)<br>(335)<br>(334)<br>(335)<br>(336)<br>(337)<br>(338) | 0.072<br>0.181<br>1.035<br>0.471<br>0.355<br>0.471<br>0.354<br>0.218<br>0.181<br>0.218<br>0.218<br>0.218<br>0.218<br>0.471<br>4.325<br>1.34<br>1.235 | (343)<br>(344)<br>(344)<br>(345)<br>(347)<br>(348)<br>(349)<br>(350)<br>(350)<br>(351)<br>(352)<br>(353)<br>(353)<br>(353)<br>(355)<br>(355)<br>(355) | 9.19<br>10.55<br>6.42<br>7.85<br>7.27<br>7.45<br>6.22<br>4.48<br>3.98<br>3.48<br>3.48<br>3.48<br>3.48<br>2.84<br>2.30                                     |

## River discharge data at 12-hourly intervals for Station: 14B Period : 1

. .

5

1

TR 143 March 1989

| Varia | ble: KROM2 | .varl        | (length | = 350) |                |        |        | ~     |       |       |       |       |                |                |       |                |       |                |       |
|-------|------------|--------------|---------|--------|----------------|--------|--------|-------|-------|-------|-------|-------|----------------|----------------|-------|----------------|-------|----------------|-------|
|       |            |              | 0.684   | ( 37)  |                | ( 55)  | 0.411  | (73)  | 0.305 | (181) | 0.684 | (199) |                | (217)          |       | (235)          |       | (253)<br>(254) | 0.765 |
| ( 1)  | 1.235      | (19)<br>(20) | Ú.684   | (38)   |                | ( 56)  | 0.411  | (74)  | 1.235 | (182) | 0.609 | (200) | 0.471          | (218)          | 4.502 | (236)<br>(237) |       | (255)          | 0.684 |
|       | 1,035      |              | 0.684   | ( 39)  |                |        | 0.411  | (75)  | 0.765 | (183) |       | (201) | 0.537          | (219)          | 3.981 | (228)          |       | (205)          | 0.684 |
| •     | 1.035      | (22)         | 0.608   | ( 40)  |                | (58)   | 0.356  | (76)  | 0.687 | (184) |       | (202) | 0.5.7          |                | 2.728 | (239)          |       | (257)          | 0.684 |
| (4)   |            | (23)         |         | (41)   |                |        | 0.356  | ( 77) | 1.235 | (185) | 0.60B | (203) | 0.537          | (221)          | 2.309 | (239)          |       | (258)          | 0.608 |
|       | 0.941      | (24)         |         | (42)   |                | ( 60)  | 0.356  | (78)  | 10.55 | (186) | 0.608 | (204) | 0.684          | (222)          | 2.047 |                |       | (257)          | 0.684 |
|       | 0.851      | (25)         |         |        | 0.411          | ( 61)  | 0.356  | (79)  | 4.235 | (197) |       | (205) | 0.608          | (227)          | 2.047 | (241)<br>(242) |       | (260)          | 0.684 |
|       | 0.851      | (26)         |         |        |                | ( 62)  | 0.305  | (80)  | 2.728 | (198) | 0.608 | (206) | 0.537          |                | 1.92  | (242)          |       | (261)          | 0.694 |
|       | 0.851      | (27)         |         | ( 45)  |                | ( 63)  | 0.356  | (81)  | 2.309 | (187) |       | (207) | 0.851          |                | 1.797 | (244)          |       | (262)          | 0.609 |
|       | 1.035      | (28)         |         | (46)   |                | (64)   | 0.305  | (82)  | 1.797 | (190) |       | (208) | 1.035          | (226)          | 1.678 | (245)          |       | (263)          | 0.765 |
| ( 10) |            | (29)         |         | ( 47)  |                | ( 65)  | 0.305  | (83)  | 1.562 |       | 0.608 | (209) | 1.678          |                | 1.562 | (246)          | -     | (264)          | 0.851 |
| (11)  | -          | (30)         |         | (48)   |                | ( 66 ) | 0.305  | 1 84) | 1.449 |       | 0.537 | (210) | 3.33           | (228)<br>(229) | 1.447 | (247)          |       | (265)          | 0.851 |
| (12)  |            | (31)         |         | (49)   |                | ( 67)  | 0.305  | (85)  | 1.235 |       | 0.537 | (211) | 4.502          | (230)          |       | (248)          |       | (266)          | 0.765 |
| (13)  |            | (32)         |         | ( 50)  |                |        | 0.305  | (86)  | 1.205 | (194) |       | (212) | 2.873          |                | 1.34  | (249)          |       | (267)          | 0.684 |
| (15)  |            | ( 33)        |         | ( 51)  | 0.411          |        | 0.305  | ( 87) | 1.133 |       | 0.537 |       | 4.325<br>2.728 |                | 1.235 | (250)          |       | (268)          | 0.684 |
| (16)  |            | (34)         |         | ( 52)  | 0.356          | (70)   |        | (88)  | 1.173 |       | 0.471 |       | 2.176          | (203)          |       | (251)          |       | (269)          | 0.851 |
|       | 0.684      | (35)         |         | ( 53)  |                | (71)   |        | ( 87) | 1.035 |       | 0.471 | (216) |                | (254)          |       | (252)          |       | (270)          | 2.047 |
|       | A 104      | 1 741        | 0 411   | ( 54)  | 0.411          | (72)   | 0.305  |       | 1.005 | (178) | 0.537 | (210) |                |                |       |                |       |                |       |
|       |            |              |         |        |                |        |        |       |       |       | -     |       |                |                |       |                |       |                |       |
|       |            |              |         |        |                |        |        |       | 1     |       |       |       |                |                |       |                |       |                |       |
|       |            |              |         |        |                |        |        |       | 1     |       |       |       |                |                |       |                |       |                |       |
|       |            |              |         |        |                |        |        |       | ••    |       |       |       |                |                |       | *~             |       |                |       |
|       |            |              |         |        |                |        |        |       | 0.851 |       | 2.176 |       | 0.951          | (307)          | 0.411 | (325)          | 0.210 | (345)          | 0.026 |
|       | 0.941      | (107)        |         | (127)  |                | (145)  |        | (154) | 0.851 |       | 1.797 | (290) | 0.851          | (308)          | 0.411 | (326)          |       | (344)          | 0.094 |
|       | 0.851      | (110)        |         | (128)  |                | (146)  |        | (165) | 0.851 |       | 2.047 | (291) | 0.851          | (309)          | 0.411 | (327)          |       | (345)          | 0.017 |
|       | 0.851      | (111)        |         | (129)  |                | (147)  | -      | (166) | 0.851 |       | 2.176 | (292) | 0.765          | (310)          | 0.411 | (328)          | 0.210 |                | 0.072 |
|       | 0.851      |              | 1.449   | (130)  |                | (148)  |        | (167) | 0.851 |       | 2.047 | (293) | 0.765          | (311)          | 0.411 | (329)          |       | (347)          | 0,017 |
|       | 0.851      | (113)        |         | (131)  |                | (149)  | 1,678  | (168) |       |       | 1.678 | (294) | 0.769          | (312)          | 0.356 | (320)          | 0.181 | (348)          | 0.054 |
|       | 0,765      |              | 1.678   | (132)  | 0.765          | (150)  |        | (169) | 0.765 |       | 1.562 | (295) | 0.684          | (313)          | 0.356 | (331)          |       | (349)          | 9E-3  |
|       | 0.765      |              | 1.562   | (133)  | 0.745          |        | 1.449  |       | 0.765 |       | 1.449 | (296) | 0.508          | (314)          | 0.305 |                | 0.181 | (350)          | 0.026 |
|       | 0.684      |              | 1.449   |        | 0.765          | (152)  |        | (171) |       | (279) |       | (297) | 0.608          |                | 0.305 | (333)          |       | (351)          | 5E-3  |
|       | 0.684      | (117)        |         | (135)  | 0.765          |        | 1.235  | (172) |       |       | 1.235 | (298) | 0.608          |                | 0.356 | (334)          |       | (352)          | 0.026 |
|       | 0.684      |              | 1.235   |        | 0.765<br>0.684 |        | 1.133  | (173) | 0.684 | (201) |       | (299) | 0.608          | (317)          | 0.411 | (335)          | 0.117 | (353)          | 9E-3  |
|       | 1.035      | (119)        |         |        |                |        | 1.035  | (174) |       |       | 1.035 | (300) | 0.608          | (318)          | 0.356 | (336)          |       | (354)          | 0.026 |
|       | ) 1,133    |              | 1.235   | (138)  | 0.684          |        | 1.0356 | (175) | 0.684 | (293) |       | (301) | 0.608          |                | 0.356 | (337)          |       | (355)          | 0.017 |
|       | 1.035      |              | 1.235   | (139)  |                |        | 0.941  | (176) |       |       | 1.035 | (302) | 0.537          | (320)          | 0.356 |                | 0,181 | (356)          | 9E-3  |
|       | ) 1.133    |              | 1.133   |        | 0.684<br>0.684 |        | 0.941  | (177) | 0.684 |       | 0,941 | (303) | 0.537          |                | 0.356 |                | 0.148 | (357)          | 0.017 |
|       | 3.981      |              | 1.035   |        |                |        | 0.741  | (179) | 0.684 | (284) |       | (304) | 0.537          |                |       | (340)          |       | (358)          | 5E-3  |
|       | 2.585      |              | 1.035   |        | 0.608          | (191)  | 0.941  |       | 0.684 |       | 0.941 | (305) |                | (323)          | 0,25  |                | 0.054 | (357)          | 9E-3  |
|       | 2.176      | (125)        |         | (143)  | 0.608<br>0.608 |        | 0.851  |       | 0.608 | 10003 | 0.051 | (304) | 0 471          | (324)          | 0.218 | (342)          | 0.148 | (340)          | 5E~3  |
| (108) | ) 1.92     | (126)        | 0.941   | (144)  |                |        |        |       |       |       |       |       |                |                | .~    |                |       |                |       |
|       |            |              |         |        | -              |        |        |       |       |       | •     |       |                |                |       |                |       |                |       |

\$

:

.

.

۰.

1.7.1

River discharge data at 12-hourly intervals for Station: 14B Period : 2

Phosphorus transport Berg River

•

••

.

:

| riable: KROM   |   |   |  |  |   |  | (217) 0.219  | (235) 0.941   | (253) 0.26   |       |
|--|---|---|--|--|---|--|--|---|--|-------|
|  |   |   | ( 55) 0.054  | (73) 0.608   | (181) 0.119   | (199) 0.072  |  |   |  |       |
| 1) 0.017   | ( 19) 1.3E-3  | (38) 0.218  | ( 56) 0.038  | (74) 0.408   | (192) 0.094   | (200) 0.038  | (218) 0.218  | (236) 1.103   | (254) 0,181  |       |
| 2) 0.017   | (20) 5E-3   |   |  | (75) 0.5   | (183) 0.119   | (201) 0.072  | (217) 0.218  | (237) 0.851   | (255) 0.218  |       |
| 3) 0.026   | ( 21) 0.017   | (39) 0.22   | ( 58) 0.038  | (75) 0.537   | (184) 0.094   | (202) 0.038  | (220) 0.181  | (238) 0.584   | (256) 0.148  |       |
| 4) 0.026   | (22) 58-3   | (40) 0.218  | ( 59) 0.119  | ( 77) 0.471  | (185) 0.119   | (203) 0.054  | (221) 0.148  | (239) 0.584   | (257) 0.134  |       |
| 5) 0.119   | ( 23) 5E-3  | (41) 0.22   | ( 60) 0.537  | ( 78) 0.356  | (186) 0.094   | (204) 0.026  | (222) 0.119  | (240) 0.508   | (258) 0.119  |       |
| 6) 0.094   | (24) 5E-3   | (42) 0.218  | ( 61) 0.684  | ( 79) 0.356  | (187) 0.072   | (205) 0.305  | (223) 0.094  | (241) 0.537   | (259) 0.119  |       |
| 7) (),148  | ( 25) 9E-3  | (43) 0.22   | ( 62) 0.684  | ( 80) 0.305  | (188) 0.054   | (206) 0.305  | (224) 0.094  | (242) 0.507   | (260) 0.094  |       |
| B) 0.072   | ( 26) 5E-3  | (44) 0.181  | ( 63) 0.851  | (81) 0.305   | (188) 0.054<br>(189) 0.094  | (207) 0.051  | (225) 0.094  | (243) 0.471   | (261) 0.094  |       |
| 9) 0.026   | ( 27) 0.054   | (45) 0.148  |  | (82) 0.26  | (190) 0.072   | (208) 1.035  | (226) 0.072  | (244) 0.411   | (262) 0.094  |       |
| 10) 0.026  | ( 28) 0.072   | (46) 0.094  | ( 64) 0.851  | (83) 0.26  | (191) 0.094   | (209) 1.562  | (227) 0.094  | (245) 0.411   | (263) 0.119  | *     |
| 11) 0.054  | ( 29) 0.072   | ( 47) 0.054   | ( 65) 0.851  | (84) 0.218   | (192) 0.072   | (210) 1.449  | (228) 0.054  | (246) 0.411   | (264) 0.094  |       |
| 12) 0.038  | ( 30) 0.038   | (48) 0.054  | ( 66) 0.851  | (85) 0.218   | (193) 0.072   | (211) 1.035  | (229) 0.119  | (247) 0.411   | (265) 0.094  |       |
| 13) 0.054  | ( 31) 0.148   | ( 49) 0.054   |  | (85) 0.181   | (194) 0.054   | (212) 0.851  | (230) 0.119  | (248) 0.26  | (266) 0.094  |       |
| 14) 0.03B  | ( 32) 0.218   | ( 50) 0.054   | ( <b></b> )  | (87) 0.218   | (195) 0.072   | (213) 0.684  | (231) 0.148  | (249) 0.261   | (257) 0.094  |       |
| 15) 0.054  | ( 33) 0.44  | ( 51) 0.038   | <b>( -</b> · · · · ·   |  | (196) 0.054   | (214) 0.60B  | (232) 0.851  | (250) 0.26  | (268) 0.072  |       |
| 16) 0.038  | ( 34) 0.411   | ( 52) 0.038   |  | (88) 0.218   | (197) 0.072   | (215) 0.305  | (233) 0.684  | (251) 0.26  | (269) 0.094  |       |
| 17) 0.054  |   | ( <b>5</b> 3) 0.03B   | ( · · · · · · · · · · · · · · · · · · ·  | ( 89) 0.119  | (198) 0.054   | (216) 0.26   | (234) 0.765  | (252) 0.218   | (270) 0.072  |       |
|  |   |   |  |  |   |  |  |   |  |       |
| 18) 0.024  | ( 36) 0.305   | ( 54) 0.038   | ( 72) 0.608  | ( 40) 0.044  |   |  |  |   | \<br>\   |       |
|  |   |   |  |  | ·   |  |  |   | `  |       |
|  |   | · · · · · · · · · · · · · · · · · · ·   |  | (163) 0.411  | (271) 0.072   | (289) 0.181  | (307) 0.181  | (225) 0.411   | ,<br>(343) 0.26  |       |
| 91) 0.119  | (109) 0.038   | (127) 0.218   |  | (163) 0.411<br>(164) 0.305   | (271) 0.072<br>(272) 0.148  | (289) 0.181<br>(290) 0.148   | (307) 0.181<br>(309) 0.181   | (125) 0.411<br>(126) 0.411  | (343) 0.26<br>(344) 0.26   |       |
| <b>71)</b> (0.119<br><b>72)</b> (0.181   | (109) 0.038<br>(110) 0.038  | (127) 0.219<br>(128) 0.148  | (145) 0.148  | (163) 0.411  | (271) 0.072<br>(272) 0.148<br>(273) 0.094   | (289) 0.181<br>(290) 0.148<br>(291) 0.131  | (307) 0.181<br>(309) 0.181<br>(309) 0.22   | (725) 0.411<br>(726) 0.411<br>(727) 0.411   | (343) 0.24<br>(344) 0.26<br>(345) 0.26   | A3.   |
| 91) 0.119<br>92) 0.181<br>93) 0.148  | (109) 0.038<br>(110) 0.038<br>(111) 0.054   | (127) 0.219<br>(128) 0.148<br>(129) 0.181   | (145) 0.148<br>(146) 0.119   | (163) 0.411<br>(164) 0.305   | (271) 0.072<br>(272) 0.148<br>(273) 0.094<br>(274) 0.094  | (289) 0.181<br>(290) 0.148<br>(291) 0.131<br>(292) 0.148   | (307) 0.181<br>(309) 0.181<br>(309) 0.22<br>(310) 0.537  | (125) 0.411<br>(126) 0.411<br>(327) 0.411<br>(328) 0.411  | (343) 0.24<br>(344) 0.26<br>(345) 0.26<br>(346) 0.218  | A3.   |
| 91) 0.119<br>92) 0.181<br>93) 0.148<br>94) 0.148   | (109) 0.038<br>(110) 0.038<br>(111) 0.054<br>(112) 0.072  | (127) 0.219<br>(128) 0.148<br>(129) 0.181<br>(130) 0.149  | (145) 0.148<br>(146) 0.119<br>(147) 0.148<br>(148) 0.148   | (163) 0.411<br>(164) 0.305<br>(165) 0.305<br>(166) 0.218<br>(166) 0.181  | (271) 0.072<br>(272) 0.148<br>(273) 0.094<br>(274) 0.094<br>(275) 0.148   | (289) 0.181<br>(290) 0.148<br>(291) 0.131<br>(292) 0.148<br>(293) 0.181  | (307) 0.181<br>(309) 0.181<br>(309) 0.22<br>(310) 0.537<br>(311) 1.235   | (125) 0.411<br>(126) 0.411<br>(127) 0.411<br>(128) 0.411<br>(129) 0.411<br>(129) 0.411  | (343) 0.26<br>(344) 0.26<br>(345) 0.26<br>(346) 0.218<br>(347) 0.218   | A3.   |
| 91) 0.119<br>92) 0.181<br>93) 0.148<br>94) 0.148<br>95) 0.119  | (107) 0.038<br>(110) 0.038<br>(111) 0.038<br>(112) 0.072<br>(113) 0.148   | (127) 0.219<br>(128) 0.148<br>(129) 0.148<br>(129) 0.181<br>(130) 0.148<br>(131) 0.218  | (145) 0.148<br>(145) 0.119<br>(147) 0.148  | (163) 0.411<br>(164) 0.305<br>(165) 0.305<br>(166) 0.218<br>(166) 0.181  | (271) 0.072<br>(272) 0.14B<br>(273) 0.094<br>(274) 0.094<br>(275) 0.14B<br>(275) 0.14B  | (289) 0.181<br>(290) 0.148<br>(291) 0.131<br>(292) 0.148<br>(293) 0.181<br>(294) 0.148   | (307) 0.181<br>(309) 0.181<br>(309) 0.22<br>(310) 0.537<br>(311) 1.235<br>(312) 1.133  | (125) 0.411<br>(126) 0.411<br>(127) 0.411<br>(328) 0.411<br>(329) 0.411<br>(329) 0.411<br>(330) 0.411   | (343) 0.24<br>(344) 0.26<br>(345) 0.26<br>(346) 0.218<br>(347) 0.218<br>(348) 0.218  | A3.   |
| 91) 0.119<br>92) 0.181<br>93) 0.148<br>94) 0.148<br>95) 0.119<br>96) 0.094   | (109) 0.038<br>(110) 0.038<br>(111) 0.038<br>(112) 0.072<br>(113) 0.148<br>(114) 0.218  | (127) 0.219<br>(128) 0.148<br>(129) 0.181<br>(130) 0.149<br>(131) 0.218<br>(132) 0.181  | (145) 0.148<br>(146) 0.119<br>(147) 0.148<br>(148) 0.148<br>(148) 0.148<br>(147) 0.119<br>(150) 0.119  | (163) 0.411<br>(164) 0.305<br>(165) 0.305<br>(166) 0.218<br>(167) 0.181  | (271) 0.072<br>(272) 0.14B<br>(273) 0.094<br>(274) 0.094<br>(275) 0.14B<br>(275) 0.14B<br>(276) 0.094<br>(277) 0.094  | (289) 0.181<br>(290) 0.148<br>(291) 0.131<br>(292) 0.148<br>(293) 0.181<br>(294) 0.148<br>(295) 0.148  | (307) 0.181<br>(309) 0.181<br>(309) 0.22<br>(310) 0.537<br>(311) 1.235<br>(312) 1.133<br>(313) 0.765   | (125) 0.411<br>(126) 0.411<br>(127) 0.411<br>(328) 0.411<br>(329) 0.411<br>(330) 0.411<br>(331) 0.356   | (343) 0.24<br>(344) 0.26<br>(345) 0.24<br>(346) 0.218<br>(347) 0.218<br>(348) 0.218<br>(349) 0.218   | A3.   |
| 91) 0.119<br>92) 0.181<br>93) 0.148<br>94) 0.148<br>95) 0.119<br>96) 0.094<br>97) 0.094  | (109) 0.038<br>(110) 0.038<br>(111) 0.038<br>(112) 0.072<br>(113) 0.148<br>(114) 0.218<br>(115) 0.218   | (127) 0.218<br>(128) 0.148<br>(129) 0.181<br>(130) 0.148<br>(131) 0.218<br>(132) 0.181<br>(133) 0.181   | (145) 0.148<br>(146) 0.119<br>(147) 0.148<br>(148) 0.148<br>(149) 0.148<br>(147) 0.119<br>(150) 0.119<br>(151) 0.148   | (163) 0.411<br>(164) 0.305<br>(165) 0.305<br>(166) 0.218<br>(167) 0.191<br>(168) 0.149   | (271) 0.072<br>(272) 0.148<br>(273) 0.094<br>(274) 0.094<br>(275) 0.148<br>(275) 0.148<br>(276) 0.094<br>(277) 0.094<br>(278) 0.411   | (289) 0.181<br>(290) 0.148<br>(291) 0.131<br>(292) 0.148<br>(293) 0.148<br>(293) 0.148<br>(295) 0.148<br>(294) 0.119   | (307) 0.181<br>(309) 0.181<br>(309) 0.22<br>(310) 0.537<br>(311) 1.235<br>(312) 1.133<br>(313) 0.745<br>(314) 0.608  | (125) 0.411<br>(126) 0.411<br>(127) 0.411<br>(328) 0.411<br>(329) 0.411<br>(330) 0.411<br>(331) 0.356<br>(332) 0.305  | (343) 0.24<br>(344) 0.26<br>(345) 0.24<br>(346) 0.218<br>(347) 0.218<br>(348) 0.218<br>(349) 0.218<br>(350) 0.218  | A3.   |
| 91) 0.119<br>92) 0.181<br>93) 0.148<br>94) 0.148<br>95) 0.149<br>96) 0.094<br>97) 0.094<br>98) 0.148   | (107) 0.038<br>(110) 0.038<br>(111) 0.054<br>(112) 0.072<br>(113) 0.148<br>(114) 0.218<br>(114) 0.218<br>(114) 0.148  | (127) 0.218<br>(128) 0.148<br>(129) 0.148<br>(130) 0.148<br>(131) 0.218<br>(132) 0.181<br>(133) 0.181<br>(133) 0.181<br>(134) 0.119   | (145) 0.148<br>(146) 0.119<br>(147) 0.148<br>(148) 0.148<br>(147) 0.148<br>(147) 0.119<br>(150) 0.119<br>(151) 0.148<br>(152) 0.094  | (163) 0.411<br>(164) 0.305<br>(165) 0.305<br>(166) 0.218<br>(167) 0.181<br>(169) 0.181   | (271) 0.072<br>(272) 0.148<br>(273) 0.094<br>(274) 0.094<br>(275) 0.148<br>(276) 0.094<br>(277) 0.094<br>(277) 0.094<br>(277) 0.411<br>(279) 0.408  | (289) 0.181<br>(290) 0.148<br>(291) 0.131<br>(292) 0.148<br>(293) 0.181<br>(294) 0.148<br>(295) 0.148<br>(296) 0.119<br>(297) 0.148  | (307) 0.181<br>(309) 0.181<br>(309) 0.22<br>(310) 0.537<br>(311) 1.235<br>(312) 1.133<br>(313) 0.765<br>(314) 0.608<br>(315) 0.471   | (125) 0.411<br>(126) 0.411<br>(127) 0.411<br>(128) 0.411<br>(1328) 0.411<br>(1329) 0.411<br>(1330) 0.411<br>(1331) 0.356<br>(1332) 0.305<br>(1333) 0.305  | (343) 0.24<br>(344) 0.26<br>(345) 0.26<br>(346) 0.218<br>(347) 0.218<br>(348) 0.218<br>(349) 0.218<br>(350) 0.218<br>(351) 0.218   | A3,41 |
| 91) 0.119<br>92) 0.181<br>93) 0.148<br>94) 0.148<br>95) 0.148<br>95) 0.119<br>96) 0.094<br>97) 0.094<br>97) 0.094<br>98) 0.148<br>99) 0.218  | (109) 0.038<br>(110) 0.038<br>(111) 0.054<br>(112) 0.072<br>(113) 0.148<br>(114) 0.218<br>(114) 0.218<br>(114) 0.148<br>(117) 0.194   | (127) 0.219<br>(128) 0.148<br>(129) 0.148<br>(130) 0.149<br>(131) 0.218<br>(132) 0.181<br>(133) 0.181<br>(134) 0.119<br>(135) 0.148   | (145) 0.148<br>(146) 0.119<br>(147) 0.148<br>(148) 0.148<br>(147) 0.119<br>(150) 0.119<br>(151) 0.148<br>(152) 0.094<br>(153) 0.119  | (163) 0.411<br>(164) 0.305<br>(165) 0.305<br>(166) 0.218<br>(167) 0.181<br>(168) 0.181<br>(169) 0.181<br>(170) 0.148   | (271) 0.072<br>(272) 0.14B<br>(273) 0.094<br>(274) 0.094<br>(275) 0.14B<br>(275) 0.14B<br>(276) 0.094<br>(277) 0.094<br>(277) 0.094<br>(279) 0.408<br>(280) 0.305   | (289) 0.181<br>(290) 0.148<br>(291) 0.131<br>(292) 0.148<br>(293) 0.161<br>(294) 0.148<br>(295) 0.148<br>(295) 0.148<br>(296) 0.119<br>(297) 0.148   | (307) 0.181<br>(309) 0.181<br>(309) 0.22<br>(310) 0.537<br>(311) 1.235<br>(312) 1.133<br>(313) 0.765<br>(314) 0.608<br>(315) 0.471<br>(316) 0.411  | (125) 0.411<br>(124) 0.411<br>(127) 0.411<br>(328) 0.411<br>(329) 0.411<br>(330) 0.411<br>(331) 0.356<br>(132) 0.305<br>(333) 0.305<br>(334) 0.305  | (343) 0.24<br>(344) 0.26<br>(345) 0.26<br>(346) 0.218<br>(347) 0.218<br>(348) 0.218<br>(349) 0.218<br>(350) 0.218<br>(350) 0.218<br>(351) 0.218<br>(352) 0.218   | A3,41 |
| 91) 0.119<br>92) 0.181<br>93) 0.148<br>94) 0.148<br>95) 0.119<br>96) 0.094<br>97) 0.094<br>98) 0.148<br>99) 0.218<br>100) 0.218  | (109) 0.038<br>(110) 0.038<br>(111) 0.038<br>(111) 0.054<br>(112) 0.072<br>(113) 0.148<br>(114) 0.218<br>(115) 0.218<br>(114) 0.148<br>(117) 0.194<br>(118) 0.148   | (127) 0.218<br>(128) 0.148<br>(129) 0.181<br>(130) 0.148<br>(131) 0.218<br>(132) 0.181<br>(133) 0.181<br>(133) 0.181<br>(134) 0.119<br>(135) 0.148<br>(136) 0.119   | (145) 0.148<br>(144) 0.119<br>(147) 0.148<br>(148) 0.148<br>(149) 0.148<br>(147) 0.149<br>(150) 0.119<br>(151) 0.148<br>(152) 0.094<br>(153) 0.119<br>(153) 0.094  | (163) 0.411<br>(164) 0.305<br>(165) 0.305<br>(166) 0.218<br>(167) 0.181<br>(168) 0.148<br>(169) 0.148<br>(170) 0.148<br>(171) 0.148  | (271) 0.072<br>(272) 0.14B<br>(273) 0.094<br>(274) 0.094<br>(275) 0.14B<br>(276) 0.094<br>(277) 0.094<br>(277) 0.094<br>(278) 0.411<br>(279) 0.605<br>(280) 0.305<br>(281) 0.411  | (289) 0.181<br>(290) 0.148<br>(291) 0.131<br>(292) 0.148<br>(293) 0.161<br>(294) 0.148<br>(295) 0.148<br>(295) 0.148<br>(296) 0.119<br>(297) 0.148<br>(298) 0.119<br>(299) 0.094   | (307) 0.181<br>(509) 0.181<br>(309) 0.22<br>(310) 0.537<br>(311) 1.235<br>(312) 1.133<br>(313) 0.765<br>(314) 0.608<br>(315) 0.471<br>(316) 0.411<br>(317) 0.411   | (125) 0.411<br>(126) 0.411<br>(127) 0.411<br>(328) 0.411<br>(329) 0.411<br>(330) 0.411<br>(331) 0.356<br>(332) 0.305<br>(333) 0.305<br>(333) 0.305<br>(234) 0.305<br>(235) 0.26   | (543) 0.24<br>(344) 0.26<br>(345) 0.24<br>(346) 0.218<br>(347) 0.218<br>(349) 0.218<br>(349) 0.218<br>(350) 0.218<br>(351) 0.218<br>(351) 0.218<br>(352) 0.218   | A3,41 |
| 91)       0.119         92)       0.181         93)       0.148         94)       0.148         95)       0.119         96)       0.094         97)       0.094         98)       0.148         99)       0.218         100)       0.218         101)       0.218  | (109) 0.038<br>(110) 0.038<br>(111) 0.038<br>(111) 0.054<br>(112) 0.072<br>(113) 0.148<br>(113) 0.218<br>(115) 0.218<br>(114) 0.148<br>(117) 0.194<br>(118) 0.148<br>(119) 0.218  | (127) 0.218<br>(128) 0.148<br>(129) 0.181<br>(130) 0.148<br>(131) 0.218<br>(132) 0.181<br>(133) 0.181<br>(134) 0.119<br>(135) 0.148<br>(136) 0.119<br>(137) 0.148   | (145) 0.148<br>(146) 0.119<br>(147) 0.148<br>(148) 0.148<br>(147) 0.119<br>(150) 0.119<br>(151) 0.148<br>(152) 0.094<br>(153) 0.119  | (163) 0.411<br>(164) 0.305<br>(165) 0.305<br>(165) 0.218<br>(167) 0.181<br>(168) 0.149<br>(169) 0.149<br>(169) 0.148<br>(170) 0.148<br>(171) 0.148<br>(172) 0.119  | (271) 0.072<br>(272) 0.148<br>(273) 0.094<br>(274) 0.094<br>(275) 0.148<br>(275) 0.148<br>(276) 0.094<br>(277) 0.094<br>(277) 0.094<br>(279) 0.411<br>(279) 0.408<br>(280) 0.305<br>(281) 0.411<br>(282) 0.26   | (289) 0.181<br>(290) 0.148<br>(291) 0.131<br>(292) 0.148<br>(293) 0.161<br>(294) 0.148<br>(295) 0.148<br>(295) 0.148<br>(295) 0.148<br>(297) 0.149<br>(298) 0.119<br>(299) 0.094<br>(300) 0.094  | $\begin{array}{c} (307) & 0.181 \\ (309) & 0.181 \\ (309) & 0.22 \\ (310) & 0.537 \\ (311) & 1.235 \\ (312) & 1.133 \\ (313) & 0.765 \\ (314) & 0.608 \\ (315) & 0.471 \\ (316) & 0.411 \\ (316) & 0.305 \end{array}$  | (125) 0.411<br>(126) 0.411<br>(127) 0.411<br>(328) 0.411<br>(329) 0.411<br>(330) 0.411<br>(331) 0.356<br>(132) 0.305<br>(333) 0.305<br>(333) 0.305<br>(534) 0.305<br>(135) 0.26<br>(136) 0.305  | (343) 0.24<br>(344) 0.26<br>(345) 0.24<br>(346) 0.218<br>(347) 0.218<br>(349) 0.218<br>(349) 0.218<br>(350) 0.218<br>(351) 0.218<br>(351) 0.218<br>(352) 0.218<br>(353) 0.218  | A3,41 |
| 91)       0.119         92)       0.181         93)       0.148         94)       0.148         95)       0.119         96)       0.094         97)       0.094         98)       0.148         97)       0.218         100)       0.218         101)       0.218         102)       0.218                           | (109) 0.038<br>(110) 0.038<br>(111) 0.054<br>(112) 0.072<br>(113) 0.148<br>(114) 0.218<br>(114) 0.148<br>(117) 0.195<br>(118) 0.148<br>(117) 0.218<br>(118) 0.148<br>(119) 0.218<br>(120) 0.411                               | (127) 0.219<br>(128) 0.148<br>(129) 0.181<br>(130) 0.148<br>(131) 0.218<br>(132) 0.181<br>(133) 0.181<br>(134) 0.119<br>(135) 0.148<br>(136) 0.119<br>(137) 0.148<br>(138) 0.148  | (145) 0.148<br>(146) 0.119<br>(147) 0.148<br>(148) 0.148<br>(147) 0.148<br>(147) 0.119<br>(155) 0.119<br>(155) 0.119<br>(155) 0.119<br>(155) 0.119<br>(155) 0.119<br>(156) 0.094                               | (163) 0.411<br>(164) 0.305<br>(165) 0.305<br>(165) 0.218<br>(167) 0.181<br>(168) 0.148<br>(169) 0.181<br>(170) 0.148<br>(171) 0.148<br>(171) 0.148<br>(172) 0.119<br>(173) 0.119   | $\begin{array}{c} (271) & 0.072 \\ (272) & 0.148 \\ (273) & 0.094 \\ (274) & 0.094 \\ (275) & 0.148 \\ (275) & 0.148 \\ (276) & 0.094 \\ (277) & 0.094 \\ (279) & 0.411 \\ (279) & 0.408 \\ (280) & 0.305 \\ (281) & 0.411 \\ (282) & 0.26 \\ (283) & 0.305 \end{array}$  | (289) 0.181<br>(290) 0.148<br>(291) 0.131<br>(292) 0.148<br>(293) 0.181<br>(294) 0.148<br>(295) 0.148<br>(296) 0.119<br>(297) 0.148<br>(298) 0.119<br>(299) 0.094<br>(300) 0.094<br>(301) 0.119  | (307) 0.181<br>(309) 0.181<br>(309) 0.22<br>(310) 0.537<br>(311) 1.235<br>(312) 1.133<br>(313) 0.765<br>(314) 0.608<br>(315) 0.471<br>(316) 0.411<br>(316) 0.305<br>(319) 0.305  | (125) 0.411<br>(126) 0.411<br>(327) 0.411<br>(329) 0.411<br>(329) 0.411<br>(330) 0.411<br>(331) 0.356<br>(332) 0.305<br>(333) 0.305<br>(333) 0.305<br>(135) 0.26<br>(136) 0.305<br>(337) 0.305  | (343) 0.24<br>(344) 0.26<br>(345) 0.24<br>(346) 0.218<br>(347) 0.218<br>(349) 0.218<br>(349) 0.218<br>(350) 0.218<br>(351) 0.218<br>(351) 0.218<br>(353) 0.218<br>(353) 0.218<br>(355) 0.218                               | A3.41 |
| 91) 0.119<br>92) 0.181<br>93) 0.148<br>94) 0.148<br>95) 0.119<br>96) 0.094<br>97) 0.094<br>97) 0.218<br>101) 0.218<br>101) 0.218<br>102) 0.218   | (109) 0.038<br>(110) 0.038<br>(111) 0.054<br>(112) 0.072<br>(113) 0.148<br>(114) 0.218<br>(114) 0.218<br>(114) 0.148<br>(117) 0.194<br>(118) 0.148<br>(119) 0.218<br>(120) 0.411<br>(121) 0.411                               | (127) 0.218<br>(128) 0.148<br>(129) 0.181<br>(130) 0.148<br>(131) 0.218<br>(132) 0.181<br>(133) 0.181<br>(134) 0.119<br>(135) 0.148<br>(136) 0.119<br>(137) 0.148<br>(138) 0.148<br>(139) 0.181   | (145) 0.148<br>(146) 0.119<br>(147) 0.148<br>(148) 0.148<br>(147) 0.148<br>(147) 0.119<br>(150) 0.119<br>(151) 0.148<br>(152) 0.094<br>(153) 0.119<br>(154) 0.094<br>(155) 0.019<br>(156) 0.094<br>(157) 0.119 | (163) 0.411<br>(164) 0.305<br>(165) 0.305<br>(165) 0.305<br>(166) 0.218<br>(167) 0.181<br>(168) 0.149<br>(169) 0.181<br>(170) 0.148<br>(171) 0.148<br>(172) 0.119<br>(173) 0.119<br>(174) 0.094<br>(175) 0.149<br>(176) 0.119  | $\begin{array}{c} (271) & 0.072 \\ (272) & 0.148 \\ (273) & 0.094 \\ (274) & 0.094 \\ (275) & 0.148 \\ (275) & 0.148 \\ (276) & 0.094 \\ (277) & 0.094 \\ (277) & 0.094 \\ (278) & 0.411 \\ (279) & 0.608 \\ (280) & 0.305 \\ (281) & 0.411 \\ (282) & 0.26 \\ (283) & 0.305 \\ (284) & 0.181 \end{array}$  | (289) 0.181<br>(290) 0.148<br>(291) 0.131<br>(292) 0.148<br>(293) 0.161<br>(294) 0.148<br>(295) 0.148<br>(296) 0.148<br>(296) 0.119<br>(297) 0.148<br>(298) 0.119<br>(299) 0.094<br>(301) 0.119<br>(302) 0.119                               | (307) 0.181<br>(309) 0.181<br>(309) 0.22<br>(310) 0.537<br>(311) 1.235<br>(312) 1.133<br>(313) 0.765<br>(314) 0.608<br>(315) 0.471<br>(316) 0.411<br>(316) 0.305<br>(319) 0.305<br>(320) 0.356   | (125) 0.411<br>(124) 0.411<br>(127) 0.411<br>(328) 0.411<br>(329) 0.411<br>(330) 0.411<br>(331) 0.356<br>(332) 0.305<br>(333) 0.305<br>(333) 0.305<br>(135) 0.26<br>(136) 0.305<br>(136) 0.305<br>(136) 0.305   | (343) 0.24<br>(344) 0.26<br>(345) 0.26<br>(345) 0.28<br>(346) 0.218<br>(347) 0.218<br>(349) 0.218<br>(350) 0.218<br>(350) 0.218<br>(351) 0.218<br>(352) 0.218<br>(353) 0.218<br>(354) 0.218<br>(356) 0.218                 | A3,41 |
| 91)       0.119         92)       0.181         93)       0.148         94)       0.148         95)       0.119         96)       0.094         97)       0.094         98)       0.148         90)       0.218         100)       0.218         101)       0.218         103)       0.134         104)       0.094  | (109) 0.038<br>(110) 0.038<br>(111) 0.038<br>(111) 0.054<br>(112) 0.072<br>(113) 0.148<br>(114) 0.218<br>(115) 0.218<br>(114) 0.148<br>(117) 0.148<br>(117) 0.218<br>(119) 0.218<br>(120) 0.411<br>(121) 0.411<br>(122) 0.411 | $\begin{array}{c} (127) & 0.218 \\ (128) & 0.148 \\ (129) & 0.148 \\ (127) & 0.181 \\ (130) & 0.148 \\ (131) & 0.218 \\ (132) & 0.181 \\ (133) & 0.181 \\ (134) & 0.119 \\ (135) & 0.148 \\ (136) & 0.148 \\ (138) & 0.148 \\ (139) & 0.148 \\ (140) & 0.148 \end{array}$ | (145) 0.148<br>(144) 0.119<br>(147) 0.148<br>(148) 0.148<br>(149) 0.148<br>(147) 0.149<br>(150) 0.119<br>(151) 0.148<br>(152) 0.094<br>(153) 0.119<br>(154) 0.094<br>(155) 0.119<br>(154) 0.074                | (163) 0.411<br>(164) 0.305<br>(165) 0.305<br>(165) 0.305<br>(166) 0.218<br>(167) 0.181<br>(168) 0.149<br>(169) 0.181<br>(170) 0.148<br>(171) 0.148<br>(172) 0.119<br>(173) 0.119<br>(174) 0.094<br>(175) 0.149<br>(176) 0.119  | (271) 0.072<br>(272) 0.14B<br>(273) 0.094<br>(274) 0.094<br>(275) 0.14B<br>(275) 0.14B<br>(276) 0.094<br>(277) 0.094<br>(279) 0.411<br>(279) 0.408<br>(280) 0.305<br>(281) 0.411<br>(282) 0.26<br>(283) 0.305<br>(284) 0.181<br>(285) 0.218   | (289) 0.181<br>(290) 0.148<br>(291) 0.148<br>(292) 0.148<br>(293) 0.148<br>(293) 0.148<br>(294) 0.148<br>(295) 0.148<br>(296) 0.119<br>(297) 0.149<br>(299) 0.094<br>(300) 0.094<br>(301) 0.119<br>(302) 0.119<br>(303) 0.119                | $\begin{array}{c} (307) & 0.181 \\ (509) & 0.181 \\ (509) & 0.22 \\ (310) & 0.537 \\ (311) & 1.235 \\ (312) & 1.133 \\ (313) & 0.765 \\ (314) & 0.608 \\ (315) & 0.471 \\ (316) & 0.471 \\ (316) & 0.411 \\ (317) & 0.411 \\ (318) & 0.305 \\ (319) & 0.356 \\ (320) & 0.356 \\ (321) & 0.684 \end{array}$ | $ \begin{array}{c} (125) & 0.411 \\ (126) & 0.411 \\ (127) & 0.411 \\ (328) & 0.411 \\ (329) & 0.411 \\ (330) & 0.411 \\ (330) & 0.411 \\ (331) & 0.355 \\ (332) & 0.305 \\ (333) & 0.305 \\ (334) & 0.305 \\ (334) & 0.305 \\ (357) & 0.305 \\ (328) & 0.305 \\ (329) & 0.305 \end{array} $  | (343) 0.24<br>(344) 0.26<br>(345) 0.24<br>(346) 0.218<br>(347) 0.218<br>(349) 0.218<br>(350) 0.218<br>(350) 0.218<br>(351) 0.218<br>(352) 0.218<br>(354) 0.218<br>(354) 0.218<br>(355) 0.218<br>(355) 0.218<br>(357) 0.218 | A3.41 |
| 91) 0.119<br>92) 0.181<br>93) 0.148<br>94) 0.149<br>95) 0.119<br>96) 0.094<br>97) 0.094<br>98) 0.148<br>99) 0.218<br>100) 0.218<br>101) 0.218<br>102) 0.218<br>102) 0.218<br>103) 0.134<br>104) 0.094  | (109) 0.038<br>(110) 0.038<br>(111) 0.038<br>(111) 0.054<br>(112) 0.072<br>(113) 0.148<br>(114) 0.218<br>(115) 0.218<br>(116) 0.148<br>(117) 0.194<br>(118) 0.148<br>(119) 0.218<br>(120) 0.411<br>(121) 0.411<br>(122) 0.411 | (127) 0.218<br>(128) 0.148<br>(129) 0.181<br>(130) 0.148<br>(131) 0.218<br>(132) 0.181<br>(133) 0.181<br>(134) 0.119<br>(135) 0.148<br>(136) 0.119<br>(137) 0.148<br>(138) 0.148<br>(139) 0.181<br>(140), 0.148<br>(141) 0.148  | (145) 0.148<br>(146) 0.119<br>(147) 0.148<br>(148) 0.148<br>(149) 0.148<br>(147) 0.119<br>(150) 0.119<br>(151) 0.148<br>(152) 0.094<br>(153) 0.119<br>(155) 0.119<br>(155) 0.094<br>(157) 0.119<br>(158) 0.094 | (163) 0.411<br>(164) 0.305<br>(165) 0.305<br>(166) 0.218<br>(167) 0.181<br>(169) 0.181<br>(169) 0.181<br>(170) 0.148<br>(171) 0.148<br>(171) 0.148<br>(172) 0.119<br>(173) 0.119<br>(175) 0.148<br>(175) 0.148<br>(175) 0.119<br>(177) 0.119<br>(177) 0.119                | $\begin{array}{c} (271) & 0.072 \\ (272) & 0.148 \\ (273) & 0.094 \\ (274) & 0.094 \\ (275) & 0.148 \\ (275) & 0.148 \\ (275) & 0.094 \\ (277) & 0.094 \\ (279) & 0.401 \\ (279) & 0.401 \\ (279) & 0.408 \\ (280) & 0.305 \\ (281) & 0.411 \\ (282) & 0.26 \\ (283) & 0.305 \\ (284) & 0.181 \\ (285) & 0.218 \\ (286) & 0.148 \\ (286) & 0.148 \\ (286) & 0.218 \\ (286) & 0.148 \\ (286) & $ | (289) 0.181<br>(290) 0.148<br>(291) 0.131<br>(292) 0.148<br>(293) 0.148<br>(295) 0.148<br>(295) 0.148<br>(295) 0.148<br>(295) 0.148<br>(296) 0.119<br>(297) 0.094<br>(300) 0.094<br>(301) 0.119<br>(302) 0.119<br>(303) 0.119<br>(304) 0.094 | $\begin{array}{c} (307) & 0.181 \\ (509) & 0.181 \\ (509) & 0.22 \\ (310) & 0.537 \\ (311) & 1.235 \\ (312) & 1.133 \\ (313) & 0.745 \\ (314) & 0.608 \\ (315) & 0.471 \\ (316) & 0.411 \\ (317) & 0.411 \\ (316) & 0.305 \\ (319) & 0.305 \\ (320) & 0.356 \\ (321) & 0.684 \\ (522) & 0.471 \end{array}$ | (125) 0.411<br>(126) 0.411<br>(127) 0.411<br>(328) 0.411<br>(329) 0.411<br>(330) 0.411<br>(331) 0.356<br>(332) 0.305<br>(333) 0.305<br>(333) 0.305<br>(534) 0.305<br>(537) 0.305<br>(539) 0.305<br>(539) 0.305<br>(539) 0.305<br>(340) 0.26   | (143) 0.24<br>(344) 0.26<br>(345) 0.24<br>(346) 0.218<br>(347) 0.218<br>(347) 0.218<br>(349) 0.218<br>(350) 0.218<br>(351) 0.218<br>(351) 0.218<br>(352) 0.218<br>(354) 0.218<br>(355) 0.218<br>(356) 0.218<br>(357) 0.218 | A3,41 |
| 91)       0.119         92)       0.181         93)       0.148         94)       0.148         95)       0.119         96)       0.094         97)       0.094         98)       0.148         100)       0.218         101)       0.218         102)       0.218         103)       0.134         104)       0.094 | (109) 0.038<br>(110) 0.038<br>(111) 0.038<br>(111) 0.054<br>(112) 0.072<br>(113) 0.148<br>(114) 0.218<br>(115) 0.218<br>(114) 0.148<br>(117) 0.148<br>(117) 0.218<br>(119) 0.218<br>(120) 0.411<br>(121) 0.411<br>(122) 0.411 | $\begin{array}{c} (127) & 0.218 \\ (128) & 0.148 \\ (129) & 0.148 \\ (127) & 0.181 \\ (130) & 0.148 \\ (131) & 0.218 \\ (132) & 0.181 \\ (133) & 0.181 \\ (134) & 0.119 \\ (135) & 0.148 \\ (136) & 0.148 \\ (138) & 0.148 \\ (139) & 0.148 \\ (140) & 0.148 \end{array}$ | (145) 0.148<br>(144) 0.119<br>(147) 0.148<br>(148) 0.148<br>(149) 0.148<br>(147) 0.149<br>(150) 0.119<br>(151) 0.148<br>(152) 0.094<br>(153) 0.119<br>(154) 0.094<br>(155) 0.119<br>(154) 0.074                | (163) 0.411<br>(164) 0.305<br>(165) 0.305<br>(165) 0.305<br>(166) 0.218<br>(167) 0.181<br>(169) 0.149<br>(169) 0.149<br>(170) 0.148<br>(171) 0.148<br>(171) 0.148<br>(172) 0.119<br>(173) 0.119<br>(174) 0.094<br>(175) 0.149<br>(177) 0.119<br>(178) 0.094<br>(179) 0.119 | (271) 0.072<br>(272) 0.14B<br>(273) 0.094<br>(274) 0.094<br>(275) 0.14B<br>(275) 0.14B<br>(276) 0.094<br>(277) 0.094<br>(279) 0.411<br>(279) 0.408<br>(280) 0.305<br>(281) 0.411<br>(282) 0.26<br>(283) 0.305<br>(284) 0.181<br>(285) 0.218   | (289) 0.181<br>(290) 0.148<br>(291) 0.148<br>(292) 0.148<br>(293) 0.148<br>(293) 0.148<br>(294) 0.148<br>(295) 0.148<br>(296) 0.119<br>(297) 0.149<br>(299) 0.094<br>(300) 0.094<br>(301) 0.119<br>(302) 0.119<br>(303) 0.119                | (307) 0.181<br>(509) 0.181<br>(309) 0.22<br>(310) 0.537<br>(311) 1.235<br>(312) 1.133<br>(313) 0.765<br>(314) 0.608<br>(315) 0.471<br>(316) 0.411<br>(316) 0.305<br>(319) 0.305<br>(320) 0.356<br>(321) 0.684  | $ \begin{array}{c} (125) & 0.411 \\ (126) & 0.411 \\ (127) & 0.411 \\ (328) & 0.411 \\ (329) & 0.411 \\ (330) & 0.411 \\ (331) & 0.356 \\ (332) & 0.305 \\ (333) & 0.305 \\ (334) & 0.305 \\ (135) & 0.26 \\ (136) & 0.305 \\ (136) & 0.305 \\ (137) & 0.305 \\ (139) &$ | (343) 0.24<br>(344) 0.26<br>(345) 0.24<br>(346) 0.218<br>(347) 0.218<br>(349) 0.218<br>(350) 0.218<br>(350) 0.218<br>(351) 0.218<br>(352) 0.218<br>(354) 0.218<br>(354) 0.218<br>(355) 0.218<br>(355) 0.218<br>(357) 0.218 |       |

River discharge data at 12-hourly intervals for Station: 14B Period : 3

:

1

| (18)  | 0.218<br>0.181<br>0.218<br>0.464<br>3.022<br>1.92<br>1.34<br>2.175<br>0.851<br>1.797<br>0.484<br>0.408<br>0.408<br>0.537 | ( 24)<br>( 25)<br>( 26)<br>( 27)<br>( 28)<br>( 28)<br>( 30)<br>( 31)<br>( 32)<br>( 33)<br>( 33)<br>( 33)<br>( 35)<br>( 36) | 0.608<br>0.608<br>0.537<br>0.537<br>0.471<br>0.411<br>0.411<br>0.411<br>0.411<br>0.411<br>0.356<br>0.356<br>0.356 | (49)<br>(50)<br>(51)<br>(52)<br>(53)<br>(54) | 6.222<br>4.325 | ( 60)<br>( 61)<br>( 62)<br>( 63)<br>( 64)<br>( 65)<br>( 64)<br>( 67)<br>( 67)<br>( 69)<br>( 70)<br>( 71)<br>( 72) | 2.309<br>2.176 | ( 80)<br>( 81)<br>( 82)<br>( 83)<br>( 84)<br>( 85)<br>( 85)<br>( 87)<br>( 88)<br>( 89)<br>( 89)<br>( 90) |       | (197)<br>(188)<br>(189)<br>(190)<br>(191)<br>(192)<br>(193)<br>(194)<br>(195)<br>(196)<br>(197)<br>(198) | 1.92<br>1.449<br>1.34<br>1.235 | (204)<br>(205)<br>(206)<br>(207)<br>(208)<br>(209)<br>(210)<br>(211)<br>(212)<br>(213)<br>(213)<br>(214)<br>(215)<br>(216) | 1.035<br>0.941<br>0.941<br>0.941<br>0.941<br>0.941<br>0.941<br>0.951<br>0.851<br>0.851<br>0.851<br>0.851 | (222)<br>(223)<br>(224)<br>(225)<br>(226)<br>(228)<br>(229)<br>(230)<br>(231)<br>(231)<br>(232)<br>(233)<br>(234) | 1.92          | (248)<br>(249)<br>(250)<br>(251)<br>(252) | 0.851<br>0.851<br>0.745<br>0.684<br>0.684<br>0.684<br>0.684<br>0.684<br>0.684<br>0.684<br>0.6851<br>0.851<br>0.745 |       | 1.133<br>0.941<br>0.951<br>0.851<br>0.851<br>0.851<br>0.765<br>0.765<br>0.765<br>0.765<br>0.684<br>0.684 |            |
|-------|--|--|---|--|----------------|---|----------------|--|-------|--|--------------------------------|--|--|---|---------------|---|--|-------|--|------------|
|       | •  |  |   |  |                |   |                |  | \<br> |  |                                |  |  |   |               |   |  | (343) | 0.148  |            |
|       |  | (109)  | 5.82  | (127)  | 1.34           | (145)   | 0.051          | (193)  |       | (  | 0.765<br>0.765                 | (289)<br>(290)   | $0.411 \\ 0.411$   | (307)<br>(303)  | 0.26          | (326)<br>(326)                            | 0.305<br>0.26  | (344) | 0.119  | <b>A</b> 3 |
| ( 92) |  | (110)  | 3.814   | (128)  | 1.205          | (146)   | 0,765          | (164)<br>(165)   | 2.309 | • = • + •  | 0.765                          | (291)  | 0.411  |   | 0.305         |   | 0.218  |       |  | ھ          |
| ( 93) |  |  | 3.17  | (129)  | 1.235          | (147)<br>(148)  | 0.765<br>0.765 | (166)  | 1.92  | (274)  |                                | (292)  | 0.356  | (310)   | 0.305         | (328)                                     | 0.181  |       |  | Ň          |
| ( 94) |  |  | 2.873   | (130)  | 1.235          | (146)   | 0.765          | (167)  | 3.981 | (275)  | 0.608                          | (293)  | 0.30 <b>5</b>  | (311)   | 0.305         | (329)                                     | 0.181  |       |  |            |
| ( 95) | 0.851  | (113)  | 2.585   | (131)  | 1.133          | (150)   | 0.765          | (168)  | 3.814 | (275)  | 0.608                          |  | 0.356  | (312)   | 0.26          | (330)                                     | 0.148  |       |  |            |
|       |  | (114)  | 2.309   | (132)<br>(133)                               | 1.133          | (151)   | 1.797          | (169)  | 3,022 | (277)  | 0.608                          |  | 0.411  | (313)   | 0.26          | (331)                                     | 0.3  |       |  |            |
| ( 97) |  | (115).   | 2.31<br>2.176   | (133)  | 1.035          | (152)   | 1,235          | (170)  |       | (278)  | 806.0                          | (294)  | 0.356  | (314)   | 0.218         | (332)                                     | 0.26   |       |  |            |
|       | 11.29  | (116)<br>(117)   |   | (135)  | 1.035          | (153)   | 1.035          | (171)  | 2.446 | (279)  | 0.608                          | (297)  | 0.411  | (315)   | 0.26          | (333)                                     | 0.26<br>0.148  |       |  |            |
|       | 4.86<br>3.33   | (119)  |   | (136)  | 1.035          | (154)   | 2.728          | (172)  | 2.176 | (280)  | 0.608                          | (298)  | 0.411  | (316)   | 0.26<br>0.305 | (334)<br>(335)                            | 0.181  |       |  |            |
| (100) |  |  |   | (137)  | 1.035          | (155)   | 2.309          | (173)  |       | - (281)  | 0.608                          | (299)  | 0.411  | (317)<br>(318)  | 0.305         | (336)                                     | 0.119  |       |  |            |
| (102) |  |  | 1.67B   | (139)  | 1.035          | (156)   | 1.92           |  | 1.797 | (202)  | 0.608                          | (300)  | 0.471<br>0.537   | (318)   | 0.305         | (337)                                     | 0.148  |       |  |            |
|       | 9.65   | (121)  |   | (139)  | 1.035          |   | 1.679          | ·(175)   |       | (283)  | 0.608                          | (301)  | 0.337  | (320)   | 0.305         | (338)                                     |  |       |  |            |
|       | 4.502  |  | 1.678   | (140)  | 0.941          | (158)   | 1.449          |  | 1.678 | (284)  | 0.537<br>0.537                 | (302)<br>(303)   | 0.411  | (321)   | 0.25          |   | 0.119  |       |  |            |
|       | 3.488  | (123)  |   | (141)  | 0.941          | (159)   | 1.54           |  | 1.562 | (285)  | 0.537                          | (303)  | 0.411  | (322)   | 0.26          | (340)                                     |  |       |  |            |
|       | 3.022  |  | 1.449   | (142)  | 0.941          |   | 1.205          |  | 1.562 | (286)<br>(287)   | 0.537                          | (305)  | 0.411  | (323)   |               |   | 0.148  |       |  |            |
|       | 2.728  | (125)  | 1.45  | (143)  | 0.941          | (161)   | 2.873          |  | 1.552 | (289)  | 0.537                          | (305)  | 0.26   |   | 0.305         |   | 0.119  |       |  |            |
| (108) | 5.819  | (126)  | 1.34  | (144)  | 0.851          | (162)   | 3.814          |  | 1.449 | •  |                                |  |  |   |               |   |  |       |  | ·          |
|       |  |  |   |  |                |   |                |  |       |  |                                |  |  |   |               |   |  |       |  |            |

\_\_\_\_\_

(73) 2.175

(74) 2.176

( 75) 2,047

(76) 1.92

(77) 1,92

( 55) 3,408

( 56) 2.728

( 57) 2.446

( 58) 10.55

(59) 4.681

( 37) 0.356

(38) 0.411

( 39) 0.411

(40) 0.411

( 41) 0.356

\*-----

(181) 1.449

(182) 1.34

(183) 1.34

(184) 1.205

(185) 1.235

(199) 1.235

(200) 1.133

(201) 1.133

(202) 1.035

(203) 1.035

River discharge data at 12-hourly intervals for Station: 14B Period : 4

.

Variable: KROM4.var1 (length = 344)

( 17) 0.537

( 20) 0.684

(21) 0.941

( 22) 0.851

(23) 0.608

١

\_\_\_\_

( 1) 0.218

(

<

(

2) 0.181

3) 0.181

4) 0.218

(253) 0.765

0.684

0.684

0.684

0.765

1.133

Þ Ň

(254)

(255)

(256)

(257)

(258)

(235) 1.34

(236) 1.235

(239) 0.941

(240) 0.851

1.133

1.035

(237)

(238)

(217) 0.941

(218) 0.851

(219) 0.765

(220) 0.765

(221) 0.765

(222) 0.765

| Variable: KNUP   | 10.441.1  |  |  |  |   |   |   |  |   |
|--|---|--|--|--|---|---|---|--|---|
|  |   |  | ( 55) 0.054  |  | (181) 0<br>(182) 0.015<br>(183) 0<br>(183) 0<br>(184) 0<br>(185) 0<br>(186) 0                       | (199) 0   | (217) 0.03B   | (235) 2E-3   | (253) CE-3  |
|  | ( 19) 0.054   |  |  | ( 74) 2E-3   | (182) 0.015   | (200) 0   | (218) 0.04  | (236) 2E-3   | (254) 2E-3  |
|  |   |  | ( 56) 0.072<br>( 57) 0.061   | (74) 20 7  | (183) 0   | (201) 0   | (219) 0.017   | (237) 2E-3   | (255) 0.017   |
|  |   |  | ( 57) 0.001  | (76) 28-3  | (184) 0   | (202) 0   | (220) 0.02  | (238) 2E∽3   | (256) 2E-3  |
|  | ( 22) 28-3  | · · · · ·  |  | (77) 0.015   | (185) 9   | (203) 0   | (221) 2E-3  | (239) 2E-3   | (257) 0.054   |
| ( 5) 0.148   | (23) 0.017  | ( 41) 9E-3   | ( 59) 0.054  | (78) 9E-3  | (186) 0   | (204) 0   | (222) 2E-3  | (240) 2E−3   | (258) 0.017   |
| ( 6) 0.119   | ( 24) ZE-3  | (42)2E-3   | ( 60) 2E-3   | (70) 70 0 017  | (197) 0   | (205) 0   | (223) 2E-3  | (241) 2E-3   | (259) 0.181   |
| ( 7) 0.148   | (25) 0.015  | ( 43) 2E-3   | ( 61) 0.015  | (74) 0.017   | (199) 0   | (205) 0   | (224) 2E-3  | (242) 2E-3   | (260) 0.054   |
| (8)0,148   | ( 26) 2E-3  | ( 44) 2E-3   | ( 62) 2E-S   |  | (100) 35-3  | (207) 0   | (225) 28-3  | (243) 2E-3   | (261) 0.119   |
| ( 9) 0,181   | ( 27) 2E-3  | ( 45) 9E-3   | (63) 0.015   |  | (190) 0   | (208) 0   | (226) 38-3  | (244) 2E-3   | (262) 0.181   |
| ( 10) 0.181  | ( 28) 2E-3  | ( 46) 2E-3   | ( 64) 9E-3   | (82) 28-3  | (191) 75-3  | (209) 0   | (227) 28-3  | (245) 2E-3   | (263) 0.094   |
| ( 11) 0.148  | (29) 9E-3   | ( 47) 9E-3   | ( 65) 0.015  | ( B3) 2E-3   | (193) 0   | (210) 0   | (22B) 2E-3  | (246) 2E-3   | (264) 0.119   |
| (12) 0.094   | ( 30) 28-3  | (48)2E-3   | ( 66) 0.026  | ( 84) 2E-3   | (172) (   | (211) 0.017   | (229) 2E-3  | (247) 2E-3   | (265) 0.038   |
| ( 13) 0.119  | ( 31) 0.015   | ( 49) 2E-3   | ( 67) 9E-3   | ( 65) 0.015  | (173) 0   | (212) 0.018   | (230) 2E-3  | (248) 2E-3   | (266) 0.094   |
| ( 14) 0.054  | (32) 26-3   | (50)0  | ( 68) 0.017  | ( 86) 2E-3   | (194) 0   | (213) 0.017   | (231) 2E-3  | (249) 2E-3   | (267) 0.054   |
| ( 15) 0.061  | ( 33) 2E-3  | ( 51) 0.026  | ( 69) 0.015  | ( 87) 0.017  | (195) 0   | (214) 0.015   | (232) 38-3  | (250) 2E~3   | (268) 0.038   |
| ( 16) 0.072  | (34) 28-3   | ( 52) 0.038  | ( 70) 98-3   | ( 88) 5E-3   |   | (215) 25-3  | (233) 28-3  | (251) 2E-3   | (269) 0.038   |
| (17) 0.072   | ( 35) 0   | ( 53) 0.072  | ( 71) 0.012  | (89) 98-3  | (197) 0   | (215) 20 5  | (234) 26-3  | (252) 2E~3   | (270) 0.054   |
| ( 10) 0 054  | ( 36) 2E-3  | ( 54) 0.017  | ( 72) 9E-3   | ( 90) 0.017  | (198) 0   | (710) 05-0  |   |  |   |
| <ul> <li>(3) 0.148</li> <li>(-6) 0.119</li> <li>(-7) 0.148</li> <li>(-8) 0.148</li> <li>(-9) 0.181</li> <li>(-10) 0.181</li> <li>(-11) 0.148</li> <li>(-12) 0.074</li> <li>(-13) 0.119</li> <li>(-14) 0.054</li> <li>(-15) 0.061</li> <li>(-16) 0.072</li> <li>(-17) 0.072</li> <li>(-18) 0.054</li> </ul> | . <u> </u>  |  |  |  |   |   |   |  |   |
|  |   |  |  |  |   |   |   | (725) 0  | (343) 0   |
|  |   | (127) 2E-3   |  |  |   |   | (307) 0   | (325) 0  | (343) 0   |
| (91) 9E-3  | (109) 0.026   | (127) 2E-3   |  |  |   |   | (307) 0<br>(308) 0.3  | (325) 0<br>(326) 0.3   | (343) 0<br>(344) 0.3  |
| ( 91) 9E-3<br>( 92) 2E-3   | (107) 0.026<br>(110) 9E-3   | (127) 2E-3<br>(128) 2E-3   |  |  |   |   | (307) 0<br>(308) 0.3<br>(307) 0   | (325) 0<br>(326) 0.3<br>(327) 0  | (343) 0<br>(344) 0.2<br>(345) 0   |
| ( 91) 9E-3<br>( 92) 2E-3<br>( 93) 0.015  | (109) 0.024<br>(110) 9E-3<br>(111) 0.038  | (127) 2E-3<br>(128) 2E-3<br>(129) 2E-3   |  |  |   |   | (307) 0<br>(308) 0.3<br>(309) 0<br>(310) 0.3                                      | (325) 0<br>(326) 0.3<br>(327) 0<br>(328) 0.53                                    | (343) 0<br>(344) 0.2<br>(345) 0<br>(346) 0.3  |
| ( 91) 9E-3<br>( 92) 2E-3<br>( 93) 0.015<br>( 94) 0   | (109) 0.024<br>(110) 9E-3<br>(111) 0.038<br>(112) 0.017                             | (127) 2E-3<br>(128) 2E-3<br>(129) 2E-3<br>(129) 2E-3<br>(130) 2E-3                             |  |  |   |   | (307) 0<br>(308) 0.3<br>(309) 0<br>(310) 0.3<br>(311) 0                           | (325) 0<br>(326) 0.3<br>(327) 0<br>(328) 0.53<br>(329) 0                         | (343) 0<br>(344) 0.3<br>(345) 0<br>(346) 0.3<br>(347) 0   |
| ( 91) 9E-3<br>( 92) 2E-3<br>( 93) 0.015<br>( 94) 0<br>( 95) 0.015  | (109) 0.024<br>(110) 9E-3<br>(111) 0.038<br>(112) 0.017<br>(113) 9E-3               | (127) 2E-3<br>(128) 2E-3<br>(127) 2E-3<br>(130) 2E-3<br>(131) 2E-3                             |  |  |   |   | (307) 0<br>(308) 0.3<br>(309) 0<br>(310) 0.3<br>(311) 0<br>(312) 0.258            | (325) 0<br>(324) 0.3<br>(327) 0<br>(328) 0.53<br>(329) 0<br>(330) 0.2            | (343) 0<br>(344) 0.3<br>(345) 0<br>(346) 0.3<br>(347) 0<br>(348) 0.3  |
| ( 91) 9E-3<br>( 92) 2E-3<br>( 93) 0.015<br>( 94) 0<br>( 95) 0.015<br>( 96) 2E-3  | (107) 0.024<br>(110) 9E-3<br>(111) 0.038<br>(112) 0.017<br>(113) 9E-3<br>(114) 2E-3 | (127) 2E-3<br>(128) 2E-3<br>(129) 2E-3<br>(130) 2E-3<br>(131) 2E-3<br>(131) 2E-3<br>(132) 2E-3 | (145) 0.026<br>(146) 9E-3<br>(147) 0.026<br>(148) 9E-3<br>(149) 0.015<br>(150) 0.017<br>(151) 9E-3 | (163) $0.017$<br>(164) $9E-3$<br>(165) $9E-3$<br>(166) $9E-3$<br>(167) $9E-3$<br>(169) $9E-3$<br>(169) $0.017$ | (271) 5E-3<br>(272) 0.03B<br>(273) 0.148<br>(274) 5E-3<br>(275) 0.119<br>(276) 0.148<br>(277) 0.054 | (289) 0.24<br>(290) 0.85<br>(291) 0.218<br>(292) 0.32<br>(293) 0.218<br>(294) 0.25<br>(295) 0 | (307) 0<br>(308) 0.3<br>(309) 0<br>(310) 0.3<br>(311) 0<br>(312) 0.258<br>(313) 0 | (725) 0<br>(324) 0.3<br>(327) 0<br>(328) 0.53<br>(329) 0<br>(330) 0.2<br>(331) 0 | (343) 0<br>(344) 0.2<br>(345) 0<br>(346) 0.3<br>(347) 0<br>(348) 0.3<br>(349) 0   |
| ( 91) 9E-3<br>( 92) 2E-3<br>( 93) 0.015<br>( 94) 0<br>( 95) 0.015<br>( 96) 2E-3  | (107) 0.024<br>(110) 9E-3<br>(111) 0.038<br>(112) 0.017<br>(113) 9E-3<br>(114) 2E-3 | (127) 2E-3<br>(128) 2E-3<br>(129) 2E-3<br>(130) 2E-3<br>(131) 2E-3<br>(131) 2E-3<br>(132) 2E-3 | (145) 0.026<br>(146) 9E-3<br>(147) 0.026<br>(148) 9E-3<br>(149) 0.015<br>(150) 0.017<br>(151) 9E-3 | (163) $0.017$<br>(164) $9E-3$<br>(165) $9E-3$<br>(166) $9E-3$<br>(167) $9E-3$<br>(169) $9E-3$<br>(169) $0.017$ | (271) 5E-3<br>(272) 0.03B<br>(273) 0.148<br>(274) 5E-3<br>(275) 0.119<br>(276) 0.148<br>(277) 0.054 | (289) 0.24<br>(290) 0.85<br>(291) 0.218<br>(292) 0.32<br>(293) 0.218<br>(294) 0.25<br>(295) 0 | (307) 0<br>(308) 0.3<br>(309) 0<br>(310) 0.3<br>(311) 0<br>(312) 0.258<br>(313) 0 | (725) 0<br>(324) 0.3<br>(327) 0<br>(328) 0.53<br>(329) 0<br>(330) 0.2<br>(331) 0 | (343) 0<br>(344) 0.3<br>(345) 0<br>(346) 0.3<br>(347) 0<br>(348) 0.3<br>(349) 0<br>(350) 0.3  |
| ( 91) 9E-3<br>( 92) 2E-3<br>( 93) 0.015<br>( 94) 0<br>( 95) 0.015<br>( 96) 2E-3  | (107) 0.024<br>(110) 9E-3<br>(111) 0.038<br>(112) 0.017<br>(113) 9E-3<br>(114) 2E-3 | (127) 2E-3<br>(128) 2E-3<br>(129) 2E-3<br>(130) 2E-3<br>(131) 2E-3<br>(131) 2E-3<br>(132) 2E-3 | (145) 0.026<br>(146) 9E-3<br>(147) 0.026<br>(148) 9E-3<br>(149) 0.015<br>(150) 0.017<br>(151) 9E-3 | (163) $0.017$<br>(164) $9E-3$<br>(165) $9E-3$<br>(166) $9E-3$<br>(167) $9E-3$<br>(169) $9E-3$<br>(169) $0.017$ | (271) 5E-3<br>(272) 0.03B<br>(273) 0.148<br>(274) 5E-3<br>(275) 0.119<br>(276) 0.148<br>(277) 0.054 | (289) 0.24<br>(290) 0.85<br>(291) 0.218<br>(292) 0.32<br>(293) 0.218<br>(294) 0.25<br>(295) 0 | (307) 0<br>(308) 0.3<br>(309) 0<br>(310) 0.3<br>(311) 0<br>(312) 0.258<br>(313) 0 | (725) 0<br>(324) 0.3<br>(327) 0<br>(328) 0.53<br>(329) 0<br>(330) 0.2<br>(331) 0 | (343) 0<br>(344) 0.2<br>(345) 0<br>(346) 0.3<br>(347) 0<br>(348) 0.3<br>(349) 0<br>(350) 0.3<br>(351) 0   |
| ( 91) 9E-3<br>( 92) 2E-3<br>( 93) 0.015<br>( 94) 0<br>( 95) 0.015<br>( 96) 2E-3  | (107) 0.024<br>(110) 9E-3<br>(111) 0.038<br>(112) 0.017<br>(113) 9E-3<br>(114) 2E-3 | (127) 2E-3<br>(128) 2E-3<br>(129) 2E-3<br>(130) 2E-3<br>(131) 2E-3<br>(131) 2E-3<br>(132) 2E-3 | (145) 0.026<br>(146) 9E-3<br>(147) 0.026<br>(148) 9E-3<br>(149) 0.015<br>(150) 0.017<br>(151) 9E-3 | (163) $0.017$<br>(164) $9E-3$<br>(165) $9E-3$<br>(166) $9E-3$<br>(167) $9E-3$<br>(169) $9E-3$<br>(169) $0.017$ | (271) 5E-3<br>(272) 0.03B<br>(273) 0.148<br>(274) 5E-3<br>(275) 0.119<br>(276) 0.148<br>(277) 0.054 | (289) 0.24<br>(290) 0.85<br>(291) 0.218<br>(292) 0.32<br>(293) 0.218<br>(294) 0.25<br>(295) 0 | (307) 0<br>(308) 0.3<br>(309) 0<br>(310) 0.3<br>(311) 0<br>(312) 0.258<br>(313) 0 | (725) 0<br>(324) 0.3<br>(327) 0<br>(328) 0.53<br>(329) 0<br>(330) 0.2<br>(331) 0 | (.341) 0<br>(.344) 0.2<br>(.345) 0<br>(.346) 0.3<br>(.347) 0<br>(.348) 0.3<br>(.349) 0<br>(.350) 0.3<br>(.351) 0<br>(.352) 0.3  |
| ( 91) 9E-3<br>( 92) 2E-3<br>( 93) 0.015<br>( 94) 0<br>( 95) 0.015<br>( 96) 2E-3  | (107) 0.024<br>(110) 9E-3<br>(111) 0.038<br>(112) 0.017<br>(113) 9E-3<br>(114) 2E-3 | (127) 2E-3<br>(128) 2E-3<br>(129) 2E-3<br>(130) 2E-3<br>(131) 2E-3<br>(131) 2E-3<br>(132) 2E-3 | (145) 0.026<br>(146) 9E-3<br>(147) 0.026<br>(148) 9E-3<br>(149) 0.015<br>(150) 0.017<br>(151) 9E-3 | (163) $0.017$<br>(164) $9E-3$<br>(165) $9E-3$<br>(166) $9E-3$<br>(167) $9E-3$<br>(169) $9E-3$<br>(169) $0.017$ | (271) 5E-3<br>(272) 0.03B<br>(273) 0.148<br>(274) 5E-3<br>(275) 0.119<br>(276) 0.148<br>(277) 0.054 | (289) 0.24<br>(290) 0.85<br>(291) 0.218<br>(292) 0.32<br>(293) 0.218<br>(294) 0.25<br>(295) 0 | (307) 0<br>(308) 0.3<br>(309) 0<br>(310) 0.3<br>(311) 0<br>(312) 0.258<br>(313) 0 | (725) 0<br>(324) 0.3<br>(327) 0<br>(328) 0.53<br>(329) 0<br>(330) 0.2<br>(331) 0 | (341) 0<br>(344) 0.2<br>(345) 0<br>(346) 0.3<br>(347) 0<br>(348) 0.3<br>(349) 0<br>(350) 0.3<br>(351) 0<br>(352) 0.3  |
| ( 91) 9E-3<br>( 92) 2E-3<br>( 93) 0.015<br>( 94) 0<br>( 95) 0.015<br>( 96) 2E-3  | (107) 0.024<br>(110) 9E-3<br>(111) 0.038<br>(112) 0.017<br>(113) 9E-3<br>(114) 2E-3 | (127) 2E-3<br>(128) 2E-3<br>(129) 2E-3<br>(130) 2E-3<br>(131) 2E-3<br>(131) 2E-3<br>(132) 2E-3 | (145) 0.026<br>(146) 9E-3<br>(147) 0.026<br>(148) 9E-3<br>(149) 0.015<br>(150) 0.017<br>(151) 9E-3 | (163) $0.017$<br>(164) $9E-3$<br>(165) $9E-3$<br>(166) $9E-3$<br>(167) $9E-3$<br>(169) $9E-3$<br>(169) $0.017$ | (271) 5E-3<br>(272) 0.03B<br>(273) 0.148<br>(274) 5E-3<br>(275) 0.119<br>(276) 0.148<br>(277) 0.054 | (289) 0.24<br>(290) 0.85<br>(291) 0.218<br>(292) 0.32<br>(293) 0.218<br>(294) 0.25<br>(295) 0 | (307) 0<br>(308) 0.3<br>(309) 0<br>(310) 0.3<br>(311) 0<br>(312) 0.258<br>(313) 0 | (725) 0<br>(324) 0.3<br>(327) 0<br>(328) 0.53<br>(329) 0<br>(330) 0.2<br>(331) 0 | (341) 0<br>(343) 0.3<br>(345) 0<br>(346) 0.3<br>(347) 0<br>(348) 0.3<br>(349) 0<br>(350) 0.3<br>(351) 0<br>(352) 0.3<br>(352) 0.3<br>(354) 0.3  |
| ( 91) 9E-3<br>( 92) 2E-3<br>( 93) 0.015<br>( 94) 0<br>( 95) 0.015<br>( 96) 2E-3  | (107) 0.024<br>(110) 9E-3<br>(111) 0.038<br>(112) 0.017<br>(113) 9E-3<br>(114) 2E-3 | (127) 2E-3<br>(128) 2E-3<br>(129) 2E-3<br>(130) 2E-3<br>(131) 2E-3<br>(131) 2E-3<br>(132) 2E-3 | (145) 0.026<br>(146) 9E-3<br>(147) 0.026<br>(148) 9E-3<br>(149) 0.015<br>(150) 0.017<br>(151) 9E-3 | (163) $0.017$<br>(164) $9E-3$<br>(165) $9E-3$<br>(166) $9E-3$<br>(167) $9E-3$<br>(169) $9E-3$<br>(169) $0.017$ | (271) 5E-3<br>(272) 0.03B<br>(273) 0.148<br>(274) 5E-3<br>(275) 0.119<br>(276) 0.148<br>(277) 0.054 | (289) 0.24<br>(290) 0.85<br>(291) 0.218<br>(292) 0.32<br>(293) 0.218<br>(294) 0.25<br>(295) 0 | (307) 0<br>(308) 0.3<br>(309) 0<br>(310) 0.3<br>(311) 0<br>(312) 0.258<br>(313) 0 | (725) 0<br>(324) 0.3<br>(327) 0<br>(328) 0.53<br>(329) 0<br>(330) 0.2<br>(331) 0 | (341) 0<br>(344) 0.3<br>(345) 0<br>(346) 0.3<br>(347) 0<br>(348) 0.3<br>(349) 0<br>(350) 0.3<br>(351) 0<br>(352) 0.3<br>(353) 0<br>(354) 0.3  |
| ( 91) 9E-3<br>( 92) 2E-3<br>( 93) 0.015<br>( 94) 0<br>( 95) 0.015<br>( 96) 2E-3  | (107) 0.024<br>(110) 9E-3<br>(111) 0.038<br>(112) 0.017<br>(113) 9E-3<br>(114) 2E-3 | (127) 2E-3<br>(128) 2E-3<br>(129) 2E-3<br>(130) 2E-3<br>(131) 2E-3<br>(131) 2E-3<br>(132) 2E-3 | (145) 0.026<br>(146) 9E-3<br>(147) 0.026<br>(148) 9E-3<br>(149) 0.015<br>(150) 0.017<br>(151) 9E-3 | (163) $0.017$<br>(164) $9E-3$<br>(165) $9E-3$<br>(166) $9E-3$<br>(167) $9E-3$<br>(169) $9E-3$<br>(169) $0.017$ | (271) 5E-3<br>(272) 0.03B<br>(273) 0.148<br>(274) 5E-3<br>(275) 0.119<br>(276) 0.148<br>(277) 0.054 | (289) 0.24<br>(290) 0.85<br>(291) 0.218<br>(292) 0.32<br>(293) 0.218<br>(294) 0.25<br>(295) 0 | (307) 0<br>(308) 0.3<br>(309) 0<br>(310) 0.3<br>(311) 0<br>(312) 0.258<br>(313) 0 | (725) 0<br>(324) 0.3<br>(327) 0<br>(328) 0.53<br>(329) 0<br>(330) 0.2<br>(331) 0 | (341) 0<br>(344) 0.3<br>(345) 0<br>(346) 0.3<br>(347) 0<br>(348) 0.3<br>(347) 0<br>(350) 0.3<br>(351) 0<br>(352) 0.3<br>(353) 0<br>(354) 0.3<br>(355) 0<br>(356) 0.3  |
| ( 91) 9E-3<br>( 92) 2E-3<br>( 93) 0.015<br>( 94) 0<br>( 95) 0.015<br>( 96) 2E-3  | (107) 0.024<br>(110) 9E-3<br>(111) 0.038<br>(112) 0.017<br>(113) 9E-3<br>(114) 2E-3 | (127) 2E-3<br>(128) 2E-3<br>(129) 2E-3<br>(130) 2E-3<br>(131) 2E-3<br>(131) 2E-3<br>(132) 2E-3 | (145) 0.026<br>(146) 9E-3<br>(147) 0.026<br>(148) 9E-3<br>(149) 0.015<br>(150) 0.017<br>(151) 9E-3 | (163) $0.017$<br>(164) $9E-3$<br>(165) $9E-3$<br>(166) $9E-3$<br>(167) $9E-3$<br>(169) $9E-3$<br>(169) $0.017$ | (271) 5E-3<br>(272) 0.03B<br>(273) 0.148<br>(274) 5E-3<br>(275) 0.119<br>(276) 0.148<br>(277) 0.054 | (289) 0.24<br>(290) 0.85<br>(291) 0.218<br>(292) 0.32<br>(293) 0.218<br>(294) 0.25<br>(295) 0 | (307) 0<br>(308) 0.3<br>(309) 0<br>(310) 0.3<br>(311) 0<br>(312) 0.258<br>(313) 0 | (725) 0<br>(324) 0.3<br>(327) 0<br>(328) 0.53<br>(329) 0<br>(330) 0.2<br>(331) 0 | (341) 0<br>(344) 0.3<br>(345) 0<br>(346) 0.3<br>(347) 0<br>(348) 0.3<br>(350) 0.3<br>(351) 0<br>(351) 0<br>(352) 0.3<br>(353) 0<br>(354) 0.3<br>(354) 0.3<br>(355) 0.3<br>(355) 0.3   |
| ( 91) 9E-3<br>( 92) 2E-3<br>( 93) 0.015<br>( 94) 0<br>( 95) 0.015<br>( 96) 2E-3  | (107) 0.024<br>(110) 9E-3<br>(111) 0.038<br>(112) 0.017<br>(113) 9E-3<br>(114) 2E-3 | (127) 2E-3<br>(128) 2E-3<br>(129) 2E-3<br>(130) 2E-3<br>(131) 2E-3<br>(131) 2E-3<br>(132) 2E-3 | (145) 0.026<br>(146) 9E-3<br>(147) 0.026<br>(148) 9E-3<br>(149) 0.015<br>(150) 0.017<br>(151) 9E-3 | (163) $0.017$<br>(164) $9E-3$<br>(165) $9E-3$<br>(166) $9E-3$<br>(167) $9E-3$<br>(169) $9E-3$<br>(169) $0.017$ | (271) 5E-3<br>(272) 0.03B<br>(273) 0.148<br>(274) 5E-3<br>(275) 0.119<br>(276) 0.148<br>(277) 0.054 | (289) 0.24<br>(290) 0.85<br>(291) 0.218<br>(292) 0.32<br>(293) 0.218<br>(294) 0.25<br>(295) 0 | (307) 0<br>(308) 0.3<br>(309) 0<br>(310) 0.3<br>(311) 0<br>(312) 0.258<br>(313) 0 | (725) 0<br>(324) 0.3<br>(327) 0<br>(328) 0.53<br>(329) 0<br>(330) 0.2<br>(331) 0 | (341) 0<br>(343) 0.3<br>(345) 0<br>(346) 0.3<br>(347) 0<br>(348) 0.3<br>(350) 0.3<br>(351) 0<br>(352) 0.3<br>(353) 0<br>(354) 0.3<br>(355) 0<br>(354) 0.3<br>(355) 0<br>(354) 0.3   |
| ( 91) 9E-3<br>( 92) 2E-3<br>( 93) 0.015<br>( 94) 0<br>( 95) 0.015<br>( 96) 2E-3  | (107) 0.024<br>(110) 9E-3<br>(111) 0.038<br>(112) 0.017<br>(113) 9E-3<br>(114) 2E-3 | (127) 2E-3<br>(128) 2E-3<br>(129) 2E-3<br>(130) 2E-3<br>(131) 2E-3<br>(131) 2E-3<br>(132) 2E-3 | (145) 0.026<br>(146) 9E-3<br>(147) 0.026<br>(148) 9E-3<br>(149) 0.015<br>(150) 0.017<br>(151) 9E-3 | (163) $0.017$<br>(164) $9E-3$<br>(165) $9E-3$<br>(166) $9E-3$<br>(167) $9E-3$<br>(169) $9E-3$<br>(169) $0.017$ | (271) 5E-3<br>(272) 0.03B<br>(273) 0.148<br>(274) 5E-3<br>(275) 0.119<br>(276) 0.148<br>(277) 0.054 | (289) 0.24<br>(290) 0.85<br>(291) 0.218<br>(292) 0.32<br>(293) 0.218<br>(294) 0.25<br>(295) 0 | (307) 0<br>(308) 0.3<br>(309) 0<br>(310) 0.3<br>(311) 0<br>(312) 0.258<br>(313) 0 | (725) 0<br>(324) 0.3<br>(327) 0<br>(328) 0.53<br>(329) 0<br>(330) 0.2<br>(331) 0 | (341) 0<br>(344) 0.3<br>(345) 0<br>(346) 0.3<br>(347) 0<br>(348) 0.3<br>(357) 0<br>(350) 0.3<br>(351) 0<br>(352) 0.3<br>(353) 0<br>(354) 0.3<br>(355) 0<br>(356) 0.3<br>(357) 0<br>(358) 0.3<br>(359) 0                           |
| ( 91) 9E-3<br>( 92) 2E-3<br>( 93) 0.015<br>( 94) 0<br>( 95) 0.015<br>( 96) 2E-3  | (107) 0.024<br>(110) 9E-3<br>(111) 0.038<br>(112) 0.017<br>(113) 9E-3<br>(114) 2E-3 | (127) 2E-3<br>(128) 2E-3<br>(129) 2E-3<br>(130) 2E-3<br>(131) 2E-3<br>(131) 2E-3<br>(132) 2E-3 | (145) 0.026<br>(146) 9E-3<br>(147) 0.026<br>(148) 9E-3<br>(149) 0.015<br>(150) 0.017<br>(151) 9E-3 |  | (271) 5E-3<br>(272) 0.03B<br>(273) 0.148<br>(274) 5E-3<br>(275) 0.119<br>(276) 0.148<br>(277) 0.054 | (289) 0.24<br>(290) 0.85<br>(291) 0.218<br>(292) 0.32<br>(293) 0.218<br>(294) 0.25<br>(295) 0 | (307) 0<br>(308) 0.3<br>(309) 0<br>(310) 0.3<br>(311) 0<br>(312) 0.258<br>(313) 0 | (725) 0<br>(324) 0.3<br>(327) 0<br>(328) 0.53<br>(329) 0<br>(330) 0.2<br>(331) 0 | (343) 0<br>(344) 0.3<br>(345) 0<br>(346) 0.3<br>(347) 0<br>(349) 0.3<br>(350) 0.3<br>(351) 0<br>(352) 0.3<br>(353) 0<br>(354) 0.3<br>(355) 0<br>(356) 0.3<br>(357) 0<br>(358) 0.3<br>(357) 0<br>(358) 0.3<br>(359) 0<br>(358) 0.3 |

River discharge data at 12-hourly intervals for Station: 14B Period : 5

Phosphorus transport Berg River

•

Variable: KROM5.vari (length = 360)

TR 143 March 1989

\_ \_ \_ \_ \_

2 43

| ariadie: NRC  | )M6.var1 (len  | igen - 5807   |  |  |             |  |   |   |  |
|---|--|---|--|--|-------------|--|---|---|--|
| ······································  |  |   | ( 55) 1.562  | ( 73) 0.765  | (181) 0.851 | (199) 1,797  | (   |   |  |
| 1) 0.148  | (19) 2.05  | ( 37) 0.537<br>( 30) 0.471  | ( 56) 0.684  | (74) 1.34  | (182) 2.175 | (200) 1.673  | (218) 1.449   | (235) 1.133   | (254) 0.941  |
| 2) 0.148  | (20) 1.133   | (38) 0.471  | ( 57) 1 739  | ( 75) 1.035  | (183) 3.448 | (201) 1.678  | (219) 1.449   | (237) 1.133   | (255) 0.941  |
| 3) 0.218  | (21) 1.135   | ( 39) 0.237   | ( 57) 1.200  | ( 74) 1 235  | (184) 5,428 | (202) 2.728  | (220) 1.34  | (238) 1.035   | (256) 0.851  |
| 4) 0.218  | (22) 1.035   | (40) 0.471  | (30) 1.073   | ( 77) 1 797  | (185) 5.237 | (203) 5.428  | (221) 1.34  | (239) 0.941   | (257) 0.851  |
| 5) 0.305  | (23) 0.941   | (41) 0.4/1  | 1 271 1.304  | ( 78) 3 488  | (186) 5.049 | (204) 4.152  | (222) 1.235   | (240) 0.941   | (258) 1.562  |
| 6) 0.305  | ( 24) 0.765  | (42) 0.411  | ( 00) 1.233  | ( 70) 1 47   | (187) 5.049 | (205) 3 175  | (223) 1.235   | (241) 0.941   | (259) 2.176  |
| 7) 0.305  | ( 25) 0.765  | (43) 0,411  | ( 51) 1.035  |  | (188) 3.814 | (206) 2.728  | (224) 1.235   | (242) 0.941   | (260) 2.175  |
| 8) 0.305  | ( 26) 0.684  | (44) 0.411  | ( 52) 1.447  |  | (168) 0.014 | (207) 2.585  | (225) 1.235   | (243) 0.851   | (261) 1.92   |
| 9) 0.851  | ( 27) 0.684  | ( 45) 0.411   | (63) 1.235   | ( 01) 1.447  | (190) 2.728 | (208) 2.309  | (226) 1.235   | (244) 0.851   | (262) 1.676  |
| 10) 0.608   | (28)0.684  | ( 46) 0.471   | ( 64) 1.035  |  | (190) 2.728 | (209) 2.176  | (227) 1.235   | (245) 0.851   | (263) 1.449  |
| 11) 1.542   | (29)0.608  | ( 47) 0.411   | ( 65) 0.941  | ( 83) 1.133  | (171) 2.720 | (210) 2.047  | (228) 1.235   | (246) 0.765   | (264) 1.34   |
| 12) 1.34  | ( 30) 0.608  | ( 48) 0.411   | ( 66) 0.941  | ( 84) 1.035  | (192) 2.585 |  | (229) 1.133   | (247) 0.765   | (265) 1.25   |
| 131 1.235   | (31)0.608  | ( 49) 0.537   | ( 67) 0.851  | (85) 1.035   | (193) 2.446 | (211) 2.047  | (230) 1.133   | (248) 0.765   | (266) 1.235  |
| 14) 0.941   | ( 32) 0.537  | ( 50) 2.047   | ( 68) 0.851  | ( 86) 0,941  | (194) 2.309 | (212) 1.92   | (231) 1.035   | (249) 0.851   | (267) 1.67   |
| 15) 1.133   | ( 33) 0.537  | ( 51) 0.941   | ( 69) 0.851  | ( 87) 2.585  | (195) 2.309 | (213) 1.797  |   | (250) 0.851   | (268) 2.728  |
| 14) 0.851   | ( 34) 0.471  | ( 52) 0.765   | ( 70) 0.765  | ( 88) 1.562  | (196) 2.176 | (214) 1.797  | (232) 1.034   | (251) 0.851   |  |
| 17) 0 684   | ( 35) 0.537  | ( 53) 1.678   | ( 71) Ù.584  | ( 89) 1.449  | (197) 2.047 |  |   | (252) 1.035   |  |
| 10) 7 444   | ( 36) 0.471  | ( 54) 0.60B   | ( 72) 0.684  | ( 90) 1.34   | (198) 1.92  | (216) 1.447  | (234) 1.133   | (232) 1.035   |  |
|   |  |   |  | (73) 0.765<br>(74) 1.34<br>(75) 1.035<br>(76) 1.235<br>(77) 1.747<br>(76) 3.488<br>(77) 1.92<br>(80) 1.678<br>(81) 1.449<br>(82) 1.235<br>(83) 1.133<br>(84) 1.035<br>(85) 1.035<br>(85) 1.035<br>(86) 0.941<br>(87) 2.585<br>(89) 1.562<br>(89) 1.562 |             |  |   |   |  |
|   |  |   |  |  |             |  |   |   |  |
|   |  | <b></b>   |  |  |             | (289) 0.851  | (307) 0.537   | (325) 0.537   | (343) 0.26   |
| 91) 1.235   | (107) 0.634  | (127) 0.608   | (145) 2.95   | (163) 1.797  | (271) 1.797 | (289) 0.851<br>(290) 0.851   | (307) 0.537<br>(308) 0.537  | (325) 0.537<br>(326) 0.471  | (343) 0.26<br>(344) 0.26   |
| 91) 1.235<br>92) 1.235  | (107) 0.634<br>(110) 0.684   | (127) 0.608<br>(129) 0.808  | (145) 2.95<br>(146) 2.728  | (163) 1.797  | (271) 1.797 | (289) 0.851<br>(290) 0.851<br>(291) 0.765  | (307) 0.537<br>(308) 0.537<br>(309) 0.684   | (325) 0.537<br>(326) 0.471<br>(327) 0.356   | (343) 0.26<br>(344) 0.26<br>(345) 0.21   |
| 91) 1.235<br>92) 1.235<br>93) 2.176   | (109) 0.634<br>(110) 0.684<br>(111) 0.941  | (127) 0.608<br>(129) 0.608<br>(129) 0.941   | (145) 2.95<br>(146) 2.728<br>(147) 3.488   | (163) 1.797  | (271) 1.797 | (287) 0.851<br>(290) 0.851<br>(291) 0.765<br>(292) 0.765   | (307) 0.537<br>(308) 0.537<br>(309) 0.684<br>(310) 0.608  | (325) 0.537<br>(326) 0.471<br>(327) 0.356<br>(328) 0.411  | (343) 0.26<br>(344) 0.26<br>(345) 0.21<br>(346) 0.21   |
| 91) 1.235<br>92) 1.235<br>93) 2.176<br>94) 2.728  | (109) 0.634<br>(110) 0.684<br>(111) 0.941<br>(112) 1.235   | (127) 0.408<br>(129) 0.608<br>(129) 0.941<br>(130) 1.34   | (145) 2.95<br>(146) 2.728<br>(147) 3.488<br>(148) 3.814  | (163) 1.797  | (271) 1.797 | (289) 0.851<br>(290) 0.851<br>(291) 0.765<br>(292) 0.765<br>(293) 0.765  | (307) 0.537<br>(308) 0.537<br>(309) 0.684<br>(310) 0.608<br>(311) 0.608   | (325) 0.537<br>(326) 0.471<br>(327) 0.356<br>(328) 0.411<br>(329) 0.411   | (343) 0.26<br>(344) 0.26<br>(345) 0.21<br>(346) 0.21<br>(346) 0.21<br>(347) 0.21   |
| 91) 1.235<br>92) 1.235<br>93) 2.176<br>94) 2.728<br>95) 2.446   | (109) 0.634<br>(110) 0.684<br>(111) 0.941<br>(112) 1.235<br>(113) 1.035  | (127) 0.608<br>(129) 0.608<br>(129) 0.941<br>(130) 1.34<br>(131) 1.449  | (145) 2.95<br>(146) 2.728<br>(147) 3.488<br>(148) 3.814<br>(149) 3.175   | (163) 1.797  | (271) 1.797 | (289) 0.851<br>(290) 0.851<br>(291) 0.765<br>(292) 0.765<br>(293) 0.765<br>(293) 0.765   | (307) 0.537<br>(308) 0.537<br>(309) 0.684<br>(310) 0.608<br>(311) 0.608<br>(312) 0.537  | (325) 0.537<br>(326) 0.471<br>(327) 0.356<br>(328) 0.411<br>(329) 0.411<br>(330) 0.356  | (343) 0.26<br>(344) 0.26<br>(345) 0.21<br>(346) 0.21<br>(346) 0.21<br>(347) 0.21<br>(348) 0.18   |
| 91) 1.235<br>92) 1.235<br>93) 2.176<br>94) 2.728<br>95) 2.446<br>96) 2.309  | (109) 0.634<br>(110) 0.684<br>(111) 0.941<br>(112) 1.235<br>(113) 1.035<br>(114) 0.941   | (127) 0.608<br>(129) 0.608<br>(129) 0.941<br>(130) 1.34<br>(131) 1.449<br>(132) 1.449   | (145) 2.95<br>(146) 2.728<br>(147) 3.488<br>(148) 3.814<br>(149) 3.175<br>(150) 2.873  | (163) 1.797  | (271) 1.797 | (289) 0.851<br>(290) 0.851<br>(291) 0.765<br>(292) 0.765<br>(293) 0.765  | (307) 0.537<br>(308) 0.537<br>(309) 0.684<br>(310) 0.608<br>(311) 0.608<br>(312) 0.537<br>(313) 0.608   | $\begin{array}{c} (325) & 0.537 \\ (326) & 0.471 \\ (327) & 0.356 \\ (328) & 0.411 \\ (329) & 0.411 \\ (330) & 0.356 \\ (331) & 0.411 \end{array}$  | (343) 0.26<br>(344) 0.26<br>(345) 0.21<br>(346) 0.21<br>(346) 0.21<br>(348) 0.13<br>(348) 0.13<br>(349) 0.21   |
| 91) 1.235<br>92) 1.235<br>93) 2.176<br>94) 2.728<br>95) 2.446<br>96) 2.309<br>97) 2.176   | (109) 0.634<br>(110) 0.684<br>(111) 0.941<br>(112) 1.235<br>(113) 1.035<br>(114) 0.941<br>(115) 1.678  | (127) 0.608<br>(129) 0.608<br>(129) 0.608<br>(129) 0.941<br>(130) 1.34<br>(131) 1.449<br>(132) 1.449<br>(133) 1.678   | (145) 2.95<br>(146) 2.728<br>(147) 3.488<br>(148) 3.814<br>(149) 3.175<br>(150) 2.873<br>(151) 2.585   | (163) 1.797  | (271) 1.797 | (289) 0.851<br>(290) 0.851<br>(291) 0.765<br>(292) 0.765<br>(293) 0.765<br>(293) 0.765   | $\begin{array}{c} (307) & 0.537 \\ (308) & 0.537 \\ (309) & 0.484 \\ (310) & 0.408 \\ (311) & 0.408 \\ (312) & 0.537 \\ (313) & 0.408 \\ (314) & 0.537 \end{array}$   | $\begin{array}{c} (325) & 0.537 \\ (326) & 0.471 \\ (327) & 0.356 \\ (323) & 0.411 \\ (329) & 0.411 \\ (330) & 0.356 \\ (331) & 0.411 \\ (332) & 0.305 \end{array}$   | $\begin{array}{c} (343) & 0.25 \\ (344) & 0.26 \\ (345) & 0.21 \\ (346) & 0.21 \\ (346) & 0.21 \\ (348) & 0.13 \\ (348) & 0.13 \\ (349) & 0.21 \\ (350) & 0.21 \end{array}$  |
| 91) 1.235<br>92) 1.235<br>93) 2.176<br>94) 2.728<br>95) 2.446<br>96) 2.309<br>97) 2.176<br>98) 1.678  | (109) 0.634<br>(110) 0.684<br>(111) 0.941<br>(112) 1.235<br>(113) 1.035<br>(114) 0.941<br>(115) 1.678<br>(116) 1.449   | (127) 0.608<br>(129) 0.608<br>(129) 0.941<br>(130) 1.34<br>(131) 1.449<br>(132) 1.449<br>(133) 1.678<br>(134) 1.678   | (145) 2.95<br>(146) 2.728<br>(147) 3.488<br>(148) 3.814<br>(149) 3.175<br>(150) 2.873<br>(151) 2.585<br>(152) 2.309  | (163) 1.797  | (271) 1.797 | (289) 0.851<br>(290) 0.851<br>(291) 0.765<br>(292) 0.765<br>(293) 0.765<br>(294) 0.765<br>(295) 0.765  | $\begin{array}{c} (307) & 0.537 \\ (308) & 0.537 \\ (309) & 0.684 \\ (310) & 0.608 \\ (311) & 0.608 \\ (312) & 0.537 \\ (313) & 0.608 \\ (314) & 0.537 \\ (315) & 0.537 \end{array}$  | $\begin{array}{c} (325) & 0.537 \\ (326) & 0.471 \\ (327) & 0.356 \\ (328) & 0.411 \\ (329) & 0.411 \\ (330) & 0.356 \\ (331) & 0.411 \\ (332) & 0.305 \\ (333) & 0.356 \end{array}$  | $\begin{array}{c} (343) & 0.25\\ (344) & 0.26\\ (345) & 0.21\\ (346) & 0.21\\ (347) & 0.21\\ (348) & 0.13\\ (349) & 0.21\\ (350) & 0.21\\ (351) & 0.26\end{array}$   |
| 91) 1.235<br>92) 1.235<br>93) 2.176<br>94) 2.728<br>95) 2.446<br>96) 2.309<br>97) 2.176<br>98) 1.7678<br>99) 1.562  | (109) 0.684<br>(110) 0.684<br>(111) 0.684<br>(111) 0.941<br>(112) 1.235<br>(113) 1.035<br>(113) 1.035<br>(114) 0.941<br>(115) 1.678<br>(116) 1.449<br>(117) 1.34   | (127) 0.608<br>(129) 0.608<br>(129) 0.6041<br>(130) 1.34<br>(131) 1.449<br>(132) 1.449<br>(132) 1.678<br>(134) 1.678<br>(135) 1.92  | (145) 2.95<br>(146) 2.728<br>(147) 3.488<br>(148) 3.814<br>(149) 3.175<br>(150) 2.873<br>(151) 2.585<br>(152) 2.309<br>(153) 2.047   | (163) 1.797  | (271) 1.797 | (289) 0.851<br>(290) 0.851<br>(291) 0.765<br>(292) 0.765<br>(293) 0.765<br>(294) 0.765<br>(295) 0.765<br>(295) 0.684   | (307) 0.537<br>(308) 0.537<br>(309) 0.684<br>(310) 0.608<br>(311) 0.608<br>(312) 0.537<br>(313) 0.637<br>(314) 0.537<br>(316) 0.537<br>(316) 0.608  | (325) 0.537<br>(326) 0.471<br>(327) 0.356<br>(323) 0.411<br>(329) 0.411<br>(330) 0.356<br>(331) 0.411<br>(332) 0.305<br>(333) 0.356<br>(334) 0.305  | $\begin{array}{c} (343) & 0.25 \\ (344) & 0.26 \\ (345) & 0.21 \\ (346) & 0.21 \\ (346) & 0.21 \\ (347) & 0.21 \\ (349) & 0.21 \\ (350) & 0.21 \\ (351) & 0.26 \\ (352) & 0.21 \end{array}$  |
| 91) 1.235<br>92) 1.235<br>93) 2.176<br>94) 2.728<br>95) 2.444<br>96) 2.309<br>97) 2.176<br>98) 1.678<br>99) 1.562<br>00) 1.449  | (109) 0.634<br>(110) 0.694<br>(111) 0.941<br>(112) 1.235<br>(113) 1.035<br>(114) 0.941<br>(115) 1.678<br>(116) 1.449<br>(117) 1.34<br>(119) 1.133  | (127) 0.608<br>(129) 0.608<br>(129) 0.608<br>(129) 0.941<br>(130) 1.34<br>(131) 1.449<br>(132) 1.449<br>(132) 1.678<br>(133) 1.678<br>(135) 1.92<br>(136) 1.92  | (145) 2.95<br>(146) 2.728<br>(147) 3.488<br>(148) 3.814<br>(149) 3.175<br>(150) 2.873<br>(151) 2.585<br>(152) 2.309<br>(153) 2.047<br>(154) 1.92   | (163) 1.797  | (271) 1.797 | (287) 0.851<br>(290) 0.851<br>(291) 0.765<br>(292) 0.765<br>(293) 0.765<br>(294) 0.765<br>(295) 0.765<br>(295) 0.765<br>(296) 0.684<br>(297) 0.765   | (307) 0.537<br>(308) 0.537<br>(309) 0.684<br>(310) 0.608<br>(311) 0.608<br>(312) 0.537<br>(313) 0.608<br>(314) 0.537<br>(316) 0.537<br>(316) 0.608<br>(317) 0.608   | (325) 0.537<br>(326) 0.471<br>(327) 0.356<br>(320) 0.411<br>(329) 0.411<br>(330) 0.356<br>(331) 0.411<br>(332) 0.305<br>(333) 0.356<br>(335) 0.356  | $\begin{array}{c} (343) & 0.25 \\ (344) & 0.26 \\ (545) & 0.211 \\ (346) & 0.211 \\ (347) & 0.211 \\ (348) & 0.131 \\ (349) & 0.211 \\ (350) & 0.211 \\ (350) & 0.213 \\ (351) & 0.26 \\ (352) & 0.213 \\ (353) & 0.18 \end{array}$  |
| 91) 1.235<br>92) 1.235<br>93) 2.176<br>94) 2.728<br>95) 2.446<br>96) 2.309<br>97) 2.176<br>98) 1.678<br>99) 1.562<br>00) 1.449<br>01) 1.34  | (109) 0.634<br>(110) 0.684<br>(111) 0.941<br>(112) 1.235<br>(113) 1.035<br>(114) 0.941<br>(115) 1.678<br>(114) 1.449<br>(117) 1.34<br>(116) 1.133<br>(119) 1.035   | (127) 0.608<br>(129) 0.608<br>(129) 0.608<br>(129) 0.941<br>(130) 1.34<br>(131) 1.449<br>(132) 1.449<br>(133) 1.678<br>(134) 1.678<br>(135) 1.92<br>(136) 1.92<br>(137) 2.176   | (145) 2.95<br>(146) 2.728<br>(147) 3.488<br>(147) 3.488<br>(148) 3.814<br>(149) 3.175<br>(150) 2.873<br>(151) 2.585<br>(152) 2.307<br>(153) 2.047<br>(154) 1.92<br>(155) 1.797   | (163) 1.797  | (271) 1.797 | (289) 0.851<br>(290) 0.851<br>(291) 0.765<br>(292) 0.765<br>(293) 0.765<br>(294) 0.765<br>(295) 0.765<br>(295) 0.765<br>(296) 0.684  | $\begin{array}{c} (307) & 0.537 \\ (308) & 0.537 \\ (309) & 0.684 \\ (310) & 0.608 \\ (311) & 0.608 \\ (312) & 0.537 \\ (313) & 0.608 \\ (314) & 0.537 \\ (315) & 0.537 \\ (316) & 0.608 \\ (317) & 0.608 \\ (318) & 0.537 \end{array}$   | (325) 0.537<br>(326) 0.471<br>(327) 0.356<br>(323) 0.411<br>(329) 0.411<br>(330) 0.356<br>(331) 0.411<br>(332) 0.305<br>(333) 0.356<br>(334) 0.305<br>(335) 0.356   | $\begin{array}{c} (343) & 0.25\\ (344) & 0.24\\ (545) & 0.213\\ (346) & 0.243\\ (347) & 0.243\\ (348) & 0.16\\ (348) & 0.213\\ (350) & 0.213\\ (351) & 0.26\\ (352) & 0.213\\ (352) & 0.213\\ (353) & 0.18\\ (354) & 0.18\end{array}$  |
| 91) 1.235<br>92) 1.235<br>93) 2.176<br>94) 2.728<br>95) 2.446<br>96) 2.309<br>97) 2.176<br>98) 1.678<br>99) 1.562<br>00) 1.449<br>01) 1.34<br>02) 1.235   | (109) 0.634<br>(110) 0.684<br>(111) 0.941<br>(112) 1.235<br>(113) 1.035<br>(114) 0.941<br>(115) 1.678<br>(116) 1.449<br>(117) 1.34<br>(119) 1.133<br>(119) 1.035<br>(120) 1.035  | (127) 0.608<br>(129) 0.608<br>(129) 0.941<br>(130) 1.34<br>(131) 1.449<br>(132) 1.449<br>(133) 1.678<br>(134) 1.678<br>(134) 1.678<br>(135) 1.92<br>(136) 1.92<br>(137) 2.176<br>(138) 2.2  | (145) 2.95<br>(146) 2.728<br>(147) 3.488<br>(148) 3.814<br>(149) 3.175<br>(150) 2.873<br>(151) 2.585<br>(152) 2.309<br>(153) 2.047<br>(154) 1.92<br>(155) 1.797<br>(156) 1.562   | (163) 1.797  | (271) 1.797 | (289) 0.851<br>(290) 0.851<br>(291) 0.765<br>(292) 0.765<br>(293) 0.765<br>(294) 0.765<br>(295) 0.765<br>(296) 0.684<br>(297) 0.765<br>(298) 0.684<br>(299) 0.608  | (307) 0.537<br>(308) 0.537<br>(309) 0.684<br>(310) 0.608<br>(311) 0.608<br>(312) 0.537<br>(313) 0.608<br>(314) 0.537<br>(316) 0.537<br>(316) 0.608<br>(317) 0.608   | (325) 0.537<br>(326) 0.471<br>(327) 0.356<br>(323) 0.411<br>(329) 0.411<br>(330) 0.356<br>(331) 0.411<br>(332) 0.305<br>(333) 0.356<br>(335) 0.356<br>(335) 0.356<br>(335) 0.356  | $\begin{array}{c} (343) & 0.25 \\ (344) & 0.24 \\ (545) & 0.216 \\ (346) & 0.216 \\ (346) & 0.126 \\ (347) & 0.216 \\ (348) & 0.136 \\ (349) & 0.216 \\ (350) & 0.216 \\ (351) & 0.26 \\ (351) & 0.26 \\ (352) & 0.216 \\ (353) & 0.18 \\ (355) & 0.18 \\ (355) & 0.18 \end{array}$  |
| 91) 1.235<br>92) 1.235<br>93) 2.176<br>94) 2.728<br>95) 2.446<br>96) 2.309<br>97) 2.176<br>98) 1.678<br>99) 1.562<br>00) 1.449<br>01) 1.34<br>02) 1.235<br>03) 1.035  | (109) 0.684<br>(110) 0.684<br>(111) 0.941<br>(112) 1.235<br>(113) 1.035<br>(114) 0.941<br>(115) 1.678<br>(116) 1.449<br>(117) 1.34<br>(118) 1.133<br>(119) 1.035<br>(120) 1.035<br>(121) 0.941                               | (127) 0.608<br>(129) 0.608<br>(129) 0.608<br>(129) 0.941<br>(130) 1.34<br>(131) 1.449<br>(132) 1.449<br>(132) 1.678<br>(134) 1.678<br>(135) 1.92<br>(136) 1.92<br>(137) 2.176<br>(138) 2.2<br>(139) 2.446   | (145) 2.95<br>(146) 2.728<br>(147) 3.468<br>(148) 3.814<br>(149) 3.175<br>(150) 2.873<br>(151) 2.585<br>(152) 2.309<br>(153) 2.047<br>(153) 2.047<br>(155) 1.797<br>(156) 1.562<br>(157) 0.608   | (163) 1.797  | (271) 1.797 | (289) 0.851<br>(290) 0.851<br>(291) 0.765<br>(292) 0.765<br>(293) 0.765<br>(294) 0.765<br>(295) 0.765<br>(296) 0.684<br>(297) 0.765<br>(298) 0.684<br>(297) 0.608  | $\begin{array}{c} (307) & 0.537 \\ (308) & 0.537 \\ (309) & 0.684 \\ (310) & 0.608 \\ (311) & 0.608 \\ (312) & 0.537 \\ (313) & 0.608 \\ (314) & 0.537 \\ (315) & 0.537 \\ (316) & 0.608 \\ (317) & 0.608 \\ (318) & 0.537 \end{array}$   | (325) 0.537<br>(326) 0.471<br>(327) 0.356<br>(323) 0.411<br>(329) 0.411<br>(330) 0.356<br>(331) 0.411<br>(332) 0.305<br>(333) 0.356<br>(333) 0.356<br>(334) 0.305<br>(336) 0.356<br>(336) 0.356<br>(338) 0.356                              | $\begin{array}{c} (343) & 0.25\\ (344) & 0.26\\ (344) & 0.26\\ (346) & 0.216\\ (347) & 0.216\\ (347) & 0.216\\ (349) & 0.216\\ (359) & 0.216\\ (351) & 0.26\\ (351) & 0.26\\ (351) & 0.26\\ (352) & 0.213\\ (353) & 0.18\\ (355) & 0.18\\ (355) & 0.18\\ (355) & 0.146\end{array}$   |
| 91) 1.235<br>92) 1.235<br>93) 2.176<br>94) 2.728<br>95) 2.446<br>96) 2.309<br>97) 2.176<br>98) 1.678<br>99) 1.542<br>00) 1.449<br>01) 1.34<br>02) 1.235<br>03) 1.035<br>04) 0.941   | (109) 0.634<br>(110) 0.634<br>(111) 0.941<br>(112) 1.235<br>(113) 1.035<br>(113) 1.035<br>(114) 0.941<br>(115) 1.678<br>(116) 1.449<br>(117) 1.34<br>(118) 1.133<br>(119) 1.035<br>(120) 1.035<br>(121) 0.941<br>(122) 0.851 | (127) 0.608<br>(129) 0.608<br>(129) 0.608<br>(127) 0.941<br>(130) 1.34<br>(131) 1.449<br>(132) 1.449<br>(133) 1.678<br>(135) 1.92<br>(136) 1.92<br>(136) 1.92<br>(137) 2.176<br>(138) 2.2<br>(139) 2.446<br>(140) 2.446   | (145) 2.95<br>(146) 2.728<br>(147) 3.488<br>(148) 3.814<br>(149) 3.175<br>(150) 2.873<br>(151) 2.885<br>(152) 2.309<br>(153) 2.047<br>(153) 2.047<br>(154) 1.92<br>(155) 1.797<br>(156) 1.562<br>(157) 0.608<br>(158) 1.678                | (163) 1.797  | (271) 1.797 | (289) 0.851<br>(290) 0.851<br>(291) 0.765<br>(293) 0.765<br>(293) 0.765<br>(294) 0.765<br>(295) 0.765<br>(296) 0.684<br>(297) 0.765<br>(298) 0.684<br>(297) 0.608<br>(301) 0.608<br>(301) 0.608  | (307) 0.537<br>(308) 0.537<br>(309) 0.684<br>(310) 0.608<br>(311) 0.608<br>(312) 0.537<br>(313) 0.408<br>(314) 0.537<br>(315) 0.537<br>(316) 0.608<br>(317) 0.608<br>(318) 0.537<br>(319) 0.537   | (325) 0.537<br>(326) 0.471<br>(327) 0.356<br>(323) 0.411<br>(329) 0.411<br>(330) 0.356<br>(331) 0.411<br>(332) 0.305<br>(333) 0.356<br>(335) 0.356<br>(335) 0.356<br>(335) 0.356  | $\begin{array}{c} (343) & 0.25\\ (344) & 0.24\\ (345) & 0.214\\ (346) & 0.216\\ (347) & 0.216\\ (349) & 0.216\\ (359) & 0.216\\ (351) & 0.26\\ (351) & 0.26\\ (352) & 0.216\\ (353) & 0.18\\ (354) & 0.18\\ (355) & 0.18\\ (355) & 0.18\\ (357) & 0.18\\ (357) & 0.18\end{array}$  |
| 91) 1.235<br>92) 1.235<br>93) 2.176<br>94) 2.728<br>95) 2.446<br>96) 2.309<br>97) 2.176<br>98) 1.678<br>99) 1.562<br>00) 1.449<br>01) 1.34<br>02) 1.235<br>03) 1.035<br>04) 0.941<br>05) 0.851  | (109) 0.634<br>(110) 0.694<br>(111) 0.941<br>(112) 1.235<br>(113) 1.035<br>(114) 0.941<br>(115) 1.679<br>(116) 1.479<br>(116) 1.133<br>(119) 1.133<br>(119) 1.035<br>(120) 1.035<br>(121) 0.941<br>(122) 0.851               | $      \begin{array}{c} (127) & 0.608 \\ (129) & 0.608 \\ (129) & 0.941 \\ (130) & 1.34 \\ (131) & 1.449 \\ (132) & 1.478 \\ (133) & 1.678 \\ (134) & 1.678 \\ (135) & 1.92 \\ (136) & 1.92 \\ (136) & 1.92 \\ (136) & 2.176 \\ (138) & 2.2 \\ (139) & 2.446 \\ (140) & 2.446 \\ (141) & 3.98 \\ \end{array}    $ | (145) 2.95<br>(146) 2.728<br>(147) 3.488<br>(148) 3.814<br>(149) 3.175<br>(150) 2.873<br>(151) 2.585<br>(152) 2.307<br>(153) 2.047<br>(155) 1.797<br>(156) 1.562<br>(157) 0.408<br>(159) 1.678   | (163) 1.797  | (271) 1.797 | (289) 0.851<br>(290) 0.851<br>(291) 0.765<br>(292) 0.765<br>(293) 0.765<br>(294) 0.765<br>(295) 0.765<br>(296) 0.684<br>(297) 0.765<br>(298) 0.684<br>(299) 0.608<br>(300) 0.608<br>(301) 0.608<br>(301) 0.608<br>(302) 0.537<br>(303) 0.537                               | $\begin{array}{c} (307) & 0.537 \\ (308) & 0.537 \\ (309) & 0.684 \\ (310) & 0.608 \\ (311) & 0.608 \\ (312) & 0.537 \\ (313) & 0.608 \\ (314) & 0.537 \\ (315) & 0.537 \\ (316) & 0.608 \\ (317) & 0.608 \\ (317) & 0.608 \\ (318) & 0.537 \\ (319) & 0.537 \\ (320) & 0.537 \end{array}$                  | (325) 0.537<br>(326) 0.471<br>(327) 0.356<br>(323) 0.411<br>(329) 0.411<br>(330) 0.356<br>(331) 0.411<br>(332) 0.305<br>(333) 0.356<br>(333) 0.356<br>(334) 0.305<br>(336) 0.356<br>(336) 0.356<br>(338) 0.356                              | $\begin{array}{c} (343) & 0.25\\ (344) & 0.24\\ (345) & 0.216\\ (346) & 0.216\\ (347) & 0.216\\ (348) & 0.18,\\ (349) & 0.216\\ (350) & 0.216\\ (351) & 0.26\\ (351) & 0.26\\ (352) & 0.216\\ (352) & 0.18\\ (353) & 0.18\\ (355) & 0.18\\ (354) & 0.148\\ (356) & 0.144\\ (357) & 0.148\end{array}$   |
| 91) 1.235<br>92) 1.235<br>93) 2.176<br>94) 2.728<br>95) 2.446<br>96) 2.309<br>97) 2.176<br>98) 1.678<br>99) 1.562<br>00) 1.479<br>99) 1.562<br>00) 1.449<br>01) 1.34<br>02) 1.235<br>03) 1.035<br>03) 1.035<br>04) 0.951<br>05) 0.851 | (109) 0.634<br>(110) 0.684<br>(111) 0.941<br>(112) 1.235<br>(113) 1.035<br>(114) 0.941<br>(115) 1.678<br>(116) 1.449<br>(117) 1.34<br>(119) 1.035<br>(120) 1.035<br>(121) 0.941<br>(122) 0.851<br>(123) 0.765                | (127) 0.608<br>(129) 0.608<br>(129) 0.941<br>(130) 1.34<br>(131) 1.449<br>(132) 1.449<br>(132) 1.478<br>(134) 1.678<br>(134) 1.678<br>(135) 1.92<br>(136) 1.92<br>(137) 2.176<br>(138) 2.2<br>(139) 2.446<br>(140) 2.446<br>(141) 3.98<br>(142) 3.981   | (145) 2.95<br>(146) 2.728<br>(147) 3.488<br>(148) 3.814<br>(149) 3.175<br>(150) 2.873<br>(151) 2.585<br>(152) 2.309<br>(153) 2.047<br>(154) 1.92<br>(155) 1.797<br>(156) 1.562<br>(157) 0.608<br>(158) 1.678<br>(159) 1.678<br>(159) 1.678 | (163) 1.797  | (271) 1.797 | (289) 0.851<br>(290) 0.851<br>(291) 0.765<br>(292) 0.765<br>(293) 0.765<br>(294) 0.765<br>(295) 0.765<br>(296) 0.765<br>(296) 0.765<br>(297) 0.765<br>(298) 0.684<br>(297) 0.608<br>(300) 0.608<br>(301) 0.608<br>(301) 0.537<br>(303) 0.537                               | $\begin{array}{c} (307) & 0.537 \\ (308) & 0.537 \\ (309) & 0.684 \\ (310) & 0.608 \\ (311) & 0.608 \\ (312) & 0.537 \\ (313) & 0.608 \\ (314) & 0.537 \\ (315) & 0.537 \\ (316) & 0.608 \\ (317) & 0.608 \\ (318) & 0.537 \\ (319) & 0.537 \\ (320) & 0.537 \\ (321) & 0.537 \\ (322) & 0.537 \end{array}$ | (325) 0.537<br>(326) 0.471<br>(327) 0.356<br>(323) 0.411<br>(329) 0.411<br>(330) 0.356<br>(331) 0.411<br>(332) 0.305<br>(333) 0.356<br>(333) 0.356<br>(335) 0.356<br>(336) 0.356<br>(337) 0.356<br>(338) 0.356<br>(339) 0.356               | $\begin{array}{c} (343) & 0.25\\ (344) & 0.26\\ (344) & 0.216\\ (346) & 0.216\\ (346) & 0.216\\ (347) & 0.216\\ (349) & 0.216\\ (350) & 0.216\\ (351) & 0.26\\ (351) & 0.26\\ (352) & 0.216\\ (353) & 0.18\\ (353) & 0.18\\ (355) & 0.18\\ (355) & 0.148\\ (356) & 0.146\end{array}$   |
| 91) 1.235<br>92) 1.235<br>93) 2.176<br>94) 2.728<br>95) 2.446<br>96) 2.309<br>97) 2.176<br>98) 1.678<br>99) 1.562<br>00) 1.449<br>01) 1.34<br>02) 1.235<br>03) 1.035<br>04) 0.941<br>05) 0.851  | (109) 0.634<br>(110) 0.694<br>(111) 0.941<br>(112) 1.235<br>(113) 1.035<br>(114) 0.941<br>(115) 1.679<br>(116) 1.479<br>(116) 1.133<br>(119) 1.133<br>(119) 1.035<br>(120) 1.035<br>(121) 0.941<br>(122) 0.851               | $      \begin{array}{c} (127) & 0.608 \\ (129) & 0.608 \\ (129) & 0.941 \\ (130) & 1.34 \\ (131) & 1.449 \\ (132) & 1.478 \\ (133) & 1.678 \\ (134) & 1.678 \\ (135) & 1.92 \\ (136) & 1.92 \\ (136) & 1.92 \\ (136) & 2.176 \\ (138) & 2.2 \\ (139) & 2.446 \\ (140) & 2.446 \\ (141) & 3.98 \\ \end{array}    $ | (145) 2.95<br>(146) 2.728<br>(147) 3.488<br>(148) 3.814<br>(149) 3.175<br>(150) 2.873<br>(151) 2.585<br>(152) 2.307<br>(153) 2.047<br>(155) 1.797<br>(156) 1.562<br>(157) 0.408<br>(159) 1.678   | (163) 1.797(164) 1.92(165) 1.797(166) 1.562(167) 1.449(168) 1.449(168) 1.34(170) 1.235(171) 1.235(172) 1.133(173) 1.133(174) 1.035(175) 1.035(175) 1.035(177) 1.035  | (271) 1.797 | (289) 0.851<br>(290) 0.851<br>(291) 0.765<br>(293) 0.765<br>(293) 0.765<br>(294) 0.765<br>(294) 0.765<br>(296) 0.684<br>(297) 0.765<br>(298) 0.684<br>(297) 0.765<br>(298) 0.684<br>(300) 0.608<br>(301) 0.608<br>(301) 0.608<br>(301) 0.537<br>(303) 0.537<br>(305) 0.537 | $\begin{array}{c} (307) & 0.537 \\ (308) & 0.537 \\ (309) & 0.637 \\ (310) & 0.608 \\ (311) & 0.608 \\ (312) & 0.537 \\ (313) & 0.408 \\ (314) & 0.537 \\ (315) & 0.537 \\ (316) & 0.608 \\ (317) & 0.608 \\ (318) & 0.537 \\ (320) & 0.537 \\ (321) & 0.537 \\ (321) & 0.537 \\ (323) & 0.537 \end{array}$ | (325) 0.537<br>(326) 0.471<br>(327) 0.356<br>(323) 0.411<br>(329) 0.411<br>(330) 0.356<br>(331) 0.411<br>(332) 0.305<br>(333) 0.356<br>(333) 0.356<br>(335) 0.356<br>(336) 0.356<br>(337) 0.356<br>(339) 0.356<br>(339) 0.356<br>(340) 0.26 | $\begin{array}{c} (343) & 0.25\\ (344) & 0.24\\ (545) & 0.214\\ (345) & 0.214\\ (346) & 0.124\\ (347) & 0.214\\ (346) & 0.124\\ (357) & 0.244\\ (355) & 0.124\\ (355) & 0.244\\ (355) & 0.18\\ (355) & 0.18\\ (355) & 0.18\\ (356) & 0.144\\ (357) & 0.18\\ (358) & 0.144\\ (357)$ |

River discharge data at 12-hourly intervals for Station: 14B

.

.

Period : 6

.

;

ይ

| Variable: D  | ORING1.var1  | (length = 360)   |  |  |   |  | ~ <i></i>  |   |  |
|--|--|--|--|--|---|--|--|---|--|
|  |  | ( 37) 0  | ( 55) 0  | (73) 0   | (181) 0   | (199) 0  | (217) 0  | (235) 0   | (253) 0  |
| (1)0   | (19)0<br>(20)0   | (38)0  | (56) 0   | (74) 0   | (182) 0   | $(200)$ $\theta$   | (218) Ø  | (234) 0   | (254) 0  |
| (2)0   | (20)0  | (39)0  | (57) 0   | (75) 0   | (183) 0   | (IO1) O  | (219) Ó  | (237) 0   | (255) 0  |
| (3)0   | (21) 0   | (40)0  | (58)0  | (76)0  | (184) 0   | (202) 0  | (220) 0  | (238) 0   | (256) 0  |
| (4)0   | (22) 0   |  | (59)0  | (77) 0   | (185) 0   | (203) 0  | (221) 0  | (239) 0   | (257) 0  |
| (5)0   | (23)0  | (41)0  | ( 60) 0  | (78) 0   | (136) U   | (204) 0  | (222) 0  | (240) 0   | (258) 0  |
| ( 6) 0   | (24)0  | (42)0  | ( 61) 0  | (79) 0   | (187) 0   | (205) 0  | (223) 0  | (241) 0   | (259) 0  |
| (7)0   | (25)0  | (43)ů  | ( 62) 0  | (80)0  | (188) Ú   | (206) 0  | (224) Ö  | (242) 0   | (260) 0  |
| ( 8) 0   | (26)0  | (44)0  | ( 63) 0  | (81)0  | (189) 0   | (207) 0  | (225) 0  | (243) 0   | (261) 0  |
| (9)0   | (27)0  | (45)0  | (64)0  | (82) 0   | (190) 0   | (208) 0  | (226) 0  | (244) 0   | (262) 0  |
| ( 10) 0  | (28)0  | (46)0  |  | (83)0  | (191) 0   | (209) 0  | (227) 0  | (245) 0   | (263) ()   |
| (11)0  | ( 29) 0  | (47) 0   | ( 65) 0  | (84)0  | (192) 9   | (210) 0  | (228) 0  | (246) 0   | (264) 0  |
| (12)0  | ( 30) 0  | (48)0  | (66)0  | (85)0  | (193) 0   | (211) 0  | (227) 0  | (247) 0   | (265) 0  |
| (13)0  | (31)0  | (49)0  | ( 67) 0  | (84)0  | (194) 0   | (212) 0  | (230) 0  | (248) 0   | (255) 0  |
| (14)0  | (32)0  | (50)Ŭ  | ( 68) 0  | ( 87) 0  | (195) 0   | (213) 0  | (231) 0  | (249) Ŭ   | (267) 0  |
| (15) 0   | (33)0  | ( 51) 0  | ( 49) 0  |  | (196) 0   | (214) 0  | (232) 0  | (250) 0   | (268) 0  |
| (16) 0   | (34)0  | (52)0  | (70)0  | ( 88) 0  | , (197) 0   | (215) 0  | (233) 0  | (251) 0   | (269) Ŭ  |
| (17)0  | ( 35) 0  | (53)0  | (71)0  | (89)0  | (198) 0   | (216) 0  | (234) 0  | (252) 0   | (270) 0  |
| (18)0  | (36)0  | (54)0  | (72)0  | (90)0  | (198) 0   | (210) -  |  |   |  |
|  |  |  |  |  |   |  |  |   |  |
|  |  |  |  |  |   |  |  |   |  |
|  | (199) 0  | (127) 0  | (145) 0  | (163) Ú  | (271) 0   | (299) 0  | · (307) 0  | (325) 0.019   | (343) 1.212<br>(344) 0.358   |
| ( 91) 0  | (109) 0  | (127) 0<br>(128) Ú   | (145) Q<br>(146) Q   |  | (271) 0<br>(272) 0  | (299) Q<br>(290) Q   | · (307) 0<br>(308) 0   | (325) 0.026   | (344) 0.358  |
| ( 91) 0<br>( 92) 0   | (110) 0  | (128) 0  |  | (163) 0<br>(164) 0<br>(165) 0  | (271) 0<br>(272) 0<br>(273) 0   | (299) 0<br>(290) 0<br>(291) 0  | (307) 0<br>(308) 0<br>(309) 0  | (326) 0.026<br>(327) 0.026  | (344) 0.358<br>(345) 0.49  |
| 91) 0<br>92) 0<br>93) 0  | (110) 0<br>(111) 0   | (128) Ú<br>(129) Ú   | (146) 0  | (163) Ü<br>(164) Ö   | (271) 0<br>(272) 0<br>(273) 0<br>(274) 0  | (299) 0<br>(290) 0<br>(291) 0<br>(292) 0   | <ul> <li>(307) 0</li> <li>(308) 0</li> <li>(309) 0</li> <li>(310) 0</li> </ul>   | (325) 0.025<br>(327) 0.025<br>(328) 0.025   | (344) 0.358<br>(345) 0.49<br>(345) 0.651   |
| (91)0<br>(92)0<br>(93)0<br>(94)0   | (110) 0<br>(111) 0<br>(112) 0  | (128) 0<br>(129) 0<br>(130) 0  | (146) 0<br>(147) 0<br>(148) 0  | (163) 0<br>(164) 0<br>(165) 0  | (271) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(275) 0   | (299) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0  | - (307) 0<br>(308) 0<br>(309) 0<br>(310) 0<br>(311) 0  | (326) 0.026<br>(327) 0.026<br>(328) 0.025<br>(329) 6E-3   | (344) 0.358<br>(345) 0.49<br>(346) 0.651<br>(347) 1.069  |
| ( 91) 0<br>( 92) 0<br>( 93) 0<br>( 94) 0<br>( 94) 0<br>( 95) 0   | (110) 0<br>(111) 0<br>(112) 0<br>(113) 0   | (128) 0<br>(129) 0<br>(130) 0<br>(131) 0   | (146) 0<br>(147) 0   | (163) 0<br>(164) 0<br>(165) 0<br>(166) 0   | (271) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(275) 0<br>(275) 0<br>(276) 0   | (299) ()<br>(290) ()<br>(291) ()<br>(292) ()<br>(293) ()<br>(294) ()   | (307) 0<br>(308) 0<br>(309) 0<br>(310) 0<br>(311) 0<br>(312) 0   | (325) 0.025<br>(327) 0.025<br>(328) 0.025<br>(329) 5E-3<br>(330) 0  | (344) 0.358<br>(345) 0.49<br>(346) 0.651<br>(347) 1.669<br>(348) 2.59  |
| ( 91) 0<br>( 92) 0<br>( 93) 0<br>( 94) 0<br>( 95) 0<br>( 95) 0   | (110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(114) 0  | (128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0  | (146) 0<br>(147) 0<br>(148) 0<br>(149) 0<br>(150) 0  | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0  | (271) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(275) 0<br>(275) 0<br>(276) 0<br>(277) 0  | (299) 0<br>(290) 0<br>(291) 0<br>(293) 0<br>(293) 0<br>(294) 0<br>(295) 0  | $\begin{array}{c} (307) & 0 \\ (308) & 0 \\ (709) & 0 \\ (510) & 0 \\ (511) & 0 \\ (512) & 0 \\ (313) & 0 \end{array}$   | (326) 0.026<br>(327) 0.026<br>(328) 0.025<br>(329) 6E-3<br>(330) 0<br>(331) 0   | (344) 0.358<br>(345) 0.49<br>(345) 0.651<br>(347) 1.069<br>(343) 2.69<br>(349) 1.667   |
| ( 91) 0<br>( 92) 0<br>( 93) 0<br>( 93) 0<br>( 94) 0<br>( 95) 0<br>( 96) 0<br>( 97) 0   | $\begin{array}{c} (110) & 0 \\ (111) & 0 \\ (112) & 0 \\ (113) & 0 \\ (113) & 0 \\ (114) & 0 \\ (115) & 0 \end{array}$                                 | (128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0   | (146) 0<br>(147) 0<br>(148) 0<br>(149) 0<br>(150) 0<br>(151) 0   | (163) Ŭ<br>(164) Ŭ<br>(165) Ŭ<br>(166) Ŭ<br>(167) Ŭ<br>(158) Ŭ   | (271) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(274) 0<br>(276) 0<br>(276) 0<br>(277) 0<br>(277) 0   | (299) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(294) 0<br>(295) 0<br>(296) 0   | $\begin{array}{cccc} (307) & 0 \\ (208) & 0 \\ (709) & 0 \\ (710) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (713) & 0 \\ (713) & 0 \\ (714) & 0 \end{array}$   | (326) 0.026<br>(327) 0.026<br>(329) 0.025<br>(329) 6E-3<br>(320) 0<br>(331) 0<br>(332) 0  | (344) 0.358<br>(345) 0.49<br>(346) 0.651<br>(347) 1.669<br>(347) 2.49<br>(349) 1.667<br>(350) 1.116  |
| ( 91) 0<br>( 92) 0<br>( 93) 0<br>( 93) 0<br>( 94) 0<br>( 95) 0<br>( 95) 0<br>( 97) 0<br>( 98) 0  | $\begin{array}{c} (110) & 0 \\ (111) & 0 \\ (112) & 0 \\ (113) & 0 \\ (113) & 0 \\ (114) & 0 \\ (115) & 0 \\ (116) & 0 \end{array}$                    | (128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(134) 0  | (146) 0<br>(147) 0<br>(148) 0<br>(149) 0<br>(150) 0<br>(151) 0<br>(151) 0  | (163) 0<br>(164) 0<br>(165) 0<br>(166) 0<br>(167) 0<br>(168) 0<br>(169) 0  | (271) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(275) 0<br>(276) 0<br>(277) 0<br>(278) 0<br>(279) 0   | (299) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(294) 0<br>(295) 0<br>(296) 0<br>(297) 0  | $\begin{array}{cccc} (307) & 0 \\ (308) & 0 \\ (709) & 0 \\ (710) & 0 \\ (711) & 0 \\ (712) & 0 \\ (313) & 0 \\ (314) & 0 \\ (315) & 0 \end{array}$  | (324) 0.024<br>(327) 0.024<br>(328) 0.025<br>(329) 4E-3<br>(330) 0<br>(331) 0<br>(332) 0<br>(333) 0   | (344) 0.358<br>(345) 0.49<br>(345) 0.651<br>(347) 1.669<br>(349) 1.667<br>(349) 1.657<br>(350) 1.116<br>(351) 1.116  |
| ( 91) 0<br>( 92) 0<br>( 93) 0<br>( 93) 0<br>( 94) 0<br>( 95) 0<br>( 95) 0<br>( 97) 0<br>( 98) 0<br>( 99) 0   | (110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(117) 0  | (128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(133) 0<br>(134) 0<br>(135) 0  | $(146) 0  (147) 0  (148) 0  (149) 0  (150) 0  (151) 0  (151) 0  (152) 0  (153) 0 \\ (153$                 | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(166) 0<br>(167) 0<br>(158) 0<br>(169) 0<br>(170) 0<br>(171) 0   | (271) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(274) 0<br>(275) 0<br>(276) 0<br>(277) 0<br>(277) 0   | (299) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(294) 0<br>(295) 0<br>(296) 0   | $\begin{array}{cccc} (307) & 0 \\ (308) & 0 \\ (709) & 0 \\ (710) & 0 \\ (711) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (713) & 0 \\ (715) & 0 \\ (715) & 0 \\ (715) & 0 \\ (716) & 0 \end{array}$  | (324) 0.024<br>(327) 0.024<br>(329) 0.024<br>(329) 6E-3<br>(320) 0<br>(331) 0<br>(332) 0<br>(333) 0<br>(333) 0<br>(334) 0   | (344) 0.358<br>(345) 0.49<br>(345) 0.651<br>(347) 1.069<br>(143) 2.59<br>(349) 1.657<br>(350) 1.116<br>(351) 1.116<br>(352) 0.39   |
| ( 91) 0<br>( 92) 0<br>( 93) 0<br>( 93) 0<br>( 95) 0<br>( 95) 0<br>( 95) 0<br>( 97) 0<br>( 99) 0<br>( 100) 0  | (116) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(118) 0   | (128) 0(129) 0(130) 0(131) 0(132) 0(133) 0(134) 0(135) 0(136) 0  |  | (163) 0<br>(164) 0<br>(165) 0<br>(166) 0<br>(166) 0<br>(167) 0<br>(167) 0<br>(167) 0<br>(170) 0<br>(171) 0<br>(172) 0  | (271) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(275) 0<br>(276) 0<br>(277) 0<br>(278) 0<br>(279) 0   | $\begin{array}{c} (299) & 0 \\ (290) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \\ (293) & 0 \\ (295) & 0 \\ (295) & 0 \\ (296) & 0 \\ (297) & 0 \\ (298) & 0 \\ (299) & 0 \end{array}$  | $\begin{array}{cccc} (307) & 0 \\ (308) & 0 \\ (709) & 0 \\ (710) & 0 \\ (711) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (713) & 0 \\ (714) & 0 \\ (714) & 0 \\ (714) & 0 \\ (714) & 0 \\ (714) & 0 \\ (714) & 0 \\ (714) & 0 \\ (717) & 0 \end{array}$  | (324) 0.024<br>(327) 0.024<br>(328) 0.024<br>(329) 4E-3<br>(330) 0<br>(331) 0<br>(332) 0<br>(333) 0<br>(334) 0<br>(335) 0   | (344) 0.358<br>(345) 0.49<br>(345) 0.651<br>(347) 1.069<br>(349) 1.667<br>(349) 1.667<br>(350) 1.116<br>(351) 1.116<br>(352) 0.39<br>(353) 0.238   |
| ( 91) 0<br>( 92) 0<br>( 93) 0<br>( 93) 0<br>( 95) 0<br>( 95) 0<br>( 95) 0<br>( 97) 0<br>( 98) 0<br>( 99) 0<br>(100) 0<br>(101) 0   | (110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(118) 0<br>(119) 0                                  | (128) 0(127) 0(130) 0(131) 0(132) 0(133) 0(134) 0(135) 0(136) 0(136) 0   | $(146) 0 \\ (147) 0 \\ (148) 0 \\ (149) 0 \\ (150) 0 \\ (151) 0 \\ (151) 0 \\ (152) 0 \\ (153) 0 \\ (154) 0 \\ (155) 0 \end{cases}$  | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(167) 0<br>(169) 0<br>(170) 0<br>(170) 0<br>(172) 0<br>(172) 0  | (271) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(275) 0<br>(276) 0<br>(277) 0<br>(278) 0<br>(278) 0<br>(279) 0<br>(280) 0   | $\begin{array}{c} (299) 0 \\ (291) 0 \\ (291) 0 \\ (292) 0 \\ (293) 0 \\ (294) 0 \\ (295) 0 \\ (296) 0 \\ (297) 0 \\ (297) 0 \\ (297) 0 \\ (297) 0 \\ (299) 0 \\$ | $\begin{array}{cccc} (307) & 0 \\ (308) & 0 \\ (709) & 0 \\ (710) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (714) & 0 \\ (714) & 0 \\ (714) & 0 \\ (714) & 0 \\ (716) & $  | (324) 0.024<br>(327) 0.024<br>(328) 0.025<br>(329) 4E-3<br>(330) 0<br>(331) 0<br>(332) 0<br>(333) 0<br>(334) 0<br>(335) 0<br>(335) 0  | (344) 0.358<br>(345) 0.49<br>(345) 0.651<br>(347) 1.069<br>(349) 1.667<br>(350) 1.116<br>(351) 1.116<br>(352) 0.39<br>(353) 0.228<br>(354) 0.157   |
| ( 91) 0<br>( 92) 0<br>( 93) 0<br>( 93) 0<br>( 94) 0<br>( 95) 0<br>( 95) 0<br>( 97) 0<br>( 97) 0<br>( 97) 0<br>( 97) 0<br>( 100) 0<br>(101) 0   | (110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(118) 0<br>(119) 0<br>(120) 0                       | (128) 0<br>(127) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(134) 0<br>(135) 0<br>(136) 0<br>(136) 0<br>(137) 0<br>(138) 0   | $(146) 0  (147) 0  (149) 0  (150) 0  (150) 0  (151) 0  (152) 0  (153) 0  (154) 0  (155) 0  (156) 0 \\ (156$                     | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(167) 0<br>(169) 0<br>(169) 0<br>(170) 0<br>(171) 0<br>(172) 0<br>(173) 0<br>(174) 0                                  | (271) 0<br>(272) 0<br>(273) 0<br>(273) 0<br>(275) 0<br>(275) 0<br>(276) 0<br>(277) 0<br>(278) 0<br>(278) 0<br>(280) 0<br>(280) 0                                  | $\begin{array}{c} (299) 0 \\ (290) 0 \\ (291) 0 \\ (292) 0 \\ (292) 0 \\ (293) 0 \\ (295) 0 \\ (295) 0 \\ (296) 0 \\ (297) 0 \\ (297) 0 \\ (298) 0 \\ (297) 0 \\ (300) 0 \\ (301) 0 \end{array}$   | $\begin{array}{cccc} (307) & 0 \\ (308) & 0 \\ (709) & 0 \\ (710) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (713) & 0 \\ (716) & 0 \\ (718) & 0 \\ (718) & 0 \\ (719) & 0 \end{array}$   | $ \begin{array}{cccc} (326) & 0.026 \\ (327) & 0.026 \\ (328) & 0.025 \\ (329) & \delta E = 3 \\ (700) & 0 \\ (331) & 0 \\ (331) & 0 \\ (332) & 0 \\ (333) & 0 \\ (334) & 0 \\ (335) & 0 \\ (335) & 0 \\ (335) & 0 \\ (337) & 0 \end{array} $                         | (344) 0.358<br>(345) 0.49<br>(345) 0.651<br>(347) 1.069<br>(349) 1.667<br>(350) 1.116<br>(351) 1.116<br>(351) 1.116<br>(352) 0.39<br>(353) 0.258<br>(355) 0.11   |
| ( 91) 0<br>( 92) 0<br>( 93) 0<br>( 94) 0<br>( 95) 0<br>( 95) 0<br>( 97) 0<br>( 98) 0<br>( 97) 0<br>( 98) 0<br>( 100) 0<br>(101) 0<br>(102) 0<br>(103) 0  | (110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(118) 0<br>(119) 0<br>(119) 0<br>(120) 0<br>(121) 0 | (128) 0  (127) 0  (130) 0  (131) 0  (132) 0  (133) 0  (133) 0  (134) 0  (136) 0  (137) 0  (138) 0  (139) 0   | (146) 0<br>(147) 0<br>(148) 0<br>(150) 0<br>(150) 0<br>(151) 0<br>(152) 0<br>(153) 0<br>(154) 0<br>(156) 0<br>(156) 0  | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(167) 0<br>(167) 0<br>(170) 0<br>(177) 0<br>(172) 0<br>(172) 0<br>(173) 0<br>(174) 0<br>(175) 0                       | (271) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(275) 0<br>(275) 0<br>(276) 0<br>(277) 0<br>(278) 0<br>(279) 0<br>(280) 0<br>(281) 0<br>(282) 0                       | $\begin{array}{c} (299) 0 \\ (290) 0 \\ (291) 0 \\ (292) 0 \\ (292) 0 \\ (293) 0 \\ (295) 0 \\ (295) 0 \\ (295) 0 \\ (297) 0 \\ (297) 0 \\ (297) 0 \\ (297) 0 \\ (277) 0 \\ (301) 0 \\ (301) 0 \end{array}$  | $\begin{array}{cccc} (307) & 0 \\ (308) & 0 \\ (709) & 0 \\ (710) & 0 \\ (711) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (713) & 0 \\ (714) & 0 \\ (715) & 0 \\ (716) & 0 \\ (716) & 0 \\ (717) & 0 \\ (717) & 0 \\ (719) & 0 \\ (719) & 0 \\ (720) & 0 \end{array}$  | $ \begin{array}{cccc} (324) & 0.024 \\ (327) & 0.024 \\ (128) & 0.024 \\ (329) & \delta E - 3 \\ (329) & \delta E - 3 \\ (321) & 0 \\ (331) & 0 \\ (332) & 0 \\ (333) & 0 \\ (333) & 0 \\ (335) & 0 \\ (335) & 0 \\ (337) & 0 \\ (337) & 0 \\ (338) & 9 \end{array} $ | (344) 0.358<br>(345) 0.49<br>(345) 0.651<br>(347) 1.069<br>(143) 2.59<br>(349) 1.657<br>(350) 1.116<br>(351) 1.116<br>(352) 0.39<br>(353) 0.258<br>(354) 0.157<br>(355) 0.11<br>(356) 0.089                                |
| ( 91) 0<br>( 92) 0<br>( 93) 0<br>( 93) 0<br>( 95) 0<br>( 95) 0<br>( 97) 0<br>( 98) 0<br>( 97) 0<br>( 98) 0<br>( 100) 0<br>(101) 0<br>(101) 0<br>(102) 0<br>(103) 0                             | (110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(113) 0<br>(114) 0<br>(114) 0<br>(116) 0<br>(117) 0<br>(119) 0<br>(120) 0<br>(122) 0                       | $(128) 0  (129) 0  (130) 0  (131) 0  (132) 0  (133) 0  (134) 0  (135) 0  (136) 0  (136) 0  (138) 0  (139) 0  (140) 0 \\ (140) 0 \\ (129) 0 \\ (140) 0 \\ (110$ | $(146) 0 \\ (147) 0 \\ (148) 0 \\ (149) 0 \\ (150) 0 \\ (151) 0 \\ (152) 0 \\ (152) 0 \\ (153) 0 \\ (154) 0 \\ (155) 0 \\ (156) 0 \\ (157) 0 \\ (158$ | (163) 0<br>(164) 0<br>(165) 0<br>(166) 0<br>(166) 0<br>(167) 0<br>(167) 0<br>(170) 0<br>(170) 0<br>(171) 0<br>(172) 0<br>(172) 0<br>(173) 0<br>(174) 0<br>(175) 0<br>(176) 0 | (271) 0<br>(272) 0<br>(273) 0<br>(273) 0<br>(275) 0<br>(276) 0<br>(277) 0<br>(277) 0<br>(278) 0<br>(279) 0<br>(280) 0<br>(281) 0<br>(282) 0<br>(283) 0            | $\begin{array}{c} (299) 0 \\ (290) 0 \\ (291) 0 \\ (292) 0 \\ (292) 0 \\ (293) 0 \\ (295) 0 \\ (295) 0 \\ (296) 0 \\ (297) 0 \\ (297) 0 \\ (298) 0 \\ (297) 0 \\ (300) 0 \\ (301) 0 \end{array}$   | $\begin{array}{ccccc} (307) & 0 \\ (308) & 0 \\ (709) & 0 \\ (710) & 0 \\ (711) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (713) & 0 \\ (714) & 0 \\ (715) & 0 \\ (716) & 0 \\ (718) & 0 \\ (718) & 0 \\ (722) & 0 \\ (721) &$  | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | (344) 0.358<br>(345) 0.49<br>(345) 0.651<br>(347) 1.069<br>(243) 2.69<br>(349) 1.657<br>(350) 1.116<br>(351) 1.116<br>(352) 0.39<br>(353) 0.238<br>(354) 0.157<br>(355) 0.089<br>(357) 0.06                                |
| ( 91) 0<br>( 92) 0<br>( 93) 0<br>( 93) 0<br>( 95) 0<br>( 95) 0<br>( 95) 0<br>( 97) 0<br>( 98) 0<br>( 97) 0<br>( 98) 0<br>( 97) 0<br>( 100) 0<br>(101) 0<br>(102) 0<br>(103) 0<br>(104) 0       |  | (128) 0(129) 0(130) 0(131) 0(132) 0(133) 0(134) 0(135) 0(136) 0(136) 0(138) 0(139) 0(140) 0(141) 0   | (146) 0<br>(147) 0<br>(147) 0<br>(150) 0<br>(151) 0<br>(152) 0<br>(153) 0<br>(154) 0<br>(155) 0<br>(156) 0<br>(157) 0<br>(158) 0<br>(159) 0  | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(166) 0<br>(167) 0<br>(158) 0<br>(167) 0<br>(170) 0<br>(171) 0<br>(172) 0<br>(173) 0<br>(174) 0<br>(175) 0<br>(176) 0<br>(177) 0 | (271) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(275) 0<br>(276) 0<br>(277) 0<br>(277) 0<br>(278) 0<br>(279) 0<br>(280) 0<br>(281) 0<br>(281) 0<br>(283) 0<br>(284) 0 | $\begin{array}{c} (299) 0 \\ (290) 0 \\ (291) 0 \\ (292) 0 \\ (293) 0 \\ (293) 0 \\ (295) 0 \\ (295) 0 \\ (296) 0 \\ (297) 0 \\ (298) 0 \\ (298) 0 \\ (297) 0 \\ (297) 0 \\ (300) 0 \\ (301) 0 \\ (302) 0 \\ (304) 0 \end{array}$  | $\begin{array}{c} (307) & 0 \\ (308) & 0 \\ (709) & 0 \\ (711) & 0 \\ (711) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (714) & 0 \\$ | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | (344) 0.358<br>(345) 0.49<br>(345) 0.651<br>(347) 1.069<br>(349) 1.667<br>(350) 1.116<br>(351) 1.116<br>(351) 1.116<br>(353) 0.238<br>(353) 0.238<br>(353) 0.157<br>(355) 0.11<br>(356) 0.089<br>(357) 0.06<br>(358) 0.055 |
| ( 91) 0<br>( 92) 0<br>( 92) 0<br>( 93) 0<br>( 94) 0<br>( 95) 0<br>( 95) 0<br>( 97) 0<br>( 97) 0<br>( 98) 0<br>( 100) 0<br>( 101) 0<br>( 102) 0<br>( 103) 0<br>( 104) 0<br>( 105) 0<br>( 106) 0 | (110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(113) 0<br>(114) 0<br>(114) 0<br>(116) 0<br>(117) 0<br>(119) 0<br>(120) 0<br>(122) 0                       | $(128) 0  (129) 0  (130) 0  (131) 0  (132) 0  (133) 0  (134) 0  (135) 0  (136) 0  (136) 0  (138) 0  (139) 0  (140) 0 \\ (140) 0 \\ (129) 0 \\ (140) 0 \\ (110$ | $(146) 0 \\ (147) 0 \\ (148) 0 \\ (149) 0 \\ (150) 0 \\ (151) 0 \\ (152) 0 \\ (152) 0 \\ (153) 0 \\ (154) 0 \\ (155) 0 \\ (156) 0 \\ (157) 0 \\ (158$ | (163) 0<br>(164) 0<br>(165) 0<br>(166) 0<br>(166) 0<br>(167) 0<br>(167) 0<br>(170) 0<br>(170) 0<br>(171) 0<br>(172) 0<br>(172) 0<br>(173) 0<br>(174) 0<br>(175) 0<br>(176) 0 | (271) 0<br>(272) 0<br>(273) 0<br>(273) 0<br>(275) 0<br>(276) 0<br>(277) 0<br>(278) 0<br>(279) 0<br>(280) 0<br>(280) 0<br>(281) 0<br>(283) 0<br>(284) 0<br>(285) 0 | $\begin{array}{c} (299) 0 \\ (290) 0 \\ (291) 0 \\ (292) 0 \\ (2934) 0 \\ (2934) 0 \\ (295) 0 \\ (295) 0 \\ (297) 0 \\ (297) 0 \\ (297) 0 \\ (297) 0 \\ (297) 0 \\ (297) 0 \\ (297) 0 \\ (297) 0 \\ (297) 0 \\ (297) 0 \\ (297) 0 \\ (293) 0$  | $\begin{array}{ccccc} (307) & 0 \\ (308) & 0 \\ (709) & 0 \\ (710) & 0 \\ (711) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (712) & 0 \\ (713) & 0 \\ (714) & 0 \\ (715) & 0 \\ (716) & 0 \\ (718) & 0 \\ (718) & 0 \\ (722) & 0 \\ (721) &$  | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | (344) 0.358<br>(345) 0.49<br>(345) 0.651<br>(347) 1.069<br>(243) 2.69<br>(349) 1.657<br>(350) 1.116<br>(351) 1.116<br>(352) 0.39<br>(353) 0.238<br>(354) 0.157<br>(355) 0.089<br>(357) 0.06                                |

| River    | discharge | data at | at | 12-hourly | intervals | for | Station: | 15D |  |
|----------|-----------|---------|----|-----------|-----------|-----|----------|-----|--|
| 114 1441 |           |         |    | •         |           |     | Period : | 1   |  |

.

Phosphorus transport Berg River

TR 143 March 1989

ېپې نو د تېر د ه بر د د ک

•

00022<sup>-1.1</sup>

| 1             | ING2.vari () | enath ≠ 360)               |                            |              |  |       |                            |                    |                    |             |
|---------------|--------------|----------------------------|----------------------------|--------------|--|-------|----------------------------|--------------------|--------------------|-------------|
| Variable: DUR |              |                            |                            |              | (181)<br>(182)<br>(183)<br>(184)<br>(185)<br>(186)<br>(187)<br>(189)<br>(199)<br>(190)<br>(191)<br>(194)<br>(194)<br>(195)<br>(197)<br>(198) |       |                            | (217) 0.069        | (235) 0.034        | (253) 0.019 |
|               | ( 19) 0.012  | ( 37) 0.012                | (55) 0.012                 | (73)0.012    | (181)  | 0.019 | (199) 0.012<br>(200) 0.012 | (218) 0.051        | (236) 0.034        | (254) 0.019 |
| ( 2) 0.025    | ( 20) 0.019  | ( 38) 0.019                |                            | ( 74) 0.019  | (182)  | 0.019 | (201) 0.012                | (219) 0.758        | (237) 0.034        | (255) 0.019 |
| ( 3) 0.019    | (21) 0.012   | ( 39) 0.012                | ( 57) 0.013                | '( 75) 0.019 | (185)  | 0.019 | (201) 0.012<br>(202) 0.012 | (220) 0.145        | (238) 0.034        | (256) 0.019 |
| (4) 0.019     | (22) 0.019   | (40) 0.019                 | ( 58) 0.019                | ( 76) 0.026  | (184)  | 0.019 | (202) 0.012<br>(203) 0.012 | (221) 0.089        | (239) 0.034        | (257) 0.017 |
| ( 5) 0.019    | (23) 0.012   | (41) 0.012                 | ( 59) 0.012                | ( 77) 0.019  | (185)  | 0.012 | (203) 0.012<br>(204) 0.054 | (222) 0.069        | (240) 0.034        | (258) 0.019 |
| ( 6) 0.019    | ( 24) 0.019  | (42) 0.019                 | ( 60) 0.019                | ( 78) 0.019  | (186)  | 0.019 | (205) 0.034                | (223) 0.05         | (241) 0.034        | (259) 0.019 |
| ( 7) 0.019    | ( 25) 0.034  | ( 43) 0.011                | (61)0.012                  | ( 79) 0.069  | (187)  | 0.012 | (205) 0.034                | (224) 0.051        | (242) 0.034        | (250) 0.019 |
| ( 8) 0.019    | (26) 0.034   | ( 44) 0.012                | ( 62) 0.019                | (80) 0.11    | (188)  | 0.019 | (207) 0.423                | (225) 0.06         | (243) 0.034        | (261) 0.019 |
| ( 9) 0.267    | ( 27) 0.034  | (45) 0.011                 | ( 63) 0.012                | (81) 0.049   | (187)  | 0.012 | (208) 1.116                | (226) 0.06         | (244) 0.034        | (262) 0.019 |
| ( 10) 0.06    | (28) 0.034   | (46) 0.012                 | ( 64) 0.019                | ( 82) 0.051  | (190)  | 0.017 | (209) 0.47                 | (227) 0.051        | (245) 0.026        | (253) 0.019 |
| (11) 0.025    | ( 29) 0.012  | (47) 0.012                 | ( 65) 0.012                | (83)0.026    | (191)  | 0.012 |                            | (228) 0.051        | (246) 0.034        | (254) 0.019 |
| ( 12) 0.019   | ( 30) 0.019  | (48) 0.012                 | ( 66) 0,019                | (84) 0.025   | (192)  | 0.014 | (210) 1.116                | (229) 0.042        | (247) 0.026        | (265) 0.019 |
| (13) 0.019    | ( 31) 0.012  | (49) 0.012                 | ( 67) 0.012                | ( 85) 0.019  | (19.3)   | 0.012 | (211) 1.023                | (230) 0.034        | (248) 0.034        | (256) 0.019 |
| (14) 0.017    | ( 32) 0.019  | ( 50) 0.012                | ( 68) 0.019                | ( 86) 0.019  | (194)  | 0.019 | (212) 0.21                 | (231) 0.034        | (249) 0.019        | (257) 0.019 |
| (15) 0.012    | ( 33) 0.012  | ( 51) 0.012                | ( 69) 0.012                | (87)0.019    | (195)  | 0.012 | (213) 1.422                | (232) 0.034        | (250) 0.034        | (258) 0.019 |
| (16) 0.019    | ( 34) 0.019  | ( 52) 0.012                | ( 70) 0.019                | ( 88) 0.019  | (196)  | 0.019 | (214) 0.145                |                    |                    | (269) 0.019 |
| (17) 0.012    | ( 35) 0.012  | ( 53) 0.012                | ( 71) 0.012                | ( 89) 0.019  | (197)  | 0.012 | (                          |                    |                    | (270) 1.116 |
| 1 101 0 010   | ( 361 0.019  | ( 54) 0.012                | ( 72) 0.012                | ( 90) 0.019  | (198)  | 0.012 | (216) 0.069                |                    |                    |             |
|               |              |                            |                            |              |  | -     | ·                          |                    |                    | ·           |
|               |              |                            |                            |              |  |       | (289) 0.026                | (307) 0,012        |                    |             |
| ( 91) 0.012   | (109) 0.051  |                            | (145) 0.034                | (164) 0.025  | (272)<br>(272)<br>(273)<br>(274)<br>(274)<br>(276)   | 0.133 | (290) 0.025                | (208) 0.012        | (326) 6E-3         | (344) 0     |
| ( 92) 0.019   | (110) 0.051  | (128) 0.019                | (145) 0.089<br>(147) 0.051 | (165) 0.019  | (273)  | 5.315 | (291) 0.025                | (309) 0.012        | (327) 6E-3         | (345) Ŭ     |
| ( 93) 0.012   | (111) 0.034  | (129) 0.019                | (147) 0.031<br>(148) 0.145 | (155) 0.026  | (274)  | 0.238 | (292) 0.026                | (310) 0.012        | (328) 6E-3         | (346) 0     |
| ( 94) 0.019   | (112) 0.034  | (130) 0.019                | (148) 0.143<br>(149) 0.11  | (167) 0.019  | (275)  | 0.133 | (293) 0.019                | (311) 6E-3         | (JIP) 6E-J         | (347) 0     |
| ( 95) 0.012   | (113) 0.048  | (131) 0.019                | (149) 0.011<br>(150) 0.051 | (168) 0.026  | (276)  | 0.077 | (294) 0.026                | (312) 6E-3         | (330) <b>6</b> E-3 | (34님) 이     |
| ( 95) 0.019   | (114) 0.075  | (132) 0.017                | (151) 0.034                | (169) 0.019  | (277)  | 0.069 | (295) 0.019                | (313) <b>6</b> E-3 | (CC1) 6E-3         | (_49) 0     |
| ( 97) 0.012   | (115) 0.051  | (133) 0.019                | (152) 0.034                | (170) 0.019  | (277)<br>(278)<br>(279)  |       | (296) 0.019                | (314) 6E-3         | (332) 4E-3         | (350) 0     |
| (98) 0.019    | (116) 0.034  | (134) 0.019                | (153) 0.034                | (171) 0.019  | (279)  | 0.051 | (297) 0.019                | (315) 68-3         | (333) 6E-3         | (351) 0     |
| ( 99) 0.012   | (117) 0.034  | (135) 0.019<br>(136) 0.019 | (154) 0.034                | (172) 0.019  | (280)  | 0.034 | (298) 0.019                | (316) 6E-3         | (334) 6E-3         | (352) 0     |
| (100) 0.012   | (118) 0.034  | (137) 0.019                | (155) 0.034                | 1173) 0.019  | (281)  | 0.034 | (299) 0.019                | (317) <u>6</u> E-3 | (335) 6E-3         | (353) 0     |
| (101) 0.012   | (119) 0.026  | (138) 0.019                | (156) 0                    | (174) 0.019  | (282)  | 0.034 | (300) 0.019                | (318) 6E-3         | (336) 6E-3         | (354) Ó     |
| (102) 0.012   | (120) 0.026  | (139) 0.019                | (157) 0.034                | (175) 0.019  | (283)  | 0.034 | (301) 0.019                | (319) 6E-3         | (337) 5E-3         | (355) 0     |
| (103) 0.069   | (121) 0.019  | (140) 0.019                | (158) 0                    | (176) 0.019  | (284)  | 0.034 | (302) 0.019                | (320) <b>6</b> E-3 | (338) <b>6E-</b> 3 | (356) 0     |
| (104) 0.051   | (122) 0.019  | (141) 0.019                | (159) 0.034                | (177) 0.019  | (285)  | 0.034 | (303) 0.019                | (321) 6E-3         | (339) 3E-3         | (357) 0     |
| (105) 0.638   | (123) 0.019  | (141) 0.017<br>(142) 0.019 | (160) 0.026                | (178) 0.019  | (290)<br>(280)<br>(281)<br>(282)<br>(283)<br>(284)<br>(285)<br>(286)<br>(287)<br>(288)   | 0.034 | (304) 0.019                | (32⊋) 6E-3         | (340) <u>6</u> E-3 | (358) 0     |
| (106) 0.133   | (124) 0.019  | (143) 0.019                | (161) 0.019                | (179) 0.019  | (287)  | 0.026 | (305) 0.019                | (323) 6E-3         | (341) 3E-3         | (359) 0     |
| (107) 0.069   | (125) 0.019  | (143) 0.014<br>(144) 0.019 | (152) 0.025                | (180) 0.019  |  |       | (306) 0.019                | (324) 6E-3         | (342) 3E-3         | (360) 0     |
| (108) 0.06    | (126) 0.019  | (144) (1017                |                            |              |  |       |                            |                    |                    |             |
|               |              |                            |                            |              |  |       |                            | N                  |                    |             |

River discharge data at 12-hourly intervals for Station: 15D

Period : 2

|   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (55) 0  (55) 0  (56) 0  (57) 0  (58) 0  (59) 0  (40) 0  (41) 0  (41) 0  (41) 0  (41) 0  (43) 0  (43) 0  (45) 0  (46) 0  (   | (73) 0<br>(74) 0<br>(75) 0<br>(75) 0<br>(76) 0<br>(77) 0<br>(78) 0<br>(78) 0<br>(80) 0<br>(81) 0<br>(81) 0<br>(82) 0<br>(83) 0<br>(83) 0<br>(85) 0<br>(85) 0 | (181) 0<br>(182) 0<br>(182) 0<br>(183) 0<br>(184) 0<br>(185) 0<br>(186) 0<br>(187) 0<br>(188) 0<br>(189) 0<br>(189) 0<br>(197) 0<br>(191) 0<br>(192) 0<br>(193) 0<br>(194) 0 | (199) 0<br>(205) 0<br>(201) 0<br>(202) 0<br>(203) 0<br>(204) 0<br>(205) 0<br>(206) 0<br>(207) 0<br>(208) 0<br>(209) 0<br>(210) 0<br>(211) 0 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (253) 0<br>(254) 0<br>(255) 0<br>(255) 0<br>(257) 0<br>(257) 0<br>(259) 0<br>(259) 0<br>(260) 0<br>(261) 0<br>(261) 0<br>(263) 0<br>(263) 0 |
|---|--|---|--|--|---|--|---|---|
|   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $ \begin{pmatrix} 55 \\ 6 \\ 56 \end{pmatrix} 0 \\ (57) 0 \\ (58) 0 \\ (59) 0 \\ (60) 0 \\ (60) 0 \\ (61) 0 \\ (61) 0 \\ (61) 0 \\ (62) 0 \\ (61) 0 \\ (63) 0 \\ (63) 0 \\ (64) 0 \\ (66) 0 $ | (73) 0<br>(75) 0<br>(75) 0<br>(77) 0<br>(77) 0<br>(78) 0<br>(79) 0<br>(80) 0<br>(81) 0<br>(82) 0<br>(82) 0<br>(83) 0<br>(84) 0<br>(85) 0                     | (182) 0<br>(183) 0<br>(184) 0<br>(185) 0<br>(185) 0<br>(186) 0<br>(187) 0<br>(188) 0<br>(189) 0<br>(190) 0<br>(191) 0<br>(192) 0<br>(193) 0                                  | (200) 0<br>(201) 0<br>(202) 0<br>(203) 0<br>(204) 0<br>(205) 0<br>(206) 0<br>(206) 0<br>(207) 0<br>(208) 0<br>(209) 0<br>(209) 0<br>(210) 0 | (219).6<br>(220) 0<br>(221) 0<br>(223) 0<br>(223) 0<br>(223) 0<br>(224) 0<br>(225) 0<br>(225) 0<br>(225) 0<br>(225) 0<br>(227) 0<br>(228) 0<br>(229) 0 | (237) 6E-3<br>(238) 0<br>(239) 0<br>(240) 0<br>(241) 0<br>(242) 0<br>(242) 0<br>(243) 0<br>(244) 0<br>(245) 0<br>(246) 0<br>(247) 0 | (255) 0<br>(255) 0<br>(257) 0<br>(258) 0<br>(259) 0<br>(259) 0<br>(251) 0<br>(251) 0<br>(251) 0<br>(263) 0<br>(263) 0<br>(265) 0            |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (57) 0 $(58) 0$ $(59) 0$ $(60) 0$ $(61) 0$ $(62) 0$ $(62) 0$ $(63) 0$ $(63) 0$ $(63) 0$ $(63) 0$ $(64) 0$ $(66) 0$ $(66) 0$ $(66) 0$ $(66) 0$   | (75) 0<br>(76) 0<br>(77) 0<br>(78) 0<br>(78) 0<br>(80) 0<br>(81) 0<br>(82) 0<br>(82) 0<br>(83) 0<br>(84) 0<br>(85) 0   | (183) 0<br>(184) 0<br>(185) 0<br>(186) 0<br>(187) 0<br>(189) 0<br>(189) 0<br>(190) 0<br>(191) 0<br>(192) 0<br>(193) 0  | (201) 0<br>(202) 0<br>(203) 0<br>(204) 0<br>(205) 0<br>(206) 0<br>(206) 0<br>(207) 0<br>(208) 0<br>(209) 0<br>(209) 0<br>(210) 0<br>(211) 0 | (220) 0<br>(221) 0<br>(222) 0<br>(223) 0<br>(223) 0<br>(224) 0<br>(225) 0<br>(225) 0<br>(225) 0<br>(227) 0<br>(228) 0<br>(229) 0                       | (238) 0<br>(239) 0<br>(240) 0<br>(241) 0<br>(242) 0<br>(242) 0<br>(243) 0<br>(244) 0<br>(245) 0<br>(246) 0<br>(247) 0               | (256) 0<br>(257) 0<br>(258) 0<br>(259) 0<br>(260) 0<br>(261) 0<br>(261) 0<br>(263) 0<br>(263) 0<br>(265) 0                                  |
| $ \begin{pmatrix} 2 \\ 3 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (58) 0  (59) 0  (40) 0  (41) 0  (41) 0  (41) 0  (43) 0  (43) 0  (43) 0  (43) 0  (44) 0  (45) 0  (46) 0  (   | (74) 0<br>(77) 0<br>(78) 0<br>(78) 0<br>(80) 0<br>(80) 0<br>(81) 0<br>(82) 0<br>(83) 0<br>(84) 0<br>(85) 0   | (184) 0<br>(185) 0<br>(185) 0<br>(187) 0<br>(188) 0<br>(189) 0<br>(199) 0<br>(190) 0<br>(191) 0<br>(192) 0<br>(193) 0  | (202) 0<br>(203) 0<br>(204) 0<br>(205) 0<br>(206) 0<br>(206) 0<br>(207) 0<br>(208) 0<br>(209) 0<br>(209) 0<br>(210) 0<br>(211) 0            | (221) 0<br>(222) 0<br>(223) 0<br>(223) 0<br>(224) 0<br>(225) 0<br>(225) 0<br>(225) 0<br>(227) 0<br>(228) 0<br>(229) 0                                  | (239) 0<br>(240) 0<br>(241) 0<br>(242) 0<br>(243) 0<br>(243) 0<br>(244) 0<br>(245) 0<br>(246) 0<br>(247) 0                          | (257) 0<br>(258) 0<br>(259) 0<br>(260) 0<br>(261) 0<br>(262) 0<br>(263) 0<br>(263) 0<br>(264) 0<br>(265) 0                                  |
| $ \begin{pmatrix} 4 \\ 0 \end{pmatrix} \begin{pmatrix} 22 \\ 5 \end{pmatrix} \begin{pmatrix} 23 \\ 4 \end{pmatrix} \begin{pmatrix} 23 \\ 23 \end{pmatrix} \begin{pmatrix} 23 \\ 24 \end{pmatrix} \begin{pmatrix} 24 \\ $ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{pmatrix} 59 \\ 0 \\ 60 \\ 0 \\ 62 \\ 0 \\ 62 \\ 0 \\ 64 \\ 0 \\ 64 \\ 0 \\ 64 \\ 0 \\ 64 \\ 0 \\ 64 \\ 0 \\ 64 \\ 0 \\ 64 \\ 0 \\ 64 \\ 0 \\ 64 \\ 0 \\ 64 \\ 0 \\ 64 \\ 0 \\ 64 \\ 0 \\ 0 \\ 0 \\ 0 \\ 64 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ $  | ( 77) 0<br>( 78) 0<br>( 78) 0<br>( 80) 0<br>( 81) 0<br>( 81) 0<br>( 82) 0<br>( 83) 0<br>( 84) 0<br>( 85) 0   | (185) 0<br>(186) 0<br>(187) 0<br>(188) 0<br>(189) 0<br>(190) 0<br>(191) 0<br>(192) 0<br>(193) 0  | (203) 0<br>(204) 0<br>(205) 0<br>(206) 0<br>(207) 0<br>(208) 0<br>(209) 0<br>(209) 0<br>(210) 0<br>(211) 0                                  | (221) 0<br>(222) 0<br>(223) 0<br>(223) 0<br>(224) 0<br>(225) 0<br>(225) 0<br>(225) 0<br>(227) 0<br>(228) 0<br>(229) 0                                  | (240) 0<br>(241) 0<br>(242) 0<br>(243) 0<br>(244) 0<br>(245) 0<br>(245) 0<br>(246) 0<br>(247) 0                                     | (258) 0<br>(259) 0<br>(260) 0<br>(251) 0<br>(262) 0<br>(263) 0<br>(263) 0<br>(265) 0  |
| $ \begin{pmatrix} 5 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (59) 0 $(60) 0$ $(61) 0$ $(61) 0$ $(62) 0$ $(63) 0$ $(63) 0$ $(64) 0$ $(65) 0$ $(66) 0$ $(66) 0$ $(66) 0$ $(66) 0$ $(66) 0$   | (78) 0<br>(79) 0<br>(80) 0<br>(81) 0<br>(82) 0<br>(82) 0<br>(83) 0<br>(84) 0<br>(85) 0   | (186) 0<br>(187) 0<br>(188) 0<br>(189) 0<br>(190) 0<br>(191) 0<br>(192) 0<br>(193) 0   | (204) 0<br>(205) 0<br>(206) 0<br>(207) 0<br>(208) 0<br>(209) 0<br>(210) 0<br>(211) 0  | (222) 0<br>(223) 0<br>(224) 0<br>(225) 0<br>(225) 0<br>(226) 0<br>(227) 0<br>(228) 0<br>(229) 0  | (240) 0<br>(241) 0<br>(242) 0<br>(243) 0<br>(244) 0<br>(245) 0<br>(245) 0<br>(246) 0<br>(247) 0                                     | (259) 0<br>(260) 0<br>(251) 0<br>(262) 0<br>(263) 0<br>(263) 0<br>(265) 0   |
| $ \begin{pmatrix} 6 \\ 7 \end{pmatrix} 0 (24) \\ (7) 0 (25) \\ (8) 0 (27) \\ (10) 0 (27) \\ (10) 0 (27) \\ (11) 0 (27) \\ (11) 0 (27) \\ (12) 0 (30) \\ (13) 0 (31) \\ (14) 0 (32) \\ (15) 0 (33) \\ (16) 0 (33$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | ( 40) 0  ( 41) 0  ( 42) 0  ( 42) 0  ( 43) 0  ( 44) 0  ( 45) 0  ( 46  | (79)0<br>(80)0<br>(81)0<br>(82)0<br>(83)0<br>(84)0<br>(84)0  | (187) 0<br>(188) 0<br>(189) 0<br>(190) 0<br>(191) 0<br>(192) 0<br>(193) 0  | (205) 0<br>(206) 0<br>(207) 0<br>(208) 0<br>(209) 0<br>(210) 0<br>(211) 0   | (223) 0<br>(224) 0<br>(225) 0<br>(225) 0<br>(226) 0<br>(227) 0<br>(228) 0<br>(229) 0   | (241) 0<br>(242) 0<br>(243) 0<br>(244) 0<br>(245) 0<br>(245) 0<br>(246) 0<br>(247) 0  | (260) 0<br>(251) 0<br>(252) 0<br>(263) 0<br>(263) 0<br>(265) 0  |
| $ \begin{pmatrix} 7 \\ 7 \end{pmatrix} 0 \qquad \begin{pmatrix} 25 \\ 29 \\ (8) \\ 0 \\ (9) \\ 0 \\ (10) \\ 0 \\ (10) \\ 0 \\ (12) \\ 0 \\ (13) \\ 0 \\ (13) \\ 0 \\ (31) \\ (14) \\ 0 \\ (32) \\ (15) \\ 0 \\ (33) \\ (16) \\ 0 \\ (34) \\ (35) $  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | ( 61) 0  ( 62) 0  ( 63) 0  ( 64) 0  ( 64) 0  ( 65) 0  ( 65) 0  ( 66) 0  ( 67) 0  ( 68) 0 0  ( 68) 0 0  ( 68) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | (80)0<br>(81)0<br>(82)0<br>(83)0<br>(84)0<br>(84)0<br>(85)0  | (198) 0<br>(189) 0<br>(190) 0<br>(191) 0<br>(192) 0<br>(193) 0   | (206) 0<br>(207) 0<br>(208) 0<br>(209) 0<br>(210) 0<br>(211) 0  | (224) 0<br>(225) 0<br>(226) 0<br>(227) 0<br>(227) 0<br>(228) 0<br>(229) 0  | (242) 0<br>(243) 0<br>(244) 0<br>(245) 0<br>(245) 0<br>(246) 0<br>(247) 0   | (251) 0<br>(252) 0<br>(263) 0<br>(264) 0<br>(265) 0   |
| $ \begin{pmatrix} & B \\ ( & P) & 0 \\ ( & P) & 0 \\ ( & 10) & 0 \\ ( & 11) & 0 \\ ( & 12) & 0 \\ ( & 12) & 0 \\ ( & 13) & 0 \\ ( & 13) & 0 \\ ( & 14) & 0 \\ ( & 15) & 0 \\ ( & 15) & 0 \\ ( & 16) & 0 \\ ( & 15) & 0 \\ ( & 16)$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (62) 0       (63) 0       (63) 0       (63) 0       (65) 0       (65) 0       (66) 0       (67) 0       (68) 0       (68) 0   | (81)0<br>(82)0<br>(83)0<br>(84)0<br>(85)0  | (189) 0<br>(190) 0<br>(191) 0<br>(192) 0<br>(193) 0  | (207) 0<br>(208) 0<br>(209) 0<br>(210) 0<br>(211) 0   | (225) 0<br>(225) 0<br>(227) 0<br>(228) 0<br>(228) 0<br>(229) 0   | (243) 0<br>(244) 0<br>(245) 0<br>(246) 0<br>(246) 0   | (262) 0<br>(263) 0<br>(264) 0<br>(265) 0  |
| $ \begin{pmatrix} 9 \\ 0 \end{pmatrix} 0 & (27) \\ (10) 0 & (28) \\ (11) 0 & (29) \\ (12) 0 & (30) \\ (13) 0 & (31) \\ (14) 0 & (35) \\ (15) 0 & (37) \\ (16) 0 & (37) \\ (36) 0$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | ( 43) 0       ( 44) 0       ( 45) 0       ( 45) 0       ( 46) 0       ( 46) 0       ( 46) 0       ( 46) 0       ( 46) 0       ( 46) 0   | (82)0<br>(83)0<br>(84)0<br>(85)0   | (190) 0<br>(191) 0<br>(192) 0<br>(193) 0   | (208) ů<br>(209) ů<br>(210) ů<br>(211) ů  | (225) 0<br>(227) 0<br>(228) 0<br>(229) 0   | (244) 0<br>(245) 0<br>(246) 0<br>(247) 0  | (262) 0<br>(263) 0<br>(264) 0<br>(265) 0  |
| $ \begin{pmatrix} 10 \\ 0 \\ 11 \\ 0 \\ 12 \\ 0 \\ 13 \\ 0 \\ 13 \\ 0 \\ 14 \\ 0 \\ 15 \\ 0 \\ 15 \\ 0 \\ 16 \\ 0 \\ 37 \\ 16 \\ 0 \\ 37 \\ 16 \\ 0 \\ 37 \\ 16 \\ 0 \\ 37 \\ 16 \\ 0 \\ 37 \\ 16 \\ 0 \\ 37 \\ 16 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 6 ( 64) 0<br>6 ( 65) 0<br>7 ( 66) 0<br>6 ( 67) 0<br>7 ( 68) 0   | (83)0<br>(84)0<br>(85)0  | (191) 0<br>(192) 0<br>(193) 0  | (209) 0<br>(210) 0<br>(211) 0   | (227) 0<br>(228) 0<br>(229) 0  | (245) 0<br>(246) 0<br>(247) 0   | (263) 0<br>(264) 0<br>(265) 0   |
| $ \begin{array}{c} (11) & 0 & (29) \\ (12) & 0 & (30) \\ (13) & 0 & (31) \\ (14) & 0 & (32) \\ (15) & 0 & (33) \\ (16) & 0 & (34) \\ \end{array} $  | 9)     0     {47}     0       0)     0     (-48)     0       1)     9     (49)     0       2)     0.019     (50)     0       3)     0     (51)     0 | ( 45) 0<br>( 66) 0<br>( 67) 0<br>( 67) 0<br>( 66) 0   | (84)0<br>(85)0   | (192) 0<br>(193) 0   | (210) 0<br>(211) 0  | (228) 0<br>(229) 0   | (246) 0<br>(247) 0  | (264) 0<br>(265) 0  |
| $ \begin{array}{c} (12) & 0 & (30) \\ (13) & 0 & (31) \\ (14) & 0 & (32) \\ (15) & 0 & (33) \\ (16) & 0 & (33) \\ \end{array} $   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 66) 0<br>(67) 0<br>(68) 0   | (85) 0   | (193) 0  | (211) 0   | (229) 0  | (247) 0   | (265) Ú   |
| (13) 0 (31)<br>(14) 0 (32)<br>(15) 0 (33)<br>(15) 0 (33)<br>(16) 0 (34)   | L) 9 (49) (<br>2) 0.019 (50) (<br>3) 0 (51) (  | (67)0<br>(68)0  |  |  |   |  |   |   |
| (14) 0 (32)<br>(15) 0 (33)<br>(16) 0 (34)   | 2) 0.019 (50) (<br>3) 0 (51) (   | (68)0   | ( 86) 0  | (194) 0  |   |  | (248) 0   | (256) 0   |
| (15) 0 (33)   | 3) 0 (51) (  |   |  |  | (212) 0   | (230) 0  | (249) 0   | (267) 0   |
| (16) 0 (34  |  |   | (87) 0   | (195) ů  | (213) 0   | (231) 0  |   | (268) 0   |
|   | 4)0 (54)4  |   | ( 88) 0  | (196) Ŭ  | (214) 0   | (232) 0.019  | (250) 0   | (269) 0   |
| / 1 / Th  |  |   | (87)0  |  |   | (233) 6E-3   | (251) 0   | (270) 9   |
| (17)0 (35   | 5)0 (53)0<br>5)0 (54)0   |   | ( 90) 0  | (193) Ŭ  | (215) 0   | (234) 0  | (252) 0   |   |
|   |  |   |  |  |   | ·<br>  | (775) 0 017   | (343) 0.019   |
|   |  | ) (145) 0   | (163) V  | (271) 0  | (289) 0   | (307) 0  | (325) 0.012<br>(326) 0.012  |   |
|   |  |   | (154) 0.034  | (272) 0  | (290) 0   | (308) 0  |   | (344) 6101/<br>(345) 6E-3   |
| <pre></pre>   | 0) 0 (128)   |   | (165) 0.034  | (273) Q  | (291) 0   | (307) 0  | (327) 0.019   | (346) 5E-3  |
|   | 1) 0 (129)   |   | (166) 0.034  | (274) 0  | (292) 0   | (310) 0  | (328) 0.019   | (342) 0   |
| · · · · · · · · · · · · · · · · · · ·   | 2) 0 (130)   |   | (167) 0.034  | (275) Q  | (293) 0   | (311) 0.579  | (329) 0.019   | (348) 0   |
|   | 3) 0 (131)   | · ·   | (168) 0.034  | (276) 0  | (294) 0   | (312) 0.069  | (330) 0.019   |   |
|   | 4) 0 (132)   | • • • • • •   | (167) 0.034  | (277) 0  | (295) 0   | (313) 0  | (331) 0.019   | (349) 0<br>(350) 0  |
|   | 5) 0 (133)   | · · · · · ·   | (170) 0.034  | (278) 0  | (296) 0   | (314) 6E-3   | (332) 0.019   | •   |
|   | 6) 0 (134)   | •   | (171) 0.034  | (279) 0  | (297) 0   | (315) 6E-3   | (333) 0.019   | (351) 0   |
|   | 7) 0 (135)   |   | (172) 0.034  | (280) 0  | (298) 0   | (316) 6E-3   | (334) 0.019   | (352) 0   |
|   | 8) 0 (136)   |   | (173) 6E-3   | (281) 0  | (299) 0   | (317) 6E-3   | (335) 0.019   | (353) 0   |
|   | 9) 0 (137)   |   | (174) 0  | (282) 0  | (300) 0   | (318) AE-3   | (336) 0.019   | (354) 0   |
|   | (138) (138)  |   | (175) 0  | (283) 0  | (301) 0   | (319) 6E-3   | (337) 0.019   | (355) 0   |
|   | (139)  |   | (176) 0  | (284) 0  | (302) 0   | (320) 6E-3   | (338) 0.019   | (356) 0   |
|   | (140)  |   | (177) 0  | (285) 0  | (303) 0   | (321) 68-3   | (339) 0.019   | (357) 0   |
|   | (141)  |   | (178) 0  | (286) 0  | (304) 0   | (322) 6E-3   | (340) 0.019   | (358) 0   |
|   | (142)  |   | (178) 0  | (287) 0  | (305) 0   | (323) 0.012  | (341) 0.019   | (359) 0   |
| (107) 0 (12   | (143)  |   | (190) 0  | (000) 0  | (306) 0   | (324) <b>6</b> E-3   | (342) 0.019   | (360) 0   |
| (100) 0 (17   | 26) 0 (144)  | 0 (162) 0   |  |  |   |  |   |   |

River discharge data at 12-hourly intervals for Station: 15D Period : 3

Phosphorus transport Berg River

1

TR 143 March 1989

. بېرونې

A3.48

### Period : 4

## River discharge data at 12-hourly intervals for Station: 15D

| ( 91) 6E-3  | (109) 2.257 | (127) 0.051 | (145) 0.034 | (163) 0.103 |
|-------------|-------------|-------------|-------------|-------------|
| ( 92) 0.019 | (110) 0.678 | (128) 0.051 | (146) 0.034 | (164) 0.121 |
| ( 93) 6E-3  | (111) 0.39  | (129) 0.051 | (147) 0.004 | (165) 0.069 |
| (94) 6E-3   | (112) 0.21  | (130) 0.051 | (148) 0.004 | (166) 0.069 |
| ( 95) 6E-3  | (113) 0.157 | (101) 0.051 | (149) 0.026 | (157) 1.069 |
| (96) 6E-3   | (114) 0.133 | (132) 0.051 | (150) 0.026 | (168) 0.358 |
| 1 97) 2.257 | (115) 0.11  | (133) 0.034 | (151) 0.845 | (169) 0.25  |
| (98) 4.257  | (116) 0.11  | (134) 0.034 | (152) 0.11  | (170) 0.157 |
| ( 99) 0.327 | (117) 0,089 | (135) 0.034 | (153) 0.069 | (171) 0.133 |
| (100) 0.157 | (118) 0.089 | (136) 0.034 | (154) 0.889 | (172) 0.11  |
| (101) 0.077 | (119) 0.069 | (137) 0.034 | (155) 0.327 | (173) 0.1   |
| (102) 0.051 | (120) 0,069 | (138) 0.034 | (156) 0.157 | (174) 0.11  |
| (103) 4.427 | (121) 0.069 | (139) 0.034 | (157) 0.11  | (175) 0.11  |
| 104) 0.423  | (122) 0.069 | (140) 0.034 | (158) 0.089 | (176) 0.089 |
| 105) 0.267  | (123) 0.069 | (141) 0.034 | (157) 0.069 | (177) 0.069 |
| 106) 0.099  | (124) 0.069 | (142) 0.034 | (160) 0.069 | (178) 0.069 |
| (107) 0.12  | (125) 0.06  | (143) 0.034 | (161) 0.157 | (179) 0.069 |
| (108) 3.413 | (126) 0.06  | (144) 0.034 | (162) 0.253 | (180) 0.069 |
|             |             |             |             |             |
|             |             |             |             |             |

|   | (271) | 0.019 | (289) | 4E-3   | (207) | 4E~7 | (325) |       | (343) |    |
|---|-------|-------|-------|--------|-------|------|-------|-------|-------|----|
|   |       | 0.019 | (290) | 6E-3   | (308) | 6E-3 |       | 6E-3  | (344) | Q. |
|   | (273) | 0.019 | (291) | 4E-3   | (309) | 6E-3 | (727) |       |       |    |
|   | (274) | 0.019 | (292) | 6E-3   | (10)  | 6E-3 | (328) |       |       |    |
|   | (275) | 0.019 | (292) | 6E - 3 | (311) | 6E-3 | (329) |       |       |    |
|   | (276) | 0.017 | (294) | 6E-3   | (312) | 6E~3 | (320) | 0,069 |       |    |
|   | (277) | 0.019 | (295) | 6E-3   | (313) | 4E-3 | (331) | 0     |       |    |
|   | (278) | 0.019 | (296) | 6E-3   | (314) | 6E~3 | (332) | Ū.    |       |    |
|   | (279) | 0.019 | (297) | 3E-3   | (315) | 6E~3 |       |       |       |    |
|   | (280) | 0.019 | (298) | 6E-3   | (315) | 6E-7 | (334) | 0     |       |    |
|   | (281) | 0.019 | (299) | 3E-3   | (317) | 6E-3 | (335) |       |       |    |
|   | (202) | 0.019 | (300) | 6E-3   | (318) | 6E-3 | (336) | 0     |       |    |
|   | (283) | 6E-3  | (301) | 3E-3   | (319) | 6E-3 | (337) | 0     |       |    |
| • | (284) | 0.019 | (302) | 6E-3   | (320) | 6E-3 | (308) |       |       |    |
|   | (285) | 6E-3  | (303) | 3E-3   | (321) | 6E-0 | (309) | Ŭ     |       |    |
|   | (286) | 0.019 | (304) | 0.069  | (322) | 6E-3 | (340) |       |       |    |
|   | (297) | 6E-3  | (305) | 6E-3 . | (323) | 6E~3 | (341) | Ú.    |       |    |
|   | (208) | 0.019 | (306) | 6E-3   | (324) | 6E-3 | (342) | 0     |       |    |
|   |       |       |       |        |       |      |       |       |       |    |

\_\_\_\_\_

| ć | 1) 0      | (  | 19) | 0.019 | ( | 37) | 6E-3  | (  | 55) | 0.017 | - ( | 73)          | 0.019 |
|---|-----------|----|-----|-------|---|-----|-------|----|-----|-------|-----|--------------|-------|
| è | 2) 0      | ć  | 20) | 0.017 | ( | 38) | 6E-3  | (  | 56) | 0.017 | (   | 74)          | 0.019 |
| è | Sí o      | Ċ  | 21) | 0.019 | ( | 36) | 6E-3  | (  | 57) | 0.019 | (   | 75)          | 0.012 |
| ì | 4) 0      | i  | 22) | 0.017 | ( | 40) | 6E-3  | l  | 58) | 0.551 | t   | 75)          | 0.012 |
| ŕ | 5) 0      | Ċ  | 22) | 0.019 | ( | 41) | 3E-3  | (  | 59) | 0.017 | (   | 77)          | 0.012 |
|   | 6) 0      | i  | 24) | 0.019 | ( | 42) | 0     | í. | 6O) | 0.051 | 1   | 78)          | 0.012 |
| i | 71 0      | i  | 25) | 0.017 | Ċ | 43) | Ó     | (  | 61) | 0.019 |     |              | 0.012 |
|   | 8) 0.019  | t  | 26) | 0.019 | t | 44) | ΰ     | 1  | 62) | 0.025 | •   | <b>B</b> Ø ) | 0,012 |
|   | 9) 0.025  | Ċ  | 27) | 0.017 | ( | 45) | 0     | (  | 67) | 0.019 | (   | 81)          | 0,012 |
|   | 10) 0.025 | (  | 28) | 0.019 | ( | 46) | 0     | 4  | 64) | 0.017 | 4   |              | 0.012 |
|   | 11) 0.019 | (  | 27) | 0.017 | ( | 47) | 0     | (  | 65) | 0,069 | •   |              | 0.012 |
|   | 12) 0.026 | (  | 30) | 0.019 | ( | 48) | Ŭ.    | (  | 66) | 0.034 | (   |              | 0.012 |
| i | 13) 0.019 | Ċ  | 31) | 0.012 | ( | 49) | 0     | (  | 67) | 0,019 | - ( | 85)          | 0.012 |
|   | 14) 0.026 | Ċ  | 32) | 0.012 | ( | 50) | 1.24  | (  | 6B) | 0.019 | - C |              | 0.012 |
|   | 15) 0.019 | (  | 33) | 0,012 | Ċ | 51) | 0.077 | (  | 69) | 0,012 | (   |              | 0,012 |
|   | 16) 0.026 | i  | 34) | 0.012 | ( | 52) | 3.765 | (  | 70) | 0,019 | - C | 88)          | 0.012 |
|   | 17) 0.019 | i  | 35) | 0.012 | i | 53) | 0.88  | (  | 71) | 0.069 | (   | 89)          | 0.012 |
| i | 18) 0,026 | í. | 36) | 0.012 | i | 54) | 0.051 | (  | 72) | 0.034 | (   | 90)          | 0.012 |

| (181) 0.05 | 7 (199) 0.031 | (217) 0.004 | (235) 0.183 | (253) 0.019 |
|------------|---------------|-------------|-------------|-------------|
| (182) 0.06 | 9 (200) 0.051 | (218) 0.034 | (206) 0.069 | (254) 0.019 |
| (180) 0.06 | (201) 0.041   | (212) 0.074 | (237) 0.051 | (255) 0.019 |
| (184) 0.05 | 1 (202) 0.042 | (220) 0.034 | (238) 0.051 | (255) 0.019 |
| (185) 0.05 | 1 (203) 0.041 | (221) 0.074 | (239) 0.034 | (257) 0.019 |
| (186) 0.06 |               | (222) 0.004 | (240) 0.034 | (258) 0.019 |
| (187) 0.06 |               | (227) 0.034 | (241) 0.034 | (259) 0.019 |
| (188) 0.06 |               | (224) 0.004 | (242) 0,034 | (260) 0.019 |
| (189) 0.05 |               | (225) 0.034 | (243) 0.042 | (261) 0.019 |
| (190) 0.05 |               | (226) 0.034 | (244) 0.034 | (262) 0.019 |
| (191) 0.05 |               | (227) 0.034 | (245) 0.678 | (263) 0.019 |
| (192) 0.06 |               | (228) 0.034 | (246) 0.026 | (264) 0.019 |
| (193) 0.06 | • -           | (229) 0.034 | (347) 0.019 | (265) 0.019 |
| (194) 0.15 |               | (200) 0.034 | (248) 0.019 | (266) 0.019 |
| (195) 0.07 |               | (231) 0.054 | (249) 0.019 | (267) 0.019 |
| (196) 0.06 |               | (232) 0.034 | (250) 0.019 | (268) 0.019 |
| (197) 0.06 |               | (233) 0.042 | (251) 0.019 | (269) 0.019 |
| (198) 0.05 | · - ·         | (234) 0.11  | (252) 0.019 | (270) 0.019 |

TR 143 M

|   | DORING5.var1   | (length = 360)  |  |  |  |  |  |   |   |
|---|--|---|--|--|--|--|--|---|---|
|   |  | <br>( 37) ψ   | ( 53) 0  | ( 73) 0  | (181) 0  | (199) 0  | (217) 0  | (235) 0   | (253) 0   |
| (1)0  | (19)0  |   | (56)0  | (74) 0   | (182) 0  | (200) 0  | (218) 0  | (236) 0   | (254) 0   |
| (2)0  | (20)0  | (38) 0  | (57)0  | (75) 0   | (183) 🔅  | (201) 0  | (219) Ŭ  | (237) 0   | (255) 0   |
| (3)0  | (21)0  | (40) 0  | (58)0  | (76) 0   | (134) 0  | (202) 0  | (220) 0  | (208) ()  | (256) 0   |
| (4)0  | (22) 0   |   | ( 59) 0  | (77) 0   | (185) 👳  | (203) = 0  | (221) 0  | (239) 0   | (257) ů   |
| (5)0  | (25)0  | (41)0   | (60)0  | (78) 0   | (106) 0  | (204) 0  | (222) 0  | (240) 0   | (258) 0   |
| ( 6) 0  | (24)0  | (42)0   |  | (79) 0   | (187) 0  | (205) 0  | (223) 0  | (241) 0   | (259) 0   |
| (7)0  | (25)Ú  | (43)0   | (61)0  | (80)0  | (188) 0  | (206) 0  | (224) 0  | (242) 0   | (240) Q   |
| (8)0  | (25)0  | (44)0   | ( 62) 0  | (81)0  | (187) 0  | (207) 0  | (225) 0  | (243) 0   | (261) Ŭ   |
| (9)0  | (27)0  | (45)0   | (63)0  | (82)0  | (190) 0  | (208) 0  | (224) 0  | (244) 0 1   | (262) 0.034   |
| ( 10) 0   | (28)0  | (46)0   | ( 64 ) 0   | •  | (191) 0  | (209) 0  | (227) 0  | (245) 0   | (263) 0.042   |
| (11)0   | (29)0  | (47) Ŭ  | ( 65) Ú  | (83)0  | (192) 0  | (210) 0  | (228) 0  | (246) 0   | (264) 9.042   |
| (12) 0  | . (30) 0   | (48))   | (66)Ú  | (84)0  | (172) 0  | (211) 0  | (229) 0  | (247) 0   | (265) 0.051   |
| (13) 0  | (31) 0   | (49)Ŭ   | (67)0  | (85)0  |  | (212) 0  | (230) 0  | (248) 0   | (256) 0.051   |
| (14) 0  | (32)0  | (50)0   | ( 68) 0  | (86)0  | (194) 0  |  | (251) 0  | (249) 0   | (267) 0.026   |
| (15)0   | ( 33) 0  | ( 51) 0   | ( 69) 0  | (87) O   | (195) 0  | (213) 0  | (232) 0  | (250) 0   | (268) 0.026   |
| (16) 0  | (34)0  | (52)0   | (70)0  | (88)Ŭ  | (196) 0  | (214) 0  |  | (251) 0   | (269) 0.026   |
| (17) 0  | (35)0  | (53) 0  | (71)Ú  | (89)ů  | • • · · •  | (215) 0  |  | (252) 0   | (270) 0.034   |
| (18) 0  | (36)0  | (54)0   | (72) 0   | (90)0  | (198) Ú  | (216) 0  | (234) 0  |   |   |
|   |  |   |  |  | -  |  |  |   |   |
|   |  |   |  |  | -  |  |  |   | ·   |
|   |  |   |  | (162) 0  | (271) 0.034  | (289) 0.019  | (307) 0.019  | (325) 0   | (343) 0   |
| (91)0   | (109) 0  | (127) 0   | (145) 0  | (163) 0  | -<br>(271) 0.034<br>(272) 0.034  | (289) 0.019<br>(290) 0.019   | (308) 0.019<br>(308) 0.019   | (325) 0<br>(326) 0  | (343) O<br>(344) O  |
| (92)0   | (109) 0<br>(110) 0   | (127) 0<br>(128) 0  | (145) 0<br>(146) 0   | (163) 0<br>(164) 0   | (271) 0.034  | (289) 0.019<br>(290) 0.019<br>(291) 0.019  | (307) 0.019<br>(308) 0.019<br>(309) 0.019  | (325) 0<br>(326) 0<br>(327) 0   | (343) 0<br>(344) 0<br>(345) 0   |
| (92)0<br>(93)0  | (109) 0<br>(110) 0<br>(111) 0  | (127) 0<br>(128) 0<br>(129) 0   | (145) 0<br>(146) 0<br>(147) 0  | (163) 0<br>(164) 0<br>(165) 0  | (271) 0.034<br>(272) 0.034   | (289) 0.019<br>(290) 0.019   | (307) 0.019<br>(308) 0.019<br>(309) 0.019<br>(310) 0.012   | (325) 0<br>(326) 0<br>(327) 0<br>(328) 0  | (343) 0<br>(344) 0<br>(345) 0<br>(346) 0  |
| (92)0<br>(93)0<br>(94)0   | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0   | (127) 0<br>(128) 0<br>(129) 0<br>(129) 0<br>(130) 0   | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0   | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0   | (271) 0.034<br>(272) 0.034<br>(273) 0.034  | (289) 0.019<br>(290) 0.019<br>(291) 0.019<br>(292) 0.019<br>(292) 0.019  | (307) 0.019<br>(308) 0.019<br>(309) 0.019<br>(310) 0.012<br>(311) 0.012  | (325) 0<br>(326) 0<br>(327) 0<br>(328) 0<br>(329) 0   | (343) 0<br>(344) 0<br>(345) 0<br>(346) 0<br>(347) 0   |
| (92)0<br>(93)0<br>(94)0<br>(95)0  | (107) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(112) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0   | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(148) 0  | (165) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(165) 0  | (271) 0.034<br>(272) 0.034<br>(270) 0.034<br>(274) 0.034   | (289) 0.019<br>(290) 0.019<br>(291) 0.019<br>(292) 0.019   | (307) 0.019<br>(308) 0.019<br>(309) 0.019<br>(310) 0.012<br>(311) 0.012<br>(312) 6E-3  | (325) 0<br>(326) 0<br>(327) 0<br>(328) 0<br>(329) 0<br>(330) 0  | (343) 0<br>(344) 0<br>(345) 0<br>(346) 0<br>(347) 0<br>(347) 0  |
| (92)0<br>(93)0<br>(94)0<br>(95)0<br>(95)0   | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0  | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(149) 0<br>(150) 0   | (167) 0<br>(164) 0<br>(165) 0<br>(166) 0<br>(167) 0<br>(168) 0   | (271) 0.034<br>(272) 0.034<br>(273) 0.034<br>(274) 0.034<br>(274) 0.034<br>(275) 0.034   | (289) 0.019<br>(290) 0.019<br>(291) 0.019<br>(292) 0.019<br>(292) 0.019  | (307) 0.019<br>(308) 0.019<br>(309) 0.019<br>(310) 0.012<br>(311) 0.012<br>(312) 6E-3<br>(313) 6E-3  | (325) 0<br>(326) 0<br>(327) 0<br>(328) 0<br>(329) 0<br>(329) 0<br>(330) 0<br>(331) 0  | (343) 0<br>(344) 0<br>(345) 0<br>(346) 0<br>(347) 0<br>(347) 0<br>(348) 0<br>(349) 0  |
| (92)0<br>(93)0<br>(94)0<br>(95)0<br>(95)0<br>(96)0<br>(97)0   | $\begin{array}{c} (109) & 0 \\ (110) & 0 \\ (111) & 0 \\ (112) & 0 \\ (112) & 0 \\ (112) & 0 \\ (113) & 0 \\ (114) & 0 \\ (115) & 0 \end{array}$   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0   | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(149) 0<br>(150) 0<br>(151) 0  | (167) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(168) 0<br>(168) 0  | $\begin{array}{c} (271) & 0.054 \\ (272) & 0.034 \\ (272) & 0.034 \\ (274) & 0.054 \\ (275) & 0.054 \\ (275) & 0.034 \\ (277) & 0.034 \end{array}$   | (289) 0.019<br>(290) 0.019<br>(291) 0.019<br>(292) 0.019<br>(292) 0.019<br>(293) 0.019<br>(294) 0.019  | (307) 0.019<br>(308) 0.019<br>(309) 0.019<br>(310) 0.012<br>(311) 0.012<br>(312) 6E-3  | (325) 0<br>(326) 0<br>(327) 0<br>(328) 0<br>(328) 0<br>(330) 0<br>(331) 0<br>(331) 0  | (343) 0<br>(344) 0<br>(345) 0<br>(346) 0<br>(347) 0<br>(348) 0<br>(349) 0<br>(350) 0  |
| ( 92) 0<br>( 93) 0<br>( 94) 0<br>( 95) 0<br>( 95) 0<br>( 97) 0<br>( 98) 0   | $\begin{array}{c} (109) & 0 \\ (110) & 0 \\ (111) & 0 \\ (112) & 0 \\ (112) & 0 \\ (113) & 0 \\ (114) & 0 \\ (115) & 0 \\ (114) & 0 \end{array}$   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(133) 0  | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(149) 0<br>(150) 0<br>(151) 0<br>(152) 0   | (165) 0(164) 0(165) 0(166) 0(157) 0(168) 0(168) 0(157) 0(170) 0  | $\begin{array}{c} (271) & 0.034 \\ (272) & 0.034 \\ (273) & 0.034 \\ (274) & 0.034 \\ (275) & 0.034 \\ (275) & 0.034 \\ (277) & 0.034 \\ (278) & 0.034 \end{array}$  | (289) 0.019<br>(290) 0.019<br>(291) 0.019<br>(292) 0.019<br>(292) 0.019<br>(294) 0.019<br>(295) 0.019  | (307) 0.019<br>(308) 0.019<br>(309) 0.019<br>(310) 0.012<br>(311) 0.012<br>(312) 6E-3<br>(313) 6E-3  | (325) 0<br>(326) 0<br>(327) 0<br>(328) 0<br>(329) 0<br>(329) 0<br>(330) 0<br>(331) 0  | (343) 0<br>(344) 0<br>(245) 0<br>(344) 0<br>(347) 0<br>(348) 0<br>(349) 0<br>(350) 0<br>(351) 0   |
| ( 92) 0<br>( 93) 0<br>( 94) 0<br>( 95) 0<br>( 95) 0<br>( 97) 0<br>( 98) 0<br>( 99) 0  | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(117) 0   |   | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(148) 0<br>(150) 0<br>(151) 0<br>(152) 0<br>(153) 0  | (165) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(165) 0<br>(168) 0<br>(168) 0<br>(170) 0<br>(170) 0  | $\begin{array}{c} (271) & 0.034 \\ (272) & 0.034 \\ (272) & 0.034 \\ (274) & 0.034 \\ (275) & 0.034 \\ (275) & 0.034 \\ (277) & 0.034 \\ (278) & 0.034 \\ (279) & 0.034 \end{array}$   | (289) 0.019<br>(290) 0.019<br>(291) 0.019<br>(292) 0.019<br>(292) 0.019<br>(294) 0.019<br>(294) 0.019<br>(295) 0.019<br>(294) 0.019  | (307) 0.019<br>(308) 0.019<br>(309) 0.019<br>(310) 0.012<br>(311) 0.012<br>(313) 6E-3<br>(313) 6E-3<br>(314) 6E-3  | (325) 0<br>(326) 0<br>(327) 0<br>(328) 0<br>(328) 0<br>(330) 0<br>(331) 0<br>(331) 0  | (343) 0<br>(344) 0<br>(245) 0<br>(344) 0<br>(347) 0<br>(349) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0  |
| (92)       0         (93)       0         (94)       0         (95)       0         (96)       0         (97)       0         (97)       0         (97)       0         (100)       0   | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(118) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(132) 0<br>(133) 0<br>(135) 0<br>(136) 0  | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(149) 0<br>(150) 0<br>(151) 0<br>(152) 0<br>(153) 0<br>(154) 0   | (165) 0<br>(164) 0<br>(165) 0<br>(155) 0<br>(156) 0<br>(158) 0<br>(159) 0<br>(171) 0<br>(171) 0  | $\begin{array}{c} (271) & 0.034 \\ (272) & 0.034 \\ (272) & 0.034 \\ (274) & 0.034 \\ (275) & 0.034 \\ (276) & 0.034 \\ (277) & 0.034 \\ (278) & 0.034 \\ (279) & 0.034 \\ (290) & 0.034 \end{array}$  | (289) 0.019<br>(290) 0.019<br>(291) 0.019<br>(292) 0.019<br>(292) 0.019<br>(294) 0.019<br>(295) 0.019<br>(295) 0.019<br>(297) 0.019  | (307) 0.019<br>(308) 0.019<br>(309) 0.019<br>(310) 0.012<br>(311) 0.012<br>(312) 8E-3<br>(313) 8E-3<br>(314) 6E-3<br>(315) 0   | $\begin{array}{cccc} (325) & 0 \\ (326) & 0 \\ (327) & 0 \\ (328) & 0 \\ (229) & 0 \\ (320) & 0 \\ (330) & 0 \\ (331) & 0 \\ (333) & 0 \end{array}$   | (343) 0<br>(344) 0<br>(345) 0<br>(346) 0<br>(347) 0<br>(347) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(353) 0   |
| ( 92) 0<br>( 93) 0<br>( 94) 0<br>( 95) 0<br>( 95) 0<br>( 97) 0<br>( 98) 0<br>( 98) 0<br>( 99) 0<br>( 100) 0<br>( 101) 0   | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(118) 0<br>(119) 0   | (127) 0<br>(129) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(133) 0<br>(134) 0<br>(135) 0<br>(136) 0<br>(137) 0                                  | $(145) 0  (146) 0  (147) 0  (147) 0  (150) 0  (151) 0  (151) 0  (152) 0  (153) 0  (154) 0  (155) 0 \\ (155$                     | (165) 0 $(164) 0$ $(165) 0$ $(165) 0$ $(168) 0$ $(157) 0$ $(157) 0$ $(170) 0$ $(171) 0$ $(172) 0$ $(173) 0$  | $\begin{array}{c} (271) & 0.054 \\ (272) & 0.034 \\ (272) & 0.034 \\ (274) & 0.054 \\ (275) & 0.054 \\ (275) & 0.054 \\ (276) & 0.034 \\ (276) & 0.034 \\ (279) & 0.034 \\ (280) & 0.034 \\ (281) & 0.019 \end{array}$   | (289) 0.019<br>(290) 0.019<br>(291) 0.019<br>(292) 0.019<br>(292) 0.019<br>(294) 0.019<br>(295) 0.019<br>(295) 0.019<br>(294) 0.019<br>(298) 0.019   | (307) 0.019<br>(308) 0.019<br>(309) 0.019<br>(311) 0.012<br>(311) 0.012<br>(312) 6E-3<br>(313) 6E-3<br>(315) 0<br>(316) 0  | (325) 0<br>(326) 0<br>(328) 0<br>(328) 0<br>(329) 0<br>(320) 0<br>(331) 0<br>(333) 0<br>(333) 0<br>(334) 0  | (343) 0<br>(344) 0<br>(345) 0<br>(346) 0<br>(347) 0<br>(347) 0<br>(347) 0<br>(350) 0<br>(351) 0<br>(351) 0<br>(353) 0<br>(354) 0  |
| (       92)       0         (       93)       0         (       94)       0         (       95)       0         (       95)       0         (       96)       0         (       97)       0         (       98)       0         (       97)       0         (       97)       0         (       100)       0         (100)       0       (101)         (102)       0    | $ \begin{array}{c} (109) & 0 \\ (110) & 0 \\ (111) & 0 \\ (112) & 0 \\ (112) & 0 \\ (113) & 0 \\ (114) & 0 \\ (115) & 0 \\ (115) & 0 \\ (115) & 0 \\ (117) & 0 \\ (118) & 0 \\ (119) & 0 \\ (120) & 0 \end{array} $              |   |  | (165) 0 (164) 0 (165) 0 (157) 0 (157) 0 (157) 0 (157) 0 (170) 0 (171) 0 (172) 0 (173) 0 (174) 0  | $\begin{array}{c} (271) & 0.054 \\ (272) & 0.034 \\ (272) & 0.034 \\ (274) & 0.054 \\ (275) & 0.054 \\ (275) & 0.054 \\ (277) & 0.034 \\ (277) & 0.034 \\ (279) & 0.034 \\ (280) & 0.034 \\ (280) & 0.034 \\ (281) & 0.019 \\ (282) & 0.019 \end{array}$   | (289) 0.019<br>(290) 0.019<br>(291) 0.019<br>(292) 0.019<br>(292) 0.019<br>(293) 0.019<br>(294) 0.019<br>(295) 0.019<br>(297) 0.019<br>(298) 0.019<br>(299) 0.019<br>(300) 0.019   | (307) 0.019<br>(308) 0.019<br>(309) 0.019<br>(310) 0.012<br>(311) 0.012<br>(312) 6E-3<br>(313) 6E-3<br>(314) 6E-3<br>(315) 0<br>(314) 0<br>(317) 0   | $\begin{array}{cccc} (325) & 0 \\ (326) & 0 \\ (327) & 0 \\ (328) & 0 \\ (329) & 0 \\ (329) & 0 \\ (331) & 0 \\ (331) & 0 \\ (332) & 0 \\ (333) & 0 \\ (333) & 0 \\ (333) & 0 \\ (335) & 0 \end{array}$   | (343) 0<br>(344) 0<br>(345) 0<br>(346) 0<br>(347) 0<br>(347) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(353) 0   |
| ( 92) 0         ( 93) 0         ( 94) 0         ( 95) 0         ( 96) 0         ( 97) 0         ( 98) 0         ( 97) 0         ( 97) 0         ( 100) 0         (101) 0         (102) 0         (103) 0  | $ \begin{array}{c} (109) & 0 \\ (110) & 0 \\ (111) & 0 \\ (112) & 0 \\ (112) & 0 \\ (113) & 0 \\ (114) & 0 \\ (115) & 0 \\ (115) & 0 \\ (116) & 0 \\ (117) & 0 \\ (118) & 0 \\ (119) & 0 \\ (120) & 0 \\ (121) & 0 \end{array} $ | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(134) 0<br>(135) 0<br>(134) 0<br>(135) 0<br>(136) 0<br>(137) 0<br>(138) 0<br>(139) 0 | $(145) 0  (144) 0  (147) 0  (148) 0  (149) 0  (150) 0  (151) 0  (152) 0  (153) 0  (153) 0  (155) 0  (155) 0  (155) 0  (157) 0 \\ (157$                           | (165) 0 (164) 0 (165) 0 (165) 0 (165) 0 (168) 0 (168) 0 (170) 0 (170) 0 (171) 0 (172) 0 (172) 0 (174) 0 (175) 0  | $\begin{array}{c} (271) & 0.034 \\ (272) & 0.034 \\ (272) & 0.034 \\ (273) & 0.034 \\ (274) & 0.034 \\ (275) & 0.034 \\ (275) & 0.034 \\ (279) & 0.034 \\ (279) & 0.034 \\ (280) & 0.034 \\ (281) & 0.019 \\ (282) & 0.019 \end{array}$  | (289) 0.019<br>(290) 0.019<br>(291) 0.019<br>(292) 0.019<br>(292) 0.019<br>(294) 0.019<br>(295) 0.019<br>(295) 0.019<br>(297) 0.019<br>(298) 0.019<br>(299) 0.019<br>(301) 0.019   | (307) 0.019<br>(308) 0.019<br>(309) 0.019<br>(310) 0.012<br>(311) 0.012<br>(312) 6E-3<br>(313) 6E-3<br>(314) 6E-3<br>(315) 0<br>(316) 0<br>(316) 0<br>(317) 0<br>(318) 0   | $\begin{array}{cccc} (325) & 0 \\ (326) & 0 \\ (327) & 0 \\ (328) & 0 \\ (329) & 0 \\ (323) & 0 \\ (331) & 0 \\ (333) & 0 \\ (334) & 0 \\ (334) & 0 \\ (334) & 0 \\ (334) & 0 \end{array}$  | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(347) 0<br>(349) 0<br>(359) 0<br>(351) 0<br>(351) 0<br>(353) 0<br>(354) 0<br>(354) 0  |
| (       92)       0         (       93)       0         (       94)       0         (       94)       0         (       94)       0         (       94)       0         (       96)       0         (       97)       0         (       98)       0         (       99)       0         (100)       0         (101)       0         (102)       0         (104)       0 |  |   | $(145) 0  (146) 0  (147) 0  (148) 0  (149) 0  (150) 0  (151) 0  (152) 0  (153) 0  (153) 0  (155) 0  (155) 0  (158) 0 \\ (158$                         | (165) 0 (164) 0 (165) 0 (165) 0 (165) 0 (167) 0 (157) 0 (170) 0 (171) 0 (172) 0 (173) 0 (173) 0 (175) 0 (175) 0 (176) 0                                | $\begin{array}{c} (271) & 0.034 \\ (272) & 0.034 \\ (272) & 0.034 \\ (273) & 0.034 \\ (275) & 0.034 \\ (275) & 0.034 \\ (276) & 0.034 \\ (277) & 0.034 \\ (279) & 0.034 \\ (280) & 0.034 \\ (281) & 0.019 \\ (282) & 0.019 \\ (283) & 0.019 \\ (284) & 0.019 \end{array}$  | (289) 0.019<br>(291) 0.019<br>(292) 0.019<br>(292) 0.019<br>(292) 0.019<br>(294) 0.019<br>(295) 0.019<br>(295) 0.019<br>(297) 0.019<br>(297) 0.019<br>(299) 0.019<br>(300) 0.019<br>(301) 0.019  | $\begin{array}{c} (307) & 0.019 \\ (308) & 0.019 \\ (309) & 0.019 \\ (310) & 0.012 \\ (311) & 0.012 \\ (311) & 0.012 \\ (312) & 4E-3 \\ (313) & 4E-3 \\ (313) & 4E-3 \\ (314) & 6E-3 \\ (315) & 0 \\ (314) & 0 \\ (315) & 0 \\ (316) & 0 \\ (317) & 0 \\ (319) & 0 \\ (320) & 0 \end{array}$ | $\begin{array}{cccc} (325) & 0 \\ (325) & 0 \\ (328) & 0 \\ (329) & 0 \\ (329) & 0 \\ (323) & 0 \\ (331) & 0 \\ (333) & 0 \\ (334) & 0 \\ (334) & 0 \\ (335) & 0 \\ (335) & 0 \\ (336) & 0 \\ (337) & 0 \end{array}$  | (343) 0<br>(344) 0<br>(345) 0<br>(346) 0<br>(347) 0<br>(348) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(351) 0<br>(352) 0<br>(354) 0<br>(355) 0   |
| ( 92) 0         ( 93) 0         ( 94) 0         ( 95) 0         ( 97) 0         ( 97) 0         ( 97) 0         ( 97) 0         ( 100) 0         ( 101) 0         ( 102) 0         ( 103) 0         ( 105) 0  |  | (127) 0 (128) 0 (129) 0 (130) 0 (131) 0 (132) 0 (132) 0 (133) 0 (135) 0 (134) 0 (136) 0 (137) 0 (138) 0 (139) 0 (140) 0 (141) 0                                   | $(145) 0 \\ (146) 0 \\ (147) 0 \\ (148) 0 \\ (149) 0 \\ (150) 0 \\ (151) 0 \\ (152) 0 \\ (153) 0 \\ (153) 0 \\ (154) 0 \\ (155) 0 \\ (155) 0 \\ (156) 0 \\ (158$ | (165) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(168) 0<br>(159) 0<br>(170) 0<br>(171) 0<br>(171) 0<br>(172) 0<br>(173) 0<br>(174) 0<br>(175) 0<br>(175) 0 | $\begin{array}{c} (271) & 0.054 \\ (272) & 0.034 \\ (272) & 0.034 \\ (274) & 0.054 \\ (275) & 0.054 \\ (275) & 0.054 \\ (276) & 0.034 \\ (277) & 0.034 \\ (279) & 0.034 \\ (280) & 0.034 \\ (281) & 0.019 \\ (282) & 0.019 \\ (283) & 0.019 \\ (285) & 0.019 \end{array}$  | (289) 0.019<br>(290) 0.019<br>(291) 0.019<br>(292) 0.019<br>(292) 0.019<br>(294) 0.019<br>(294) 0.019<br>(294) 0.019<br>(294) 0.019<br>(299) 0.019<br>(299) 0.019<br>(300) 0.019<br>(301) 0.019<br>(302) 0.019                               | $\begin{array}{c} (307) & 0.019 \\ (308) & 0.019 \\ (309) & 0.019 \\ (311) & 0.012 \\ (311) & 0.012 \\ (312) & 4E-3 \\ (313) & 4E-3 \\ (313) & 4E-3 \\ (314) & 6E-3 \\ (315) & 0 \\ (314) & 0 \\ (314) & 0 \\ (317) & 0 \\ (318) & 0 \\ (319) & 0 \\ (320) & 0 \\ (321) & 0 \end{array}$     | $\begin{array}{cccc} (325) & 0 \\ (326) & 0 \\ (327) & 0 \\ (328) & 0 \\ (329) & 0 \\ (329) & 0 \\ (331) & 0 \\ (331) & 0 \\ (333) & 0 \\ (333) & 0 \\ (334) & 0 \\ (335) & 0 \\ (336) & 0 \\ (338) & 0 \end{array}$  | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(347) 0<br>(347) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(351) 0<br>(353) 0<br>(354) 0<br>(355) 0<br>(355) 0                                  |
| ( 92) 0<br>( 93) 0<br>( 94) 0<br>( 95) 0<br>( 95) 0<br>( 97) 0<br>( 97) 0<br>( 98) 0<br>( 97) 0<br>( 100) 0<br>( 100) 0<br>( 101) 0<br>( 102) 0<br>( 103) 0<br>( 104) 0<br>( 105) 0<br>( 106) 0   |  | (127) 0 (128) 0 (129) 0 (130) 0 (131) 0 (132) 0 (133) 0 (135) 0 (134) 0 (135) 0 (136) 0 (137) 0 (138) 0 (139) 0 (140) 0 (141) 0 (142) 0                           | $(145) 0 \\ (144) 0 \\ (147) 0 \\ (148) 0 \\ (149) 0 \\ (150) 0 \\ (151) 0 \\ (152) 0 \\ (153) 0 \\ (153) 0 \\ (153) 0 \\ (154) 0 \\ (155) 0 \\ (157) 0 \\ (157) 0 \\ (159) 0 \\ (169) 0 \\ (160$ | (165) 0 (164) 0 (165) 0 (157) 0 (157) 0 (157) 0 (157) 0 (170) 0 (171) 0 (172) 0 (173) 0 (173) 0 (174) 0 (175) 0 (176) 0 (177) 0 (178) 0                | $\begin{array}{c} (271) & 0.034 \\ (272) & 0.034 \\ (272) & 0.034 \\ (274) & 0.034 \\ (274) & 0.034 \\ (275) & 0.034 \\ (277) & 0.034 \\ (277) & 0.034 \\ (279) & 0.034 \\ (280) & 0.034 \\ (280) & 0.034 \\ (281) & 0.019 \\ (282) & 0.019 \\ (283) & 0.019 \\ (284) & 0.019 \\ (284) & 0.019 \\ (284) & 0.019 \end{array}$ | (289) 0.019<br>(290) 0.019<br>(291) 0.019<br>(292) 0.019<br>(292) 0.019<br>(294) 0.019<br>(295) 0.019<br>(294) 0.019<br>(297) 0.019<br>(297) 0.019<br>(297) 0.019<br>(300) 0.019<br>(301) 0.019<br>(302) 0.019<br>(304) 0.019                | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{cccc} (325) & 0 \\ (326) & 0 \\ (327) & 0 \\ (328) & 0 \\ (329) & 0 \\ (3231) & 0 \\ (331) & 0 \\ (3331) & 0 \\ (3332) & 0 \\ (334) & 0 \\ (334) & 0 \\ (334) & 0 \\ (334) & 0 \\ (337) & 0 \\ (338) & 0 \\ (339) & 0 \\ (340) & 0 \end{array}$  | (343) 0<br>(344) 0<br>(345) 0<br>(346) 0<br>(347) 0<br>(347) 0<br>(350) 0<br>(351) 0<br>(351) 0<br>(353) 0<br>(354) 0<br>(355) 0<br>(355) 0<br>(355) 0                                  |
| (92) 0<br>(93) 0<br>(94) 0<br>(95) 0<br>(95) 0<br>(97) 0<br>(97) 0<br>(97) 0<br>(197) 0<br>(100) 0<br>(101) 0<br>(102) 0<br>(103) 0<br>(105) 0  |  | (127) 0 (128) 0 (129) 0 (130) 0 (131) 0 (132) 0 (132) 0 (133) 0 (135) 0 (134) 0 (136) 0 (137) 0 (138) 0 (139) 0 (140) 0 (141) 0                                   | $(145) 0 \\ (146) 0 \\ (147) 0 \\ (148) 0 \\ (149) 0 \\ (150) 0 \\ (151) 0 \\ (152) 0 \\ (153) 0 \\ (153) 0 \\ (154) 0 \\ (155) 0 \\ (155) 0 \\ (156) 0 \\ (158$ | (165) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(168) 0<br>(159) 0<br>(170) 0<br>(171) 0<br>(171) 0<br>(172) 0<br>(173) 0<br>(174) 0<br>(175) 0<br>(175) 0 | $\begin{array}{c} (271) & 0.054 \\ (272) & 0.034 \\ (272) & 0.034 \\ (274) & 0.054 \\ (275) & 0.054 \\ (275) & 0.054 \\ (276) & 0.034 \\ (277) & 0.034 \\ (279) & 0.034 \\ (280) & 0.034 \\ (281) & 0.019 \\ (282) & 0.019 \\ (283) & 0.019 \\ (285) & 0.019 \end{array}$  | (289) 0.019<br>(290) 0.019<br>(291) 0.019<br>(292) 0.019<br>(292) 0.019<br>(295) 0.019<br>(295) 0.019<br>(295) 0.019<br>(297) 0.019<br>(297) 0.019<br>(297) 0.019<br>(301) 0.019<br>(302) 0.019<br>(303) 0.019<br>(304) 0.019<br>(305) 0.019 | $\begin{array}{c} (307) & 0.019 \\ (308) & 0.019 \\ (309) & 0.019 \\ (311) & 0.012 \\ (311) & 0.012 \\ (312) & 4E-3 \\ (313) & 4E-3 \\ (313) & 4E-3 \\ (314) & 6E-3 \\ (315) & 0 \\ (314) & 0 \\ (314) & 0 \\ (317) & 0 \\ (318) & 0 \\ (319) & 0 \\ (320) & 0 \\ (321) & 0 \end{array}$     | $\begin{array}{cccc} (325) & 0 \\ (326) & 0 \\ (327) & 0 \\ (328) & 0 \\ (329) & 0 \\ (329) & 0 \\ (331) & 0 \\ (331) & 0 \\ (332) & 0 \\ (333) & 0 \\ (333) & 0 \\ (334) & 0 \\ (335) & 0 \\ (337) & $ | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(346) 0<br>(347) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(351) 0<br>(353) 0<br>(354) 0<br>(354) 0<br>(355) 0<br>(354) 0<br>(357) 0<br>(358) 0 |

### River discharge data at 12-hourly intervals for Station: 15D Period : 5

-

(73) 0

(74) Ŭ

(75) 0

(76) 0

( 77) 0

(78) 0

( 79) 0

(80) 0

0

0

Ŭ

Ú

Q

0

Û

(163) 0.39

0.059

0.019

0.051

0,157

0.11

0.089

0.069

0.069

0.051

0.0517

0,051

0.051

0.034

(174) 0.034

(175) 0.034

( 81)

( 82)

(83)

( 84)

( 85)

(86)

( 97)

(88)

( 89)

( 90)

(164)

(165)

(166)

(157)

(168)

(169)

(170)

(171)

(172)

(173)

(55) 0

(56) 0

0

Û.

- 0

0

Ō.

Ó

0

Ō

( 57)

( 58)

( 59)

( 60)

( 61)

( 62)

( 53)

( 54) O.

( 65)

(66) 0

( 57) 0

(68)Ú

(69) 0

(70) 0

(71) 0

(72) 0

\_\_\_\_

(145) 0.077

(146) 0.059

(147) 0.456

(148) 0.423

(149) 0.11

(150) 0.059

(151) 0.051

(152) 0.051

(153) 0.034

(154) 0.034

(155) 0.034

(156) 0.026

(157) 0.019

( 37) 0

Ó

-0

Ū.

0

Ŭ,

- Ó

Q.

0

Ŭ.

0

Û.

0

Ŭ,

0

(38)

( 39)

(40)

( 41)

(42)

(43)

( 44)

( 47)

( 49)

( 50)

( 51)

( 52)

( 53)

(54) Ŭ

(127) 0

(129) 0

(131) U

(133) 0

(132)

(136)

(137)

(138)

(128) - 0.012

(130) 0.012

(134) 0.889

(135) 0.069

(139) 0.019

- Û

0.034

0.034

0.019

(46) 0

(48) Ŭ

- (45)

(181) 0.034

(182) 1.667

(184) 3.926

(185) 1.154

(187) 1.023

(188) 0.561

(190) 0.297

(191) 0.238

(192) 0.183

(193) 0.157

(194) 0.157

(195) 0.157

(196) 0.133

(197) 0.133

(198) 0.11

\_\_\_\_\_\_

(271) 0.051

(272) 0.051

(273) = 0.051

(278) 0.034

(279) 0.034

(280) 0.034

(281) 0.034

(282) 0.034

(283) 0.034

0.040

0.034

0.074

0.034

(271)

(275)

(276)

(277)

(189) 0.39

(186) 2.69

(183) 11.7

(199) 0.11

(200) 0.099

(201) 0.089

(205) 8.372

(205) 0.523

(206) 0.358

(207) 0.297

(211) 0.157

(212) 0.133

(213) 0.11

(214) Ù.11

(215) 0.099

(216) 0.085

(289) 0.026

0.019

0.019

0.025

0.019

0.026

0.019

0.026

0.019

0.019

0.019

(301) 0.019

0.026

1.212

0.224

0.183

0.157

(202) = 0.21

(204)

(208)

(209)

(210)

\_\_\_\_\_

(290)

(291)

(292)

(293)

(294)

(295)

(296)

(297)

(298)

(299)

(300)

(217)

(218)

(219)

(220)

(221)

(222)

(223)

(224)

(225)

(226)

(227)

(228)

(229)

(230)

(231)

(232)

(208)

(209)

(310)

(311)

(312)

(313)

(314)

(315)

(316)

(317)

(318)

(319)

(233) 0.069

(234) 0.133

(307) 0.019

0.089

0.085

0.077

0.077

0.069

0.069

0.069

0.069

0.069

0.069

0.069

0.069

0.051

0.051

0.051

0.051

0.019

0.019

0.019

0.019

0.019

0.019

0.019

0.019

0.019

0.019

0.019

0.019

| Divon   | discharge | data af | at | 17-hourly | intervals | for | Station: | 15D |
|---------|-----------|---------|----|-----------|-----------|-----|----------|-----|
| KI AEL. | urscha ge | 9019    |    |           |           |     | Period : | 6   |

Variable: DDRING6.vari (length = 360)

( 19) 0

(20) 9

(21) 0

(22) 0

(22) 0

(24) 0

(25) 0

(26) 0

(27) 0

(<u>28)</u> Ú

(29) 0

(30) 0

(31) 0

(32) 0

(33) 0

(34) 0

(35) 0

(36) 0

(109) 0

(110) 0

(111) 0

(117) 0

(118) 0

(119) 0

(120) 0

(121) 0

(112) 0.019

(113) 0.019

(114) 0.012

(115) 0.034

(115) 0.019

\_\_\_\_\_

(1) 0

(2) 0

0 (5)

(4)0

( 5) 0

(6)0

(7) 0

(8)0

( 9) 0

(10) 0

(11) 0

(12) 0

(13) 0

(14) 0

(15) 0

(16) 0

(17) 0

(18) 0

\_\_\_\_\_

( 91) 0.034

(92)

( 93)

( 94)

( 95)

( 96)

( 97)

( 98)

( 99)

(100)

(101)

0.034

1.309

0.069

0.074

0.019

0.019

0.012

6E-3

6E-3

6E-3

(102) 0.069

(103) 0

(235) 0.089

(236) 0.069

(258) 0.06

(240) 0.051

(241) 0.051

(242) 0.051

(243) 0.051

(249) 0.051

(251) 0.051

(252) = 0.051

\_\_\_\_\_

(025) 0.019

(326) 0.019

(327) 0.012

(328) = 0.012

(329) = 0.012

(330) = 0.012

(331) 0.012

(332) 0.012

(333) 0.012

(334) 0.012

(335) 0.012

(336) 0.012

(337)

0.012

0.069

0.051

-0.051

0.051

-0.051

0.051

0.051

0.051

(237)

(239)

(244)

(245)

(246)

(247)

(248)

(250)

(253)

(255)

(252)

(263)

(264)

(266)

(267)

(268)

0.051

0.014

0.099

0.089

0.257

0.009

0.069

0.069

(254) = 0.051

(254) 0.051

(257) 0.034

(259) 1.422

(260) 0.224

(281) 0.133

(265) 0.11

(269) 0.11

(270) 0.0a9

(343) 66-3

(045) <u>5E-3</u>

(046) 6E-0 况 (047) 6E-0 况

(348) 6E-3 🛉

(351) 6E-3

(352) 6E-3

(353) 6E-3

(354) 6E-3

(355) 3E-3

(356) 0

(357) 0

(358) 0

(359) 0 (360) 0

\_\_\_\_\_

6E-7

6E - 3

6E-3

0

(344)

(349)

(350)

(258) 0.49

|              |       |       |       | gth = 30<br> |                 |                |              | (73)  | 0 162 | (181) | 0.35  | (199)       | 0.218 | (217) | 2.5   | (235)  | 0.993  | (253)          | 0.575           |
|--------------|-------|-------|-------|--------------|-----------------|----------------|--------------|-------|-------|-------|-------|-------------|-------|-------|-------|--------|--------|----------------|-----------------|
|              | 1.236 | (19)  | 0.447 | (37)         | 0.36            | ( 52)          | 0.7101       | (73)  | 0.15  | (182) | 0.36  | (200)       | 0.204 | (218) | 2.346 | (236)  | 0.92   | (254)          | 0.546           |
|              | 1.112 | (20)  | 0.471 | (33)         | 0.35            | ,              | 0.218        | (75)  |       | (183) | 0.36  | (201)       | 0.249 | (219) | 6.578 | (257)  | 0.92   | • - • • •      | 0.495           |
| 3)           | 1.071 | (21)  | 0.447 | (39)         | 0.32            |                | 0.21         | (75)  | 0.993 | (184) | 0.381 | (202)       | 0.249 | (220) | 4.691 | (238)  | 0.949  |                | 0.495           |
| 4)           | 0.92  | ( 22) | 0.425 | (40)         | 0.34            | • • - •        | 0.218        | (73)  |       | (185) | 0.402 | (205)       | 0.213 | (221) | 3.523 | (227)  | 1.324  | (237)          | 0.447           |
| 55           | 0.849 | (23)  | 0.402 | (41)         | 0.32            |                | 0,219        |       |       | (186) | 0.36  |             | 1.152 | (222) | 2.902 | (240)  | 1.0/1  | · · · · ·      | 0.442           |
| 6            | 0,815 | (24)  | 0.402 | (42)         | 0.295           |                | 0.218        | (78)  |       | (187) | 0.05  | (205)       | 0.545 | (223) | 2.524 | (241)  | 0.993  | (259)          |                 |
| (7)          | 0.782 | (25)  | 0.402 | (42)         | 0.283           | (61)           | 0.169        | ( 79) |       | (188) | 0.36  | (206)       | 0.447 | (224) | 2.170 | (242)  | 0.92   | (260)          | 0.447           |
| ີ ອີ         | 0.849 | ( 26) | 0.688 | (44)         | 0.249           | ( 62)          | 0.204        |       | 6.87  | (188) | 0.36  | (207)       | 1.87  | (225) | 2.07  | (24.7) | 0.042  | (261)          |                 |
| ( 9)         | 0.92  | (27)  | 0.546 | (45)         | 0.218           | ( 6")          | 0.189        |       | 7.47  |       | 0.00  | (208)       | 1.20  | (226) | 2.178 | (244)  | 0.782  | (262)          | (a, 40)         |
| ( 10)        | 1.002 |       | 0.554 | (46)         | 0.218           | ( 64)          | 0.176        | (82)  | 4.205 | (190) | 0.52  | (209)       | 2.019 | (227) | 17    | (245)  | 0.782  | (245)          | 0.402           |
| (10)         | 0.849 | (29)  | 0.495 | ( 47)        | V.219           | ( 65)          | 0.162        | (80)  | 3.31  | (191) |       | (210)       |       | (228) | 1 416 | (246)  | ் 658  | (204)          | 0,782           |
| (11)         | 0.782 | ( 30) | 0.471 | (48)         | 0.218           | ( 66)          | 0.162        | (84)  | 2.902 | (192) | 0.267 | (210) (211) | 8.88  | (229) | 1 324 | (247)  | 0.658  | (265)          | 0.576           |
| (13)         | 0.718 | ( 31) | 0.447 | ( 49)        | 0.21            | ( 67)          | <b>0.162</b> | (85)  |       | (193) | 0.283 | (211)       | 5.202 | (230) | 1.236 | (248)  | 0.601  | (255)          | 0.546           |
|              | 0.658 | ( 32) | 0.447 |              | 0.208           | ( 68)          | 0.162        | (66)  | 2.178 | (194) | 0.265 | (212)       | 5.73  | (231) | 1.152 | (249)  | 0.601  | (267)          | 0.52            |
| (14)         | 0.546 | (33)  | 0.402 | (51)         | 0.189           | ( 69)          | 0.162        | (87)  | 1.87  | (195) |       |             | 4.205 | (232) | 1.071 | (250)  | 0.546  | (268)          | 0.658           |
| (15)         | 0.546 | (33)  | 0.381 | ( 52)        | 0.208           | ( 70)          | 0.152        |       |       |       | 0.263 | (214)       | 3.520 |       | 1.071 | (251)  | 0,495  | (267)          | 0.501           |
| (16)         | 0.346 | (35)  | 0.36  | (53)         | 0.189           | (71)           | 0.15         |       | 1,611 | (197) |       |             | 2.302 |       | 0.993 |        | 0.546  |                | 5.775           |
| (17)<br>(18) |       |       | A 74  | 1 541        | 0.189           | (72)           | 0.15         |       | 1,416 | (198) | 0.234 | (210)       |       |       |       |        |        |                |                 |
|              |       |       |       |              |                 |                |              |       |       |       | -     |             |       | •     |       |        |        | ı.             |                 |
|              |       |       |       |              | 0.782           | (145)          | 1.416        | (163) | 0.849 | (271) |       | (287)       | 0.559 | (307) | 0.72  | (325)  | 0.189  | (243)          | 1.4             |
| ( 91)        | 1.324 | (109) |       | (127)        | • • • • • • • • | (146)          | 2.262        | (164) | 0.782 | (272) | 2,902 | (290)       | 0.658 | (308) | 0.32  | (326)  | 0.189  | (344)          |                 |
| (92)         | 1.152 | (110) |       | (128)        | 0.782<br>0.719  | (146)          | 2.524        | (165) | -     | (273) | 13.41 | (271)       | 0.601 | (309) | 0.28% | (327)  | 0.189  | (345)<br>(744) | 0.05            |
|              | 1.071 |       | 2.346 | (129)        | 0.683           | (147)          | 6.4.75       | (156) |       | (224) | 4.691 | (292)       | 0.554 | (310) | 0.263 | (328)  | 0.218  | (346)<br>(347) |                 |
| (94)         | 0.973 | (112) |       | (120)        | 0.658           | (144)          | 2,902        | (157) |       | (275) | 3,102 | (297)       | 0.546 | (311) | 0.033 | (327)  | 0.218  |                |                 |
| ( 95)        |       | (113) | 2.019 | (131)        | 0.558           |                | 4.568        | (163) |       | (176) |       | (294)       | 0.521 | (312) | 067   | (20)   | 0.218  | (0.18)         | 0.000<br>- 0.00 |
| (96)         |       | (114) |       | (132)        | -               | (151)          |              | (169) |       |       | 1.732 | (295)       | 0.447 | (313) | 0.049 | (331)  | 0.1:19 | (349)          |                 |
|              | 0.782 |       | 2.170 | (133)        | 0.601           | (151)          | 1.945        | (170) |       |       | 1.416 | (296)       | 0,447 | (314) | 0.249 | (332)  | 0.189  | (350)          | 0.034           |
| ( 98)        |       | (116) |       | (134)        | Ú.546           |                | 1.732        |       | 0.546 |       | 1.324 | (297)       | 0.402 | (315) | 0.210 | (333)  | 0.189  | (351)          | 0.029           |
|              | 0.658 | (117) |       | (135)        | 0.546           |                | 1.512        | (172) |       |       | 1.071 | (298)       | 0.425 | (316) | 0.254 | (334)  | 0.162  | (352)          | 0.029           |
|              | 0.658 |       | 1.416 | (136)        | 0.521           |                | 1.324        |       | 0.495 | (281) |       | (299)       | 0.447 | (317) | 0.218 | (335)  | 0.162  | (253)          | 0.029           |
|              | 0.601 |       | 1.324 | (137)        | 0.495           |                | 1.275        |       | 0.471 | (282) |       | (300)       | 0.447 | (318) | 0.234 | (336)  | 0.162  | (354)          | 0.029           |
| (102)        | 11.51 |       | 1.234 | (138)        | 0.471           | (130)          | 1.236        |       | 0.447 |       | 0.849 | (301)       | 0.402 | (319) | 0.218 | (337)  | 0.096  | (355)          | 0.038           |
|              | 3.309 | •     | 1.152 |              | 0.447           |                | 1.112        |       | 0.447 | (284) |       | (302)       | 0,381 | (320) | 0.234 | (338)  | 0.096  | (356)          |                 |
|              | 2.346 |       | 1.071 | (140)        | 0.447           |                | 1.071        |       | 0.402 | (285) | 0.782 | (303)       | 0.36  | (321) | 0.213 | (339)  | 0.094  | (257)          | 0.029           |
| (105)        | 25    | (123) | 0.993 | (141)        | 0.447           |                | 0.993        |       | 0.402 | (286) | -     | (304)       | 0.06  | (322) | 0.204 | (340)  | 0.088  | (358)          | 0.029           |
| (106)        | 7.167 | (124) |       | (142)        | 0.471<br>0.447  | (150)<br>(151) | 0.992        |       | 0.402 |       | 0.718 |             | 0.32  | (323) | 0.139 | (341)  | 7.9    | (359)          | 0.02            |
| (            |       | (125) | 0.92  | (143)        |                 |                |              |       |       |       |       |             | •     | (324) | 0.189 | (342)  | 7.9    |                | 0.02            |

| Diver   | محمد والمحمد |      | <b>-+</b> | 12-hourly   | intervals | for | Station: | 17B |
|---------|--------------|------|-----------|-------------|-----------|-----|----------|-----|
| vi ver. | orscharge    | uaca | aL        | 12 11001 17 |           |     | Period : | 2   |

:

Phosphorus transport Berg River

-

TR 143 March 1989

| Variable: KOM   | PAG3.vart (1  | ength = 300)   |   |   |  |  |  |   |  |
|---|---|--|---|---|--|--|--|---|--|
|   |   |  | ( 55) 0.014   | ( 73) 0.138   | (181) 2E-1   | (199) SE-C   | (217) 0.116  | (235) 1.0/1<br>(235) 1.0/1  | (254) 0.127  |
| ( 1) 0.076  | ( 177 / 4 2   |  |   | ( 74) 0.15  | (192) CE-0   | (200) SE-3   | (218) 0.025  | (207) 0.495   | (255) 0.108  |
| ( 2) 0.05   | (20) 0.012  |  | ( 57) 0.014   | ( 75) 0.116   | (183) SE-3   | (201) 5E-3   | (219) 0.096  |   | (255) 0,116  |
| ( 3) 0.029  | (21) 9  | • • • • • • • • • • • • •  | ( 58) 0.02  | ( 76) 0.116   | (184) 1E-3   | (202) 5E−3   | (220) 7.9  | (2:8) 0.75  | (257) 0.096  |
| (4) 0.025   | ( 22) 5E-3  |  | ( 59) 0.029   | (77) 7.9  | (165) 1E-3   | (203) <b>5</b> E-3   |  | (239) 0.545   | (258) 0.095  |
| ( 5) 0.029  | (23)9   |  |   | ( 78) 0.043   | (196) 18-3   | (204) 5E~3   | (222) 0.05   | (240) 0.545   |  |
| ( 6) 0.029  | ( 24) 0.017   |  | ( 60) 0.884   | ( 79) 0.065   | (167) 1E-3   | (205) 5E-C   | (223) 0.038  | (241) 0.495   | (259) 7.9  |
| ( 7) 0.029  | (25)0.02  |  | ( 61) 0.32  | ( 80) 0.057   | (138) 1E-3   | (206) 9  | (224) 0.000  | (242) 0.425   | (250) 0.071  |
| (8) 0.029   | ( 26) 0.014   | (44) ∂.038   | ( 62) 0.189   | (81) 0.05   | (189) 58-3   | (207) 0.162  | (225) 0.029  | (243) 0.283   | (261) 0.053  |
| ( 9) 0.029  | ( 27) 0.014   |  | ( 63) 2.524   | (82) 0.044  | (190) /E-3   | (203) 0.993  | (226) 0.02   | (244) 0.253   | (252) 0.063  |
| (10) 0.038  | (28) 0.025  |  | ( 64) 1.194   | (83) 0.038  | (191) 9  | (209) 0.658  | (227) 0.02   | (245) 0.249   | (263) 7.9  |
| (11) 0.029  | (29) 0.05   | (47) 0.029   | ( 65) 0.718   |   | 11011 7F-3   | (210) 1.152  | (229) 0.02   | (245) 0.234   | (264) 7.9  |
| (12) 0.029  | ( 30) 0.044   | ( 48) 0.029  | ( 60) 0.471   |   | (193) 9  | (211) 0.601  | (229) 0.017  | (247) 0.216   | (265) 7.9  |
| (13) 0.029  | ( 31) 0.601   | (49) 0.029   | ( 67) 0.402   | ( 80) V.V.7<br>2 D/N 0 029  | (194) 7E-3   | (212) 0.447  | (230) 0.017  | (248) 0.218   | (255) 7.9  |
| (14) 0.029  | (32)0.36  | ( 50) 0.029  | ( 68) 0.265   | ( 88) 0.027<br>( 97) 0.029  | (195) 9  | (213) 0.32   | (231) 0.02   | (249) Ú.189   | (267) 7.9  |
| ( 15) 0.029   | ( 33) 0.189   | ( 51) 0.029  | ( 69) 0.249   |   | (196) 7E-3   | (214) 0.218  | (232) 0.249  | (250) 0.176   | (258) 7.9  |
| ( 16) 0.029   | ( 34) 0.162   | (52) 0.029   | ( 70) 0.176   |   | (197) 5E-3   | 17151 0 178  | (233) 1.236  | (251) 0.142   | (259) 7.9  |
| (17) 0.02   | ( 39) 0.138   | ( 53) 0.02   | ( 71) 0.162   | ( 84) 0.038<br>( 85) 0.029<br>( 86) 0.029<br>( 87) 0.029<br>( 88) 0.02<br>( 89) 0.02<br>( 89) 0.029<br>( 90) 0.017  | (178) SE-3   | 0145 0 138   | (274) 1.512  | (232) 0.152   | (270) 0.071  |
| ( 18) 0.017   | ( 56) 0.106   | ( 54) 0.029  | ( 72) 0.162   | ( 90) 0.017   | (1981 05-3   |  |  |   |  |
|   |   |  |   |   | -  | <i>.</i> .   |  |   | · .  |
|   |   |  |   |   | -  |  |  |   |  |
|   |   |  |   |   | -  | (289) 7.9  | (367) 0.05   | (325) 0.32  | (343) 0.138  |
| (91) 9  | (109) 0.029   | (127)  |   |   | -  | (287) 7.9<br>(290) 7.7   | (307) 0.05<br>(308) 0.05   | (325) 0.32<br>(325) 0.263   | (343) 0.139<br>(344) 0.127   |
| (91)9<br>(92)0.012  | (109) 0.029<br>(110) 0.029  | (127) 0.138<br>(126) 0.116   |   |   | -  | (289) 7.9<br>(290) 7.7<br>(291) 0.029  | (307) 0.05<br>(308) 0.05<br>(309) 0.05   | (325) 0.32<br>(325) 0.263<br>(327) 0.245  | (343) 0.108<br>(344) 0.107<br>(345) 0.112  |
| ( 91) 9<br>( 92) 0.012<br>( 93) 0.014   | (109) 0.029<br>(110) 0.029<br>(111) 0.02  | $(127) \cdots 138$<br>$(126) \cdots 116$<br>$(129) \cdots 116$   |   |   | -  | (287) 7.9<br>(290) 7.7   | (307) 0.05<br>(308) 0.05<br>(309) 0.05<br>(310) 0.11s  | (325) 0.32<br>(325) 0.263<br>(327) 0.245<br>(327) 0.218   | (.343) 0.178<br>(.344) 0.177<br>(.345) 0.115<br>(.745) 0.115   |
| ( 91) 9<br>( 92) 0.012<br>( 93) 0.014<br>( 93) 0.025  | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014   | (127) + 0.138<br>(126) + 0.116<br>(129) + 0.116<br>(129) + 0.116<br>(170) + 0.116  |   |   | -  | (289) 7.9<br>(290) 7.7<br>(291) 0.029  | $\begin{array}{c} (367) & 0.05 \\ (369) & 0.05 \\ (309) & 0.05 \\ (310) & 0.115 \\ (311) & 0.718 \end{array}$  | (325) 0.32<br>(325) 0.265<br>(327) 0.245<br>(328) 0.218<br>(328) 0.218<br>(329) 0.189   | (343) 0.129<br>(344) 0.127<br>(345) 0.115<br>(345) 0.115<br>(347) 0.076  |
| ( 91) 9<br>( 92) 0.012<br>( 93) 0.014<br>( 94) 0.025<br>( 95) 0.029   | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.03   | (127) + 0.133<br>(126) + 0.116<br>(129) + 0.116<br>(120) + 0.116<br>(121) + 0.4  |   |   | -  | (289) 7.9<br>(290) 7.7<br>(291) 0.029<br>(292) 0.071   | (367) 0.05<br>(309) 0.05<br>(309) 0.05<br>(310) 0.115<br>(311) 0.718<br>(312) 0.107  | (325) 0.32<br>(325) 0.267<br>(327) 0.245<br>(323) 0.218<br>(323) 0.218<br>(329) 0.119<br>(320) 0.204  | (343) 0.109<br>(344) 0.107<br>(345) 0.115<br>(345) 0.115<br>(347) 0.076<br>(349) 0.095   |
| ( 91) 9<br>( 92) 0.012<br>( 93) 0.014<br>( 94) 0.025<br>( 95) 0.029<br>( 96) 0.025  | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.03<br>(114) 0.263  | (127) + 0.138 (126) + 0.116 (129) + 0.116 (120) + 0.116 (131) + 0.4 (132) + 0.096  |   |   | -  | (289) 7.9<br>(290) 7.7<br>(291) 0.029<br>(292) 0.071<br>(292) 0.055  | $\begin{array}{c} (367) & 0.05 \\ (369) & 0.05 \\ (309) & 0.05 \\ (310) & 0.115 \\ (311) & 0.718 \\ (312) & 0.127 \\ (313) & 1.235 \end{array}$  | (325) 0.32<br>(325) 0.267<br>(327) 0.245<br>(323) 0.218<br>(327) 0.119<br>(320) 0.208<br>(321) 0.109  | (343) 0.119<br>(344) 0.127<br>(345) 0.115<br>(345) 0.115<br>(347) 0.076<br>(349) 0.095<br>(349) 0.095  |
| ( 91) 9<br>( 92) 0.012<br>( 93) 0.014<br>( 94) 0.025<br>( 95) 0.029<br>( 96) 0.025<br>( 97) 0.014   | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.03<br>(114) 0.263<br>(115) 0.138   | $\begin{array}{c} (127) & 0.138 \\ (126) & 0.116 \\ (129) & 0.116 \\ (120) & 0.116 \\ (131) & 7.4 \\ (132) & 0.096 \\ (133) & 7.9 \end{array}$   |   |   | -  | (289) 7.9<br>(290) 7.7<br>(291) 0.029<br>(292) 0.053<br>(292) 0.053<br>(294) 0.063   | (367) 0.05<br>(309) 0.05<br>(309) 0.05<br>(310) 0.115<br>(311) 0.718<br>(312) 0.107  | (325) 0.32<br>(325) 0.26%<br>(327) 0.24%<br>(327) 0.245<br>(329) 0.21H<br>(329) 0.109<br>(320) 0.204<br>(321) 0.109<br>(332) 0.162                | (343) 0.179<br>(344) 0.107<br>(345) 0.115<br>(345) 0.115<br>(347) 0.076<br>(349) 0.076<br>(349) 0.075<br>(349) 0.076<br>(350) 0.088  |
| ( 91) 9<br>( 92) 0.012<br>( 93) 0.014<br>( 94) 0.025<br>( 95) 0.029<br>( 96) 0.025<br>( 97) 0.012   | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.03<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096  | $\begin{array}{c} (127) & 0.138 \\ (126) & 0.116 \\ (129) & 0.116 \\ (120) & 0.116 \\ (131) & 6.4 \\ (132) & 0.096 \\ (133) & 7.9 \\ (134) & 0.05 \end{array}$   |   |   | -  | (289) 7.9<br>(290) 7.7<br>(291) 0.029<br>(292) 0.071<br>(293) 0.063<br>(294) 0.063<br>(295) 0.05   | $\begin{array}{c} (367) & 0.05 \\ (369) & 0.05 \\ (309) & 0.05 \\ (310) & 0.115 \\ (311) & 0.718 \\ (312) & 0.127 \\ (313) & 1.225 \\ (314) & 0.884 \\ (315) & 0.458 \end{array}$  | (325) 0.32<br>(325) 0.263<br>(327) 0.245<br>(328) 0.218<br>(329) 0.318<br>(329) 0.319<br>(320) 0.109<br>(331) 0.109<br>(332) 0.162<br>(333) 0.162 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| ( 91) 9<br>( 92) 0.012<br>( 93) 0.014<br>( 94) 0.025<br>( 95) 0.029<br>( 96) 0.025<br>( 97) 0.014<br>( 98) 0.012<br>( 99) 0.02                | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.05<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9                               | $\begin{array}{c} (127) & 0.138 \\ (126) & 0.116 \\ (129) & 0.116 \\ (120) & 0.116 \\ (131) & 0.4 \\ (132) & 0.096 \\ (133) & 2.9 \\ (134) & 0.05 \\ (135) & 0.05 \end{array}$   | (145) 9<br>(146) 9<br>(147) 9<br>(143) 0.017<br>(143) 0.02<br>(150) 0.029<br>(151) 0.02<br>(152) 0.017<br>(153) 0.014 | $\begin{array}{c} (163) & 0.017 \\ (164) & 0.065 \\ (155) & 0.063 \\ (165) & 0.038 \\ (167) & 0.0.7 \\ (168) & 0.014 \\ (169) & 9 \\ (170) & 7E-3 \\ (171) & 9 \end{array}$ | (271) 0.029<br>(272) 0.029<br>(273) 0.029<br>(273) 0.029<br>(274) 0.029<br>(276) 0.029<br>(276) 0.029<br>(277) 0.02<br>(277) 0.038<br>(279) 0.32                               | (289) 7.9<br>(290) 7.7<br>(291) 3.029<br>(292) 3.071<br>(292) 0.055<br>(294) 0.055<br>(295) 0.05   | $\begin{array}{c} (367) & 0.05 \\ (369) & 0.05 \\ (309) & 0.05 \\ (310) & 0.115 \\ (311) & 0.718 \\ (312) & 0.107 \\ (313) & 1.205 \\ (314) & 0.884 \end{array}$   | (325) 0.32<br>(325) 0.263<br>(325) 0.245<br>(327) 0.245<br>(329) 0.218<br>(329) 0.204<br>(320) 0.204<br>(321) 0.109<br>(332) 0.162<br>(333) 0.162 | (343) 0.129<br>(344) 0.127<br>(345) 0.115<br>(745) 0.115<br>(747) 0.076<br>(349) 0.095<br>(349) 0.095<br>(350) 0.088<br>(351) 7.9<br>(352) 0.088                             |
| ( 91) 9<br>( 92) 0.012<br>( 93) 0.014<br>( 94) 0.025<br>( 95) 0.029<br>( 96) 0.025<br>( 97) 0.014<br>( 98) 0.012<br>( 99) 0.02<br>( 100) 0.32 | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.05<br>(114) 0.263<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9<br>(118) 0.071 | $(127) + 0.138 \\ (126) + 0.116 \\ (129) + 0.116 \\ (120) + 0.116 \\ (131) + 0.4 \\ (132) + 0.096 \\ (133) + 0.096 \\ (133) + 0.05 \\ (134) + 0.058 \\ (136) + 0.058 \\$ | (145) 9(146) 9(147) 9(143) 0.017(143) 0.02(150) 0.029(151) 0.02(152) 0.017(153) 0.014(154) 0.014                      | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (271) 0.029<br>(272) 0.029<br>(273) 0.029<br>(273) 0.029<br>(274) 0.029<br>(275) 0.029<br>(275) 0.025<br>(277) 0.02<br>(278) 0.038<br>(279) 0.32<br>(280) 0.234                | (289) 7.9<br>(290) 7.7<br>(291) 0.029<br>(292) 0.071<br>(293) 0.065<br>(294) 0.065<br>(294) 0.05<br>(295) 0.05<br>(295) 0.05<br>(298) 0.029                  | $\begin{array}{c} (367) & 0.05 \\ (369) & 0.05 \\ (309) & 0.05 \\ (310) & 0.115 \\ (311) & 0.718 \\ (312) & 0.127 \\ (313) & 1.225 \\ (314) & 0.884 \\ (315) & 0.458 \end{array}$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (343) 0.119<br>(344) 0.107<br>(345) 0.115<br>(345) 0.115<br>(347) 0.076<br>(349) 0.076<br>(349) 0.095<br>(349) 0.098<br>(350) 0.088<br>(351) 7.9<br>(352) 0.088<br>(352) 7.9 |
| ( 91) 9<br>( 92) 0.012<br>( 93) 0.014<br>( 94) 0.025<br>( 95) 0.029<br>( 96) 0.025<br>( 97) 0.012<br>( 98) 0.012<br>( 99) 0.02<br>( 100) 0.32 | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.03<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9<br>(118) 0.071<br>(119) 7.9   | $\begin{array}{c} (127) & 0.138 \\ (126) & 0.116 \\ (129) & 0.116 \\ (129) & 0.116 \\ (131) & 0.4 \\ (132) & 0.096 \\ (133) & 0.96 \\ (133) & 0.05 \\ (135) & 0.05 \\ (136) & 0.038 \\ (137) & 0.029 \end{array}$  | (145) 9(146) 9(147) 9(147) 9(147) 0.017(150) 0.029(151) 0.02(152) 0.017(153) 0.014(154) 0.014(155) 0.014              | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (2/1, 0.029<br>(272) 0.029<br>(273) 0.029<br>(273) 0.029<br>(274) 0.029<br>(275) 0.029<br>(276) 0.025<br>(277) 0.02<br>(278) 0.038<br>(279) 0.32<br>(280) 0.234<br>(281) 0.162 | (289) 7.9<br>(290) 7.7<br>(291) 0.029<br>(292) 0.071<br>(292) 0.053<br>(294) 0.063<br>(294) 0.065<br>(295) 0.05<br>(295) 0.058<br>(298) 0.029<br>(299) 0.029 | $\begin{array}{c} (367) & 0.05 \\ (369) & 0.05 \\ (309) & 0.05 \\ (310) & 0.115 \\ (311) & 0.718 \\ (312) & 0.107 \\ (313) & 1.205 \\ (314) & 0.884 \\ (315) & 0.458 \\ (316) & 0.564 \\ (317) & 0.447 \\ (210) & 0.714 \end{array}$ |   |  |
| ( 91) 9<br>( 92) 0.012<br>( 93) 0.014<br>( 94) 0.025<br>( 95) 0.029<br>( 94) 0.025<br>( 97) 0.012<br>( 98) 0.012<br>( 99) 0.02<br>( 100) 0.32 | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.03<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9<br>(118) 0.071<br>(119) 7.9   | $\begin{array}{c} (127) & 0.138 \\ (126) & 0.116 \\ (129) & 0.116 \\ (129) & 0.116 \\ (131) & 0.4 \\ (132) & 0.096 \\ (133) & 0.96 \\ (133) & 0.05 \\ (135) & 0.05 \\ (136) & 0.038 \\ (137) & 0.029 \end{array}$  | (145) 9(146) 9(147) 9(147) 9(147) 0.017(150) 0.029(151) 0.02(152) 0.017(153) 0.014(154) 0.014(155) 0.014              | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (2/1, 0.029<br>(272) 0.029<br>(273) 0.029<br>(273) 0.029<br>(274) 0.029<br>(275) 0.029<br>(276) 0.025<br>(277) 0.02<br>(278) 0.038<br>(279) 0.32<br>(280) 0.234<br>(281) 0.162 | (289) 7.9<br>(290) 7.7<br>(291) 0.029<br>(292) 0.071<br>(292) 0.053<br>(294) 0.063<br>(294) 0.065<br>(295) 0.05<br>(295) 0.058<br>(298) 0.029<br>(299) 0.029 | $\begin{array}{c} (367) & 0.05 \\ (369) & 0.05 \\ (309) & 0.05 \\ (310) & 0.115 \\ (311) & 0.718 \\ (312) & 0.107 \\ (313) & 1.205 \\ (314) & 0.884 \\ (315) & 0.458 \\ (316) & 0.564 \\ (317) & 0.447 \\ (210) & 0.714 \end{array}$ |   |  |
| ( 91) 9<br>( 92) 0.012<br>( 93) 0.014<br>( 94) 0.025<br>( 95) 0.029<br>( 94) 0.025<br>( 97) 0.012<br>( 98) 0.012<br>( 99) 0.02<br>( 100) 0.32 | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.03<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9<br>(118) 0.071<br>(119) 7.9   | $\begin{array}{c} (127) & 0.138 \\ (126) & 0.116 \\ (129) & 0.116 \\ (129) & 0.116 \\ (131) & 0.4 \\ (132) & 0.096 \\ (133) & 0.96 \\ (133) & 0.05 \\ (135) & 0.05 \\ (136) & 0.038 \\ (137) & 0.029 \end{array}$  | (145) 9(146) 9(147) 9(147) 9(147) 0.017(150) 0.029(151) 0.02(152) 0.017(153) 0.014(154) 0.014(155) 0.014              | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (2/1, 0.029<br>(272) 0.029<br>(273) 0.029<br>(273) 0.029<br>(274) 0.029<br>(275) 0.029<br>(276) 0.025<br>(277) 0.02<br>(278) 0.038<br>(279) 0.32<br>(280) 0.234<br>(281) 0.162 | (289) 7.9<br>(290) 7.7<br>(291) 0.029<br>(292) 0.071<br>(292) 0.053<br>(294) 0.063<br>(294) 0.065<br>(295) 0.05<br>(295) 0.058<br>(298) 0.029<br>(299) 0.029 | $\begin{array}{c} (367) & 0.05 \\ (369) & 0.05 \\ (309) & 0.05 \\ (310) & 0.115 \\ (311) & 0.718 \\ (312) & 0.107 \\ (313) & 1.205 \\ (314) & 0.884 \\ (315) & 0.458 \\ (316) & 0.564 \\ (317) & 0.447 \\ (210) & 0.714 \end{array}$ |   |  |
| ( 91) 9<br>( 92) 0.012<br>( 93) 0.014<br>( 94) 0.025<br>( 95) 0.029<br>( 94) 0.025<br>( 97) 0.012<br>( 98) 0.012<br>( 99) 0.02<br>( 100) 0.32 | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.03<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9<br>(118) 0.071<br>(119) 7.9   | $\begin{array}{c} (127) & 0.138 \\ (126) & 0.116 \\ (129) & 0.116 \\ (129) & 0.116 \\ (131) & 0.4 \\ (132) & 0.096 \\ (133) & 0.96 \\ (133) & 0.05 \\ (135) & 0.05 \\ (136) & 0.038 \\ (137) & 0.029 \end{array}$  | (145) 9(146) 9(147) 9(147) 9(147) 0.017(150) 0.029(151) 0.02(152) 0.017(153) 0.014(154) 0.014(155) 0.014              | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (2/1, 0.029<br>(272) 0.029<br>(273) 0.029<br>(273) 0.029<br>(274) 0.029<br>(275) 0.029<br>(276) 0.025<br>(277) 0.02<br>(278) 0.038<br>(279) 0.32<br>(280) 0.234<br>(281) 0.162 | (289) 7.9<br>(290) 7.7<br>(291) 0.029<br>(292) 0.071<br>(292) 0.053<br>(294) 0.063<br>(294) 0.065<br>(295) 0.05<br>(295) 0.058<br>(298) 0.029<br>(299) 0.029 | $\begin{array}{c} (367) & 0.05 \\ (369) & 0.05 \\ (309) & 0.05 \\ (310) & 0.115 \\ (311) & 0.718 \\ (312) & 0.107 \\ (313) & 1.205 \\ (314) & 0.884 \\ (315) & 0.458 \\ (316) & 0.564 \\ (317) & 0.447 \\ (210) & 0.714 \end{array}$ |   |  |
| ( 91) 9<br>( 92) 0.012<br>( 93) 0.014<br>( 94) 0.025<br>( 95) 0.029<br>( 94) 0.025<br>( 97) 0.012<br>( 98) 0.012<br>( 99) 0.02<br>( 100) 0.32 | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.03<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9<br>(118) 0.071<br>(119) 7.9   | $\begin{array}{c} (127) & 0.138 \\ (126) & 0.116 \\ (129) & 0.116 \\ (129) & 0.116 \\ (131) & 0.4 \\ (132) & 0.096 \\ (133) & 0.96 \\ (133) & 0.05 \\ (135) & 0.05 \\ (136) & 0.038 \\ (137) & 0.029 \end{array}$  | (145) 9(146) 9(147) 9(147) 9(147) 0.017(150) 0.029(151) 0.02(152) 0.017(153) 0.014(154) 0.014(155) 0.014              | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (2/1, 0.029<br>(272) 0.029<br>(273) 0.029<br>(273) 0.029<br>(274) 0.029<br>(275) 0.029<br>(276) 0.025<br>(277) 0.02<br>(278) 0.038<br>(279) 0.32<br>(280) 0.234<br>(281) 0.162 | (289) 7.9<br>(290) 7.7<br>(291) 0.029<br>(292) 0.071<br>(292) 0.053<br>(294) 0.063<br>(294) 0.065<br>(295) 0.05<br>(295) 0.058<br>(298) 0.029<br>(299) 0.029 | $\begin{array}{c} (367) & 0.05 \\ (369) & 0.05 \\ (309) & 0.05 \\ (310) & 0.115 \\ (311) & 0.718 \\ (312) & 0.107 \\ (313) & 1.205 \\ (314) & 0.884 \\ (315) & 0.458 \\ (316) & 0.564 \\ (317) & 0.447 \\ (210) & 0.714 \end{array}$ |   |  |
| ( 91) 9<br>( 92) 0.012<br>( 93) 0.014<br>( 94) 0.025<br>( 95) 0.029<br>( 96) 0.025<br>( 97) 0.012<br>( 98) 0.012<br>( 99) 0.02<br>( 100) 0.32 | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.03<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9<br>(118) 0.071<br>(119) 7.9   | $\begin{array}{c} (127) & 0.138 \\ (126) & 0.116 \\ (129) & 0.116 \\ (129) & 0.116 \\ (131) & 0.4 \\ (132) & 0.096 \\ (133) & 0.96 \\ (133) & 0.05 \\ (135) & 0.05 \\ (136) & 0.038 \\ (137) & 0.029 \end{array}$  | (145) 9(146) 9(147) 9(147) 9(147) 0.017(150) 0.029(151) 0.02(152) 0.017(153) 0.014(154) 0.014(155) 0.014              | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (2/1, 0.029<br>(272) 0.029<br>(273) 0.029<br>(273) 0.029<br>(274) 0.029<br>(275) 0.029<br>(276) 0.025<br>(277) 0.02<br>(278) 0.038<br>(279) 0.32<br>(280) 0.234<br>(281) 0.162 | (289) 7.9<br>(290) 7.7<br>(291) 0.029<br>(292) 0.071<br>(292) 0.053<br>(294) 0.063<br>(294) 0.065<br>(295) 0.05<br>(295) 0.058<br>(298) 0.029<br>(299) 0.029 | $\begin{array}{c} (367) & 0.05 \\ (369) & 0.05 \\ (309) & 0.05 \\ (310) & 0.115 \\ (311) & 0.718 \\ (312) & 0.107 \\ (313) & 1.205 \\ (314) & 0.884 \\ (315) & 0.458 \\ (316) & 0.564 \\ (317) & 0.447 \\ (210) & 0.714 \end{array}$ |   |  |
| ( 91) 9<br>( 92) 0.012<br>( 93) 0.014<br>( 94) 0.025<br>( 95) 0.029<br>( 96) 0.025<br>( 97) 0.012<br>( 98) 0.012<br>( 99) 0.02<br>( 100) 0.32 | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.03<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9<br>(118) 0.071<br>(119) 7.9   | $\begin{array}{c} (127) & 0.138 \\ (126) & 0.116 \\ (129) & 0.116 \\ (129) & 0.116 \\ (131) & 0.4 \\ (132) & 0.096 \\ (133) & 0.96 \\ (133) & 0.05 \\ (135) & 0.05 \\ (136) & 0.038 \\ (137) & 0.029 \end{array}$  | (145) 9(146) 9(147) 9(147) 9(147) 0.017(150) 0.029(151) 0.02(152) 0.017(153) 0.014(154) 0.014(155) 0.014              | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (2/1, 0.029<br>(272) 0.029<br>(273) 0.029<br>(273) 0.029<br>(274) 0.029<br>(275) 0.029<br>(276) 0.025<br>(277) 0.02<br>(278) 0.038<br>(279) 0.32<br>(280) 0.234<br>(281) 0.162 | (289) 7.9<br>(290) 7.7<br>(291) 0.029<br>(292) 0.071<br>(292) 0.053<br>(294) 0.063<br>(294) 0.065<br>(295) 0.05<br>(295) 0.058<br>(298) 0.029<br>(299) 0.029 | $\begin{array}{c} (367) & 0.05 \\ (369) & 0.05 \\ (309) & 0.05 \\ (310) & 0.115 \\ (311) & 0.718 \\ (312) & 0.107 \\ (313) & 1.205 \\ (314) & 0.884 \\ (315) & 0.458 \\ (316) & 0.564 \\ (317) & 0.447 \\ (210) & 0.714 \end{array}$ |   |  |

.

#### River discharge data at 12-hourly intervals for Station: 17B Period : 3

.

Phosphorus transport Berg River

Variable: KOMPAG3.varl (length = 360)

2

-53

\_\_\_\_\_\_

| 1) 0.116   | ( 19) 0.029<br>( 20) 0.014  | ( 37) **   | ( 55) 0.014  | (73) 0.02   |
|--|---|--|--|---|
| 2) 0.162   | ( 20) 0.014   | (38) 9   | ( 56) 0.017  | ( 74) 0.029   |
| 3) 0,162   | (21) 0.014  | ( 39) 0.014  | ( 57) 0.014  | (75) 0.02   |
| 41 0.15  | (22) 0.02   | (40) 0.02  | ( 58) 0,012 <sup>,</sup>   | ( 76) 0.017   |
| 5) 0.115   | (23) 0.02   | (41) 0.014   | (59)9  | (77) 9  |
| 6) 0.088   | (24) 0.02   | (42) 9   | ( 60) 7E-3   | 1 78) 58~3  |
| 71 0.096   | (25) 0.02   | ( 43) E-3  | ( 61) 5E-3   | (79) SE~  |
| 6) 7.9   | (26) 0.02   | ( 44) ::E-3  | ( 62) SE-3   | (80) SE-3   |
| 9)79   | (27)0.014   | ( 45) CE-3   | ( 63) SE-3   | (81) 9  |
| 10) 7.9  | (28)9   | ( 46) 2E-3   | ( 64) 0.012  |   |
| 11) 7.9  | ( 29) 7E~3  | ( 47) (E-3   | ( 45) 0.02   | ( B2) 3E-3  |
| 12) 0.071  | ( 30) 5E-3  | ( 48) 1E-3   | ( 66) 0.025  |   |
| 13) 0.043  | ( 31) 5E-3  | ( 49) 1E-3   | ( 67) 0.03   | ( 83) 26-3  |
| 14) 0.063  | ( 32) 3E-3  | ( 50) 1E-3   | ( 68) 0.025  | ( 80) 15-0  |
| 15) 0.063  | ( 33) 1E-3  | ( 51) IE-3   | ( 69) 0.038  | ( 87) 24-5<br>7 881 16-7  |
| 16) 0.05   | (34)0   | ( 52) 1E-3   | ( 70) 0.02   | ( 00) 16-3  |
| 17) 0.038  | ( 35) 5E-3  | ( <u>5</u> 3) 1E-3   | ( 71) 0.013  | (87)0   |
| 18) 0.035  | (36) 9  | ( 54) 5E-3   | (72) 0.029   | ( 407 0   |
|  |   |  | ( 54) 0.017<br>( 57) 0.014<br>( 58) 0.012<br>( 59) 9<br>( 40) 7E-3<br>( 41) 5E-3<br>( 42) 5E-3<br>( 42) 5E-3<br>( 43) 0.012<br>( 45) 0.02<br>( 45) 0.02<br>( 46) 0.025<br>( 47) 0.03<br>( 48) 0.025<br>( 49) 0.03<br>( 70) 0.02<br>( 71) 0.013<br>( 72) 0.029  |   |
|  |   |  | <b>.</b>   |   |
| 91) 0  | (109) 0   | (127) 1  | (145) 0  | (153) 0   |
| 91) 0  | (109) 0   | (127) 1  | (145) 0  | (153) 0   |
| 91) 0<br>92) 0   | (109) 0<br>(110) 0  | (127) 0<br>(128) 0   | (145) 0<br>(146) 0   | (153) 0<br>(154) 0<br>(155) 0   |
| 91) 0<br>92) 0<br>93) 0<br>94) 0   | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0  | (127) 0<br>(129) 0<br>(129) 0<br>(126) 0   | (145) 0<br>(146) 0<br>(147) 0<br>(147) 0<br>(148) 0  | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0   | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0  | (127) 0<br>(129) 0<br>(129) 0<br>(126) 0   | (145) 0<br>(146) 0<br>(147) 0<br>(147) 0<br>(148) 0  | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0   | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0  | (127) 0<br>(129) 0<br>(129) 0<br>(126) 0   | (145) 0<br>(146) 0<br>(147) 0<br>(147) 0<br>(148) 0  | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>95) 0   | (109) 0<br>(116) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(133) 0  | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(148) 0<br>(149) 0<br>(150) 0<br>(150) 0<br>(151) 0  | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(169) 0<br>(169) 0<br>(170) 0  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>95) 0   | (109) 0<br>(116) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(133) 0  | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(148) 0<br>(149) 0<br>(150) 0<br>(150) 0<br>(151) 0  | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(169) 0<br>(169) 0<br>(170) 0  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>95) 0   | (109) 0<br>(116) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(133) 0  | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(148) 0<br>(149) 0<br>(150) 0<br>(150) 0<br>(151) 0  | (153) 0<br>(164) 0<br>(155) 0<br>(155) 0<br>(156) 0<br>(157) 0<br>(169) 0<br>(169) 0<br>(170) 0   |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>96) 0<br>97) 0   | (109) 0<br>(116) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(133) 0  | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(148) 0<br>(149) 0<br>(150) 0<br>(150) 0<br>(151) 0  | (153) 0<br>(164) 0<br>(155) 0<br>(155) 0<br>(156) 0<br>(157) 0<br>(169) 0<br>(169) 0<br>(170) 0   |
| 91) 0<br>92) 0<br>93) 0<br>93) 0<br>951 0<br>951 0<br>96) 0<br>97) 0   | (109) 0<br>(116) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(133) 0  | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(148) 0<br>(149) 0<br>(150) 0<br>(150) 0<br>(151) 0  | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(169) 0<br>(169) 0<br>(170) 0  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>95) 0   | (109) 0<br>(116) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(133) 0  | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(148) 0<br>(149) 0<br>(150) 0<br>(150) 0<br>(151) 0  | (153) 0<br>(164) 0<br>(155) 0<br>(155) 0<br>(156) 0<br>(157) 0<br>(169) 0<br>(169) 0<br>(170) 0   |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>95) 0   | (109) 0<br>(116) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(133) 0  | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(148) 0<br>(149) 0<br>(150) 0<br>(150) 0<br>(151) 0  | (153) 0(164) 0(155) 0(155) 0(156) 0(157) 0(169) 0(169) 0(170) 0   |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>94) 0<br>95) 0<br>97) 0<br>97) 0<br>97) 0<br>97) 0<br>97) 0<br>100) 0<br>100) 0<br>100) 0<br>101) 0<br>103) 0           | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(115) 0<br>(115) 0<br>(115) 0<br>(117) 0<br>(118) 0<br>(119) 0<br>(120) 0<br>(122) 0  | (127) 0(128) 0(129) 0(120) 0(131) 0(131) 0(133) 0(133) 0(134) 0(135) 0(136) 0(136) 0(136) 0(136) 0(139) 0(140) 0   | (145) 0  (146) 0  (147) 0  (147) 0  (148) 0  (150) 0  (150) 0  (151) 0  (151) 0  (152) 0  (154) 0  (155) 0  (155) 0  (158 | (153) 0(164) 0(165) 0(165) 0(167) 0(169) 0(170) 0(171) 0(172) 0(177) 0(173) 0(175) 0(176) 0   |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>94) 0<br>95) 0<br>97) 0<br>97) 0<br>97) 0<br>97) 0<br>97) 0<br>100) 0<br>100) 0<br>100) 0<br>103) 0                     | $ \begin{array}{c} (109) & 0 \\ (110) & 0 \\ (111) & 0 \\ (112) & 0 \\ (112) & 0 \\ (113) & 0 \\ (114) & 0 \\ (115) & 0 \\ (115) & 0 \\ (116) & 0 \\ (117) & 0 \\ (117) & 0 \\ (118) & 0 \\ (119) & 0 \\ (119) & 0 \\ (120) & 0 \\ (121) & 0 \\ (123) & 0 \end{array} $ | (127) 0 (128) 0 (129) 0 (120) 0 (121) 0 (122) 0 (123) 0 (123) 0 (125) 0 (124) 0 (125) 0 (136) 0 (137) 0 (136) 0 (137) 0 (136) 0 (140) 0 (141) 0  | (145) 0(146) 0(147) 0(147) 0(148) 0(150) 0(151) 0(151) 0(152) 0(155) 0(155) 0(155) 0(155) 0(157) 0   | (153) 0 (164) 0 (165) 0 (165) 0 (165) 0 (167) 0 (169) 0 (170) 0 (171) 0 (172) 0 (173) 0 (174) 0 (175) 0 (176) 0 (177) 0   |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>94) 0<br>95) 0<br>97) 0<br>97) 0<br>97) 0<br>97) 0<br>97) 0<br>100) 0<br>100) 0<br>101) 0<br>102) 0<br>103) 0           | $ \begin{array}{c} (109) & 0 \\ (110) & 0 \\ (111) & 0 \\ (112) & 0 \\ (112) & 0 \\ (113) & 0 \\ (114) & 0 \\ (115) & 0 \\ (115) & 0 \\ (116) & 0 \\ (117) & 0 \\ (117) & 0 \\ (118) & 0 \\ (119) & 0 \\ (119) & 0 \\ (120) & 0 \\ (121) & 0 \\ (123) & 0 \end{array} $ | (127) 0 (128) 0 (129) 0 (120) 0 (121) 0 (122) 0 (123) 0 (123) 0 (125) 0 (124) 0 (125) 0 (136) 0 (137) 0 (136) 0 (137) 0 (136) 0 (140) 0 (141) 0  | (145) 0(146) 0(147) 0(147) 0(148) 0(150) 0(151) 0(151) 0(152) 0(155) 0(155) 0(155) 0(155) 0(157) 0   | (153) 0 (164) 0 (165) 0 (165) 0 (165) 0 (167) 0 (169) 0 (170) 0 (171) 0 (172) 0 (173) 0 (174) 0 (175) 0 (176) 0 (177) 0   |
| 91) 0<br>92) 0<br>93) 0<br>93) 0<br>94) 0<br>95) 0<br>96) 0<br>97) 0<br>98) 0<br>97) 0<br>98) 0<br>97) 0<br>100) 0<br>101) 0<br>102) 0<br>103) 0<br>103) 0<br>105) 0 | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(115) 0<br>(115) 0<br>(115) 0<br>(117) 0<br>(118) 0<br>(119) 0<br>(120) 0<br>(122) 0  | (127) 0  (128) 0  (129) 0  (120) 0  (121) 0  (121) 0  (122) 0  (123) 0  (125) 0  (124) 0  (136) 0  (137) 0  (138) 0  (139) 0  (140) 0  (141) 0  (142) 0  (142) 0  (143) 0  (143) 0  (143) 0  (143) 0  (144) 0  (144) 0  (145) 0  (145) 0  (145) 0  (146) 0  (147 | (145) 0  (146) 0  (147) 0  (147) 0  (148) 0  (150) 0  (150) 0  (151) 0  (152) 0  (153) 0  (154) 0  (154) 0  (157) 0  (157) 0  (157) 0  (159) 0  (159) 0  (160) 0  (161) 0  (161) 0  (141) 0  (145) 0  (147) 0  (148) 0  (148) 0  (148) 0  (148) 0  (148) 0  (148) 0  (148) 0  (148) 0  (148) 0  (150) 0  (151) 0  (152) 0  (153) 0  (154) 0  (154) 0  (154) 0  (154) 0  (154) 0  (155) 0  (155) 0  (155) 0  (155) 0  (157) 0  (157) 0  (157) 0  (157) 0  (157) 0  (158) 0  (157) 0  (158) 0  (157) 0  (158) 0  (157) 0  (158) 0  (157) 0  (158) 0  (157) 0  (158) 0  (158) 0  (157) 0  (158) 0  (158) 0  (157) 0  (158 | (153) 0 $(164) 0$ $(165) 0$ $(165) 0$ $(163) 0$ $(169) 0$ $(170) 0$ $(171) 0$ $(177) 0$ |

| <br>(121) V | (199) Q | (217) 0 | (235) 0  | (253) 0 |
|-------------|---------|---------|----------|---------|
| (182) 0     | (200) 0 | (213) 0 | (236) 0  | (254) O |
| (183) 0     | (201) 0 | (219) 0 | (237) 0  | (255) 0 |
| 184) 0      | (202) 0 | (220) 0 | (2.53) 0 | (256) 0 |
| (185) 0     | (203) 0 | (221) 0 | (239) 0  | (257) 0 |
| (135) 0     | (204) 0 | (222) 0 | (240) 0  | (258) 0 |
| (187) 0     | (205) 0 | (223) 0 | (241) 0  | (259) 0 |
| (183) 0     | (206) 0 | (224) 0 | (242) 0  | (250) 0 |
| (189) Ú     | (207) U | (225) 0 | (14.) Ú  | (251) 0 |
| (190) 0     | (208) 0 | (225) 0 | (244) 0  | (252) 0 |
| (191) 0     | (209) 0 | (227) 0 | (245) 0  | (263) 0 |
| (192) Ú     | (210) 0 | (228) 0 | (246) 0  | (264) 0 |
| (192) 0     | (211) 0 | (229) 0 | (147) Ú  | (265) 0 |
| (174) 0     | (212) 0 | (230) 0 | (248) 0  | (255) 0 |
| (195) 0     | (215) 0 | (231) 0 | (249) Q  | (267) 0 |
| (176) 0     | (214) 0 | (232) 0 | (250) 0  | (268) 0 |
| (197)Ú      | (215) 0 | (233) 0 | (251) 0  | (269) 0 |
| (173) 0     | (216) 0 | (234) 0 | (252) 0  | (270) 0 |

## River discharge data at 12-hourly intervals for Station: 17B Period : 5

Phosphorus transport Berg River

A3.55

5°. `24

| Va  | riable           | a visi | ari       | (length | 3  | 36  | 507      |   |        |       |              |
|-----|------------------|--------|-----------|---------|----|-----|----------|---|--------|-------|--------------|
|     |                  |        | <br>19) 0 | (       | 37 | ' 1 | <u>ی</u> | ( | 55)    | U     | (73)Ŭ        |
| C   | $\mathbf{D} = 0$ |        |           |         | ΞE |     |          | 4 | 56)    | 0     | (74)0        |
| ٤.  | -2) Q            |        | 20) 0     |         |    |     |          | ì | 57)    |       | (75) 0       |
| (   | 3) 0             | (      | 21) 0     |         | 34 |     |          |   |        |       | (76) 0       |
| 6   | 4) 0             | L L    | 22) V     | • •     | 40 | 5)  | .,       |   | 58)    |       |              |
| i   | 5) 0             | (      | 23) 0     | (       | 41 | )   |          | ( | 59)    | 0     | (77) 0       |
| 2   |                  | i      | 24) 0     | . (     | 42 | 2)  | ÷0       | ( | - 60 I | Û Û   | (7B) V       |
|     | 6) 0             | •      | 25) 0     |         | 4. | ĥ.  |          | ( | 61)    | . Q.  | ( 79) 0      |
| (   | 7) 0             | •      | - •       |         | 4  | -   |          | i | 621    | O O   | (B0) 0       |
| t - | 8) Ŭ             |        | 26) 0     |         |    | •   |          | - | 63)    |       | (81)0        |
| t   | 9)0              | (      | 27) 0     |         | 4: |     |          |   |        |       | ( 82) 0      |
| i.  | 10) 0            | (      | 28) Q     | ) (     | 44 | 5)  | 0        | • | 64     |       | • • • •      |
| ì   | 111 0            | (      | 29) O     | . (     | 4  | 1   |          | ( | 63)    | 0     | (83) 9       |
| 2   | 12) 0            |        | 30) 0     | ) (     | 48 | 3)  | Q.       | ( | 66.    | ) (). | ( B4) û      |
| !   |                  |        | 31)0      |         | 49 | ۶Ŷ. | di l     | ( | 671    | 0     | (35)0        |
| (   | 13) 0            | •      |           |         | 51 |     |          |   | 68     |       | (86)0        |
| C   | 14) 0            |        | 32) C     |         | -  |     |          | • | 69)    |       | (87)0        |
| C   | 15) 0            | (      | 33) ()    |         | -  |     | ÷.       | • |        |       | (88)0        |
| C   | 16) 0            | 1      | 34) 0     |         | 5: |     |          | ( | 70)    |       | (89)0        |
| ć   | 17) 0            | (      | 35) 0     | ) (     | 5  | 3)  | Q.       | ( | 71)    |       | , – <b>.</b> |
| è   | 18) 0            | i i    | 36) (     | ) (     | 51 | 4)  | Û.       | ( | 72     | jυ    | (90)0        |

| (181) 0 | (199) 0 | (247) 0   | (255) 0            | (_5_) 0   |
|---------|---------|-----------|--------------------|-----------|
| (182) 0 | (200) 0 | (213) 0   | (255) 0            | (254) 0   |
| (180) 0 | (201) 0 | (219) 0   | (207) 0            | (255) 0   |
| (194) 0 | (202) 0 | (226) = 0 | (11 <b>38</b> ) (0 | (255) 0   |
| (165) 0 | (203) 0 | (221) 0   | (23 <b>9</b> ) ()  | (267) 0   |
| (136) 0 | (204) 0 | (222) 0   | (240) Ó            | (283) 0   |
| (182) 0 | (205) 0 | (200) 0   | (241) 0            | (259) 0   |
| (183) 0 | (205) 0 | (224) 0   | (242) 0            | (250) 0   |
| (189) 0 | (207) 0 | (225) 0   | (24.5) 0           | (251 - 9  |
| (190) 0 | (203) 0 | (226) 0   | (244) 0            | (26.1) 0  |
| (191) 0 | (209) 0 | (2:7) 9   | (245) 0            | (263 - O  |
| (192) 0 | (210) 0 | (228) 0   | (244) ()           | (264) + 0 |
| (193) 0 | (211) 0 | (229) 0   | (⊇47) O            | (265) 0   |
| (194) U | (212) 0 | (230) 0   | (248) Ŭ            | (256) 0   |
| (195) 0 | (215) 0 | (231) 0   | (249) 0            | (257) 0   |
| (175) 0 | (214) 0 | (202) 0   | (250) 0            | (26a) O   |
| (193) 0 | (215) 0 | (233) 0   | (251) 0            | (269) 0   |
| (178) 0 | (215) 0 | (2:34) 0  | (252) 0            | (276) 0   |

| ( 91) Ŭ | (107) 0 | (127) 0  | (145) 0  | (153) 0 |
|---------|---------|----------|----------|---------|
| (92)0   | (110) 0 | (128) 0  | (146) 0  | (154) 0 |
| (93)0   | (111) 0 | (129) 0  | (147) 0  | (165) 0 |
|         | (11.) 0 | (130) 0  | (143) 15 | (166) Ú |
| (94)0   | (113) 0 | (131) 0  | (149) 0  | (157) 0 |
| ( 95) 0 | 1114) 0 | (132) 6  | (150) 0  | (12B) Ú |
| 1 95) 0 | (115) 0 | (133) 0  | (151) 0  | (159) 0 |
| ( 97) 0 |         | (134) 0  | (152) 0  | (170) 0 |
| ( 98) 0 | (115) 0 | (135) 0  | (153) 0  | (171) 0 |
| ( 99) 0 | (117) 0 |          | (154) 0  | (1/2) 0 |
| (100) 0 | (118) 0 | (136) 0  | (155) 0  | (173) 0 |
| (101) 0 | (117) 0 | (137) ,0 | (156) 0  | (174) 0 |
| (102) 0 | (120) Ú | (139) 0  | (157) 0  | (175) Ú |
| (103) 0 | (121) 🛇 | (139) 0  | -        | (176) 0 |
| (104) 0 | (122) 0 | (140) 0  | (158) Ú  | (177) 0 |
| (105) 0 | (123) 0 | (141) 0  | (159) 0  | (178) 0 |
| (106) 0 | (124) 0 | (142) 0  | (160) 0  |         |
| (107) 0 | (125) 0 | (143) 0  | (161) 0  | (179) 0 |
| (108) 0 | (126) 0 | (144) Ù  | (162) 0  | (190) Ó |

| (271) Ú | (289) 0 | (307) 0     | (325) 0     | (34.5) 2.087       |
|---------|---------|-------------|-------------|--------------------|
| 272) 0  | (290) 0 | (308) 0     | (526) 0.04  | (344) 2.09         |
| 273) 0  | (291) 0 | (309) 0     | (327) 1E-3  | (345) 0.519        |
| 274) 0  | (292) 0 | (510) 0     | (329) 0.035 | (.45) 0.51         |
| 2751 0  | (293) 0 | (311) 0     | (1229) 5日一時 | 1.5473-01.510      |
| (27a) 0 | (294) 0 | (31.2) 9    | (370) DE -1 | (198) <b>1.</b> 87 |
| (2/7) 0 | (295)-0 | \$ 23 25 41 | (331) 16-3  | (Carriel 1 / /1    |
| (278) 0 | (295) 0 | (314) 9     | (302) 1E-3  | (150) 1.575        |
| (279) 0 | (297) 0 | (315) 0     | (333) 6     | (151) 1.57         |
| (280) 0 | (298) 0 | (316) 0     | (334) Ŭ     | (352) 1.121        |
| (201) 0 | (299) 0 | (317) 0     | (335) 0     | (353) 0.518        |
| (282) 0 | (300) 0 | (318) 0     | (336) 0     | (354) 0.295        |
| (283) 0 | (301) 0 | (319) 0     | (337) 0     | (355) 0.197        |
| (284) 0 | (302) 0 | (270) 0     | (338) 0     | (356) 0.159        |
| (285) 0 | (303) 0 | (321) 0     | (339) 0.376 | (357) 0.121        |
| (286) 0 | (304) 0 | (322) 0     | (340) 0.02  | (358) 0.12         |
| (287) 0 | (305) 0 | (323) 0     | (341) 3E-3  | (359) 0.083        |
| (286) 0 | (306) 0 | (324) 0     | (342) LE-3  | (360) 0.07         |

# River discharge data at 12-hourly intervals for Station: 20A

Period : 1

|  |   | gth = 330)<br>   |   |   |  |   | (217) 0  | (275) 9.17   | 12531 0   |
|--|---|--|---|---|--|---|--|--|---|
| 1) 0   | (19)0   | (37) 0   | ( 55) 0   | (75)0   | /:31) 0  | (199) 0   | (213) 0  | (234) 0.065  | (254) 0   |
| 2) 0   | (20) 0  | (38) 0   | ( 56) Q   | (74) 0  | (182) 0  | (200) 0   | (219) 0  | (227) 9  | (255) 0   |
| 3)0  | (21) 0  | ( 39) ->   | ( 57) 0   | (75) 9  | (183) 0  |   | (220) 0  | (218) 48-5   | (25a) 0   |
| 4) 0   | (22) 0  | ( 40) 0  | (58)0   | ( 76) 1E-3  | (184) 0  | (202) 0   |  | (1159) 1E-3  | (257) 0   |
| 5)0  | (23)  | ( 41) 0  | ( 59) 0   | ( 77) 9   | (165) Ú  | (203) 0   | (221) 0  | (240) 18-3   | (258) 0 (   |
|  | (24) 0  | (42) 0   | ( 60) 0   | ( 76) 0.015   | (186) ()   | (204) 0   | (222) 0  | (241) 0  | (257) 0   |
| <b>6)</b> 0  | (25) 0  | (4.5)  | ( 61) 1E-J  | ( 79) 5年-3  | (187) 0  | (205) ŭ   | (225) 0  | (242) 1E-3   | (360) 0   |
| 7) U   | (25) 0  | (44) 0   | ( 62) 16~3  | (80) 0.017  | (188) 0  | (205) 0   | (224) 0  | (141) 16-2<br>(141) 0  | (251) 0   |
| 8)0  | (27) 0  | (43)   | ( 53) 1E-3  | ( 81) 3E-3  | (187) Ú  | (207) 0.819   | (225) 9  |  | (252) 0   |
| 9)0  | (28) 0  | (46) 0   | (64)9   | ( 82) 7E-3  | (190) 0  | (208) 0.021   | (225) 9  | (244) 0  | (263) 0   |
| 10) 0  |   | (47)0  | ( 55) SE-J  | ( 93) 16-3  | (191) U  | (209) 3E-3  | (227) 0  | (245) 0  | (254) 0   |
| 11) 0  | (29)0   | (46) 🔆   | ( 36, 5E-2  | ( 84) 0.015   | (192) O  | (210) LE-3  | (223) 0  | (245) 0  | (154) V<br>(265) V  |
| 12) 0  | (30)0   | (49) 2   | ( 57) TE-3  | (85) 0  | (190) Q  | (211) 1E-3  | (229) V  | (247) 0  |   |
| 13) 0  | (31)0   |  | ( 68) 1E-3  | (84) 9  | (194) 0  | (212) 2E-3  | (2001-0  | (249) 9  | (255) ()<br>(255) ()  |
| 14) ü  | ( 32) 0   | ( 50) 0  | ( 88) IE-3  | (37) 0  | (195) 0  | (213) 0   | (231) 0.295  | (245) 0  | (257) N   |
| 15) 0  | (33)0   | (51))  | (70) Ŭ  | (188)7E-3   | (176) 0  | (214) 0   | (232) 0.52   | (250) Ú  | (253) 0   |
| 16) 0  | ( 34) 1E-3  | (52)0  |   | (89)0   | (197) 0  | (215) 0   | (232) 0.32<br>(233) 0.121<br>(234) 0.296   |  | (259) 0   |
| 17) 0  | (35)0   | (53)0  | (71)0   | ( 87) 0<br>( 90) 0  |  | (216) 0   | (234) 0.296  | (252) 0  | (270) Ó   |
| 18) 0  | ( 36) 1E-3  | (54)0  |   |   |  |   |  |  |   |
|  |   |  |   |   |  |   |  |  |   |
|  |   |  |   |   |  |   |  |  | 1 (11) (11) (11) (11)   |
| 19 - 16 19 19 19 19 19 19 19 19  | ·   |  |   | (163) Ø   | (2/1) 0  | (289) o   | (207) 0  | (005) 0 1  | - (343) (C.C.)  |
| 91) 0  | (109) υ   | (127) 0  | (145) 0   |   | (1274) 0<br>(1274) 0   | (269) 0<br>(290) 0  | (207) 0<br>(208) 0   | (025) 0 (<br>(325) 1E-0  | - (343) (0100)<br>- (344) (0103   |
| 91) O<br>92) O   | (109) U<br>(110) U  | (127) 0<br>(128) 0   | (145) 0<br>(145) 0  | (163) 0   | (2/1) 0<br>(274) 0<br>(273) 0  | (269) 0<br>(290) 0<br>(291) 0   | (2077 - 0<br>(20日) - ひ<br>(20月) - ひ  | (005) 0 (<br>(305) 1E-0<br>(007) 0   | - (343) (0.00)<br>- (344) (0.03<br>- (345) (8E-3  |
| 91) 0<br>92) 0<br>93) 0  | (109) U<br>(110) U<br>(111) Ú   | (127) 0<br>(128) 0<br>(129) 0  | (145) 0<br>(145) 0<br>(145) 0<br>(147) 0  | (163) 0<br>(164) 0<br>(155) 0   | (1271) 0<br>(1272) 0<br>(1273) 0<br>(1274) 0   | (269) 0<br>(270) 0<br>(291) 0<br>(292) 0  | (2077 0<br>(2087 0<br>(3097 0<br>(3107 0.015   | (005) 0 (<br>(005) 1E-0<br>(007) 0<br>(007) 6<br>(003) 6E-0  | (343) (0.03)<br>(344) (0.03)<br>(345) (8E=3)<br>(345) (8E=3)  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0   | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0   | (145) 0<br>(145) 0<br>(147) 0<br>(142) 0  | (153) 0<br>(154) 0<br>(155) 0<br>(155) 0                                      | (271) 0<br>(274) 0<br>(273) 0<br>(274) 0<br>(274) 0<br>(274) 0   | (289) 0<br>(270) 0<br>(291) 0<br>(292) 0<br>(292) 0   | (2077)()<br>(2087)()<br>(3097)()<br>(310)(0,015)<br>(211)(5日~2)  | (325) 0 (<br>(325) 1E-3<br>(323) 0<br>(323) 6E-3<br>(323) 0  | <ul> <li>(343) (0,00)</li> <li>(344) (0,03)</li> <li>(345) (3E-3)</li> <li>(345) (3E-3)</li> <li>(345) (3E-3)</li> <li>(345) (3E-3)</li> </ul>                                |
| 91) 0<br>92) 0<br>93) 0<br>93) 0<br>94) 0<br>95) 0   | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(112) 0   | (127) 0<br>(128) 0<br>(129) 0<br>(129) 0<br>(130) 0<br>(131) 0   | (145) 0<br>(145) 0<br>(147) 0<br>(142) 0<br>(149) 0   | (167) 0<br>(164) 0<br>(155) 0<br>(155) 0<br>(157) 0                           | $\begin{array}{c} (2/1) & 0 \\ (272) & 0 \\ (273) & 0 \\ (273) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \end{array}$   | (269) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(292) 0<br>(293) 0<br>(294) 0   | (107) 0<br>(108) 0<br>(309) 0<br>(310) 0.015<br>(011) 5851<br>(312) 0.050  | (025) 0<br>(325) 1E-0<br>(323) 1E-0<br>(323) 0<br>(323) 6E-0<br>(323) 0<br>(323) 6E-3  | (343) (0108)<br>(344) (0108)<br>(345) (8E-3)<br>(345) (8E-3)<br>(345) (8E-3)<br>(345) (8E-3)<br>(345) (8E-3)<br>(342) (8E-3)  |
| 91) 0<br>92) 0<br>93) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0  | (109) 0<br>(110) 0<br>(111) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(114) 0   | (127) 0<br>(128) 0<br>(129) 0<br>(120) 0<br>(130) 0<br>(130) 0<br>(132) 0  | $\begin{array}{c} (145) & 0 \\ (145) & 0 \\ (145) & 0 \\ (147) & 0 \\ (148) & 0 \\ (148) & 0 \\ (148) & 0 \\ (150) & 0 \end{array}$   | (162) 0(164) 0(155) 0(155) 0(155) 0(157) 0(166) 0                             | $\begin{array}{c} (271) & 0 \\ (272) & 0 \\ (272) & 0 \\ (273) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \\ (277) & 0 \\ (021) \end{array}$  | (269) 0<br>(270) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(293) 0<br>(294) 0<br>(295) 0  | (107) 0<br>(108) 0<br>(309) 0<br>(310) 0.015<br>(111) 58~3<br>(312) 0.053<br>(313) 1E~3  | (025) 0  | (343) (0.03)<br>(344) (0.03)<br>(345) (8E+3)<br>(345) (8E+3)<br>(142) (8E+3)<br>(142) (82+3)<br>(142) (82+3)  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>93) 0<br>95) 0<br>96) 0<br>97) 0   | (109) 0<br>(110) 0<br>(111) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(114) 0<br>(115) 0   | (127) = 0<br>(128) = 0<br>(129) = 0<br>(120) = 0<br>(131) = 0<br>(132) = 0<br>(133) = 0  | $\begin{array}{c} (145) & 0 \\ (145) & 0 \\ (147) & 0 \\ (142) & 0 \\ (142) & 0 \\ (143) & 0 \\ (150) & 0 \\ (151) & 0 \end{array}$   | (165) 0<br>(164) 0<br>(155) 0<br>(155) 0<br>(157) 0<br>(157) 0<br>(157) 0     | (171) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(274) 0<br>(275) 0<br>(275) 0<br>(273) 0.021<br>(273) 0.021  | $\begin{array}{cccc} (269) & 0 \\ (270) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \\ (294) & 0 \\ (255) & 0 \\ (255) & 0 \\ (296) & 0 \end{array}$                                     | (207) 0<br>(309) 0<br>(309) 0<br>(310) 0.015<br>(211) 58-5<br>(312) 0.055<br>(312) 18-5<br>(314) 18-5  | (325) 0 - 7<br>(325) 1E - 7<br>(325) 0 - (<br>(323) 6E+7<br>(325) 0 - (<br>(227) 6E+7<br>(125) 6E+7<br>(1252) 9  | (343) 0.000<br>(344) 0.003<br>(345) 3E-3<br>(345) 3E-3<br>(345) 3E-3<br>(447) 3E-3<br>(142) 12-3<br>(142) 12-3<br>(349) 0<br>(350) 10-3                                       |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>97) 0<br>98) 0  | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(116) 0   | $\begin{array}{cccc} (127) & 0 \\ (128) & 0 \\ (129) & 0 \\ (120) & 0 \\ (130) & 0 \\ (131) & 0 \\ (132) & 0 \\ (133) & 0 \\ (134) & 0 \end{array}$  | $\begin{array}{c} (145) & 0 \\ (145) & 0 \\ (142) & 0 \\ (143) & 0 \\ (143) & 0 \\ (150) & 0 \\ (151) & 0 \\ (152) & 0 \end{array}$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$                          | (274) = 0<br>(274) = 0<br>(274) = 0<br>(275) = 0<br>(275) = 0<br>(275) = 0<br>(275) = 0<br>(277) = 0.021<br>(278) = 0.021<br>(279) = 5E-3  | (289) 0<br>(270) 0<br>(291) 0<br>(292) 0<br>(292) 0<br>(294) 0<br>(294) 0<br>(294) 0<br>(294) 0<br>(294) 0  | (107) 0<br>(309) 0<br>(309) 0<br>(310) 0.015<br>(111) 58~1<br>(311) 0.053<br>(312) 0.053<br>(313) 18~1<br>(314) 18~3<br>(314) 0  | (025) 0 - 7<br>(305) 1E - 7<br>(305) 1E - 7<br>(303) 6E - 7<br>(303) 6E - 7<br>(303) 6E - 7<br>(303) 6E - 7<br>(305) 9<br>(305) 9  | (243) 0.101<br>(244) 0.103<br>(245) 3E-3<br>(245) 3E-3<br>(245) 3E-3<br>(247) 3E-7<br>(142) 17-1<br>(142) 17-1<br>(250) 11-5<br>(250) 11-5                                    |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>56] 0<br>97) 0<br>98) 0<br>98) 0  | (109) 0(110) 0(111) 0(112) 0(112) 0(113) 0(114) 0(114) 0(115) 0(115) 0  | $\begin{array}{c} (127) & 0 \\ (128) & 0 \\ (129) & 0 \\ (129) & 0 \\ (130) & 0 \\ (131) & 0 \\ (132) & 0 \\ (134) & 0 \\ (135) & 0 \end{array}$   | $\begin{array}{c} (145) & 0 \\ (145) & 0 \\ (147) & 0 \\ (142) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (152) & 0 \\ (152) & 0 \end{array}$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$                          | (171) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(274) 0<br>(275) 0<br>(275) 0<br>(273) 0.021<br>(273) 0.021  | (289) 0<br>(290) 0<br>(291) 0<br>(293) 0<br>(293) 0<br>(294) 0<br>(295) 0<br>(296) 0<br>(296) 0<br>(297) 0<br>(293) 0   | (107) 0<br>(309) 0<br>(309) 0<br>(310) 0.015<br>(311) 58~2<br>(312) 0.053<br>(314) 1E~3<br>(314) 1E~3<br>(315) 0<br>(315) 0<br>(315) 1E~3  | (025) 0 - 7<br>(305) 1E -<br>(307) 0<br>(303) 6E - 7<br>(307) 0<br>(307) 6E - 7<br>(307) 6E - 7<br>(307) 9<br>(307) 9<br>(307) 9<br>(307) 9<br>(307) 9<br>(307) 9  | (343) 0.101<br>(344) 0.103<br>(344) 0.103<br>(344) 3E-3<br>(344) 3E-3<br>(149) 12-1<br>(149) 12-1<br>(149) 9<br>(350) 11-3<br>(751) 0<br>(352) 1E-3                           |
| 91) 0<br>92) 0<br>93) 0<br>93) 0<br>93) 0<br>95) 0<br>95) 0<br>97) 0<br>98) 0<br>99) 0<br>100) 0   | (109) 0 (110) 0 (111) 0 (112) 0 (112) 0 (113) 0 (114) 0 (114) 0 (115) 0 (115) 0 (115) 0 (117) 0 (117) 0 (119) 0 ( | (127) = 0 $(128) = 0$ $(129) = 0$ $(130) = 0$ $(131) = 0$ $(132) = 0$ $(135) = 0$ $(135) = 0$ $(135) = 0$  | $\begin{array}{c} (145) & 0 \\ (145) & 0 \\ (147) & 0 \\ (147) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (152) & 0 \\ (152) & 0 \\ (154) & 0 \end{array}$  | (167) 0(164) 0(155) 0(155) 0(157) 0(157) 0(157) 0(157) 0(170) 0(171) 0(172) 0 | (274) = 0<br>(274) = 0<br>(274) = 0<br>(275) = 0<br>(275) = 0<br>(275) = 0<br>(275) = 0<br>(277) = 0.021<br>(278) = 0.021<br>(279) = 5E-3  | (289) 0<br>(270) 0<br>(291) 0<br>(292) 0<br>(292) 0<br>(294) 0<br>(294) 0<br>(294) 0<br>(294) 0<br>(294) 0  | (107) 0<br>(309) 0<br>(309) 0<br>(310) 0.015<br>(310) 0.050<br>(311) 58~2<br>(312) 0.050<br>(313) 1E~3<br>(314) 1E~3<br>(315) 0<br>(315) 1E~3<br>(317) 0   | (025) 0 - (<br>(325) 1E-0<br>(327) 0<br>(323) 6E-0<br>(327) 0<br>(327) 6E-0<br>(327) 9<br>(327) 9<br>(327) 9<br>(327) 9<br>(327) 9<br>(327) 9<br>(327) 9<br>(327) 5E-3   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| 91) 0<br>92) 0<br>93) 0<br>93) 0<br>95) 0<br>95) 0<br>96) 0<br>97) 0<br>98) 0<br>99) 0<br>(0) 0<br>01) 0   | (109) 0<br>(110) 0<br>(111) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(114) 0<br>(115) 0<br>(115) 0<br>(115) 0<br>(115) 0<br>(115) 0<br>(117) 0<br>(119) 0   | $(127) 0 \\ (128) 0 \\ (129) 0 \\ (130) 0 \\ (130) 0 \\ (131) 0 \\ (132) 0 \\ (132) 0 \\ (135) 0 \\ (135) 0 \\ (135) 0 \\ (135) 0 \\ (137$ | $\begin{array}{c} (145) & 0 \\ (145) & 0 \\ (145) & 0 \\ (142) & 0 \\ (142) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (152) & 0 \\ (153) & 0 \\ (153) & 0 \end{array}$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$                          | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (107) 0<br>(308) 0<br>(309) 0<br>(310) 0.015<br>(111) 58~3<br>(312) 0.050<br>(313) 1E~3<br>(314) 16~3<br>(315) 0<br>(315) 0<br>(315) 10~3<br>(317) 10~3<br>(317) 10~3  | (325) 0 - 7<br>(325) 0 - 7<br>(325) 0 - (<br>(323) 62-7<br>(325) 62-7<br>(227) 82-7<br>(227) 82-7<br>(227) 9<br>(227) 9<br>(227) 9<br>(227) 9<br>(227) 9<br>(227) 9<br>(227) 52-3<br>(225) 52-7  | (343) 0.101<br>(344) 0.101<br>(345) 3E-3<br>(345) 3E-3<br>(147) 3E-3<br>(147) 3E-3<br>(140) 0.1<br>(140) 0.1<br>(140) 0.1<br>(150) 11-3<br>(151) 0.<br>(352) 0.<br>(354) 1E-3 |
| 91) 0<br>92) 0<br>93) 0<br>93) 0<br>95) 0<br>95) 0<br>95) 0<br>97) 0<br>98) 0<br>99) 0<br>(00) 0<br>(01) 0<br>(02) 0   | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(116) 0<br>(117) 0<br>(119) 0<br>(119) 0<br>(1120) 0   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{c} (145) & 0 \\ (145) & 0 \\ (142) & 0 \\ (142) & 0 \\ (142) & 0 \\ (150) & 0 \\ (151) & 0 \\ (152) & 0 \\ (152) & 0 \\ (153) & 0 \\ (154) & 0 \\ (155) & 0 \\ (156) & 0 \end{array}$  | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                         | (274) 0<br>(274) 0<br>(274) 0<br>(275) 0<br>(275) 0<br>(275) 0<br>(275) 0<br>(277) 0.021<br>(278) 0.021<br>(278) 0.021<br>(279) 5E-3<br>(280) 5E-3<br>(281) 1E-3   | $\begin{array}{c} (269) & 0 \\ (270) & 0 \\ (291) & 0 \\ (292) & 0 \\ (292) & 0 \\ (293) & 0 \\ (294) & 0 \\ (294) & 0 \\ (294) & 0 \\ (294) & 0 \\ (293) & 0 \\ (299) & 0 \end{array}$ | (107) 0<br>(309) 0<br>(309) 0<br>(310) 0.015<br>(312) 0.053<br>(313) 18-3<br>(314) 18-3<br>(314) 18-3<br>(315) 0<br>(315) 18-3<br>(317) 0<br>(318) 18-3<br>(319) 18-3  | (325) 0 - 7<br>(325) 1E - 3<br>(325) 1E - 3<br>(323) 6E - 3<br>(323) 6E - 3<br>(327) 8E - 3<br>(327) 9<br>(337) 9<br>(337) 9<br>(337) 9<br>(337) 9<br>(337) 9<br>(337) 9<br>(337) 9<br>(337) 5E - 3<br>(337) 5E - 3                                    | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| 91) 0<br>92) 0<br>93) 0<br>93) 0<br>93) 0<br>94) 0<br>95) 0<br>97) 0<br>97) 0<br>98) 0<br>99) 0<br>(00) 0<br>(00) 0<br>(01) 0<br>(02) 0<br>(03) 0                    | (109) 0(110) 0(111) 0(112) 0(113) 0(113) 0(114) 0(114) 0(115) 0(115) 0(115) 0(115) 0(117) 0(119) 0(120) 0(121) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(135) 0<br>(135) 0<br>(135) 0<br>(136) 0<br>(138) 0<br>(139) 0   | $\begin{array}{c} (145) & 0 \\ (145) & 0 \\ (147) & 0 \\ (147) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (155) & 0 \\ (153) & 0 \\ (155) & 0 \\ (156) & 0 \\ (157) & 0 \end{array}$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$                          | $\begin{array}{c} (2/1) & 0 \\ (2/2) & 0 \\ (2/2) & 0 \\ (2/3) & 0 \\$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (107) 0<br>(309) 0<br>(309) 0<br>(310) 0.015<br>(311) 58-5<br>(312) 0.055<br>(313) 18-5<br>(314) 18-3<br>(314) 0<br>(315) 0<br>(315) 18-3<br>(317) 0<br>(318) 18-3<br>(317) 0<br>(319) 0<br>(320) 18-3                             | (025) 0 - 7<br>(325) 1E-0<br>(325) 1E-0<br>(323) 6E-0<br>(323) 6E-0<br>(323) 6E-0<br>(325) 6E-0<br>(037) 9<br>(037) 9<br>(037) 9<br>(037) 9<br>(037) 5E-5<br>(037) 5E-5<br>(037) 5E-5  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| 91) 0<br>92) 0<br>93) 0<br>93) 0<br>93) 0<br>94) 0<br>56; 0<br>97) 0<br>98) 0<br>99) 0<br>(00) 0<br>(00) 0<br>(00) 0<br>(01) 0<br>(02) 0                             | (109) 0 $(110) 0$ $(111) 0$ $(112) 0$ $(113) 0$ $(113) 0$ $(114) 0$ $(115) 0$ $(116) 0$ $(116) 0$ $(117) 0$ $(119) 0$ $(119) 0$ $(120) 0$ $(121) 0$ $(122) 0$   | $\begin{array}{c} (127) & 0 \\ (128) & 0 \\ (129) & 0 \\ (130) & 0 \\ (131) & 0 \\ (132) & 0 \\ (135) & 0 \\ (135) & 0 \\ (135) & 0 \\ (135) & 0 \\ (137) & 0 \\ (138) & 0 \\ (139) & 0 \\ (140) & 0 \end{array}$  | $\begin{array}{c} (145) & 0 \\ (145) & 0 \\ (147) & 0 \\ (147) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (152) & 0 \\ (155) & 0 \\ (154) & 0 \\ (155) & 0 \\ (156) & 0 \\ (156) & 0 \end{array}$                           | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                         | (271) 0 $(272) 0$ $(273) 0$ $(274) 0$ $(275) 0$ $(275) 0$ $(275) 0$ $(275) 0$ $(277) 0$ $(273) 0$ $(274) 0$ $(274) 0$ $(274) 0$ $(274) 0$ $(274) 0$ $(274) 0$ $(274) 0$ $(284) 2E-3$ $(284) 2E-3$ $(284) 2E-3$   | (289) 0<br>(270) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(294) 0<br>(295) 0<br>(295) 0<br>(296) 0<br>(297) 0<br>(297) 0<br>(293) 0<br>(299) 0<br>(301) 0                                  | (107) 0<br>(309) 0<br>(309) 0<br>(310) 0.015<br>(312) 0.053<br>(313) 18-3<br>(314) 18-3<br>(314) 18-3<br>(315) 0<br>(315) 18-3<br>(317) 0<br>(318) 18-3<br>(319) 18-3  | (025) 0  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>97) 0<br>98) 0<br>99) 0<br>100) 0<br>100) 0<br>102) 0<br>103) 0<br>104) 0                             | (109) 0 $(110) 0$ $(111) 0$ $(111) 0$ $(112) 0$ $(113) 0$ $(114) 0$ $(115) 0$ $(114) 0$ $(115) 0$ $(114) 0$ $(117) 0$ $(118) 0$ $(119) 0$ $(120) 0$ $(121) 0$ $(122) 0$ $(122) 0$   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(135) 0<br>(135) 0<br>(135) 0<br>(135) 0<br>(137) 0<br>(138) 0<br>(137) 0<br>(139) 0<br>(141) 0   | $\begin{array}{c} (145) & 0 \\ (145) & 0 \\ (142) & 0 \\ (142) & 0 \\ (142) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (152) & 0 \\ (153) & 0 \\ (154) & 0 \\ (153) & 0 \\ (156) & 0 \\ (157) & 0 \\ (156) & 0 \\ (157) & 0 \end{array}$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$                          | (2/1) 0<br>(274) 0<br>(274) 0<br>(275) 0<br>(275) 0<br>(275) 0<br>(275) 0<br>(275) 0<br>(277) 0.021<br>(278) 0.021<br>(279) 5E-3<br>(280) 5E-3<br>(281) 4E-3<br>(281) 4E-3<br>(283) 0<br>(284) 2E-3<br>(285) 0   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (107) 0<br>(309) 0<br>(309) 0<br>(310) 0.015<br>(311) 58-5<br>(312) 0.055<br>(313) 18-5<br>(314) 18-3<br>(314) 0<br>(315) 0<br>(315) 18-3<br>(317) 0<br>(318) 18-3<br>(317) 0<br>(319) 0<br>(320) 18-3                             | (325) 0 (<br>(325) 16 (<br>(325) 46-3<br>(323) 46-3<br>(323) 46-3<br>(225) 46-3<br>(325) 9<br>(337) 9<br>(337) 9<br>(337) 9<br>(337) 9<br>(337) 56-3<br>(338) 56-3<br>(338) 56-3<br>(339) 0.03   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| 91) 0<br>92) 0<br>93) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>97) 0<br>98) 0<br>98) 0<br>98) 0<br>98) 0<br>100) 0<br>101) 0<br>102) 0<br>103) 0<br>104) 0<br>105) 0 | (109) 0 $(110) 0$ $(111) 0$ $(112) 0$ $(113) 0$ $(113) 0$ $(114) 0$ $(115) 0$ $(116) 0$ $(116) 0$ $(117) 0$ $(119) 0$ $(119) 0$ $(120) 0$ $(121) 0$ $(122) 0$   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(135) 0<br>(135) 0<br>(135) 0<br>(137) 0<br>(137) 0<br>(138) 0<br>(138) 0<br>(142) 0  | (145) 0(145) 0(147) 0(148) 0(148) 0(150) 0(151) 0(155) 0(155) 0(155) 0(156) 0(156) 0(156) 0(157) 0(159) 0   | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                         | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (107) 0<br>(309) 0<br>(309) 0<br>(310) 0.015<br>(311) 58~2<br>(312) 0.053<br>(314) 18~3<br>(314) 18~3<br>(315) 0<br>(316) 18~3<br>(317) 0<br>(318) 18~3<br>(317) 0<br>(318) 18~3<br>(317) 0<br>(318) 18~3<br>(317) 0<br>(320) 18~3 | (325) 0 (<br>(325) 18-3<br>(325) 18-3<br>(323) 68-3<br>(323) 68-3<br>(777) 88-3<br>(777) 88-3<br>(777) 88-3<br>(777) 9<br>(325) 9<br>(325) 9<br>(337) 9<br>(337) 9<br>(337) 9<br>(338) 9<br>(338) 9<br>(338) 9<br>(338) 9<br>(339) 0.03<br>(340) 0.083 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>93) 0<br>56) 0<br>97) 0  | (109) 0 $(110) 0$ $(111) 0$ $(111) 0$ $(112) 0$ $(113) 0$ $(114) 0$ $(115) 0$ $(114) 0$ $(115) 0$ $(114) 0$ $(117) 0$ $(118) 0$ $(119) 0$ $(120) 0$ $(121) 0$ $(122) 0$ $(122) 0$   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(135) 0<br>(135) 0<br>(135) 0<br>(135) 0<br>(137) 0<br>(138) 0<br>(137) 0<br>(139) 0<br>(141) 0   | $\begin{array}{c} (145) & 0 \\ (145) & 0 \\ (142) & 0 \\ (142) & 0 \\ (142) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (152) & 0 \\ (153) & 0 \\ (154) & 0 \\ (154) & 0 \\ (156) & 0 \\ (157) & 0 \\ (156) & 0 \\ (157) & 0 \end{array}$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$                          | (2/1) 0<br>(274) 0<br>(274) 0<br>(275) 0<br>(275) 0<br>(275) 0<br>(275) 0<br>(275) 0<br>(277) 0.021<br>(278) 0.021<br>(279) 5E-3<br>(280) 5E-3<br>(281) 4E-3<br>(281) 4E-3<br>(283) 0<br>(284) 2E-3<br>(285) 0   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (107) 0<br>(308) 0<br>(309) 0<br>(310) 0.015<br>(111) 58~2<br>(312) 0.050<br>(313) 1E~3<br>(314) 1E~3<br>(315) 0<br>(518) 1E~3<br>(317) 0<br>(318) 1E~3<br>(319) 0<br>(320) 1E~3<br>(321) 0<br>(322) 1E~3                          | (025) 0 (<br>(305) 1E-0<br>(305) 1E-0<br>(307) 0<br>(303) 6E-0<br>(307) 8E-0<br>(307) 8E-0<br>(307) 9<br>(337) 9<br>(337) 9<br>(337) 9<br>(338) 5E-3<br>(338) 5E-3<br>(338) 5E-3<br>(339) 0.032<br>(340) 0.0833<br>(342) 0.083                         | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |

#### River discharge data at 12-hourly intervals for Station: 20A Period : 3

. .

٠.

| Taote: /       | /155.var1 ( | length a Joyle |          |         |          |         |           |          |                  | 10001      | (507) 0   |
|----------------|-------------|----------------|----------|---------|----------|---------|-----------|----------|------------------|------------|-----------|
|                |             | · · · ·        | (55) 0   | ( 73) 0 | ( 91) 0  | 1217) 0 | (235) u   | (255) () | (271) 9          | (29?) 0    |           |
| 1) 0           | (19)0       | (37)0          |          | (74) 0  | (92) 0   | (218) 0 | (2.5) 0   | (254) 0  | (272) 0          | (290) 0    | (308) 0   |
| 2) 0           | (20)9       | (38)0          | (56)0    | •       | (95)0    | (219) 0 | (232) = 0 | (255) 0  | (27 <b>3)</b> V  | (291) 0    | (304) 6   |
| 3) 0           | (21)0       | ( 39) ()       | ( 57) 0  | ( /5) 0 |          | (220) 0 | (278) 0   | (255) 0  | (274) 0          | (292) 0    | (310) Q   |
| 4) ()          | (22)0       | (40)0          | (59))    | (76)0   | ( 94) 0  |         | (274) 0   | (257) 0  | (275) 0          | (293) 0    | (311) V   |
| 5) 0           | (23) 0      | (41)0          | (59)0    | (77)0   | ( 95) 0  | (221) 0 |           | (258) 0  | (275) 0          | (294) 0    | (312) 0   |
|                | (24) 0      | (42) 0         | ( 60) 0  | (79)0   | ( 96) 0  | (222) 0 | (240) 0   | •        | (2/7) 0          | (295) 0    | (315) 0   |
| 6) U           | (25) 0      | (47) 0         | (61)0    | ( 79) V | ( 47) () | (223) 0 | (241) 0   | (259) +  |                  | (295) 0    | (40.0)    |
| 7) 0           |             | (44)0          | (62) 11  | (UU) Ó  | ( 73) 0  | (224) 0 | (242) 0   | (260) 0  | (278) 0          | • •        | (315) 0   |
| 8) ()          | (26)0       | ( 45) 0        | ( 63) 14 | (31) 0  | ( 99) 0  | (225) 0 | (243) 9   | (261) 9  | (279) 0          | (297) 0    |           |
| 910            | (27)0       |                | (54)0    | (82)0   | (100) 0  | (226) 0 | (244) 0   | (252) 0  | (230) 0          | (298) 0    | (315) 0   |
| 0)0            | (28) Q      | (46)0          | •        | (83)0   | (101) 0  | (227) 0 | (245) 0   | (263) 0  | (2 <b>31</b> ) V | (299) 0    | (317) 0   |
| 1)0            | (29) 0      | ( 47) 0        | ( 65) 🤣  | •       | (102) 0  | (228) 0 | (245) 0   | (264) 0  | (202) = 0        | (200) 0    | (213) 0   |
| 2) 0           | (30)0       | (48)0          | (66)0    | (84)0   |          | (229) 0 | (247) 0   | (265) 0  | · (DeC) 0        | (, (1), 0) | (J19) O   |
| 3) 0           | (31)0       | (49)0          | ( 57) 0  | (35)0   | (103) 0  | (230) 0 | (243) 0   | (255) 0  | (284) 0          | (302) 0    | (320) 0   |
| 4) 0           | (32)0       | ( 50) 0        | ( 48) 0  | (85)0   | (104) 0  |         | (249) 0   | (26)) 0  | (195) 0          | (203) 0    | (321) 0   |
| 5) 0           | (33)0       | ( 51) 0        | ( 69) û  | (87) V  | (103) 0  | (231) 0 |           | (246) 0  | (286) 0          | (304) 0    | (022) 0   |
| 6) 0           | (34)0       | ( 52) SE 3     | ( 70) 0  | (BB)V   | (106) 0  | (232) 0 | (2:0) 0   | ,        | (297) 0          | (305) 0    | (323) - 0 |
|                | (35)0       | ( 57) 0        | (71)0    | (89)0   | (107) 0  | (233) V | (251) 0   | (269) 0  | (194) 0          | (305) 0    | (324) 0   |
| .7) Ŭ<br>(8) Ŭ | (34)0       | ( 54) 0        | ( 22) 0  | ( 90) 0 | (1081 0  | (224) 9 | (252) 0   | (270) Q  | (199) 0          | ()         |           |

|        |          |         |          |         | (1 <del>3</del> 9) v | (325) 0   | (343) 0 |
|--------|----------|---------|----------|---------|----------------------|-----------|---------|
| 07)0   | (127) () | (145) 0 | (143) 0  | (181) 0 | •                    | (326) 0   | (344) 0 |
| 110) 0 | (128) 0  | (146) Ú | (164) Ú  | (182) 0 | (200) 0              | • •       | (345) 0 |
| 111) 0 | (129) 0  | (147) 0 | (155) \$ | (192) ( | (201) 0              | (327) 0   |         |
| 112) 0 | (130) 0  | (148) 0 | (15a) Č  | (164) 0 | (202) 0              | (258) 0   | (346) 0 |
|        |          | (149) 6 | (157) 6  | (135) 0 | (203) 0              | (329) 0   | (247) 0 |
| 113) 0 | (171) 0  | (150) 0 | (1/28) 0 | (196) 0 | (204) 0              | (730) 0   | (343) 0 |
| 114) 0 | (132) 0  |         | 7159) 0  | (187) 0 | (205) 0              | (221) 0   | (242) 0 |
| 115) 0 | (135) 0  | (15L) Ŭ |          | (108) 0 | (206) 0              | (332) 0   | (350) 0 |
| 116) 0 | (134) 0  | (152) 0 | (170) 0  | • • •   | (207) 0              | (300) 0   | (251) 0 |
| 117) 0 | (135) 0  | (155) 9 | (171) 0  | (194) 0 | • •                  | (7.54) 0  | (352) 0 |
| 118) 0 | (136) 0  | (154) 0 | (172) 0  | (190) 0 | (208) 0              |           | (353) 0 |
| 119) 0 | (137) 0  | (155) 0 | (173) 0  | (191) 0 | (209) 0              | (335) 0   |         |
| 120) 0 | (138) 0  | (155) 0 | (174) 0  | (192) 0 | (210) Ŭ              | (336) 0   | (354) 0 |
|        | (137) 0  | (157) 0 | (175) 0  | (193) 0 | (211) 0              | (337) Ü   | (355) 0 |
| 121) 0 |          | (158) 0 | (176) 0  | (144) 0 | (212) 0              | (338) 0   | (356) 0 |
| 122) 0 | (140) 0  |         | (177) 0  | (195) 0 | (213) 0              | (339) 0   | (357) 0 |
| 123) 0 | (141) 0  | (159) 0 | •        | (196) 0 | (214) 0              | . (340) 0 | (358) 0 |
| 124) 0 | (142) 0  | (160) 0 | (178) 0  | • • •   | (215) 0              | (341) V   | (359) 0 |
| 125) 0 | (143) 0  | (161) 0 | (179) 0  | (197) Ú | • •                  | (342) 0   | (360) 0 |
| 126) 0 | (144) 0  | (162) 0 | (180) O  | (198) 0 | (216) 0              | (342) *   |         |

River discharge data at 12-hourly intervals for Station: 20A Period : 5

|     | 1) 0.64       |     | 19) 0.64 | (   | 37) 0.4  |   | 55) | 0.4  |    | 70) | 0.16 |
|-----|---------------|-----|----------|-----|----------|---|-----|------|----|-----|------|
| i.  | · · · · · · · | ;   | 20) 0.54 | -   | 381 0.4  |   |     | 0.4  | (  | 74) | 0.16 |
| i.  | 2) 0.64       |     | 21) 0.64 | •   | 39) 0.4  | - |     | 0.15 | Ċ  | 75) | 0.16 |
| l.  | 3) 0.64       |     |          | -   | 403 0.4  |   |     | 0.15 |    |     | 0.15 |
|     | 4) 0.64       | . ( | 22) 0.64 | -   |          | • |     | 0.16 |    |     | 0.16 |
| t – | 5) 0.64       | (   | 23) 0.64 | •   | 41) 0.4  |   |     |      |    |     | 0.15 |
| t   | 6) 0.54       | - C | 24) 0.54 | -   | 42) 0.4  |   | -   | 0.16 |    |     |      |
| (   | 7) 0.64       | (   | 25) 0.64 | {   | 40)04    |   |     | 0.16 | -  |     | 0.16 |
| (   | 8) 0.64       | (   | 26) 0.64 | (   | 44) 0.4  |   |     | 0.10 |    |     | 0.16 |
| Ċ   | 9) 0.64       |     | 27) 0.64 | (   | 45) 0.4  | í | 623 | 0.16 | ۰. |     | 0.16 |
| i   | 10) 0.54      | t   | 28) 0.64 | (   | 45) 0.4  | ( | 64) | 0.15 | (  |     | 0.16 |
|     | 11) 0.64      | · i | 29) 0.4  | í   | 47) 0.4  | í | 55) | 0.16 |    | 80) | 0.07 |
|     | 12) 0.64      | ì   | 30) 0.4  | i   | 48) 0.4  | ( | 66) | 0.15 |    | 347 | 0.07 |
| -   | 13) 0.64      | - 7 | 31) 0.4  | •   | 49) 0.4  | ć | 67) | Ú.16 | 4  | 85) | 0.07 |
|     |               | - 2 | 321 0.4  |     | 50) 0.4  |   |     | 0.15 | 1  | 35) | 0.07 |
|     | 14) 0.64      | - 5 | -        |     | 51) 0.4  |   |     | 0.16 | i  |     | 0.07 |
|     | 15) 0.64      |     | 33) 0.4  |     |          |   |     | 0.16 | ì  |     | 0.07 |
| •   | 16) 0.64      |     | 34) 0.4  |     | 52) 0.4  | • |     |      |    |     | 0.07 |
| C   | 17) 0.64      | (   | 35) 0.4  | -   | 57) 0.4  |   |     | 0.16 |    |     | 0.07 |
| C   | 18) 0.54      | - C | 36) 0.4  | - ( | 54) ().4 | ( | 72) | 0.15 | •  | 401 | 0.07 |

|                          | (179) 0.34 | (217) 0.43    | (205) 0.19 | (253) 0.073 |
|--------------------------|------------|---------------|------------|-------------|
| (101) 0.05<br>(102) 0.05 | (200) 0.34 | (218) 0.43    | (236) 0.19 | (254) 0.0/0 |
| (182) 0.05<br>(133) 0.05 | (201) 0.45 | (219) 0.43    | (237) 0.19 | (255) 0.07  |
| (184) 0:05               | (202) 0.43 | (220) 0 43    | (238) 0.19 | (256) 0.07  |
| (185) 0.05               | (205) 0.43 | (221) 0.47    | (209) 0.19 | (257) 0.07  |
| (186) 0.05               | (204) 0.40 | (222) 0.43    | (240) 0.19 | (258) 0.02  |
| (187) 0.05               | (205) 0.43 | (223) 0.43    | (241) 0.19 | (259) 0.07  |
| (168) 0.05               | (206) 0.40 | (224) 0.43    | (242) 0.19 | (260) 0.07  |
| (189) 0.05               | (207) 0.40 | (225) 0.19    | (243) 0.19 | (251) 0.07  |
| (190) 0.05               | (20B) 0.43 | (126) 0-19    | (244) 0.19 | (252) 0.07  |
| (191) 0.95               | (209) 0.41 | (2271, 0, 12) | (245) 0.19 | (251) 0.07  |
| (192) 0.05               | (210) 0.47 | (228) 0.19    | (245) 0.19 | (264) 0.67  |
| (193) 0.05               | (211) 0.45 | (229) 0.19    | (247) 0.19 | (265) 0.07  |
| (194) 0.05               | (212) 0.43 | (230) 0.19    | (248) 0.19 | (266) 0.07  |
| (195) 0.05               | (213) 0.43 | (231) 0.19    | (247) 0.19 | (257) 0.07  |
| (196) 0.05               | (214) 0.43 | (232) 0.19    | (220) 0.19 | (248) 0.07  |
| (197) 0.432              | (215) 0.43 | (230) 0.19    | (251) 0.19 | (259) 0.07  |
| (198) 0.432              | (216) 0.45 | (234) 0.19    | (252) 0.19 | (270) 0.07  |

| • • • • • • |            |   |             |            |
|-------------|------------|---|-------------|------------|
| ( 91) 0.07  | (109) 0.07 | (127) 0.34                              | (145) 0.32  | (160) 0.32 |
| ( 92) 0.07  | (110) 0.07 | (128) 0.34                              | (146) 0.32  | (164) 0.32 |
| ( 93) 0.07  | (111) 0.07 | (129) 0.34                              | (147) 0.72  | (165) 0.32 |
| ( 94) 0.07  | (112) 0.07 | (130) 0.34                              | (143) 0.32  | (155) 0.72 |
| ( 95) 0.07  | (110) 0.34 | (131) 0.34                              | (149) 0.32  | (167) 0.32 |
| ( 95) 0.07  | (114) 0.34 | (132) 0.34                              | (150) 0.32  | (153) 0.32 |
| ( 97) 0.07  | (115) 0.34 | (133) 0.34                              | (151) 0.32  | (169) 0.32 |
| ( 98) 0.07  | (116) 0.34 | (134) 0.34 /                            | (152) 0.32  | (176) 0.32 |
| ( 97) 0.07  | (117) 0.34 | (135) 0.34                              | (153) 0.32  | (171) 0.32 |
| (100) 0.07  | (118) 0.34 | (136) 0.34                              | (154) 0.32  | (172) 0.32 |
| (101) 0.07  | (117) 0.34 | (137) 0.34                              | (155) 0.32  | (173) 0.05 |
| (102) 0.07  | (120) 0.34 | (138) 0.34                              | (156) 0.32  | (174) 0.05 |
| (103) 0.07  | (121) 0.34 | (139) 0.34                              | (157) 0.232 | (175) 0.05 |
| (104) 0.07  | (122) 0.34 | (140) 0.34                              | (158) 0.232 | (176) 0.05 |
| (105) 0.07  | (123) 0.34 | (141) 0.32                              | (159) 0.32  | (177) 0.05 |
| (106) 0.07  | (124) 0.34 | (142) 0.32                              | (150) 0.32  | (178) 0.05 |
| (102) 0.07  | (125) 0.34 | (143) 0.32                              | (151) 0.32  | (179) 0.05 |
| (108) 0.07  | (125) 0.34 | (144) 0.32                              | (162) 0.32  | (130) 0.05 |
| (100) 0.07  | (140) 0.34 | 1 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 |             |            |

|            |   | a service of the service of the service of           |  |
|------------|---|--|--|
| (289) 0.05 | (207) 0.05  | (325) <i>0</i> .16                                   | (343) 1.155  |
| (290) 0.05 | (Co8) 0.05  | (316) 0.16   | (344) 1.156  |
|            | (309) 0.15  | (327) 0.15   | (345) 1.155  |
|            | (210) 0.15  | (128) 0.16   | (346) <b>1.1</b> 55  |
|            | (311) 0.15  | (329) 0.16   | (347) 1,155  |
| (294) 0.05 | (312) 0.16  | (320) 0.15   | (14日) 1.15ゃ  |
|            | (213) 0.16  | (331) 0.16   | (349) 1.100  |
| • = • •    | (314) 0.16  | (332) 0.14   | (350) 1.156  |
|            | (315) 0.16  | (333) 0.16   | (351) 1.156  |
|            | (316) 0.16  | (334) 0.16   | (352) 1.156  |
| <b>,</b> = | (317) 0.15  | (335) 0.15   | (353) 1.156  |
|            | • • • •   | (334) 0.16   | (354) 1.156  |
|            |   | (337) 1.136  | (355) 1.156  |
|            | • • •   | (338) 1,156  | (356) 1.156  |
|            |   | (339) 1.156  | (357) 1.15   |
|            | • .   | (340) 1.155  | (353) 1.16   |
| • • • • •  |   |  | (359) 1.1  |
| (304) 0.05 | (324) 0.16  | (342) 1.156  | (360) 1.1  |
|            | $\begin{array}{c} (290) & 0.05 \\ (291) & 0.05 \\ (292) & 0.05 \\ (292) & 0.05 \\ (293) & 0.05 \\ (294) & 0.05 \\ (295) & 0.05 \\ (297) & 0.05 \\ (297) & 0.05 \\ (298) & 0.05 \\ (300) & 0.05 \\ (301) & 0.05 \\ (302) & 0.05 \\ (303) & 0.05 \\ (304) & 0.05 \\ (305) & 0.05 \end{array}$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $ \begin{array}{c} (290) & 0.05 & (308) & 0.05 & (324) & 0.16 \\ (291) & 0.05 & (309) & 0.16 & (327) & 0.16 \\ (292) & 0.05 & (310) & 0.16 & (128) & 0.16 \\ (292) & 0.05 & (311) & 0.16 & (129) & 0.16 \\ (293) & 0.05 & (312) & 0.16 & (330) & 0.15 \\ (294) & 0.05 & (312) & 0.16 & (333) & 0.16 \\ (295) & 0.05 & (313) & 0.16 & (333) & 0.16 \\ (296) & 0.05 & (314) & 0.16 & (333) & 0.16 \\ (297) & 0.05 & (316) & 0.16 & (333) & 0.16 \\ (298) & 0.05 & (316) & 0.16 & (333) & 0.16 \\ (299) & 0.05 & (316) & 0.16 & (334) & 0.16 \\ (299) & 0.05 & (318) & 0.16 & (334) & 0.16 \\ (301) & 0.05 & (319) & 0.15 & (337) & 1.136 \\ (302) & 0.05 & (321) & 0.16 & (338) & 1.156 \\ (304) & 0.05 & (322) & 0.15 & (341) & 1.156 \\ (305) & 0.05 & (323) & 0.15 & (341) & 1.156 \\ \end{array} $ |

## River discharge data at 12-hourly intervals for Station: 21D Period : 1

Phosphorus transport Berg River

|  | ELVEJ.var1 (   | •  |  |   |   |   |  |  |   |
|--|--|--|--|---|---|---|--|--|---|
|  |  | ( 37) 0.4  | ( 55) 0.4  | (73) 0.10   | (131) 0.05  | (199) 0.04  | (217) 0.43   | (235) 0.19<br>(235) 0.19   | - (153) - 0 - 071<br>- (154) - 0 - 075  |
| 1) 0.64  | ( 17) 0.84<br>( 20) 0.54   | (73) 0.4   | ( 55) 0.4  | ( 74) 0.15  | (152) 0.05  | (200) 0.24  | (218) 0.43   | (217) 0.19   | (255) 0.07  |
| 2) 0.64  | (21) 0.64  | ( 39) 0.4  | ( 57) 0.15   | ( 75) 0.16  | (183) 0.05  | (201) 0.43  | (219) 0.43   | (238) 0.19   | (255) 0.07  |
| 3) 0.64  | (22) 0.64  | (40) 0.4   | ( 59) 0.16   | (76) 0.16   | (164) 0.05  | (202) 0.42  | (220) 0.43   |  | (257) 0.07  |
| 4) 0.64  |  | (41) 0.4   | ( 59) 0.16   | ( 77) 0.16  | (195) 0.05  | - (203) 0,43  | (221) 0.43   | (239) 0.19   | (258) 0.07  |
| 5) (.64  | (23) 0.64  | (42) 0.4   | (50) 0.16  | ( 78) 0.15  | (166) 0.05  | (204) 0.43  | (222) 0.43   | (240) 0.19   | (159) 0.07  |
| 6) 0.54  | (24) 0.64  |  | (61) 0.16  | (79) 0.15   | (197) 0.05  | (205) 0.43  | (223) 0.45   | (241) 9.19   | (250) 0.07  |
| 7) 0.64  | (25) 0.64  | ( 45) 0.4<br>/ 44. 0.4   | ( 62) 0.16   | ( 80) 0.16  | (138) 0.05  | (206) 0.40  | (224) 0.45   | $(42) 0.1^{+}$   |   |
| 8) 0.61  | (26) 0.54  | { 44) 0.4<br>/ 1≣\ /\ 4  | ( 63) 0.16   | ( 81) 0.16  | (137) 0.05  | (207) 0.44  | (225) 0.19   | (1411-0-19   | (251) 0.07  |
| 9) 0.64  | ( 17) 0-54   | (45)0.4  | ( 64) 0.16   | ( 82) 0.14  | (190) 0.05  | (208) 0.43  | (226) 0.19   | (244) 0.19   | (242) 0.07  |
| 10) 0.44   | (28) 0.54  | (46)0.4  | ( 65) 0.15   | (83) 0.07   | (1-1) 0.05  | (209) 0.40  | (227) 0.19   | (245) 0.19   | (253) 0.0   |
| 11) 0.64   | (29) 0.4   | (47) •••   | ( 63) 0.15   | ( 84) 0.07  | (192) 0.05  | (210) 0.45  | (228) 0.19   | (24a) 0.19   | (254) 0.07  |
| 12) 0.64   | ( 20) 0.4  | (48) 0.4   | ( 67) 0.16   | (85) 0.07   | (17) 0.05   | (211) 0.43  | (209) 0.19   | (247) 0.19   | (265) 0.07  |
| 13) 0.64   | (31)0.4  | (49) 0.4   | (63) 0.16  | (85) 0.07   | (194) 0.05  | (212) 0.43  | (230) 0.19   | (248) 0.17   | (266) 0.07  |
| 14) 0.64   | ( 32) 0.4  | ( 50) 0.4  |  | ( 87) 0.07  | (175) 0.05  | (213) 0.43  | (201) 0.19   | (249) 0.19   | (267) 0.07  |
| 15) 0.64   | ( 33) 0.4  | ( 51) 0.4  | ( 69) 0.16   | ( 88) 0.07  | (196) 0.05  | (214) 0.43  | (232) 0.19   | (250) 0.19   | (268) 0.07  |
| 16) 0.54   | ( 34) 0.4  | (52) 0.4   | ( 70) 0.16   | (89) 0.07   | (197) 0.452   |   | (233) 0.19   | $(251)^{-0}$ , $1^{-9}$  | (257) 0.07  |
| 17) 0.64   | (35)0.4  | ( 53) 0.4<br>( 54) 0.4   | ( 71) 0.16<br>( 72) 0.16   | (90) 0.07   | 4.4403 0 437  | 19141 0 41 1  | (274) 0.19   | (252) Ú.17   | (270) 0.07  |
| 18) 0.54   | ( 36) 0.4  |  |  |   | (178) 0.432   |   |  |  |   |
|  |  |  |  |   |   |   |  |  |   |
|  |  |  |  | (143) 0.32  | (21) 9.97   | (289) 0.05  | (307) 0.05   | (725) 0.16   | (343) 1.13  |
|  | (109) 0.07   | (127) 0.34   |  | (163) 0.32<br>(164) 0.32  | (211) 0.07<br>(272) 0.07  | (289) 0.05<br>(290) 0.05  | (307) 0.05<br>(308) 0.05   | (725) 0.16<br>(725) 0.14   | (340) 1.10<br>(344) 1.15  |
| 91) 0.07<br>92) 0.07   | (109) 0.07<br>(110) 0.67   | (127) 0.34<br>(128) 0.34   | (145) 0.52   | (163) 0.32<br>(164) 0.32<br>(165) 0.32  | (241) 0.07<br>(272) 0.07<br>(273) 0.07  | (289) 0.05<br>(290) 0.05<br>(291) 0.05  | (307) 0.05<br>(308) 0.05<br>(309) 0.16   | (325) 0.14<br>(325) 0.14<br>(327) 0.14   | (343) 1.13<br>(344) 1.15<br>(345) 1.15  |
| 91) 0.07<br>92) 0.07<br>93) 0.07   | (109) 0.07<br>(110) 0.07<br>(111) 0.67   | (127) 0.34<br>(128) 0.34<br>(129) 0.34   | (145) 0.32<br>(146) 0.32   | (163) 0.32<br>(164) 0.32<br>(165) 0.32<br>(155) 0.32  | (241) 0.07<br>(272) 0.07<br>(373) 0.07<br>(274) 0.07  | (289) 0.05<br>(296) 0.05<br>(291) 0.05<br>(292) 0.05  | (307) 0.05<br>(308) 0.05<br>(309) 0.16<br>(310) 0.16   | (725) 0.14<br>(326) 0.14<br>(327) 0.15<br>(370) 0.15   | (340) 1.10<br>(344) 1.10<br>(345) 1.15<br>(345) 1.15<br>(345) 1.15  |
| 91) 0.07<br>92) 0.07<br>93) 0.07<br>93) 0.07<br>94) 0.07   | (109) 0.07<br>(110) 0.67<br>(111) 0.67<br>(112) 0.07   | (127) 0.34<br>(128) 0.34<br>(129) 0.34<br>(130) 0.34   | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(140) 0.32   | $\begin{array}{c} (163) & 0.32 \\ (164) & 0.32 \\ (165) & 0.32 \\ (155) & 0.32 \\ (157) & 0.32 \end{array}$   | $\begin{array}{c} (2 \ '1) & 0.07 \\ (2 \ 2) & 0.07 \\ (2 \ 3) & 0.07 \\ (2 \ 3) & 0.07 \\ (2 \ 3) & 0.07 \\ (2 \ 3) & 0.07 \end{array}$  | (289) 0.05<br>(290) 0.05<br>(291) 0.03<br>(292) 0.05<br>(293) 0.05  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (325) 0.16<br>(325) 0.16<br>(327) 0.16<br>(327) 0.16<br>(329) 0.16<br>(329) 0.16   | (340) 1.10<br>(344) 1.15<br>(345) 1.15<br>(345) 1.15<br>(345) 1.15<br>(347) 1.10  |
| 91) 0.07<br>92) 0.07<br>93) 0.07<br>93) 0.07<br>94) 0.07<br>95) 0.07   | (109) 0.07<br>(110) 0.07<br>(111) 0.07<br>(112) 0.07<br>(112) 0.07<br>(113) 0.34   | (127) 0.34<br>(129) 0.34<br>(129) 0.34<br>(130) 0.34<br>(131) 0.34   | (145) 0.32<br>(146) 0.32<br>(147) 0.32   | (163) 0.32<br>(164) 0.32<br>(165) 0.32<br>(155) 0.32  | (2/1) 0.07<br>(272) 0.07<br>(273) 0.07<br>(274) 0.07<br>(275) 0.07<br>(176, 0.07  | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(293) 0.05<br>(294) 0.05  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{c} (525) & 0.45 \\ (525) & 0.45 \\ (527) & 0.45 \\ (576) & 0.45 \\ (576) & 0.45 \\ (579) & 0.45 \\ (550) & 0.45 \end{array}$  | (343) 1.13<br>(344) 1.15<br>(345) 1.15<br>(345) 1.15<br>(347) 1.15<br>(347) 1.15<br>(347) 1.15  |
| 91) 0.07<br>92) 0.07<br>93) 0.07<br>93) 0.07<br>94) 0.07<br>95) 0.07<br>95) 0.07   | (109) 0.07<br>(110) 0.07<br>(111) 0.07<br>(112) 0.07<br>(112) 0.7<br>(113) 0.24<br>(114) 0.34  | (127) 0.34<br>(128) 0.34<br>(129) 0.34<br>(130) 0.34<br>(131) 0.34<br>(131) 0.34<br>(132) 0.34   | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(148) 0.32<br>(149) 0.32   | $ \begin{array}{c} (143) & 0.32 \\ (144) & 0.32 \\ (145) & 0.32 \\ (145) & 0.32 \\ (145) & 0.32 \\ (147) & 0.32 \\ (148) & 0.32 \\ (149) & 0.32 \end{array} $   | $\begin{array}{c} (2 \ '1) & 0.07 \\ (272) & 0.07 \\ (273) & 0.07 \\ (274) & 0.07 \\ (275) & 0.07 \\ (275) & 0.07 \\ (176) & 0.07 \\ (277) & 0.07 \end{array}$  | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(292) 0.05<br>(293) 0.05<br>(294) 0.05<br>(295) 0.05  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{c} (525) & 0.46 \\ (325) & 0.46 \\ (327) & 0.46 \\ (370) & 0.46 \\ (370) & 0.46 \\ (329) & 0.46 \\ (350) & 0.46 \\ (151) & 0.46 \end{array}$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| 91) 0.07<br>92) 0.07<br>93) 0.07<br>94) 0.07<br>95) 0.07<br>96) 0.07<br>97) 0.07   | (109) 0.07<br>(110) 0.07<br>(111) 0.07<br>(112) 0.07<br>(113) 0.34<br>(113) 0.34<br>(115) 0.24   | (127) 0.34(128) 0.34(129) 0.34(120) 0.34(130) 0.34(131) 0.34(132) 0.34(133) 0.34   | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(148) 0.32<br>(148) 0.32<br>(149) 0.32<br>(150) 0.32   | $\begin{array}{c} (163) & 0.32 \\ (164) & 0.32 \\ (165) & 0.32 \\ (165) & 0.32 \\ (155) & 0.32 \\ (167) & 0.32 \\ (168) & 0.32 \\ (169) & 0.32 \\ (170) & 0.32 \end{array}$   | (2/1) 0.07<br>(272) 0.07<br>(273) 0.07<br>(274) 0.07<br>(275) 0.07<br>(275) 0.07<br>(275) 0.07<br>(272) 0.07<br>(272) 0.07  | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(293) 0.05<br>(293) 0.05<br>(293) 0.05<br>(295) 0.05  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{c} (125) & 0.16 \\ (326) & 0.16 \\ (327) & 0.16 \\ (376) & 0.16 \\ (379) & 0.16 \\ (329) & 0.16 \\ (131) & 0.15 \\ (132) & 0.16 \end{array}$  | (342) 1.13<br>(344) 1.15<br>(345) 1.15<br>(345) 1.15<br>(347) 1.13<br>(347) 1.13<br>(347) 1.13<br>(347) 1.15<br>(347) 1.15<br>(350) 1.15  |
| 91) 0.07<br>92) 0.07<br>93) 0.07<br>94) 0.07<br>95) 0.07<br>95) 0.07<br>96) 0.07<br>98) 0.07   | (109) 0.07(110) 0.07(111) 0.07(112) 0.07(112) 0.07(113) 0.24(114) 0.34(115) 0.24(116) 0.34   | $(127) 0.34 \\ (128) 0.34 \\ (129) 0.34 \\ (130) 0.34 \\ (151) 0.34 \\ (151) 0.34 \\ (152) 0.34 \\ (133) 0.34 \\ (134) 0.34 \\ (13$              | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(148) 0.32<br>(148) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.32<br>(152) 0.32   | $ \begin{array}{c} (143) & 0.32 \\ (144) & 0.32 \\ (145) & 0.32 \\ (145) & 0.32 \\ (145) & 0.32 \\ (147) & 0.32 \\ (148) & 0.32 \\ (149) & 0.32 \end{array} $   | $\begin{array}{c} (2 \ '1) & 0.07 \\ (272) & 0.07 \\ (273) & 0.07 \\ (274) & 0.07 \\ (275) & 0.07 \\ (275) & 0.07 \\ (176) & 0.07 \\ (277) & 0.07 \end{array}$  | (289) 0.05<br>(290) 0.05<br>(271) 0.05<br>(292) 0.05<br>(293) 0.05<br>(274) 0.05<br>(295) 0.05<br>(295) 0.05<br>(297) 0.05  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{c} (125) & 0.16 \\ (326) & 0.16 \\ (327) & 0.16 \\ (370) & 0.16 \\ (370) & 0.16 \\ (329) & 0.16 \\ (350) & 0.16 \\ (151) & 0.16 \\ (152) & 0.16 \\ (353) & 0.16 \end{array}$  | $\begin{array}{c} (343) & 1,13\\ (344) & 1,15\\ (345) & 1,15\\ (345) & 1,15\\ (347) & 1,15\\ (347) & 1,15\\ (349) & 1,15\\ (349) & 1,15\\ (351) & 1,15\end{array}$  |
| 91) 0.07<br>92) 0.07<br>93) 0.07<br>93) 0.07<br>95) 0.07<br>95) 0.07<br>97) 0.07<br>98) 0.07<br>99) 0.07   | (109) 0.07<br>(110) 0.07<br>(111) 0.07<br>(112) 0.07<br>(112) 0.07<br>(113) 0.24<br>(114) 0.34<br>(115) 0.34<br>(116) 0.34<br>(117) 0.34               | (127) 0.34 (128) 0.34 (129) 0.34 (130) 0.34 (131) 0.34 (132) 0.34 (133) 0.34 (133) 0.34 (135) 0.34   | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(147) 0.32<br>(149) 0.32<br>(149) 0.32<br>(150) 0.32   | $\begin{array}{c} (163) & 0.32 \\ (164) & 0.32 \\ (165) & 0.32 \\ (165) & 0.32 \\ (155) & 0.32 \\ (167) & 0.32 \\ (168) & 0.32 \\ (169) & 0.32 \\ (170) & 0.32 \end{array}$   | (24) 0.07<br>(27) 0.07<br>(27) 0.07<br>(27) 0.07<br>(27) 0.07<br>(27) 0.07<br>(27) 0.07<br>(27) 0.07<br>(27) 0.08<br>(29) 0.08  | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(293) 0.05<br>(293) 0.05<br>(295) 0.05<br>(297) 0.05<br>(298) 0.05  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (325) 0.16<br>(326) 0.14<br>(327) 0.16<br>(370) 0.16<br>(329) 0.16<br>(329) 0.16<br>(330) 0.16<br>(331) 0.16<br>(323) 0.16<br>(334) 0.16   | $\begin{array}{c} (343) & 1.13 \\ (344) & 1.15 \\ (345) & 1.15 \\ (345) & 1.15 \\ (345) & 1.15 \\ (347) & 1.15 \\ (347) & 1.15 \\ (347) & 1.15 \\ (350) & 1.15 \\ (351) & 1.15 \\ (352) & 1.15 \end{array}$   |
| 91) 0.07<br>92) 0.07<br>93) 0.07<br>94) 0.07<br>95) 0.07<br>95) 0.07<br>98) 0.07<br>99) 0.07<br>99) 0.07   | (109) 0.07(110) 0.07(111) 0.07(112) 0.07(113) 0.34(114) 0.34(115) 0.34(116) 0.34(117) 0.34(11B) 0.34   | $(127)  0.34 \\ (129)  0.34 \\ (129)  0.34 \\ (170)  0.34 \\ (151)  0.34 \\ (152)  0.34 \\ (152)  0.34 \\ (153)  0.34 \\ (135$   | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(149) 0.32<br>(149) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.32<br>(152) 0.32<br>(153) 0.32   | $ \begin{array}{c} (163) & 0.32 \\ (164) & 0.32 \\ (165) & 0.32 \\ (165) & 0.32 \\ (155) & 0.32 \\ (167) & 0.32 \\ (169) & 0.32 \\ (169) & 0.32 \\ (170) & 0.32 \\ (171) & 0.32 \end{array} $   | (2/1) 0.07<br>(272) 0.07<br>(273) 0.07<br>(274) 0.07<br>(275) 0.07<br>(275) 0.07<br>(277) 0.07<br>(272) 0.07<br>(272) 0.08<br>(280) 0.08<br>(280) 0.08  | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(293) 0.05<br>(293) 0.05<br>(294) 0.05<br>(297) 0.05<br>(298) 0.05<br>(298) 0.05  | $\begin{array}{c} (307) & 0.08 \\ (308) & 0.05 \\ (308) & 0.16 \\ (310) & 0.16 \\ (311) & 0.16 \\ (312) & 0.16 \\ (312) & 0.16 \\ (314) & 0.15 \\ (314) & 0.16 \\ (316) & 0.16 \\ (317) & 0.15 \\ \end{array}$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (343) 1.13<br>(344) 1.15<br>(345) 1.15<br>(345) 1.15<br>(345) 1.15<br>(345) 1.15<br>(347) 1.15<br>(347) 1.15<br>(354) 1.15<br>(352) 1.15<br>(353) 1.15  |
| 91) 0.07<br>92) 0.07<br>93) 0.07<br>93) 0.07<br>95) 0.07<br>95) 0.07<br>98) 0.07<br>99) 0.07<br>99) 0.07<br>00) 0.07<br>01) 0.07   | (109) 0.07(110) 0.07(111) 0.07(112) 0.07(113) 0.34(113) 0.34(115) 0.34(115) 0.34(116) 0.34(117) 0.34(118) 0.34   | (127) 0.34<br>(129) 0.34<br>(129) 0.34<br>(120) 0.34<br>(151) 0.34<br>(151) 0.34<br>(132) 0.34<br>(135) 0.34<br>(135) 0.34<br>(135) 0.34<br>(135) 0.34   | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(149) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.32<br>(151) 0.32<br>(152) 0.32<br>(154) 0.32<br>(154) 0.32   | $      \begin{array}{c} (163) & 0.32 \\ (164) & 0.32 \\ (165) & 0.32 \\ (155) & 0.32 \\ (155) & 0.32 \\ (167) & 0.32 \\ (168) & 0.32 \\ (169) & 0.32 \\ (170) & 0.32 \\ (171) & 0.32 \\ (171) & 0.32 \\ (172) & 0.32 \end{array} $            | $\begin{array}{c} (2\ 1) & 0.07 \\ (.72) & 0.07 \\ (.72) & 0.07 \\ (.73) & 0.07 \\ (.23) & 0.07 \\ (.23) & 0.07 \\ (.75) & 0.07 \\ (.72) & 0.07 \\ (.272) & 0.07 \\ (.272) & 0.08 \\ (.290) & 0.08 \\ (.291) & 0.08 \end{array}$  | $\begin{array}{c} (289) & 0.05 \\ (290) & 0.05 \\ (271) & 0.05 \\ (272) & 0.05 \\ (273) & 0.05 \\ (273) & 0.05 \\ (275) & 0.05 \\ (297) & 0.05 \\ (297) & 0.05 \\ (298) & 0.05 \\ (298) & 0.05 \\ (300) & 0.05 \end{array}$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| 91) 0.07<br>92) 0.07<br>93) 0.07<br>94) 0.07<br>95) 0.07<br>95) 0.07<br>96) 0.07<br>98) 0.07<br>99) 0.07<br>00) 0.07<br>01) 0.07   | (109) 0.07(110) 0.07(111) 0.07(112) 0.07(113) 0.24(113) 0.34(115) 0.34(115) 0.34(116) 0.34(117) 0.34(119) 0.34(119) 0.34(120) 0.34                     | $(127) 0.34 \\ (128) 0.34 \\ (129) 0.34 \\ (120) 0.34 \\ (130) 0.34 \\ (131) 0.34 \\ (132) 0.34 \\ (132) 0.34 \\ (135) 0.34 \\ (135) 0.34 \\ (135) 0.34 \\ (136) 0.34 \\ (138) 0.34 \\ (13$              | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(149) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.32<br>(151) 0.32<br>(152) 0.32<br>(154) 0.32<br>(155) 0.32   | $ \begin{array}{c} (163) & 0.32 \\ (164) & 0.32 \\ (165) & 0.32 \\ (155) & 0.32 \\ (155) & 0.32 \\ (156) & 0.32 \\ (156) & 0.32 \\ (156) & 0.32 \\ (170) & 0.32 \\ (171) & 0.32 \\ (171) & 0.32 \\ (172) & 0.32 \\ (173) & 0.05 \end{array} $ | (241) 0.07<br>(272) 0.07<br>(273) 0.07<br>(274) 0.07<br>(275) 0.07<br>(275) 0.07<br>(277) 0.07<br>(272) 0.07<br>(279) 0.08<br>(280) 0.08<br>(281) 0.08<br>(281) 0.08<br>(283) 0.08  | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(293) 0.05<br>(294) 0.05<br>(294) 0.05<br>(294) 0.05<br>(297) 0.05<br>(298) 0.05<br>(299) 0.05<br>(300) 0.05<br>(301) 0.05  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{c} (125) & 0.16 \\ (326) & 0.16 \\ (327) & 0.16 \\ (370) & 0.16 \\ (370) & 0.16 \\ (350) & 0.16 \\ (151) & 0.16 \\ (152) & 0.16 \\ (153) & 0.16 \\ (354) & 0.16 \\ (356) & 0.16 \\ (357) & 1.156 \end{array}$   | (343) 1.13<br>(344) 1.15<br>(345) 1.15<br>(345) 1.15<br>(347) 1.13<br>(347) 1.13<br>(347) 1.13<br>(347) 1.15<br>(351) 1.15<br>(352) 1.15<br>(352) 1.15<br>(355) 1.15  |
| 91) 0.07<br>92) 0.07<br>93) 0.07<br>94) 0.07<br>95) 0.07<br>95) 0.07<br>97) 0.07<br>99) 0.07<br>99) 0.07<br>99) 0.07<br>00) 0.07<br>01) 0.07<br>02) 0.07   | (109) 0.07(110) 0.07(111) 0.07(112) 0.07(113) 0.34(114) 0.34(115) 0.34(115) 0.34(116) 0.34(117) 0.34(119) 0.34(119) 0.34(120) 0.34                     | $(127) 0.34 \\ (128) 0.34 \\ (129) 0.34 \\ (130) 0.34 \\ (151) 0.34 \\ (151) 0.34 \\ (152) 0.34 \\ (135) 0.34 \\ (135) 0.34 \\ (135) 0.34 \\ (136) 0.34 \\ (136) 0.34 \\ (138) 0.34 \\ (139) 0.34 \\ (13$              | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(148) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.32<br>(151) 0.32<br>(153) 0.32<br>(153) 0.32<br>(155) 0.32<br>(156) 0.32<br>(157) 0.232                              |   | $\begin{array}{c} (2 \ \ 1) & 0 \ \ 07 \\ (2 \ \ 1) & 0 \ \ 07 \\ (2 \ \ 1) & 0 \ \ 07 \\ (2 \ \ 1) & 0 \ \ 07 \\ (2 \ \ 5) & 0 \ \ 07 \\ (2 \ \ 5) & 0 \ \ 07 \\ (2 \ \ 5) & 0 \ \ 07 \\ (2 \ \ 5) & 0 \ \ 07 \\ (2 \ \ 7) & 0 \ \ 07 \ \ $ | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(292) 0.05<br>(293) 0.05<br>(294) 0.05<br>(294) 0.05<br>(297) 0.05<br>(297) 0.05<br>(297) 0.05<br>(300) 0.05<br>(301) 0.05<br>(302) 0.05  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{c} (125) & 0.16 \\ (326) & 0.16 \\ (327) & 0.16 \\ (329) & 0.16 \\ (319) & 0.16 \\ (150) & 0.16 \\ (151) & 0.16 \\ (152) & 0.16 \\ (153) & 0.16 \\ (335) & 0.16 \\ (335) & 0.16 \\ (336) & 0.16 \\ (338) & 1.196 \end{array}$                                   | $\begin{array}{c} (343) & 1.13\\ (344) & 1.15\\ (345) & 1.15\\ (345) & 1.15\\ (347) & 1.13\\ (347) & 1.13\\ (347) & 1.13\\ (347) & 1.13\\ (350) & 1.15\\ (351) & 1.15\\ (352) & 1.15\\ (355) & 1.15\\ (355) & 1.15\\ (356) & 1$ |
| 91)       0.07         92)       0.07         93)       0.07         94)       0.07         95)       0.07         96)       0.07         97)       0.07         98)       0.07         99)       0.07         00)       0.07         01)       0.07         02)       0.07         03)       0.07         04)       0.07                        | (109) 0.07(110) 0.07(111) 0.07(112) 0.07(113) 0.24(114) 0.34(115) 0.24(115) 0.24(116) 0.34(117) 0.34(119) 0.34(119) 0.34(120) 0.34(121) 0.34(122) 0.34 | $(127) 0.34 \\(129) 0.34 \\(129) 0.34 \\(120) 0.34 \\(131) 0.34 \\(132) 0.34 \\(132) 0.34 \\(133) 0.34 \\(135) 0.34 \\(135) 0.34 \\(135) 0.34 \\(136) 0.34 \\(136) 0.34 \\(136) 0.34 \\(140$ | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(149) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.32<br>(153) 0.32<br>(153) 0.32<br>(155) 0.32<br>(155) 0.32<br>(156) 0.32<br>(156) 0.32<br>(156) 0.32<br>(158) 0.232  |   | (241) 0.07<br>(272) 0.07<br>(272) 0.07<br>(274) 0.07<br>(275) 0.07<br>(275) 0.07<br>(272) 0.07<br>(272) 0.07<br>(279) 0.08<br>(290) 0.08<br>(291) 0.08<br>(291) 0.08<br>(291) 0.08<br>(293) 0.09<br>(294) 0.09<br>(295) 0.04  | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(292) 0.05<br>(293) 0.05<br>(294) 0.05<br>(297) 0.05<br>(297) 0.05<br>(297) 0.05<br>(299) 0.05<br>(300) 0.05<br>(302) 0.05<br>(303) 0.05  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{c} (525) & 0.46 \\ (325) & 0.46 \\ (327) & 0.46 \\ (327) & 0.46 \\ (327) & 0.46 \\ (327) & 0.46 \\ (329) & 0.46 \\ (331) & 0.46 \\ (334) & 0.46 \\ (335) & 0.46 \\ (335) & 0.46 \\ (336) & 0.46 \\ (336) & 1.456 \\ (336) & 1.456 \\ (336) & 1.456 \end{array}$ | (343) 1.15<br>(344) 1.15<br>(345) 1.15<br>(345) 1.15<br>(345) 1.15<br>(345) 1.15<br>(345) 1.15<br>(347) 1.15<br>(350) 1.15<br>(352) 1.15<br>(354) 1.15<br>(354) 1.15<br>(355) 1.15<br>(357) 1.(5  |
| 91)       0.07         92)       0.07         93)       0.07         94)       0.07         95)       0.07         96)       0.07         97)       0.07         98)       0.07         90)       0.07         00)       0.07         01)       0.07         02)       0.07         03)       0.07         04)       0.07         05)       0.07 | (109) 0.07(110) 0.07(111) 0.07(112) 0.07(113) 0.34(114) 0.34(115) 0.34(115) 0.34(116) 0.34(117) 0.34(119) 0.34(119) 0.34(120) 0.34(121) 0.34(122) 0.34 | $\begin{array}{c} (127) & 0.34 \\ (128) & 0.34 \\ (129) & 0.34 \\ (120) & 0.34 \\ (130) & 0.34 \\ (152) & 0.34 \\ (152) & 0.34 \\ (135) & 0.34 \\ (135) & 0.34 \\ (135) & 0.34 \\ (136) & 0.34 \\ (137) & 0.34 \\ (138) & 0.34 \\ (149) & 0.34 \\ (141) & 0.32 \end{array}$  | (145) 0. 32<br>(146) 0. 32<br>(147) 0. 32<br>(149) 0. 32<br>(149) 0. 32<br>(150) 0. 32<br>(151) 0. 32<br>(151) 0. 32<br>(153) 0. 32<br>(155) 0. 32<br>(156) 0. 32<br>(156) 0. 32<br>(157) 0. 232<br>(159) 0. 232 |   | $\begin{array}{c} (2 \ \ 1) & 0 \ \ 07 \\ (2 \ \ 1) & 0 \ \ 07 \\ (2 \ \ 1) & 0 \ \ 07 \\ (2 \ \ 1) & 0 \ \ 07 \\ (2 \ \ 5) & 0 \ \ 07 \\ (2 \ \ 5) & 0 \ \ 07 \\ (2 \ \ 5) & 0 \ \ 07 \\ (2 \ \ 5) & 0 \ \ 07 \\ (2 \ \ 7) & 0 \ \ 07 \ \ $ | $\begin{array}{c} (289) & 0.05 \\ (290) & 0.05 \\ (291) & 0.05 \\ (292) & 0.05 \\ (292) & 0.05 \\ (293) & 0.05 \\ (295) & 0.05 \\ (297) & 0.05 \\ (297) & 0.05 \\ (297) & 0.05 \\ (300) & 0.05 \\ (300) & 0.05 \\ (301) & 0.05 \\ (302) & 0.05 \\ (303) & 0.05 \\ (304) & 0.05 \end{array}$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (343) 1.13<br>(344) 1.15<br>(345) 1.15<br>(345) 1.15<br>(345) 1.15<br>(347) 1.10<br>(347) 1.10<br>(354) 1.15<br>(354) 1.15<br>(354) 1.15<br>(354) 1.15<br>(354) 1.15<br>(354) 1.15<br>(354) 1.15<br>(354) 1.15<br>(354) 1.15  |
|  | (109) 0.07(110) 0.07(111) 0.07(112) 0.07(113) 0.24(114) 0.34(115) 0.24(115) 0.24(116) 0.34(117) 0.34(119) 0.34(119) 0.34(120) 0.34(121) 0.34(122) 0.34 | $(127) 0.34 \\(129) 0.34 \\(129) 0.34 \\(120) 0.34 \\(131) 0.34 \\(132) 0.34 \\(132) 0.34 \\(133) 0.34 \\(135) 0.34 \\(135) 0.34 \\(135) 0.34 \\(136) 0.34 \\(136) 0.34 \\(136) 0.34 \\(140$ | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(149) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.32<br>(153) 0.32<br>(153) 0.32<br>(155) 0.32<br>(155) 0.32<br>(156) 0.32<br>(156) 0.32<br>(156) 0.32<br>(158) 0.232  |   | (241) 0.07<br>(272) 0.07<br>(272) 0.07<br>(274) 0.07<br>(275) 0.07<br>(275) 0.07<br>(272) 0.07<br>(272) 0.07<br>(279) 0.08<br>(290) 0.08<br>(291) 0.08<br>(291) 0.08<br>(291) 0.08<br>(293) 0.09<br>(294) 0.09<br>(295) 0.04  | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(292) 0.05<br>(293) 0.05<br>(294) 0.05<br>(297) 0.05<br>(297) 0.05<br>(297) 0.05<br>(299) 0.05<br>(300) 0.05<br>(302) 0.05<br>(303) 0.05  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{c} (525) & 0.46 \\ (525) & 0.46 \\ (527) & 0.46 \\ (527) & 0.46 \\ (529) & 0.46 \\ (530) & 0.46 \\ (531) & 0.46 \\ (533) & 0.46 \\ (534) & 0.46 \\ (335) & 0.46 \\ (335) & 0.46 \\ (336) & 0.46 \\ (336) & 1.456 \\ (336) & 1.456 \\ (336) & 1.456 \end{array}$ | (343) 1.15<br>(344) 1.15<br>(345) 1.15<br>(345) 1.15<br>(345) 1.15<br>(345) 1.15<br>(347) 1.15<br>(347) 1.15<br>(352) 1.15<br>(355) 1.15<br>(354) 1.15<br>(354) 1.15<br>(357) 1.15  |

.

-

## River discharge data at 12-hourly intervals for Station: 21D Period : 3

,

.

|  |   | ( 37) 0.4   | ( 55) 0.28   | (73) 0.6   | (181) 0.96   | (199) 0.96  | (217) 0.95  | (235) 0.96  | (25%) 0.95<br>(254) 0.95  |    |
|--|---|---|--|--|--|---|---|---|---|----|
| 1) 0.403   | ( 19) 0.4   | (38)0.4   | ( 56) 0.28   | (74) 0.6   | (132) 0,96   | (200) 0.96  | (218) 0.96  | (236) 0.96  | (255) 0.95  |    |
| 0.403  | (20) 0.4  | ( 38) 0.4   | ( 57) 0.28   | (75)06   | (193) 0.95   | (201) 0.96  | (217) 0.96  | (237) 0.96  | (255) 0.96  |    |
| 3) 0.403   | (21) 0.4  |   | ( 58) 0.28   | (76) 0.6   | (184) 11.96  | (202) 0.96  | (220) 0.96  | (238) 0.96  |   |    |
| 4) 0.403   | ( 22) 0.4   | (40) 0.4  | (59) 0.28  | (77) 0.6   | (135) 0.96   | (203) 0.96  | (221) 0.95  | (239) 0.95  | (257) 0.96<br>(257) 0.96  |    |
| 5) 0,406   | (23) 0.41   | (41) 0.4  | ( 27) V.20<br>/ LAN 0 78   | (78) 0.6   | (135) 0.95   | (204) 0.96  | (222) 0.95  | (240) 0.96  | (25B) 0.95<br>(25B) 0.95  |    |
| 6) 0.406   | (24) 0.41   | (42) 0.4  | ( 60) 0.28<br>( 51) 0.28   | (74) 0.6   | (137) 0.94   | (205) 0.96  | (22%) 0.76  | (241) 0.95  | (259) 0.95  |    |
| 7) 0.4   | (25)0.4   | (43) 0.28   |  | (80)0.0  | (158) 0.96   | (206) 0.96  | (224) 0.96  | (242) 0.96  | (260) 0.95  |    |
| 8) 0.4   | (26) 0.4  | (44) 0.28   | ( 52) 0.28   | (81) 0.6   | (134) 0.95   | (207) 0.96  | (225) 0.96  | (243) 0.76  | (251) 0.95  |    |
| 9) 0.4   | (27)0,4   | (45) 0.28   | (63)0.20   | (82) 0.6   | (190) 0.95   | (208) 0.96  | (226) V.96  | (244) 0.96  | (252) (0.95   |    |
| 0) 0.4   | (28)0.4   | (46) 0.28   | ( 54) 0.28   | (80) 0.5   | (171) 0.96   | (209) 0.96.   | (227) 0.95  | (245) 0.76  | (25.) 0.96  |    |
| (1) 0.4  | ( 29) 0.4   | (47) 0.28   | ( 55) 0.28   | (84) 0.5   | (192) 0.90   | (210) 0.96  | (22B) 0.96  | (246) 0.96  | (284) 0.96  |    |
| 12) 0.4  | (30)0.4   | (48)0.28  | ( 56) 0.28   | •  | (193) 0.95   | (211) 0.96  | (229) 0.96  | (247) 0.96  | (255) 0.95  |    |
| (3) 0.4  | ( 31) 0.4   | (49)0.28  | ( 67) 0.28   | (85)0.6<br>(85)0.6   | (194) 4.46   | (212) 0.96  | (230) 0,95  | (248) U.96  | (265) 0.90  |    |
| 4) 0.4   | (32)0.4   | ( 50) 0.28  | ( 68) 0.28   | (86)0.6  | (195) 0.95   | (213) 0.96  | (231) 0.96  | (249) 0.96  | (257) 0.95  |    |
| 15) 0.4  | ( 33) 0.4   | ( 51) 0.28  | ( 69) 0.28   | ( 87) 0.5  | (196) 0.96   | (214) 0.96  | (202) 0.96  | (250) 0.98  | (268) 0.96  |    |
| 16) 0.4  | (34) 0.4  | ( 52) 0.28  | (70) 0.28  | (83)0.5  | (197) 0.95   | (215) 0.96  | (233) 0.95  | (251) 0.96  | (359) 0.95  |    |
| 17) 0.4  | ( 35) 0.4   | ( 53) 0.28  | (71) 0.28  | ( 87) 0.6<br>( 90) 0.6   | (198) 0.95   | (215) 0.96  | (2.4) 0.95  | (252) 0.95  | (270) 0.96  |    |
| 18) 0.4  | (36)0.4   | ( 54) 0.28  | (72) 0.28  |  |  |   |   |   |   |    |
|  |   |   |  |  | -  |   |   |   |   |    |
|  |   |   |  |  |  |   |   | (75) 0.125  | (145) 0.27  |    |
|  |   |   | (145) 0.7  | (15%) 0.78   | (271) 0.96   | (289) 0.43  | (307) 0,126   | (325) 0.125   | (145) 0.27<br>(144) 0.27  | `- |
| 91) 0.6  | (107) U.6   | (127) 0.7   |  | (153) 0.78<br>(154) 0.78   | (271) 0.96<br>(272) 0.96   | (289) 0.43<br>(290) 0.43  | (307) 9,126<br>(308) 0,126  | (325) 0.125<br>(326) 0.125  | (040) 0.27<br>(049) 0.27  |    |
| 91) 0.6<br>92) 0.6   | (107) 0.6<br>(110) 0.6  | (127) 0.7<br>(128) 0.7  | (145) 0.7  | (15%) 0.78   | (271) 0.96<br>(272) 0.96<br>(273) 0.96   | (289) 0.43<br>(290) 0.43<br>(291) 0.43  | (307) 0.126<br>(308) 0.126<br>(309) 0.126   | (325) 0.125<br>(326) 0.125<br>(327) 0.125   | (343) 0.27<br>(344) 0.27<br>(343) 0.27  |    |
| 91) 0.6<br>92) 0.6<br>93) 0.6  | (107) 0.6<br>(110) 0.6<br>(111) 0.7   | (127) 0.7<br>(128) 0.7<br>(129) 0.7   | (145) 0.7<br>(146) 0.7   | (153) 0.78<br>(154) 0.78   | (271) 0.96<br>(272) 0.96<br>(273) 0.96<br>(273) 0.96   | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43  | (307) 0.126<br>(308) 0.126<br>(309) 0.126<br>(310) 0.126  | (325) 0.124<br>(326) 0.125<br>(327) 0.125<br>(328) 0.125  | (243) 0.27<br>(244) 0.27<br>(245) 0.27<br>(245) 0.27  |    |
| 91) 0.6<br>92) 0.6<br>93) 0.6<br>94) 0.5   | (107) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7  | (127) 0.7<br>(128) 0.7<br>(1297 0.7<br>(1297 0.7<br>(1301 0.7   | (145) 0.7<br>(145) 0.7<br>(147) 0.7<br>(143) 0.7   | (153) 0.78<br>(154) 0.78<br>(155) 0.78   | (271) 0.96<br>(272) 0.96<br>(273) 0.96<br>(273) 0.96<br>(275) 0.96<br>(275) 0.96   | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(292) 0.43<br>(293) 0.43  | $\begin{array}{c} (307) & 0.126 \\ (308) & 0.126 \\ (309) & 0.126 \\ (310) & 0.126 \\ (311) & 0.1269 \end{array}$   | (325) 0.124<br>(326) 0.125<br>(327) 0.125<br>(328) 0.125<br>(329) 0.27  | (343) 0.27<br>(343) 0.27<br>(345) 0.27<br>(245) 0.27<br>(347) 0.27  |    |
| 911 0.6<br>92) 0.6<br>93) 0.6<br>94) 0.5<br>951 0.6  | (107) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(112) 0.7   | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(129) 0.7<br>(130) 0.7<br>(131) 0.7  | (145) 0.7<br>(145) 0.7<br>(147) 0.7<br>(143) 0.7<br>(143) 0.7<br>(349) 0.7   | (153) 0.78<br>(154) 0.79<br>(155) 0.78<br>(155) 0.78   | (2/1) 0.96<br>(2/2) 0.96<br>(273) 0.96<br>(174) 0.96<br>(174) 0.96<br>(175) 0.96<br>(175) 0.96   | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(292) 0.43<br>(293) 0.43<br>(294) 0.43  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (325) 0.125<br>(326) 0.125<br>(327) 0.125<br>(328) 0.125<br>(329) 0.27<br>(320) 0.27<br>(320) 0.27  | $\begin{array}{c} (145) & 0.27 \\ (1544) & 0.27 \\ (145) & 0.27 \\ (145) & 0.27 \\ (147) & 0.27 \\ (147) & 0.27 \\ (149) & 0.27 \end{array}$  |    |
| 91] 0.6<br>92) 0.6<br>93) 0.6<br>94) 0.5<br>95] 0.6<br>95] 0.6<br>95] 0.6  | (109) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(112) 0.7<br>(114) 0.7  | (127) 0.7<br>(128) 0.7<br>(129, 0.7<br>(130, 0.7<br>(131) 0.7<br>(132) 0.7  | (145) 0.7<br>(145) 0.7<br>(143) 0.7<br>(143) 0.7<br>(143) 0.7<br>(149) 0.7<br>(150) 0.7  | (150) 0.78<br>(154) 0.79<br>(155) 0.78<br>(155) 0.78<br>(155) 0.78<br>(155) 0.78<br>(155) 0.78   | (271) 0.96<br>(272) 0.96<br>(273) 0.96<br>(273) 0.96<br>(278) 0.96<br>(278) 0.96<br>(278) 0.96<br>(277) 0.95   | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(295) 0.43<br>(294) 0.43<br>(294) 0.43  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{c} (525) & 0.126 \\ (526) & 0.126 \\ (527) & 0.125 \\ (528) & 0.126 \\ (528) & 0.126 \\ (529) & 0.27 \\ (530) & 0.27 \\ (531) & 0.27 \end{array}$  | (343) $(0,27)(344)$ $(0,27)(245)$ $(0,27)(245)$ $(0,27)(347)$ $(0,27)(349)$ $(0,27)(349)$ $(0,27)$  |    |
| 911 0.6<br>92) 0.6<br>93) 0.6<br>94) 0.5<br>95) 0.6<br>95) 0.6<br>95) 0.6<br>95) 0.6   | (107) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(113) 0.7<br>(114) 0.7<br>(115) 0.7   | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(130) 0.7<br>(131) 0.7<br>(131) 0.7<br>(132) 0.7<br>(133) 0.7  | $\begin{array}{c} (145) & 0.7 \\ (145) & 0.7 \\ (146) & 0.7 \\ (140) & 0.7 \\ (140) & 0.7 \\ (150) & 0.7 \\ (150) & 0.7 \\ (151) & 0.7 \end{array}$                                | (150) 0.78<br>(154) 0.79<br>(155) 0.78<br>(155) 0.78<br>(155) 0.78<br>(157) 0.78<br>(155) 0.78<br>(155) 0.78   | (2/1) 0.96<br>(2/2) 0.96<br>(273) 0.96<br>(174) 0.96<br>(175) 0.96<br>(175) 0.96<br>(176) 0.96<br>(278) 0.95   | $\begin{array}{c} (289) & 0.43 \\ (290) & 0.43 \\ (291) & 0.43 \\ (292) & 0.43 \\ (292) & 0.43 \\ (293) & 0.43 \\ (294) & 0.43 \\ (295) & 0.43 \\ (295) & 0.43 \end{array}$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (325) 0.125<br>(326) 0.125<br>(327) 0.125<br>(329) 0.22<br>(329) 0.27<br>(330) 0.27<br>(331) 0.27<br>(332) 0.27   | $ \begin{array}{c} (545) & 0.27 \\ (544) & 0.27 \\ (545) & 0.27 \\ (545) & 0.27 \\ (547) & 0.27 \\ (549) & 0.27 \\ (549) & 0.27 \\ (550) & 0.27 \end{array} $   |    |
| 911 0.6<br>92) 0.6<br>93) 0.6<br>94) 0.5<br>95] 0.6<br>95] 0.6<br>96) 0.6<br>97) 0.6<br>98) 0.6  | (107) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(112) 0.7<br>(114) 0.7<br>(115) 0.7<br>(115) 0.7<br>(116) 0.7   | (127) 0.7<br>(128) 0.7<br>(129, 0.7<br>(130, 0.7<br>(131) 0.7<br>(131) 0.7<br>(133) 0.7<br>(133) 0.7<br>(133) 0.7   |  | (150) 0.78<br>(154) 0.78<br>(155) 0.78<br>(155) 0.78<br>(155) 0.78<br>(155) 0.78<br>(155) 0.78<br>(155) 0.78<br>(159) 0.78<br>(170) 0.78   | (271) 0.96<br>(272) 0.96<br>(273) 0.96<br>(273) 0.96<br>(278) 0.96<br>(278) 0.96<br>(278) 0.96<br>(277) 0.95   | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(292) 0.43<br>(292) 0.43<br>(294) 0.43<br>(295) 0.43<br>(295) 0.43<br>(297) 0.43  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (525) 0.125<br>(526) 0.125<br>(527) 0.125<br>(529) 0.125<br>(529) 0.27<br>(530) 0.27<br>(531) 0.27<br>(532) 0.27<br>(533) 0.27  | (343) $(0,27)(344)$ $(0,27)(345)$ $(0,27)(245)$ $(0,27)(349)$ $(0,27)(349)$ $(0,27)(351)$ $(0,27)$  |    |
| 911 0.6<br>92) 0.6<br>93) 0.6<br>94) 0.5<br>951 0.6<br>951 0.6<br>953 0.6<br>97) 0.6<br>98) 0.6<br>99) 0.6   | (107) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(112) 0.7<br>(114) 0.7<br>(114) 0.7<br>(115) 0.7<br>(116) 0.7<br>(116) 0.7  | (127) 0.7 $(129) 0.7$ $(129) 0.7$ $(120) 0.7$ $(131) 0.7$ $(131) 0.7$ $(132) 0.7$ $(132) 0.7$ $(134) 0.7$ $(135) 0.7$   | $\begin{array}{c} (145) & 0.7 \\ (145) & 0.7 \\ (147) & 0.7 \\ (143) & 0.7 \\ (143) & 0.7 \\ (150) & 0.7 \\ (150) & 0.7 \\ (151) & 0.7 \\ (152) & 0.7 \\ (153) & 0.78 \end{array}$ | (150) 0.78<br>(154) 0.78<br>(155) 0.78<br>(155) 0.78<br>(155) 0.78<br>(157) 0.78<br>(157) 0.78<br>(159) 0.78<br>(170) 0.78<br>(171) 0.78   | (2/1) 0.96<br>(2/2) 0.96<br>(273) 0.96<br>(174) 0.96<br>(175) 0.96<br>(175) 0.96<br>(176) 0.96<br>(278) 0.95   | $\begin{array}{c} (289) & 0.43 \\ (290) & 0.43 \\ (291) & 0.43 \\ (292) & 0.43 \\ (292) & 0.43 \\ (295) & 0.43 \\ (295) & 0.43 \\ (295) & 0.43 \\ (297) & 0.43 \\ (298) & 0.43 \end{array}$   | $\begin{array}{c} (307) & 0.126 \\ (308) & 0.126 \\ (309) & 0.126 \\ (510) & 0.125 \\ (311) & 0.125 \\ (312) & 0.125 \\ (312) & 0.126 \\ (312) & 0.126 \\ (314) & 0.125 \\ (316) & 0.126 \end{array}$ | (525) 0.125<br>(526) 0.125<br>(527) 0.125<br>(529) 0.125<br>(529) 0.27<br>(330) 0.27<br>(331) 0.27<br>(332) 0.27<br>(333) 0.27<br>(334) 0.27  | (343) $0.27(344)$ $0.27(345)$ $0.27(347)$ $0.27(349)$ $0.27(349)$ $0.27(350)$ $0.27(351)$ $0.27(352)$ $0.27$  |    |
| 91) 0.6<br>92) 0.6<br>93) 0.6<br>94) 0.6<br>95) 0.6<br>95) 0.6<br>95) 0.6<br>98) 0.6<br>99) 0.6<br>100) 0.6  | (107) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(112) 0.7<br>(114) 0.7<br>(115) 0.7<br>(115) 0.7<br>(116) 0.7<br>(117) 0.7<br>(118) 0.7   | (127) 0.7 $(128) 0.7$ $(129) 0.7$ $(120) 0.7$ $(130) 0.7$ $(131) 0.7$ $(132) 0.7$ $(135) 0.7$ $(135) 0.7$ $(136) 0.7$   |  | (150) 0.78<br>(154) 0.79<br>(155) 0.79<br>(155) 0.78<br>(157) 0.78<br>(157) 0.78<br>(159) 0.78<br>(159) 0.78<br>(170) 0.78<br>(171) 0.78<br>(172) 0.78   | $\begin{array}{cccc} (2/1) & 0.96 \\ (2/2) & 0.96 \\ (273) & 0.96 \\ (174) & 0.96 \\ (175) & 0.76 \\ (175) & 0.76 \\ (176) & 0.96 \\ (278) & 0.94 \\ (279) & 0.96 \\ (280) & 0.96 \end{array}$                                 | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(292) 0.43<br>(292) 0.43<br>(294) 0.43<br>(295) 0.43<br>(295) 0.43<br>(297) 0.43  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (525) 0.125<br>(526) 0.125<br>(527) 0.125<br>(529) 0.27<br>(529) 0.27<br>(530) 0.27<br>(331) 0.27<br>(332) 0.27<br>(333) 0.27<br>(333) 0.27<br>(333) 0.27<br>(335) 0.27   | (343) 0.27<br>(344) 0.27<br>(345) 0.27<br>(347) 0.27<br>(347) 0.27<br>(349) 0.27<br>(359) 0.27<br>(350) 0.27<br>(352) 0.27<br>(352) 0.27  |    |
| 91) 0.6<br>92) 0.6<br>93) 0.6<br>94) 0.5<br>95) 0.6<br>95) 0.6<br>95) 0.6<br>98) 0.6<br>98) 0.6<br>99) 0.6<br>100) 0.6<br>100) 0.6                                     | (107) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(112) 0.7<br>(114) 0.7<br>(115) 0.7<br>(115) 0.7<br>(116) 0.7<br>(116) 0.7<br>(118) 0.7   | (127) 0.7 $(128) 0.7$ $(129) 0.7$ $(129) 0.7$ $(131) 0.7$ $(131) 0.7$ $(132) 0.7$ $(133) 0.7$ $(135) 0.7$ $(135) 0.7$ $(136) 0.7$ $(137) 0.7$                                     |  | (150) 0.78<br>(154) 0.79<br>(155) 0.78<br>(155) 0.78<br>(157) 0.78<br>(157) 0.78<br>(157) 0.78<br>(159) 0.78<br>(170) 0.78<br>(171) 0.78<br>(172) 0.78<br>(173) 0.78   | $\begin{array}{cccc} (2/1) & 0.96 \\ (2/2) & 0.96 \\ (273) & 0.96 \\ (174) & 0.96 \\ (175) & 0.96 \\ (176) & 0.96 \\ (176) & 0.96 \\ (278) & 0.96 \\ (278) & 0.96 \\ (279) & 0.96 \\ (280) & 0.96 \\ (281) & 0.43 \end{array}$ | $\begin{array}{c} (289) & 0.43 \\ (290) & 0.43 \\ (291) & 0.43 \\ (292) & 0.43 \\ (292) & 0.43 \\ (295) & 0.43 \\ (295) & 0.43 \\ (295) & 0.43 \\ (297) & 0.43 \\ (298) & 0.43 \end{array}$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (125) 0.125<br>(316) 0.125<br>(327) 0.125<br>(329) 0.27<br>(329) 0.27<br>(330) 0.27<br>(331) 0.27<br>(333) 0.27<br>(333) 0.27<br>(334) 0.27<br>(334) 0.27<br>(335) 0.27<br>(335) 0.27   |   |    |
| 91) 0.6<br>92) 0.6<br>93) 0.6<br>94) 0.5<br>95] 0.6<br>95] 0.6<br>97) 0.6<br>98) 0.6<br>98) 0.6<br>99) 0.6<br>99) 0.6<br>(00) 0.6<br>(01) 0.6                          | (109) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(113) 0.7<br>(114) 0.7<br>(115) 0.7<br>(116) 0.7<br>(116) 0.7<br>(117) 0.7<br>(119) 0.7<br>(119) 0.7  | (127) 0.7 $(128) 0.7$ $(129) 0.7$ $(131) 0.7$ $(131) 0.7$ $(131) 0.7$ $(135) 0.7$ $(135) 0.7$ $(135) 0.7$ $(135) 0.7$ $(136) 0.7$ $(136) 0.7$                                     |  | (150) 0.78<br>(154) 0.79<br>(155) 0.78<br>(155) 0.78<br>(155) 0.78<br>(155) 0.78<br>(155) 0.78<br>(155) 0.78<br>(159) 0.78<br>(170) 0.78<br>(171) 0.78<br>(173) 0.78<br>(173) 0.78                             | (2/1) 0.96<br>(2/2) 0.96<br>(2/2) 0.96<br>(1/4) 0.96<br>(1/5) 0.96<br>(1/5) 0.96<br>(1/7) 0.95<br>(2/9) 0.95<br>(279) 0.96<br>(280) 0.94<br>(281) 0.43<br>(282) 0.43   | $\begin{array}{c} (289) & 0.43 \\ (290) & 0.43 \\ (291) & 0.43 \\ (292) & 0.43 \\ (292) & 0.43 \\ (292) & 0.43 \\ (295) & 0.43 \\ (295) & 0.43 \\ (295) & 0.43 \\ (297) & 0.43 \\ (299) & 0.43 \\ (299) & 0.43 \end{array}$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (525) 0.125<br>(516) 0.125<br>(527) 0.125<br>(529) 0.27<br>(510) 0.27<br>(530) 0.27<br>(531) 0.27<br>(533) 0.27<br>(533) 0.27<br>(534) 0.27<br>(535) 0.27<br>(535) 0.27<br>(535) 0.27<br>(535) 0.27                             | $ \begin{array}{c} (144) & 0.27 \\ (144) & 0.27 \\ (144) & 0.27 \\ (144) & 0.27 \\ (144) & 0.27 \\ (144) & 0.27 \\ (154) & 0.27 \\ (151) & 0.27 \\ (151) & 0.27 \\ (152) & 0.27 \\ (153) & 0.27 \\ (153) & 0.27 \\ (155) & 0.27 \\ (155) & 0.27 \end{array} $                                 |    |
| 91) 0.6<br>92) 0.6<br>93) 0.6<br>94) 0.5<br>95] 0.6<br>95] 0.6<br>95] 0.6<br>97) 0.6<br>98) 0.6<br>98) 0.6<br>99) 0.6<br>100) 0.6<br>101) 0.6                          | (107) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(112) 0.7<br>(114) 0.7<br>(114) 0.7<br>(115) 0.7<br>(116) 0.7<br>(116) 0.7<br>(116) 0.7<br>(118) 0.7<br>(119) 0.7<br>(120) 0.7              | (127) 0.7 $(129) 0.7$ $(129) 0.7$ $(129) 0.7$ $(131) 0.7$ $(131) 0.7$ $(132) 0.7$ $(135) 0.7$ $(135) 0.7$ $(135) 0.7$ $(136) 0.7$ $(136) 0.7$ $(139) 0.7$                         |  | (150) 0.78<br>(155) 0.78<br>(155) 0.78<br>(155) 0.78<br>(157) 0.78<br>(157) 0.78<br>(157) 0.78<br>(159) 0.78<br>(170) 0.78<br>(171) 0.78<br>(172) 0.78<br>(173) 0.78<br>(174) 0.78<br>(174) 0.78               | (2/1) 0.96<br>(2/2) 0.96<br>(2/3) 0.96<br>(1/4) 0.96<br>(1/4) 0.96<br>(1/6) 0.96<br>(1/7) 0.96<br>(2/9) 0.96<br>(2/9) 0.96<br>(280) 0.94<br>(281) 0.43<br>(282) 0.43   | $\begin{array}{c} (289) & 0.43 \\ (290) & 0.43 \\ (291) & 0.43 \\ (292) & 0.43 \\ (292) & 0.43 \\ (292) & 0.43 \\ (294) & 0.43 \\ (295) & 0.43 \\ (297) & 0.43 \\ (299) & 0.43 \\ (299) & 0.43 \\ (299) & 0.43 \\ (300) & 0.43 \end{array}$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (525) 0.125<br>(526) 0.125<br>(527) 0.125<br>(529) 0.27<br>(529) 0.27<br>(530) 0.27<br>(531) 0.27<br>(532) 0.27<br>(533) 0.27<br>(535) 0.27<br>(535) 0.27<br>(535) 0.27<br>(536) 0.27<br>(536) 0.27                             | (343) $0.27(344)$ $0.27(345)$ $0.27(349)$ $0.27(349)$ $0.27(349)$ $0.27(350)$ $0.27(351)$ $0.27(353)$ $0.27(353)$ $0.27(355)$ $0.27(355)$ $0.27(355)$ $0.27$  |    |
| 91) 0.6<br>92) 0.6<br>93) 0.6<br>94) 0.5<br>95] 0.6<br>95] 0.6<br>95] 0.6<br>97) 0.6<br>98) 0.6<br>98) 0.6<br>99) 0.6<br>100) 0.6<br>101) 0.6                          | (109) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(113) 0.7<br>(114) 0.7<br>(115) 0.7<br>(116) 0.7<br>(116) 0.7<br>(117) 0.7<br>(118) 0.7<br>(119) 0.7<br>(120) 0.7<br>(121) 0.7              | (127) 0.7 $(128) 0.7$ $(129) 0.7$ $(129) 0.7$ $(121) 0.7$ $(151) 0.7$ $(152) 0.7$ $(153) 0.7$ $(135) 0.7$ $(135) 0.7$ $(136) 0.7$ $(136) 0.7$ $(139) 0.7$ $(139) 0.7$ $(140) 0.7$ |  | (150) 0.78<br>(155) 0.79<br>(155) 0.78<br>(155) 0.78<br>(157) 0.78<br>(157) 0.78<br>(159) 0.78<br>(170) 0.78<br>(171) 0.78<br>(172) 0.78<br>(173) 0.78<br>(173) 0.78<br>(174) 0.78<br>(175) 0.78<br>(175) 0.78 | (2/1) 0.96<br>(2/2) 0.96<br>(273) 0.96<br>(174) 0.96<br>(175) 0.76<br>(175) 0.76<br>(175) 0.96<br>(278) 0.95<br>(278) 0.95<br>(279) 0.96<br>(280) 0.94<br>(281) 0.43<br>(282) 0.43<br>(284) 0.43                               | $\begin{array}{c} (289) & 0.43 \\ (290) & 0.43 \\ (291) & 0.43 \\ (292) & 0.43 \\ (292) & 0.43 \\ (292) & 0.43 \\ (294) & 0.43 \\ (295) & 0.43 \\ (296) & 0.43 \\ (299) & 0.43 \\ (299) & 0.43 \\ (300) & 0.43 \\ (301) & 0.43 \end{array}$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (525) 0.125<br>(526) 0.125<br>(527) 0.125<br>(529) 0.27<br>(530) 0.27<br>(531) 0.27<br>(531) 0.27<br>(532) 0.27<br>(533) 0.27<br>(535) 0.27<br>(535) 0.27<br>(535) 0.27<br>(536) 0.27<br>(536) 0.27<br>(539) 0.27               | (343) $0.27(344)$ $0.27(345)$ $0.27(347)$ $0.27(349)$ $0.27(349)$ $0.27(350)$ $0.27(351)$ $0.27(352)$ $0.27(353)$ $0.27(353)$ $0.27(354)$ $0.27(355)$ $0.27(355)$ $0.27(357)$ $0.27$  |    |
| 911 0.6<br>921 0.6<br>931 0.6<br>941 0.5<br>951 0.6<br>951 0.6<br>951 0.6<br>971 0.6<br>981 0.6<br>1001 0.6<br>1011 0.6<br>1021 0.6<br>1031 0.6                        | (109) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(113) 0.7<br>(114) 0.7<br>(115) 0.7<br>(116) 0.7<br>(116) 0.7<br>(117) 0.7<br>(118) 0.7<br>(119) 0.7<br>(120) 0.7<br>(121) 0.7<br>(122) 0.7 | (127) 0.7 $(128) 0.7$ $(129) 0.7$ $(130) 0.7$ $(131) 0.7$ $(131) 0.7$ $(135) 0.7$ $(135) 0.7$ $(135) 0.7$ $(135) 0.7$ $(136) 0.7$ $(136) 0.7$ $(139) 0.7$ $(139) 0.7$ $(140) 0.7$ |  |  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(292) 0.43<br>(295) 0.43<br>(295) 0.43<br>(295) 0.43<br>(299) 0.43<br>(299) 0.43<br>(299) 0.43<br>(299) 0.43<br>(300) 0.43<br>(301) 0.43<br>(302) 0.43<br>(303) 0.43  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (125) 0.125<br>(316) 0.125<br>(327) 0.125<br>(128) 0.27<br>(329) 0.27<br>(330) 0.27<br>(331) 0.27<br>(332) 0.27<br>(333) 0.27<br>(335) 0.27<br>(335) 0.27<br>(335) 0.27<br>(336) 0.27<br>(339) 0.27<br>(339) 0.27<br>(340) 0.27 |   |    |
| 911 0.6<br>92) 0.6<br>93) 0.6<br>94) 0.5<br>955 0.6<br>955 0.6<br>96) 0.6<br>97) 0.6<br>98) 0.6  | (109) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(113) 0.7<br>(114) 0.7<br>(115) 0.7<br>(116) 0.7<br>(116) 0.7<br>(117) 0.7<br>(118) 0.7<br>(119) 0.7<br>(120) 0.7<br>(121) 0.7              | (127) 0.7 $(128) 0.7$ $(129) 0.7$ $(131) 0.7$ $(131) 0.7$ $(131) 0.7$ $(135) 0.7$ $(135) 0.7$ $(135) 0.7$ $(135) 0.7$ $(136) 0.7$ $(139) 0.7$ $(139) 0.7$ $(141) 0.7$ $(142) 0.7$ |  |  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{c} (289) & 0.43 \\ (290) & 0.43 \\ (291) & 0.43 \\ (292) & 0.43 \\ (292) & 0.43 \\ (295) & 0.43 \\ (295) & 0.43 \\ (295) & 0.43 \\ (297) & 0.43 \\ (297) & 0.43 \\ (299) & 0.43 \\ (299) & 0.43 \\ (300) & 0.43 \\ (301) & 0.43 \\ (302) & 0.43 \\ (303) & 0.43 \\ (304) & 0.43 \end{array}$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (525) 0.125<br>(526) 0.125<br>(527) 0.125<br>(529) 0.27<br>(530) 0.27<br>(531) 0.27<br>(531) 0.27<br>(532) 0.27<br>(533) 0.27<br>(535) 0.27<br>(535) 0.27<br>(535) 0.27<br>(536) 0.27<br>(536) 0.27<br>(539) 0.27               | $ \begin{array}{c} (343) & 0.27 \\ (344) & 0.27 \\ (345) & 0.27 \\ (347) & 0.27 \\ (347) & 0.27 \\ (349) & 0.27 \\ (359) & 0.27 \\ (352) & 0.27 \\ (352) & 0.27 \\ (353) & 0.27 \\ (355) & 0.27 \\ (355) & 0.27 \\ (356) & 0.27 \\ (356) & 0.27 \\ (359) & 0.27 \\ (359) & 0.27 \end{array} $ |    |
| 911 0.6<br>92) 0.6<br>93) 0.6<br>94) 0.5<br>953 0.6<br>953 0.6<br>953 0.6<br>97) 0.6<br>98) 0.6<br>99) 0.6<br>100) 0.6<br>101) 0.6<br>101) 0.6<br>103) 0.6<br>103) 0.6 | (109) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(113) 0.7<br>(114) 0.7<br>(115) 0.7<br>(116) 0.7<br>(116) 0.7<br>(117) 0.7<br>(118) 0.7<br>(119) 0.7<br>(120) 0.7<br>(121) 0.7<br>(122) 0.7 | (127) 0.7 $(128) 0.7$ $(129) 0.7$ $(130) 0.7$ $(131) 0.7$ $(131) 0.7$ $(135) 0.7$ $(135) 0.7$ $(135) 0.7$ $(135) 0.7$ $(136) 0.7$ $(136) 0.7$ $(139) 0.7$ $(139) 0.7$ $(140) 0.7$ |  |  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(292) 0.43<br>(295) 0.43<br>(295) 0.43<br>(295) 0.43<br>(299) 0.43<br>(299) 0.43<br>(299) 0.43<br>(299) 0.43<br>(300) 0.43<br>(301) 0.43<br>(302) 0.43<br>(303) 0.43  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (125) 0.125<br>(316) 0.125<br>(327) 0.125<br>(128) 0.27<br>(329) 0.27<br>(330) 0.27<br>(331) 0.27<br>(332) 0.27<br>(333) 0.27<br>(335) 0.27<br>(335) 0.27<br>(335) 0.27<br>(336) 0.27<br>(339) 0.27<br>(339) 0.27<br>(340) 0.27 |   |    |

## River discharge data at 12-hourly intervals for Station: 21D Period : 5

.

Phosphorus transport Berg River

| ادامة مد  | er FLEINI   | .varl   | (length ⇒  | (40)<br>(44)  |   |   |   |  |  | - حبب العار يدلمان  |  |   |  |  |   |
|---|---|---|--|---|---|---|---|--|--|---|--|---|--|--|---|
|   |   |   |  |   |   |   | 0.108   | (145)  | 2.76-7   | (145)   | 0.01.0   | (131)   | <u>ò</u>   | (122)  | 2.58-3<br>0.021   |
| 1)  | 0.522   | ( 19)   | 0.108  | ( 37)   | 0.108   | (55)  | 0.085   | (146)  | Ú.   | (164)   | 8E-3   | (192)   | 0  | (200)<br>(201)   | 0.054   |
| 2)  | 0.607   | ( 20)   | 0.075  | (39)  | 0.054   | ( 55)   | 0.12  | (147)  | - Q  | (155)   | Ú.   | (183)   | 0  | (201)  |   |
| 3)  | 0.385   | ( 21)   | 0.108  | ( 39)   | 0.085   | ( 57)   |   | (148)  | Q  | (166)   | 0  | (194)   | BE-3   | (202)  | 0.045   |
| 4)  | 0.317   | ( 22)   | 0.096  | ( 40)   | 0.036   | (58)  | 0.076   | (1.17)   | ò  | (167)   | Ó.   | (185)   | 0  | (205)  | 0.0052  |
| 5)  | 0.607   | (27)  | 0.096  | (41)  | 0.0742  | ( 59)   | 0.108   | (150)  | Ú.   | (168)   | Ó  | (196)   | 8E-3   | (204)  | 0.021   |
| 6)  | 0.255   | (24)  | 0.036  | (42)  | 0.0447  | ( 50)   | 0.074   | (151)  | ŏ  | (159)   | Ó.   | (137)   | 0  | (205)  | 0.0208  |
|   | 0.607   | (25)  | 0.0742   | ( 43)   | 0.085   | (61)  | 0.1445  |  | ů<br>Ú   | (170)   | O  | (188)   | 8E-3   | (206)  | 0   |
| 7)  | 0.225   | (25)  | 0.028  | (44)  | 0.064   | ( 62)   | 0.1445  | (152)  | •  | (171)   | ŏ  | (187)   | Q  | (207)  | 0   |
| 8)  | 0.197   | ( 27)   | 0.0742   | (45)  | 0.108   | ( 60)   | 0.1573  | (193)  | Ú  | (172)   | 86-3   | (150)   | (SE- )   | (208)  | Ð   |
| 9)  |   | (28)  | 0.036  | ( 46)   | 0.1704  | ( 64)   | 0.1445  | (154)  | Ú.   | •   |  | (191)   | 0  | (207)  | Ċ,  |
| 10)   | 0.1704  |   | 0.085  | (47)  | 0.906   | ( 65)   | 0.1573  | (155)  | U.   | (173)   | 0  | (142)   | õ  | (210)  | 2E-0  |
| 11)   | 0.1836  | (27)  |  | (48)  | 0.2401  | ( 66)   | 0.076   | (156)  | /E-3   | (174)   | 0.021  | (192)   | ŏ  | (211)  | 0.0449  |
| 12)   | 0.1321  | ( 20)   | 0.054  | (49)  | 0.3345  | ( 67)   | 0.12  | (197)  | Ó  | (175)   | 0  |   | 26~0   | (212)  | 2E-3  |
| 12)   | 0.132   | (31)  | 0.085  | •   | 0.225   | (63)  | 0.054   | (158)  | 2E-3   | (176)   | 0.021  | (194)   | _  | (213)  | 0   |
| 14)   | 0.108   | ( 32)   | 0.035  | ( 50)   |   | ( 69)   | 0.074   | (159)  | 0  | (177)   | Q.   | (195)   | 2.5E 3   |  | 0   |
| 15)   | 0.12  | ( 32).  | 0,108  | (51)  | 0.197   |   | 0.045   | (160)  | 2E-3   | (178)   | 0  | (176)   | 2E-3   | (214)  | 0.0060<br>0.0060  |
| 16)   | 0.074   | (34)  | 0.074  | ( 52)   | 0.1835  | (70)  | 0.0954  | (161)  | 2.5E-J   | (179)   | Ŭ.   | (197)   | Ó.   | 1215)  | -   |
| 17)   | 0.108   | ( 35)   | 0.12   | ( 53)   | 0.1704  | (71)  |   | (162)  | 0.008  | (189)   | 6  | (198)   | 8E - 2   | (215)  | 0.090   |
|   | 0.096   | ( 35)   | 0.12   | ( 54)   | 0.1331  | ( 72)   | 0.054   |  |  |   |  |   |  |  |   |
| 18)   |   |   |  |   |   |   |   |  | -  |   |  |   |  |  |   |
| 18)   |   |   |  |   |   |   |   |  |  |   | 0.12   | (253)   | 6.2102   | (271)  | 0.008   |
| 18)   |   |   |  |   | 0.0108  | (127)   | 0.0138  | (217)  | 0.197  | (275)   | 0.12   | (253)<br>(254)  | 6.2102<br>0.197  | (271)<br>(272)   | 0.108<br>0.12   |
| 18)<br><br>73)  | 0.085   | ( 91)   |  |   | 0.0109<br>86~7  | (127)<br>(129)  | 0.014   | (217)<br>(218)   | 0,197<br>4,501   | (235)<br>(236)  | 0.12<br>0.100  | (253)   | 0.2102   | (271)  | 0.108<br>0.12<br>0.1443   |
| 18)<br>72)<br>74)   | 0.085   | ( <del>9</del> 1)<br>( <del>9</del> 2)  | 0.085  | (109)   | 0.0108  | (127)   | 0.0138<br>0.014<br>0.0138   | (217)<br>(218)<br>(219)  | 0,197<br>4,501<br>0,7  | (235)<br>(236)<br>(237)   | $\substack{0.12\\0.100\\0.100}$  | (253)<br>(254)<br>(255)   | 0.2102<br>0.197  | (271)<br>(272)   | 0.108<br>0.12   |
| 18)<br>72)<br>74)<br>75)  | 0.085<br>0.045<br>0.045   | ( 91)<br>( 92)<br>( 92)   | 0.085<br>0.033<br>0.095  | (109)<br>(110)  | 0.0109<br>86~7  | (127)<br>(129)  | 0.0138<br>0.014<br>0.0138<br>0.014  | (217)<br>(218)<br>(219)<br>(229)   | 0.197<br>4.501<br>0.7<br>0.445   | (235)<br>(236)<br>(237)<br>(238)  | $0.12 \\ 0.100 \\ 0.100 \\ 0.100 \\ 0.064$   | (253)<br>(254)<br>(255)<br>(256)  | 0.2102<br>0.197<br>0.1573<br>0.1445  | (271)<br>(272)<br>(273)  | $\begin{array}{c} 0.108 \\ 0.12 \\ 0.1445 \\ 0.157 \end{array}$   |
| 18)<br>72)<br>74)<br>75)<br>76)   | 0.085<br>0.045<br>0.085<br>0.085<br>0.095   | ( 91)<br>( 92)<br>( 92)<br>( 93)<br>( 94)   | 0.085<br>0.085<br>0.085<br>0.085<br>0.085  | (109)<br>(110)<br>(111)   | 0.0109<br>86-3<br>7.86-3  | (127)<br>(129)<br>(129)   | 0.0138<br>0.014<br>0.0138   | (217)<br>(218)<br>(219)<br>(229)<br>(220)<br>(221)   | 0.197<br>4.501<br>0.7<br>0.445<br>0.522  | (235)<br>(236)<br>(237)<br>(238)<br>(239)   | 0.12<br>0.100<br>0.103<br>0.084<br>0.12  | (253)<br>(254)<br>(255)<br>(256)<br>(256)   | 0.2102<br>0.197<br>0.1573<br>0.1445<br>0.1445  | (271)<br>(272)<br>(273)<br>(274)   | $\begin{array}{c} 0.108 \\ 0.12 \\ 0.1440 \\ 0.15^{\prime\prime} \end{array}$   |
| 18)<br>73)<br>74)<br>75)<br>76)<br>77)  | 0.085<br>0.045<br>0.085<br>0.095<br>0.095   | ( <del>9</del> 1)<br>( 92)<br>( 92)<br>( 94)<br>( 94)<br>( 95)  | 0.085<br>0.093<br>0.093<br>0.095<br>0.056<br>0.054   | (109)<br>(110)<br>(111)<br>(112)<br>(113)   | 85-3<br>7.86-3<br>85-3  | (127)<br>(123)<br>(129)<br>(130)  | 0.0138<br>0.014<br>0.0138<br>0.014  | (217)<br>(218)<br>(219)<br>(220)<br>(220)<br>(221)<br>(222)  | 0.197<br>4.501<br>0.7<br>0.445<br>0.322<br>0.32  | (235)<br>(236)<br>(237)<br>(238)<br>(239)<br>(240)  | 0.12<br>0.100<br>0.108<br>0.084<br>0.12<br>0.074   | (253)<br>(254)<br>(255)<br>(255)<br>(255)<br>(257)  | 6.2102<br>0.197<br>6.1573<br>6.1445<br>6.1445<br>6.1445  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)   | 0.108<br>0.12<br>0.1442<br>0.157<br>0.157<br>0.1442<br>0.098  |
| 18)<br>73)<br>74)<br>75)<br>76)<br>77)<br>78)   | 0.085<br>0.045<br>0.085<br>0.095<br>0.1521<br>0.1521<br>0.1545  | ( 91)<br>( 92)<br>( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 95)   | 0.085<br>0.093<br>0.095<br>0.076<br>0.054<br>0.054   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)  | 80,0103<br>80-3<br>7,80-3<br>80-3<br>7,60-3<br>80-3   | (127)<br>(129)<br>(129)<br>(129)<br>(130)<br>(151)  | 0.0136<br>0.014<br>0.0136<br>0.014<br>0.0138  | (217)<br>(218)<br>(219)<br>(220)<br>(221)<br>(222)<br>(223)  | 0.197<br>4.501<br>0.7<br>0.445<br>0.522<br>0.32<br>0.2712  | (235)<br>(236)<br>(237)<br>(238)<br>(239)<br>(240)<br>(241)   | 0.12<br>0.103<br>0.103<br>0.084<br>0.12<br>0.074<br>0.108  | (253)<br>(254)<br>(255)<br>(255)<br>(255)<br>(257)<br>(258)<br>(259)  | 6.2102<br>0.197<br>6.1573<br>0.1445<br>6.1445<br>0.1445<br>0.1445  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)  | 0.108<br>0.12<br>0.1442<br>0.157<br>0.157<br>0.1442<br>0.098  |
| 18)<br>73)<br>74)<br>75)<br>76)<br>77)<br>78)<br>79)  | 0.085<br>0.045<br>0.085<br>0.095<br>0.1321<br>0.1345<br>0.12  | ( 91)<br>( 92)<br>( 92)<br>( 94)<br>( 95)<br>( 95)<br>( 97)   | 0.085<br>0.035<br>0.085<br>0.056<br>0.056<br>0.054<br>0.056<br>0.0281  | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)   | 0,0103<br>8E-3<br>7.8E-3<br>8E-3<br>7.6E-3<br>8E-3<br>7.8E-3  | (127)<br>(129)<br>(129)<br>(130)<br>(134)<br>(132)<br>(133)   | 0.0138<br>0.014<br>0.0138<br>0.014<br>0.0138<br>0.0138  | (217)<br>(218)<br>(219)<br>(220)<br>(221)<br>(222)<br>(223)<br>(223)<br>(224)  | 0.197<br>4.501<br>0.7<br>0.445<br>0.522<br>0.32<br>0.2712<br>0.225   | (235)<br>(236)<br>(237)<br>(238)<br>(239)<br>(240)<br>(241)<br>(242)  | 0.12<br>0.108<br>0.108<br>0.084<br>0.12<br>0.074<br>0.108<br>0.085   | (253)<br>(254)<br>(255)<br>(256)<br>(256)<br>(256)<br>(256)<br>(256)<br>(269)   | 0.2102<br>0.197<br>0.1573<br>0.1445<br>0.1445<br>0.1445<br>0.1321<br>0.132   | (271)<br>(272)<br>(273)<br>(274)<br>(276)<br>(276)<br>(277)<br>(279)   | 0.108<br>0.12<br>0.1445<br>0.157<br>0.1445<br>0.095<br>0.1325<br>0.1325   |
| 18)<br>73)<br>74)<br>75)<br>75)<br>75)<br>75)<br>79)<br>80)   | 0.085<br>0.045<br>0.085<br>0.095<br>0.1521<br>0.1521<br>0.145<br>0.12<br>0.985  | ( 91)<br>( 92)<br>( 92)<br>( 94)<br>( 95)<br>( 95)<br>( 96)<br>( 97)<br>( 98)   | 0.085<br>0.033<br>0.035<br>0.056<br>0.056<br>0.056<br>0.0281<br>0.0281   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)  | 8,0129<br>86-3<br>7,86-3<br>86-3<br>86-3<br>7,86-3<br>86-3  | (127)<br>(129)<br>(129)<br>(130)<br>(134)<br>(133)<br>(133)<br>(134)  | 0.014<br>0.0136<br>0.0136<br>0.014<br>0.0138<br>0.014<br>0.0638   | (217)<br>(218)<br>(229)<br>(220)<br>(221)<br>(223)<br>(223)<br>(224)<br>(225)  | 0.197<br>4.501<br>0.7<br>0.445<br>0.522<br>0.32<br>0.2712<br>0.225<br>0.2102   | (235)<br>(236)<br>(237)<br>(238)<br>(239)<br>(240)<br>(240)<br>(241)<br>(242)<br>(243)  | 0.12<br>0.103<br>0.084<br>0.054<br>0.12<br>0.074<br>0.108<br>0.085<br>0.108  | (253)<br>(254)<br>(255)<br>(256)<br>(256)<br>(256)<br>(256)<br>(256)<br>(260)<br>(251)  | 0.2102<br>0.197<br>0.1573<br>0.1445<br>0.1445<br>0.1321<br>0.132<br>0.132  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(276)<br>(277)<br>(279)  | 0.108<br>0.12<br>0.1449<br>0.157<br>0.1449<br>0.1449<br>0.095<br>0.1329<br>0.108<br>0.108   |
| 18)<br>73)<br>74)<br>75)<br>75)<br>76)<br>77)<br>78)<br>79)<br>80)<br>81)   | 0.085<br>0.045<br>0.085<br>0.095<br>0.1321<br>0.145<br>0.12<br>0.085<br>0.085   | ( 91)<br>( 92)<br>( 92)<br>( 94)<br>( 95)<br>( 95)<br>( 97)<br>( 98)<br>( 99)   | 0.085<br>0.035<br>0.035<br>0.036<br>0.054<br>0.054<br>0.058<br>0.0281<br>0.0281<br>0.108                                       | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(116)   | 0.0123<br>8E-3<br>7.8E-3<br>8E-3<br>8E-3<br>7.8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>7.8E-3  | (127)<br>(129)<br>(129)<br>(130)<br>(134)<br>(134)<br>(134)<br>(134)<br>(135)   | 0.013<br>0.013<br>0.0138<br>0.0138<br>0.0138<br>0.014<br>0.0638<br>0.054  | (217)<br>(218)<br>(219)<br>(220)<br>(221)<br>(223)<br>(223)<br>(223)<br>(224)<br>(225)<br>(226)  | 0.197<br>4.501<br>0.7<br>0.445<br>0.522<br>0.32<br>0.2710<br>0.225<br>0.2102<br>0.197  | (235)<br>(236)<br>(237)<br>(238)<br>(239)<br>(240)<br>(241)<br>(242)<br>(243)<br>(244)  | 0.12<br>0.103<br>0.084<br>0.084<br>0.12<br>0.074<br>0.108<br>0.085<br>0.108<br>0.108   | (253)<br>(254)<br>(255)<br>(256)<br>(2574)<br>(2574)<br>(2574)<br>(2574)<br>(260)<br>(260)<br>(262)   | 0.2102<br>0.197<br>0.1573<br>0.1445<br>0.1445<br>0.1445<br>0.1321<br>0.132<br>0.12<br>0.064  | (271)<br>(272)<br>(273)<br>(274)<br>(276)<br>(276)<br>(277)<br>(279)<br>(290)  | 0.108<br>0.12<br>0.1440<br>0.157<br>0.1440<br>0.095<br>0.1320<br>0.1320<br>0.108<br>0.108<br>0.095  |
| 18)<br>73)<br>74)<br>75)<br>75)<br>76)<br>77)<br>78)<br>80)<br>80)<br>81)<br>82)                                    | 0.085<br>0.045<br>0.085<br>0.095<br>0.1021<br>0.1321<br>0.1445<br>0.12<br>0.085<br>0.085<br>0.085   | ( 91)<br>( 92)<br>( 92)<br>( 95)<br>( 95)<br>( 95)<br>( 97)<br>( 98)<br>( 99)<br>(100)  | 0.085<br>0.035<br>0.035<br>0.056<br>0.054<br>0.058<br>0.0281<br>0.0281<br>0.108<br>0.054                                       | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)  | 0.0123<br>8E-3<br>7.8E-0<br>9E-3<br>9E-3<br>8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>8E-3  | (127)<br>(129)<br>(129)<br>(130)<br>(131)<br>(134)<br>(133)<br>(134)<br>(135)<br>(135)  | 0.0138<br>0.014<br>0.0138<br>0.0138<br>0.0138<br>0.014<br>0.0638<br>0.054<br>0.054  | (217)<br>(216)<br>(219)<br>(220)<br>(221)<br>(222)<br>(223)<br>(223)<br>(224)<br>(225)<br>(226)<br>(227)   | 0.197<br>4.501<br>0.7<br>0.445<br>0.322<br>0.32<br>0.2712<br>0.225<br>0.2102<br>0.197<br>0.1704                              | (235)<br>(236)<br>(237)<br>(238)<br>(240)<br>(240)<br>(241)<br>(242)<br>(243)<br>(244)<br>(243)   | 0.12<br>0.100<br>0.109<br>0.084<br>0.12<br>0.074<br>0.108<br>0.085<br>0.108<br>0.102<br>0.122  | (253)<br>(254)<br>(255)<br>(255)<br>(257)<br>(259)<br>(259)<br>(259)<br>(260)<br>(251)<br>(262)<br>(263)  | 0.2102<br>0.197<br>0.1575<br>0.1445<br>0.1445<br>0.1445<br>0.1321<br>0.1321<br>0.132<br>0.12<br>0.064<br>0.0964  | (271)<br>(272)<br>(273)<br>(274)<br>(276)<br>(277)<br>(277)<br>(279)<br>(279)<br>(280)<br>(281)  | 0.103<br>0.12<br>0.1443<br>0.157<br>0.1443<br>0.095<br>0.132<br>0.108<br>0.096<br>0.096<br>0.096  |
| 18)<br><br>73)<br>74)<br>75)<br>76)<br>77)<br>78)<br>79)<br>80)<br>80)<br>81)<br>82)<br>83)                         | 0.085<br>0.045<br>0.095<br>0.095<br>0.1521<br>0.1545<br>0.12<br>0.085<br>0.085<br>0.045<br>0.045  | ( 91)<br>( 92)<br>( 92)<br>( 94)<br>( 95)<br>( 95)<br>( 95)<br>( 96)<br>( 97)<br>( 98)<br>( 99)<br>(100)<br>(101)                         | 0.085<br>0.033<br>0.035<br>0.056<br>0.054<br>0.058<br>0.0281<br>0.108<br>0.0281<br>0.108<br>0.054                              | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(116)<br>(118)<br>(119)   | 0.0123<br>8E-7<br>7.8E-7<br>8E-7<br>8E-7<br>8E-3<br>8E-3<br>8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3  | (127)<br>(129)<br>(129)<br>(130)<br>(134)<br>(134)<br>(133)<br>(134)<br>(135)<br>(136)<br>(136)<br>(137)  | 0.014<br>0.0136<br>0.0136<br>0.014<br>0.014<br>0.0438<br>0.054<br>0.054<br>0.056<br>7.86-3  | (217)<br>(218)<br>(219)<br>(220)<br>(221)<br>(223)<br>(223)<br>(223)<br>(224)<br>(225)<br>(226)  | 0.197<br>4.501<br>0.7<br>0.445<br>0.522<br>0.32<br>0.2710<br>0.225<br>0.2102<br>0.197  | (235)<br>(236)<br>(237)<br>(237)<br>(240)<br>(241)<br>(242)<br>(242)<br>(243)<br>(244)<br>(245)<br>(246)  | 0.12<br>0.100<br>0.109<br>0.084<br>0.12<br>0.074<br>0.109<br>0.085<br>0.109<br>0.102<br>0.12<br>0.12<br>0.197  | (253)<br>(254)<br>(254)<br>(254)<br>(254)<br>(254)<br>(254)<br>(254)<br>(264)<br>(262)<br>(264)   | 0.2102<br>0.197<br>0.1573<br>0.1445<br>0.1445<br>0.1445<br>0.1321<br>0.132<br>0.132<br>0.132<br>0.084<br>0.0964<br>0.085   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(279)<br>(290)<br>(291)<br>(291)<br>(292)   | $\begin{array}{c} 0.103\\ 0.12\\ 0.1443\\ 0.157\\ 0.1443\\ 0.098\\ 0.132\\ 0.108\\ 0.098\\ 0.096\\ 0.132\\ 0.108\\ 0.076\\ 0.132\\ 0.108\end{array}$  |
| 18)<br>73)<br>74)<br>75)<br>76)<br>77)<br>78)<br>79)<br>80)<br>80)<br>81)<br>82)<br>83)                             | 0.085<br>0.045<br>0.095<br>0.1521<br>0.1521<br>0.12<br>0.085<br>0.085<br>0.085<br>0.045<br>0.045  | ( 91)<br>( 92)<br>( 92)<br>( 94)<br>( 95)<br>( 95)<br>( 97)<br>( 98)<br>( 99)<br>(100)<br>(101)<br>(102)                                  | 0.085<br>0.033<br>0.005<br>0.056<br>0.056<br>0.054<br>0.036<br>0.0281<br>0.0281<br>0.0281<br>0.054<br>0.054<br>0.054           | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(116)<br>(117)<br>(118)<br>(119)<br>(120)                                     | 0.0123<br>8E-3<br>7.8E-3<br>9E-3<br>8E-3<br>7.8E-3<br>8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>9.0742  | (127)<br>(129)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(136)<br>(137)<br>(138)                                     | 0.0134<br>0.0138<br>0.0138<br>0.014<br>0.0438<br>0.054<br>0.054<br>0.054<br>0.056<br>7.86-3<br>26-3                                     | (217)<br>(216)<br>(219)<br>(220)<br>(221)<br>(222)<br>(223)<br>(223)<br>(224)<br>(225)<br>(226)<br>(227)   | 0.197<br>4.501<br>0.7<br>0.445<br>0.322<br>0.32<br>0.2712<br>0.225<br>0.2102<br>0.197<br>0.1704                              | (235)<br>(236)<br>(237)<br>(238)<br>(240)<br>(240)<br>(241)<br>(242)<br>(243)<br>(244)<br>(243)   | 0.12<br>0.100<br>0.100<br>0.084<br>0.12<br>0.074<br>0.109<br>0.085<br>0.109<br>0.102<br>0.122<br>0.12<br>0.127<br>1.822                                    | (253)<br>(254)<br>(256)<br>(256)<br>(257)<br>(257)<br>(257)<br>(260)<br>(260)<br>(261)<br>(262)<br>(263)<br>(265)   | 0.2102<br>0.197<br>0.1573<br>0.1445<br>0.1445<br>0.1445<br>0.1321<br>0.132<br>0.132<br>0.132<br>0.132<br>0.064<br>0.0964<br>0.0964   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(279)<br>(279)<br>(290)<br>(291)<br>(281)<br>(282)<br>(283)                                     | 0.103<br>0.12<br>0.1443<br>0.157<br>0.1443<br>0.098<br>0.132<br>0.108<br>0.098<br>0.108<br>0.108<br>0.132<br>0.108  |
| 18)<br>73)<br>74)<br>75)<br>75)<br>77)<br>78)<br>79)<br>80)<br>81)<br>82)<br>82)<br>83)<br>84)                      | 0.085<br>0.045<br>0.095<br>0.1521<br>0.1545<br>0.12<br>0.985<br>0.085<br>0.045<br>0.045   | ( 91)<br>( 92)<br>( 92)<br>( 94)<br>( 95)<br>( 95)<br>( 95)<br>( 96)<br>( 97)<br>( 98)<br>( 99)<br>(100)<br>(101)                         | 0.085<br>0.033<br>0.035<br>0.036<br>0.036<br>0.036<br>0.0281<br>0.0281<br>0.0281<br>0.0281<br>0.054<br>0.054<br>0.054          | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(116)<br>(117)<br>(118)<br>(119)<br>(120)<br>(121)                            | 0.0123<br>8E-3<br>9E-3<br>9E-3<br>9E-3<br>9E-3<br>8E-3<br>8E-3<br>8E-3<br>8E-3<br>9.8E-3<br>9.8E-3<br>0.0742                                      | (127)<br>(129)<br>(129)<br>(130)<br>(134)<br>(133)<br>(134)<br>(135)<br>(134)<br>(135)<br>(134)<br>(137)<br>(138)<br>(139)                            | 0.013<br>0.013<br>0.013<br>0.013<br>0.014<br>0.053<br>0.054<br>0.054<br>0.054<br>0.055<br>7.82-3<br>22-3<br>2.52-3                      | (217)<br>(216)<br>(219)<br>(220)<br>(221)<br>(222)<br>(223)<br>(224)<br>(225)<br>(226)<br>(227)<br>(229)   | 0.197<br>4.501<br>0.7<br>0.445<br>0.302<br>0.2710<br>0.225<br>0.2102<br>0.197<br>0.1704<br>0.157                             | (235)<br>(236)<br>(237)<br>(237)<br>(240)<br>(241)<br>(242)<br>(242)<br>(243)<br>(244)<br>(245)<br>(246)  | 0.12<br>0.100<br>0.109<br>0.084<br>0.12<br>0.074<br>0.108<br>0.108<br>0.108<br>0.108<br>0.108<br>0.102<br>0.12<br>0.12<br>0.12<br>1.822                    | (253)<br>(254)<br>(254)<br>(256)<br>(256)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257) | 0.2102<br>0.197<br>0.1575<br>0.1445<br>0.1445<br>0.1445<br>0.1321<br>0.132<br>0.024<br>0.0964<br>0.0964<br>0.0964<br>0.074   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(279)<br>(279)<br>(280)<br>(281)<br>(281)<br>(282)<br>(283)<br>(284)                            | $\begin{array}{c} 0.103\\ 0.12\\ 0.144;\\ 0.157\\ 0.144;\\ 0.098\\ 0.132;\\ 0.108\\ 0.096\\ 0.132;\\ 0.108\\ 0.096\\ 0.132;\\ 0.108\\ 0.144;\\ 0.12\end{array}$                             |
| 18)<br>73)<br>74)<br>75)<br>76)<br>76)<br>78)<br>79)<br>81)<br>81)<br>82)<br>83)                                    | 0.085<br>0.045<br>0.095<br>0.1521<br>0.1521<br>0.12<br>0.085<br>0.085<br>0.085<br>0.045<br>0.045  | ( 91)<br>( 92)<br>( 92)<br>( 94)<br>( 95)<br>( 95)<br>( 97)<br>( 98)<br>( 99)<br>(100)<br>(101)<br>(102)                                  | 0.085<br>0.035<br>0.035<br>0.036<br>0.054<br>0.054<br>0.0281<br>0.0281<br>0.0281<br>0.0281<br>0.054<br>0.054<br>0.054<br>0.054 | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(116)<br>(117)<br>(118)<br>(119)<br>(120)<br>(121)<br>(122)                   | 0.0123<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>0.0742<br>0.034                               | (127)<br>(129)<br>(129)<br>(130)<br>(134)<br>(134)<br>(135)<br>(134)<br>(135)<br>(134)<br>(135)<br>(136)<br>(137)<br>(138)<br>(139)<br>(140)          | 0.014<br>0.0138<br>0.0138<br>0.0138<br>0.014<br>0.0638<br>0.054<br>0.054<br>0.054<br>0.054<br>0.055<br>7.82-3<br>22-3<br>2.52-3<br>22-3 | (217)<br>(218)<br>(219)<br>(220)<br>(221)<br>(223)<br>(223)<br>(224)<br>(225)<br>(226)<br>(227)<br>(228)<br>(229)<br>(229)                                     | 0.197<br>4.501<br>0.7<br>0.445<br>0.522<br>0.32<br>0.2712<br>0.225<br>0.2102<br>0.197<br>0.1704                              | (235)<br>(236)<br>(237)<br>(238)<br>(240)<br>(241)<br>(241)<br>(242)<br>(243)<br>(244)<br>(245)<br>(246)<br>(247)                                     | 0.12<br>0.100<br>0.100<br>0.084<br>0.12<br>0.074<br>0.109<br>0.085<br>0.109<br>0.102<br>0.122<br>0.12<br>0.127<br>1.822                                    | (253)<br>(254)<br>(255)<br>(255)<br>(255)<br>(255)<br>(255)<br>(257)<br>(262)<br>(251)<br>(262)<br>(253)<br>(265)<br>(265)<br>(265)<br>(265)  | 0.2102<br>0.197<br>0.1573<br>0.1445<br>0.1445<br>0.1445<br>0.1321<br>0.132<br>0.12<br>0.064<br>0.0964<br>0.0964<br>0.074<br>0.0954   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(274)<br>(277)<br>(277)<br>(277)<br>(277)<br>(280)<br>(281)<br>(281)<br>(282)<br>(284)<br>(285)                   | 0.103<br>0.12<br>0.144:<br>0.157<br>0.144:<br>0.095<br>0.1321<br>0.108<br>0.095<br>0.1321<br>0.108<br>0.1321<br>0.108<br>0.1321<br>0.108<br>0.122<br>0.144:                                 |
| 18)<br>73)<br>74)<br>75)<br>76)<br>76)<br>76)<br>78)<br>80)<br>80)<br>81)<br>82)<br>83)<br>84)<br>85)<br>85)<br>84) | 0.085<br>0.045<br>0.095<br>0.1521<br>0.145<br>0.12<br>0.085<br>0.085<br>0.085<br>0.045<br>0.045<br>0.045<br>0.085                             | ( 91)<br>( 92)<br>( 92)<br>( 93)<br>( 95)<br>( 95)<br>( 95)<br>( 97)<br>( 99)<br>( 100)<br>( 101)<br>( 102)<br>( 103)                     | 0.085<br>0.033<br>0.035<br>0.036<br>0.036<br>0.036<br>0.0281<br>0.0281<br>0.0281<br>0.0281<br>0.054<br>0.054<br>0.054          | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(117)<br>(120)<br>(121)<br>(122)<br>(123) | 0.0123<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>0.0742<br>0.034<br>0.0208                     | (127)<br>(129)<br>(129)<br>(130)<br>(131)<br>(134)<br>(135)<br>(135)<br>(135)<br>(136)<br>(137)<br>(138)<br>(139)<br>(140)                            | 0.014<br>0.0138<br>0.0138<br>0.014<br>0.0138<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.055<br>7.82-3<br>225-3<br>225-3<br>225-3 | (217)<br>(218)<br>(219)<br>(220)<br>(221)<br>(223)<br>(224)<br>(225)<br>(224)<br>(227)<br>(228)<br>(227)<br>(228)<br>(229)<br>(230)                            | 0.197<br>4.501<br>0.7<br>0.445<br>0.302<br>0.2710<br>0.225<br>0.2102<br>0.197<br>0.1704<br>0.157<br>0.157<br>0.1443          | (235)<br>(236)<br>(237)<br>(238)<br>(240)<br>(240)<br>(241)<br>(242)<br>(243)<br>(244)<br>(245)<br>(246)<br>(246)<br>(248)                            | 0.12<br>0.100<br>0.109<br>0.084<br>0.12<br>0.074<br>0.108<br>0.108<br>0.108<br>0.108<br>0.108<br>0.102<br>0.12<br>0.12<br>0.12<br>1.822                    | (253)<br>(254)<br>(254)<br>(256)<br>(256)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257) | 0.2102<br>0.197<br>0.1573<br>0.1445<br>0.1445<br>0.1445<br>0.1321<br>0.132<br>0.132<br>0.064<br>0.0964<br>0.0964<br>0.074<br>0.0964  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(279)<br>(290)<br>(290)<br>(291)<br>(292)<br>(293)<br>(295)<br>(295)<br>(296)                   | $\begin{array}{c} 0.103\\ 0.12\\ 0.144;\\ 0.157\\ 0.144;\\ 0.096\\ 0.132;\\ 0.108\\ 0.096\\ 0.132;\\ 0.108\\ 0.132;\\ 0.108\\ 0.132;\\ 0.144;\\ 0.12\\ 0.144;\\ 0.157\end{array}$           |
| 18)<br>73)<br>74)<br>75)<br>75)<br>76)<br>78)<br>80)<br>81)<br>82)<br>83)<br>84)<br>85)<br>85)<br>85)<br>87)        | 0.085<br>0.045<br>0.085<br>0.095<br>0.1321<br>0.1445<br>0.085<br>0.085<br>0.085<br>0.045<br>0.085<br>0.085<br>0.085<br>0.085                  | ( 91)<br>( 92)<br>( 92)<br>( 93)<br>( 95)<br>( 95)<br>( 97)<br>( 97)<br>( 97)<br>( 100)<br>( 101)<br>( 102)<br>( 103)<br>( 104)           | 0.085<br>0.035<br>0.035<br>0.036<br>0.054<br>0.054<br>0.0281<br>0.0281<br>0.0281<br>0.0281<br>0.054<br>0.054<br>0.054<br>0.054 | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(117)<br>(120)<br>(121)<br>(122)<br>(122)<br>(124)          | 0.0123<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>0.0742<br>0.0742<br>0.0742<br>0.034<br>0.0208 | (127)<br>(129)<br>(129)<br>(130)<br>(134)<br>(134)<br>(135)<br>(135)<br>(135)<br>(135)<br>(135)<br>(138)<br>(138)<br>(138)<br>(141)<br>(141)<br>(142) | 0.014<br>0.0138<br>0.0138<br>0.014<br>0.0638<br>0.054<br>0.054<br>0.054<br>0.054<br>0.055<br>7.88=3<br>2E=3<br>2.5E=3<br>2.5E=3<br>0    | (217)<br>(216)<br>(219)<br>(220)<br>(221)<br>(223)<br>(224)<br>(225)<br>(226)<br>(227)<br>(228)<br>(227)<br>(228)<br>(229)<br>(229)<br>(230)<br>(231)<br>(232) | 0.197<br>4.501<br>0.7<br>0.445<br>0.322<br>0.225<br>0.225<br>0.2102<br>0.197<br>0.1704<br>0.157<br>0.1704<br>0.157<br>0.1445 | (235)<br>(236)<br>(237)<br>(238)<br>(240)<br>(241)<br>(242)<br>(244)<br>(243)<br>(244)<br>(245)<br>(246)<br>(247)<br>(248)<br>(248)<br>(249)<br>(250) | 0.12<br>0.100<br>0.109<br>0.084<br>0.12<br>0.074<br>0.108<br>0.108<br>0.108<br>0.108<br>0.108<br>0.102<br>0.12<br>0.12<br>0.197<br>1.822<br>1.822<br>0.905 | (253)<br>(254)<br>(255)<br>(255)<br>(255)<br>(255)<br>(255)<br>(257)<br>(262)<br>(251)<br>(262)<br>(253)<br>(265)<br>(265)<br>(265)<br>(265)  | 0.2102<br>0.197<br>0.1573<br>0.1445<br>0.1445<br>0.1445<br>0.1321<br>0.132<br>0.132<br>0.064<br>0.0964<br>0.0964<br>0.0964<br>0.0964<br>0.0964<br>0.0964<br>0.0964<br>0.0964 | (271)<br>(272)<br>(273)<br>(274)<br>(276)<br>(277)<br>(279)<br>(279)<br>(279)<br>(290)<br>(291)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(296)<br>(297) | $\begin{array}{c} 0.108\\ 0.12\\ 0.1442\\ 0.157\\ 0.1442\\ 0.098\\ 0.1321\\ 0.108\\ 0.0964\\ 0.0964\\ 0.096\\ 0.1321\\ 0.108\\ 0.122\\ 0.1443\\ 0.12\\ 0.1443\\ 0.157\\ 0.1704 \end{array}$ |
| 18)<br>73)<br>74)<br>75)<br>77)<br>78)<br>79)<br>81)<br>81)<br>82)<br>83)<br>84)<br>85)<br>84)                      | 0.085<br>0.045<br>0.045<br>0.095<br>0.1321<br>0.1321<br>0.12<br>0.085<br>0.085<br>0.045<br>0.045<br>0.045<br>0.045<br>0.054<br>0.054<br>0.054 | ( 91)<br>( 92)<br>( 92)<br>( 95)<br>( 95)<br>( 95)<br>( 97)<br>( 98)<br>( 97)<br>( 100)<br>( 101)<br>( 101)<br>( 103)<br>( 104)<br>( 105) | 0.085<br>0.035<br>0.035<br>0.054<br>0.054<br>0.0281<br>0.0281<br>0.108<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(117)<br>(120)<br>(121)<br>(122)<br>(123) | 0.0123<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>0.0742<br>0.034<br>0.0208                     | (127)<br>(129)<br>(129)<br>(130)<br>(131)<br>(134)<br>(135)<br>(135)<br>(135)<br>(136)<br>(137)<br>(138)<br>(139)<br>(140)                            | 0.014<br>0.0138<br>0.0138<br>0.014<br>0.0138<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.055<br>7.82-3<br>225-3<br>225-3<br>225-3 | (217)<br>(216)<br>(219)<br>(220)<br>(221)<br>(223)<br>(224)<br>(225)<br>(224)<br>(227)<br>(228)<br>(227)<br>(228)<br>(229)<br>(230)                            | 0.197<br>4.501<br>0.7<br>0.445<br>0.302<br>0.2710<br>0.225<br>0.2102<br>0.197<br>0.1704<br>0.157<br>0.157<br>0.1443          | (235)<br>(236)<br>(237)<br>(238)<br>(240)<br>(240)<br>(242)<br>(242)<br>(244)<br>(244)<br>(245)<br>(244)<br>(246)<br>(248)<br>(248)                   | 0.12<br>0.100<br>0.109<br>0.054<br>0.12<br>0.074<br>0.108<br>0.085<br>0.108<br>0.108<br>0.102<br>0.12<br>0.12<br>0.12<br>1.822<br>1.822<br>0.905<br>0.445  | (253)<br>(254)<br>(256)<br>(256)<br>(256)<br>(256)<br>(260)<br>(260)<br>(262)<br>(263)<br>(264)<br>(265)<br>(264)<br>(265)<br>(266)<br>(266)  | 0.2102<br>0.197<br>0.1573<br>0.1445<br>0.1445<br>0.1445<br>0.1321<br>0.132<br>0.132<br>0.021<br>0.085<br>0.0964<br>0.0964<br>0.0964<br>0.0964<br>0.0964                      | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(279)<br>(290)<br>(290)<br>(291)<br>(292)<br>(293)<br>(295)<br>(295)<br>(296)                   | 0.103<br>0.12<br>0.1445<br>0.157<br>0.1445<br>0.095<br>0.1321<br>0.108<br>0.0964<br>0.1321<br>0.108<br>0.1321<br>0.108<br>0.121<br>0.1445   |

.

River discharge data at 12-hourly intervals for Station: 23A Period : 1

,

.

Variable: FLEINL.vari (length = 360)

.

| 1) 6.203<br>2) 5.95<br>3) 5.601<br>4) 4.9<br>5) 4.227<br>6) 4.02<br>7) 3.501<br>8) 3.11<br>9) 2.746<br>10) 2.605<br>11) 2.264<br>12) 1.972<br>13) 1.655<br>14) 1.396<br>15) 1.119 |                         | ( 37) 0.311<br>( 37) 0.311<br>( 38) 1.02<br>( 39) 0.686<br>( 40) 1.02<br>( 41) 1.002<br>( 42) 1.02<br>( 42) 1.02<br>( 42) 1.02<br>( 43) 0.8995<br>( 44) 0.905<br>( 45) 0.905<br>( 46) 0.704<br>( 49) 0.784<br>( 50) 0.799<br>( 51) 0.784<br>( 52) 0.799 |                            | ( 73) 0.552<br>( 74) 0.794<br>( 75) 2.771<br>( 75) 2.771<br>( 77) 2.124<br>( 73) 5.077<br>( 79) 12.75<br>( 80) 37.4<br>( 81) 15.64<br>( 81) 15.64<br>( 83) 8.52<br>( 84) 6.57<br>( 85) 5.361<br>( 85) 5.361<br>( 85) 4.85<br>( 89) 4.62<br>( 89) 3.77 |             | $\begin{array}{c} (199) & 1.254 \\ (200) & 1.138 \\ (201) & 1.138 \\ (202) & 1.019 \\ (202) & 1.019 \\ (203) & 2.291 \\ (203) & 2.291 \\ (204) & 2.291 \\ (205) & 1.201 \\ (206) & 1.802 \\ (207) & 1.676 \\ (208) & 10.8 \\ (209) & 16.02 \\ (210) & 70 \\ (211) & 45.42 \\ (212) & 21.4 \\ (213) & 54.4 \\ (214) & 25.5 \\ (215) & 14.87 \end{array}$ | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ |
|---|-------------------------|---|----------------------------|---|-------------|---|---|---|--|
| 17) 0.784<br>18) 0.7  | (35) 0.434<br>(35) 1.02 | (53) 0,784<br>(54) 0,799  | ( 71) 0.445<br>( 72) 0.607 | (89) 3.77<br>(90) 3.54  | (198) 1.264 | (216) 11.94   | (234) 3.77  | (252) 1.442   | (270) 13.16  |

Phosphorus transport Berg River

| Variable: ELEIN4.vari                                    | (length = 244)  |                  |  |   |   |  |  |  |  |  |   |   |
|--|---|------------------|--|---|---|--|--|--|--|--|---|---|
|  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$                    |                  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{c} (182) \\ (182) \\ (185) \\ (185) \\ (185) \\ (185) \\ (185) \\ (187) \\ (190) \\ 4 \\ (197) \\ 4 \\ (190) \\ 4 \\ (190) \\ 4 \\ (192) \\ 4 \\ (192) \\ 4 \\ (192) \\ 4 \\ (192) \\ 4 \\ (192) \\ 4 \\ (192) \\ 4 \\ (192) \\ 4 \\ (192) \\ 5 \\ (197) \\ 5 \\ (196) \\ 5 \\ (196) \\ 5 \end{array}$ | 1.35         1.35           0.35         12           0.35         12           0.077         12           0.077         12           0.077         12           0.077         12           0.077         12           0.077         12           0.077         12           0.027         12           0.027         12           0.027         12           0.027         12           0.027         12           0.027         12           0.027         12           0.027         12           0.027         12           0.0277         12           0.0277         12           0.0277         12           0.0277         12           0.0277         12           0.0277         12           0.0277         12           0.0277         12           0.0277         12           0.0277         12 | $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$ | (217)<br>(218)<br>(219)<br>(220)<br>(221)<br>(222)<br>(222)<br>(222)<br>(224)<br>(225)<br>(225)<br>(225)<br>(225)<br>(227)<br>(226)<br>(227)<br>(227)<br>(226)<br>(227)<br>(223)<br>(223)<br>(224) | 2.771<br>2.94<br>2.771<br>2.405<br>2.405<br>2.405<br>2.305<br>2.281<br>2.281<br>2.281<br>2.281<br>2.281<br>2.281<br>2.281<br>2.281<br>2.281<br>2.281<br>2.281<br>2.281<br>2.281<br>2.281<br>2.291<br>2.291<br>2.291<br>2.291<br>2.291<br>2.291 | $\begin{array}{c} (235) \\ (235) \\ (237) \\ (238) \\ (239) \\ (240) \\ (241) \\ (242) \\ (244) \\ (243) \\ (243) \\ (244) \\ (244) \\ (244) \\ (244) \\ (249) \\ (251) \\ (251) \\ (252) \end{array}$ | $\begin{matrix} 10\\ 7,87\\ 6,299\\ 4,801\\ 4,27\\ 3,773\\ 5,54\\ 5,114\\ 2,94\\ 2,771\\ 2,114\\ 2,94\\ 2,771\\ 2,505\\ 2,605\\ 4,02\\ 3,114\\ 2,605\\ 4,02\\ 3,114\\ 2,605\\ 1,605\\ 2,605\\ 3,114\\ 2,605\\ 1,605\\ 2,605\\ 3,114\\ 2,605\\ 3,114\\ 2,605\\ 3,114\\ 2,605\\ 3,114\\ 2,605\\ 3,114\\ 2,605\\ 3,114\\ 3$ | (253)<br>(253)<br>(253)<br>(253)<br>(254)<br>(257)<br>(257)<br>(254)<br>(251)<br>(253)<br>(253)<br>(253)<br>(253)<br>(253)<br>(253)<br>(253)<br>(253)<br>(253)<br>(253)<br>(253)<br>(257) | 2,442<br>2,124<br>2,124<br>2,124<br>2,124<br>2,144<br>2,144<br>3,144<br>4,013<br>3,538<br>2,94<br>2,94<br>2,271<br>2,442<br>2,442<br>2,442<br>2,442 |
| (91) 2.442 (109)<br>(92) 2.442 (110)<br>(92) 2.442 (111) | 50         (127)         5.07           21.9         (123)         5.07 | 7 (146) 3.11 (16 | 5) 53.2  | (272) 2   | 2.771 (<br>2.505 (  | (37) 1.674<br>(90) 1.534<br>(91) 1.534               | (307)<br>(208)<br>(309)  | 0.905<br>0.799<br>0.799  | (325)<br>(326)<br>(327)  | 0.507<br>0.7<br>0.701  | (.343)<br>(344)   | 0.385<br>0.353  |

| (107)          | 11.13<br>9.26<br>60 | (124)<br>(125)<br>(126) |                 | (142)<br>(143)<br>(144) | 3.54<br>3.54<br>3.31 | (160)<br>(161) 2<br>(162) 15 | 23.41                | (179)<br>(180)          | 6.57<br>6.239        | (280)<br>(280)<br>(280)   | 1.822                   | (305)<br>(306)          | 1.139          | (323)<br>(324)   | 0.522<br>0.522 | (341)<br>(342) | 0.445<br>0.353 |     |
|----------------|---------------------|-------------------------|-----------------|-------------------------|----------------------|------------------------------|----------------------|-------------------------|----------------------|---------------------------|-------------------------|-------------------------|----------------|------------------|----------------|----------------|----------------|-----|
| (104)<br>(105) | 15.3<br>14.43       | (122)<br>(123)          | 6.57<br>6.28    | (140)<br>(141)          | 3.77                 | (159)                        | 5.75<br>5.381<br>4.8 | (176)<br>(177)<br>(178) | 7.54<br>7.21<br>6.87 | (284)<br>(285)<br>- (286) | 1.972<br>1.972<br>1.822 | (302)<br>(303)<br>(304) | 1,138          | (321)<br>(322)   | 0.522          | (339)<br>(340) | 0.607<br>0.522 |     |
| (102)          | 16.19<br>B.2        | (120)<br>(121)          | 7.21<br>6.89    | (138)<br>(139)          | 3.77<br>3.77         | (157)                        | 9.26<br>7.213        | (174)<br>(175)          | 8.22                 | (282)<br>(283)            | 1.972                   | (201)                   | 1,138          | (319)<br>(320)   | 0.7            | (337)<br>(338) | 0.445          |     |
| (100)          | 23.92               | (118)<br>(119)          | в.22<br>7.54    | (136)<br>(137)          | 3.77<br>3.77         | (155) 1                      | 10.02<br>14.43       | (173)                   | 14.87<br>11.9        | (289)<br>(281)            | 2 124                   | (278)<br>(299)<br>(300) | 1.138          | (317)<br>(318)   | 0.607          | (335)<br>(335) | 0.445<br>0.445 |     |
| (98)<br>(99)   | 55<br>50            | (116)<br>(117)          | 11.94<br>8.2    | (134)<br>(135)          | 3.77<br>3.77         | (153)                        | 7.21<br>4.801        | (171)                   | 17.1                 | (279)                     | 2.124                   | (297)                   | 1.019          | . (315)<br>(316) | 0.7<br>0.7     | (333)<br>(334) | 0.407<br>0.445 | č   |
| (96)<br>(97)   | 2.442<br>2.605      | (114)<br>(115)          | 14.01           | (132)<br>(137)          | 4.50                 | (151)                        | 5.65                 | (169)                   | 24.44<br>19.44       | (277)                     | 2.281                   | (275)                   | 1.138          | (313)<br>(314)   | ),797<br>),7   | (331)<br>(332) | 0,507<br>0,522 | l l |
| (94)<br>(95)   | 2,440<br>2,440      | (112)<br>(113)          | $15.2 \\ 14.01$ | (103)<br>(101)          | 4.8                  | (149)                        | 2.94<br>2.94<br>2.94 | (157) (158)             |                      | (275)<br>(275)            | 2.442                   | (293)<br>(294)          | 11244<br>11138 | (311)<br>(312)   | 0.797<br>0.759 | (339)<br>(339) | 01622<br>01522 |     |
| (92)<br>(93)   | 2,442               | (110)                   | 21.9<br>16.2    | (123)<br>(129)          | 5.077                | (147)                        |                      | (165)                   | 14.87                | (1/3)<br>(1/3)            | 2,505                   | (291)<br>(292) 1        | 1,504          | (309)<br>(310)   | 0.799          | (3273<br>(329) | 0.701<br>0.522 |     |

٠

-,;

| 1) 0.271  | (19)  |  | ( 37)   | 0.307  | ( 55)   |  | (7)  | 0.7  | (191)   |  | (199)   |   | (217)  |   | (235)  |   | (253)   | 5.34  |
|---|---|--|---|--|---|--|--|--|---|--|---|---|--|---|--|---|---|---|
| 2) 0.271  | (20)  |  | (33)  |  | (36)  | 0.7  | ( 74)  |  | (182)   |  | (200)   |   | (218)  |   | (236)  |   | (254)   |   |
| 3) 0.271  |   | 2.771  | ( 19)   | 0.607  | ( 57)   | 0.8  | (75)   |  | (1月さ) 1   |  | (201)   |   | (217)  |   | (237)  |   | (255)   |   |
| 4) 0.271  |   | 3.314  | ( 40)   |  | ( 58)   | 4.301  | (75)   | 1.254  | (164) .   |  | (202)   |   | (220)  | 5.06  | (238)  |   |   | 2.771   |
| 5) 0.271  | (22)  |  | (41)  | 0.607  | 1 57)   | 4 0.   | (77)   |  | (185) :   |  | (203)   |   | (221)  | 4.3   | (222)  |   | (257)   | 3,114   |
| 6) 0.271  |   | 1.972  | ( 12)   | 0.522  | 7 50)   | 2.114  | ( 28)  |  | (196) 4   |  | (204)   |   |  | 4.53  | C2401  |   |   |   |
| 7) 0.287  |   | 1.576  | (4.)  |  | ( 51)   | 2.124  | ( 79)  |  | (1:37) -  |  | (205)   |   |  | 4.31  | (241)  |   | (252)   |   |
| 81 0.287  |   | 1.376  | ( 44)   | 0.522  | 1 52)   | 1.575  | (80)   | 2,442  | (189) (   |  | (205)   |   |  | 4.27  | (242)  |   | (2z0)   |   |
| 9) 0.35   |   | 1.264  | (4')  |  | ( 52)   | 1.50   | (81)   | 1.97   | (167) 1   |  | (207)   |   | (225)  |   | (24.5)   |   | C251  |   |
| 101 6.572   | ( 38)   |  | ( 45)   |  | ( 54)   | 1.5.4  | ( 92)  | 1.534  | (199)   | 14.4:  | (208)   |   |  | 4.402   | (244)  |   |   | 6.250   |
| 11) 5.55  | (29)  |  | ( 47)   |  | ( 45)   | 1.204  | ( 35)  | 1.39   | (131)   |  | (107)   |   | (2.37)   |   | (245)  |   | (453)   |   |
| 12) 5.381   |   | 0.905  | (44)  |  | ( 65)   |  | (84)   | 1.104  | (172)   | 10.75  | (210)   |   |  | 4.412   | (246)  |   |   | 4.501   |
| 13) 5.95  | ( 31)   |  | ( 44 )  |  | ( 67)   |  | (85)   | 1.02   | (173)   |  | (211)   |   | (229)  |   | (247)  |   | (255)   |   |
| 14) 3.54  |   | 0.799  | 1 500   |  | ( 53)   |  | ( 95)  | 1.02   | (194)   |  | (21)  |   | (229)  |   |  | 2.442   | (256)   |   |
| 15) 4.53  | (37)  |  | ເຮັບ  |  | 1 44)   |  | ( 67)  | 3.114  | (175)   |  | (213)   |   | (251)  |   | (249)  |   | (257)   |   |
| 15) 4.02  | 1 341   |  | ( 50)   |  | ( 70)   | 0.799  | (83)   | 7.213  | (195)   |  | (214)   |   | (202)  |   | (250)  |   |   | 5,653   |
| 17) 2.605   | • -   |  | ( 53)   |  | (71)  |  | ( 199)   | 4.53   | (197)   |  | (212)   |   | (233)  |   | (251)  |   | (259)   |   |
| 18) 1.97  |   |  | ( 54)   |  |   | 0.799  |  |  | (198)   | 0.57   | (216)   | 5.95  | (234)  |   | (252)  |   |   | 5.077   |
|   |   |  |   |  |   |  |  |  |   |  |   |   |  |   |  |   |   |   |
|   |   |  |   |  |   |  |  |  |   |  |   |   |  |   |  |   |   |   |
|   |   |  |   |  |   |  | (192)  | 5.53   | (271)   | 4.50   | (287)   | 2.442   | (707)  | 1.822   | (325)  | 1.375   | (340)   | 0,7   |
| 91) 2.442   | (107)   |  |   | 1.97   |   | 7.54   | (163)<br>(164)   | <i>3.</i> 53<br>4.53   | (271)<br>(272)  | 4.50<br>4.018  | (287)<br>(299)  | 2,442<br>2,442  | (302)<br>(308)   | 1,822<br>2,281  | (325)<br>(326)   | 1.395<br>1.1254   | (342)<br>(344)  | 0,7<br>0,607  |
| 91) 2.442<br>92) 2.124  | (107)<br>(110)  | 1.674  | (127)   | 1.47<br>1.97   | (145)   | 7.54<br>6.57   | (163)<br>(164)<br>(164)  | 5.53<br>4.53<br>4.02   | (271)<br>(272)<br>(273)   | 4.50<br>4.018<br>3.775   | (287)<br>(299)<br>(291)   | 2.442<br>2.442<br>2.442   | (395)<br>(398)<br>(399)  | 1.022<br>2.201<br>7.114   | (325)<br>(326)<br>(327)  | 1.395<br>1.284<br>1.354   | (343)<br>(344)<br>(345)   | 0,7<br>0,607<br>0,522   |
| 91) 2.442<br>92) 2.124<br>93) 2.124   | (107)<br>(110)<br>(111)   | 1.676  | (127)<br>(128)  | 1.97<br>1.97<br>1.97   | (145)<br>(146)  | 7+54<br>6-57<br>7-54   | (163)<br>(164)<br>(164)<br>(165)   | 5.53<br>4.53<br>4.02<br>5.54   | (271)<br>(272)<br>(273)<br>(274)  | 4.50<br>4.018<br>3.775<br>3.508  | (289)<br>(290)<br>(291)<br>(292)  | 2,442<br>2,442<br>2,442<br>2,201  | (392)<br>(398)<br>(399)<br>(310)   | 1.822<br>2.281<br>7.114<br>2.442  | (325)<br>(326)<br>(327)<br>(327)<br>(320)  | 1.395<br>1.254<br>1.254<br>1.017  | (342)<br>(344)<br>(345)<br>(346)  | 0,7<br>0,607<br>0,522<br>0,522  |
| 91) 2.442<br>92) 2.124<br>93) 2.124<br>93) 2.124<br>94) 14.43   | (107)<br>(110)<br>(111)   | 1.676<br>1.675<br>2.442<br>2.771   | (127)<br>(128)<br>(129)   | 1.97<br>1.97<br>1.97<br>2.124  | (145)<br>(146)<br>(147)   | 7.54<br>6.57<br>7.54<br>6.97   | (163)<br>(164)<br>(165)<br>(166)<br>(167)  | 3.53<br>4.53<br>4.02<br>3.54<br>3.31   | (271)<br>(272)<br>(273)<br>(274)<br>(278)   | 4.50<br>4.018<br>3.775<br>3.508<br>3.518   | (289)<br>(290)<br>(291)<br>(292)<br>(292)   | 2,442<br>2,442<br>2,442<br>2,201<br>2,201<br>2,201  | (392)<br>(308)<br>(309)<br>(310)<br>(314)  | 1.822<br>2.281<br>3.114<br>2.442<br>1.970   | (325)<br>(326)<br>(327)<br>(327)<br>(329)  | 1.395<br>1.254<br>1.254<br>1.019<br>1.019   | (343)<br>(344)<br>(344)<br>(346)<br>(346)   | 0,7<br>0,607<br>0,522<br>0,522<br>0,522   |
| 91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.43<br>95) 7.141   | (109)<br>(110)<br>(111)<br>(112)<br>(112)   | 1.676<br>1.675<br>2.442<br>2.771   | (127)<br>(128)<br>(129)<br>(129)  | 1.97<br>1.97<br>1.97<br>2.124<br>2.124<br>2.124  | (145)<br>(146)<br>(147)<br>(143)  | 7.54<br>6.57<br>7.54<br>6.87<br>5.91   | (163)<br>(164)<br>(155)<br>(166)<br>(167)<br>(163)   | 3.53<br>4.53<br>4.02<br>3.54<br>3.31<br>3.11   | (2713<br>(272)<br>(273)<br>(274)<br>(278)<br>(278)  | 4.50<br>4.018<br>5.775<br>3.508<br>5.514<br>5.114  | (287)<br>(299)<br>(291)<br>(292)<br>(292)<br>(294)  | 2,442<br>2,442<br>2,442<br>2,281<br>2,281<br>2,281<br>2,281   | (392)<br>(399)<br>(399)<br>(310)<br>(314)<br>(312)   | 1.822<br>2.281<br>3.114<br>2.442<br>1.970<br>1.822  | (325)<br>(326)<br>(327)<br>(327)<br>(327)<br>(327)<br>(329)  | 1.095<br>1.254<br>1.254<br>1.019<br>1.019<br>1.019  | (340)<br>(044)<br>(044)<br>(044)<br>(044)<br>(044)<br>(044)   | 0,7<br>0,607<br>0,522<br>0,522<br>0,522<br>0,522  |
| 91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.43<br>95) 7.941<br>95) 7.941  | (107)<br>(110)<br>(111)<br>(112)<br>(117)<br>(114)  | 1.676<br>1.675<br>2.442<br>2.771<br>2.77   | (127)<br>(128)<br>(129)<br>(129)<br>(129)<br>(121)  | 1.97<br>1.97<br>1.97<br>2.124<br>2.124<br>2.124  | (145)<br>(146)<br>(147)<br>(148)<br>(148)<br>(149)  | 7.54<br>6.57<br>7.54<br>6.97<br>9.91<br>5.25   | (163)<br>(164)<br>(155)<br>(166)<br>(167)<br>(153)<br>(153)  | 5.53<br>4.53<br>4.02<br>3.54<br>3.11<br>3.11<br>2.94   | (271)<br>(1272)<br>(223)<br>(1274)<br>(275)<br>(275)<br>(277)   | 4.80<br>4.018<br>3.775<br>3.508<br>3.524<br>3.114<br>5.114   | (287)<br>(299)<br>(291)<br>(292)<br>(292)<br>(294)<br>(294)<br>(295)  | 2,442<br>2,442<br>2,442<br>2,201<br>2,201<br>2,201<br>2,201<br>2,201  | (702)<br>(708)<br>(709)<br>(710)<br>(710)<br>(714)<br>(712)<br>(712)   | 1.822<br>2.281<br>7.114<br>2.442<br>1.970<br>1.870<br>1.870   | (325)<br>(324)<br>(327)<br>(320)<br>(320)<br>(320)<br>(320)<br>(320)<br>(321)  | 1.398<br>1.254<br>1.254<br>1.019<br>1.019<br>1.019<br>1.019   | (342)<br>(344)<br>(346)<br>(346)<br>(347)<br>(349)<br>(349)   | 0,7<br>0,807<br>0,522<br>0,522<br>0,522<br>0,522<br>0,522<br>0,522  |
| 91) 2.442<br>92) 2.124<br>93) 2.124<br>93) 2.124<br>94) 14.43<br>95) 7.541<br>95) 4.301<br>95) 4.301  | (107)<br>(110)<br>(111)<br>(112)<br>(117)<br>(114)<br>(115)   | 1.676<br>1.675<br>2.442<br>2.771<br>2.442<br>2.600   | (127)<br>(128)<br>(129)<br>(120)<br>(121)<br>(175)  | 1.97<br>1.97<br>1.97<br>2.124<br>2.124<br>1.97<br>1.802  | (145)<br>(146)<br>(146)<br>(146)<br>(146)<br>(147)<br>(147)   | 7.54<br>6.57<br>7.54<br>6.37<br>9.91<br>5.25<br>5.25   | (163)<br>(164)<br>(155)<br>(166)<br>(167)<br>(163)   | 5.53<br>4.53<br>4.02<br>3.54<br>3.11<br>3.11<br>2.94   | (2713)<br>(272)<br>(273)<br>(273)<br>(273)<br>(275)<br>(275)  | 4.80<br>4.018<br>3.775<br>3.508<br>3.514<br>3.114<br>5.114<br>5.114<br>2.74  | (289)<br>(290)<br>(291)<br>(292)<br>(292)<br>(293)<br>(294)<br>(295)<br>(295)   | 2.442<br>2.442<br>2.442<br>2.201<br>2.201<br>2.201<br>2.201<br>2.201<br>2.201<br>2.201  | $\begin{array}{c} (752) \\ (708) \\ (709) \\ (710) \\ (710) \\ (711) \\ (712) \\ (712) \\ (712) \\ (714) \\ (714) \end{array}$   | 1.822<br>2.281<br>7.114<br>2.442<br>1.970<br>1.800<br>1.800<br>1.800<br>1.800   | (325)<br>(324)<br>(327)<br>(329)<br>(329)<br>(329)<br>(329)<br>(320)<br>(321)<br>(322)   | 1.398<br>1.254<br>1.254<br>1.019<br>1.019<br>1.019<br>1.019<br>0.906  | (343)<br>(344)<br>(346)<br>(346)<br>(344)<br>(344)<br>(344)<br>(342)<br>(350)   | 0,7<br>0,507<br>0,522<br>0,522<br>0,522<br>0,522<br>0,522<br>0,522<br>0,522   |
| 91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.43<br>95) 7.541<br>95) 7.541<br>95) 4.301<br>97) 3.77<br>98] 3.114  | (107)<br>(110)<br>(111)<br>(112)<br>(112)<br>(112)<br>(112)<br>(114)<br>(115)<br>(115)  | 1.676<br>1.675<br>2.442<br>2.771<br>2.77<br>2.442  | (127)<br>(128)<br>(129)<br>(129)<br>(129)<br>(121)<br>(121)<br>(121)  | 1.97<br>1.97<br>1.97<br>2.124<br>2.124<br>1.97<br>1.802<br>1.97  | (145)<br>(146)<br>(147)<br>(148)<br>(148)<br>(149)<br>(151)   | 7.54<br>6.57<br>7.54<br>6.97<br>9.91<br>5.25<br>5.35<br>4.301  | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(167)<br>(167)<br>(167)<br>(171)  | 5.53<br>4.53<br>4.02<br>5.54<br>3.51<br>5.11<br>2.94<br>2.77<br>2.44                                   | (271)<br>(272)<br>(273)<br>(273)<br>(273)<br>(273)<br>(275)<br>(275)<br>(275)   | 4.50<br>4.018<br>3.725<br>3.508<br>3.514<br>3.114<br>5.114<br>2.74<br>2.74   | (287)<br>(290)<br>(291)<br>(292)<br>(295)<br>(295)<br>(295)<br>(276)<br>(297)   | 2.442<br>2.442<br>2.442<br>2.201<br>2.201<br>2.201<br>2.201<br>2.201<br>2.201<br>2.124<br>1.972   | (352)<br>(308)<br>(310)<br>(310)<br>(314)<br>(512)<br>(513)<br>(114)<br>(315)  | 1.822<br>2.281<br>7.114<br>2.442<br>1.970<br>1.870<br>1.870<br>1.675<br>1.675   | (325)<br>(324)<br>(327)<br>(329)<br>(329)<br>(330)<br>(330)<br>(331)<br>(331)<br>(322)<br>(323)  | 1. 298<br>1. 254<br>1. 254<br>1. 019<br>1. 019<br>1. 019<br>0. 905<br>6, 905  | (342)<br>(344)<br>(344)<br>(346)<br>(344)<br>(344)<br>(349)<br>(349)<br>(350)<br>(351)  | 0,7<br>0,607<br>0,522<br>0,522<br>0,522<br>0,522<br>0,522<br>0,522<br>0,522   |
| 91) 2.442<br>92) 2.124<br>93) 2.124<br>93) 1.124<br>94) 14.43<br>95) 7.541<br>95) 4.301<br>97) 3.77<br>98] 3.114<br>94) 2.77  | (107)<br>(110)<br>(111)<br>(112)<br>(112)<br>(112)<br>(112)<br>(114)<br>(115)<br>(115)  | 1.676<br>1.675<br>2.442<br>2.771<br>2.77<br>2.442<br>2.600<br>6.39<br>5.00   | (127)<br>(128)<br>(129)<br>(129)<br>(129)<br>(129)<br>(121)<br>(121)<br>(121)<br>(134)  | 1.97<br>1.97<br>2.124<br>2.124<br>2.124<br>1.97<br>1.802<br>1.97<br>1.97   | (145)<br>(146)<br>(147)<br>(147)<br>(147)<br>(156)<br>(151)<br>(152)  | 7.54<br>6.57<br>7.54<br>6.97<br>5.91<br>5.91<br>5.30<br>4.301<br>4.301<br>4.30                               | (163)<br>(164)<br>(165)<br>(165)<br>(167)<br>(167)<br>(163)<br>(169)<br>(170)<br>(172)                                     | 3.53<br>4.02<br>3.54<br>3.54<br>3.54<br>3.51<br>2.94<br>2.77<br>2.44<br>2.20                           | (2713<br>(272)<br>(273)<br>(273)<br>(273)<br>(273)<br>(275)<br>(275)<br>(275)<br>(279)  | 4.50<br>4.018<br>3.725<br>3.508<br>3.514<br>3.114<br>5.114<br>5.114<br>2.74<br>2.74<br>2.94<br>2.94  | (289)<br>(290)<br>(291)<br>(292)<br>(295)<br>(295)<br>(295)<br>(295)<br>(297)<br>(298)  | 2.442<br>2.442<br>2.442<br>5.281<br>2.281<br>2.281<br>2.281<br>2.281<br>2.124<br>1.972<br>1.812   | $\begin{array}{c} (507) \\ (508) \\ (509) \\ (509) \\ (510) \\ (511) \\ (512) \\ (512) \\ (512) \\ (512) \\ (515) \\ (515) \\ (516) \end{array}$   | 1.822<br>2.281<br>7.114<br>2.442<br>1.970<br>1.870<br>1.870<br>1.675<br>1.575<br>1.504  | (325)<br>(324)<br>(327)<br>(329)<br>(339)<br>(339)<br>(331)<br>(351)<br>(351)<br>(352)<br>(353)<br>(324)   | 1.398<br>1.254<br>1.254<br>1.019<br>1.019<br>1.019<br>1.019<br>0.905<br>0.905<br>0.905  | (345)<br>(344)<br>(344)<br>(346)<br>(347)<br>(349)<br>(349)<br>(349)<br>(349)<br>(350)<br>(351)<br>(352)  | 0,7<br>0,607<br>0,522<br>0,522<br>0,522<br>0,522<br>0,522<br>0,607<br>0,507<br>0,507<br>0,502<br>0,445  |
| 91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.43<br>95) 7.541<br>95) 4.301<br>97) 3.77<br>98) 3.114<br>99) 2.77<br>100) 2.605   | (107)<br>(110)<br>(111)<br>(112)<br>(117)<br>(114)<br>(115)<br>(115)<br>(115)<br>(117)<br>(118)   | 1.676<br>1.675<br>2.442<br>2.771<br>2.440<br>2.600<br>6.39<br>5.00<br>4.02   | (127)<br>(128)<br>(129)<br>(129)<br>(129)<br>(121)<br>(121)<br>(121)<br>(134)<br>(136)  | 1.97<br>1.97<br>2.124<br>2.124<br>2.124<br>1.97<br>1.802<br>1.97<br>5.6<br>5.08  | (145)<br>(146)<br>(146)<br>(147)<br>(147)<br>(149)<br>(149)<br>(151)<br>(152)<br>(153)                            | 7.54<br>6.57<br>7.54<br>6.59<br>9.91<br>5.25<br>9.35<br>4.55<br>4.55<br>4.62                                 | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(163)<br>(163)<br>(164)<br>(171)  | 3.53<br>4.02<br>3.54<br>3.54<br>3.54<br>3.51<br>2.94<br>2.77<br>2.44<br>2.20                           | (2713<br>(272)<br>(273)<br>(274)<br>(274)<br>(274)<br>(275)<br>(277)<br>(279)<br>(279)<br>(280)<br>(281)  | 4.50<br>4.018<br>5.775<br>3.508<br>3.514<br>5.114<br>5.114<br>2.94<br>2.94<br>2.94<br>2.771<br>3.538                                       | (287)<br>(290)<br>(291)<br>(292)<br>(292)<br>(292)<br>(294)<br>(294)<br>(297)<br>(297)<br>(298)<br>(299)  | 2.442<br>2.442<br>2.442<br>2.201<br>2.201<br>2.201<br>2.201<br>2.201<br>2.124<br>1.972<br>1.802<br>1.922  | $\begin{array}{c} (502) \\ (509) \\ (509) \\ (510) \\ (511) \\ (512) \\ (512) \\ (515) \\ (515) \\ (515) \\ (516) \\ (516) \\ (516) \\ (517) \end{array}$  | 1.822<br>2.281<br>3.114<br>2.442<br>1.970<br>1.870<br>1.870<br>1.675<br>1.575<br>1.504<br>1.396                                     | (325)<br>(324)<br>(327)<br>(327)<br>(327)<br>(327)<br>(327)<br>(327)<br>(327)<br>(327)<br>(324)<br>(325)   | $\begin{array}{c} 1.578\\ 1.254\\ 1.254\\ 1.017\\ 1.017\\ 1.017\\ 1.017\\ 0.906\\ 6.705\\ 0.905\\ 0.905\\ 0.905\\ 0.906\end{array}$   | (345)<br>(544)<br>(544)<br>(544)<br>(544)<br>(544)<br>(544)<br>(544)<br>(544)<br>(544)<br>(550)<br>(551)<br>(552)<br>(355)                            | 0,7<br>0,607<br>0,522<br>0,522<br>0,522<br>0,522<br>0,522<br>0,522<br>0,522   |
| 91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.40<br>95) 7.44<br>95) 7.44<br>95) 3.77<br>98) 3.114<br>99) 2.77<br>100) 2.405<br>101) 2.442   | (109)<br>(110)<br>(111)<br>(112)<br>(117)<br>(117)<br>(117)<br>(117)<br>(117)<br>(115)<br>(117)<br>(118)<br>(119)                                     | 1.676<br>1.675<br>2.442<br>2.771<br>2.442<br>2.605<br>6.99<br>5.00<br>4.02<br>3.314  | (127)<br>(128)<br>(129)<br>(129)<br>(129)<br>(121)<br>(121)<br>(121)<br>(134)<br>(135)<br>(126)                                     | 1.97<br>1.97<br>2.124<br>2.124<br>2.124<br>1.97<br>1.802<br>1.97<br>5.6<br>5.08<br>5.08  | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(150)<br>(150)<br>(150)<br>(154)                            | 7.54<br>6.57<br>7.54<br>6.97<br>9.91<br>6.20<br>5.20<br>5.20<br>4.90<br>4.90<br>4.90<br>3.77                 | (163)<br>(164)<br>(165)<br>(165)<br>(167)<br>(167)<br>(163)<br>(169)<br>(170)<br>(171)<br>(172)                            | 5.53<br>4.53<br>4.02<br>3.54<br>3.11<br>2.94<br>2.77<br>2.40<br>2.20<br>2.28                           | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(276)<br>(276)<br>(279)<br>(279)<br>(281)<br>(282)  | 4.80<br>4.018<br>3.725<br>3.508<br>3.114<br>5.114<br>5.114<br>2.94<br>2.94<br>2.94<br>2.94<br>2.94<br>3.538<br>3.114                       | (287)<br>(290)<br>(291)<br>(292)<br>(295)<br>(295)<br>(295)<br>(295)<br>(298)<br>(299)<br>(299)<br>(300)  | 2.442<br>2.442<br>2.442<br>2.201<br>2.201<br>2.201<br>2.201<br>2.201<br>2.201<br>1.972<br>1.972<br>1.802<br>1.822                                     | $\begin{array}{c} (502) \\ (509) \\ (509) \\ (510) \\ (511) \\ (512) \\ (513) \\ (513) \\ (513) \\ (513) \\ (513) \\ (516) \\ (518) \end{array}$   | 1.822<br>2.281<br>7.114<br>2.442<br>1.970<br>1.870<br>1.870<br>1.870<br>1.870<br>1.575<br>1.504<br>1.395<br>1.396                   | (325)<br>(324)<br>(327)<br>(327)<br>(327)<br>(327)<br>(327)<br>(327)<br>(327)<br>(325)<br>(325)<br>(326)   | 1.378<br>1.254<br>1.254<br>1.017<br>1.017<br>1.017<br>1.017<br>0.905<br>0.905<br>0.905<br>0.906<br>0.906  | (343)<br>(344)<br>(344)<br>(346)<br>(347)<br>(346)<br>(349)<br>(349)<br>(350)<br>(351)<br>(353)<br>(354)  | 0,7<br>0,607<br>0,522<br>0,522<br>0,522<br>0,522<br>0,522<br>0,522<br>0,507<br>0,507<br>0,502<br>0,443<br>0,522<br>0,522  |
| 91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.43<br>95) 7.441<br>95) 7.441<br>95) 7.441<br>97) 3.77<br>98) 3.114<br>99) 2.77<br>100) 2.403<br>101) 2.442<br>102) 2.281  | (107)<br>(110)<br>(111)<br>(112)<br>(115)<br>(115)<br>(115)<br>(115)<br>(115)<br>(117)<br>(118)<br>(117)<br>(120)                                     | 1.676<br>1.675<br>2.442<br>2.771<br>2.77<br>2.440<br>6.39<br>5.00<br>4.02<br>3.314<br>2.94   | (127)<br>(126)<br>(126)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(134)<br>(137)<br>(136)                            | 1.97<br>1.97<br>2.124<br>2.124<br>2.124<br>1.97<br>1.802<br>1.97<br>50.6<br>5.08<br>3.77<br>3.114                                | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(150)<br>(155)<br>(155)                                     | 7.54<br>6.57<br>7.54<br>6.97<br>9.91<br>5.20<br>5.30<br>4.30<br>4.30<br>4.30<br>3.77<br>3.77                 | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(163)<br>(163)<br>(153)<br>(170)<br>(171)<br>(172)<br>(173)<br>(174)          | 5.53<br>4.53<br>4.02<br>3.54<br>3.11<br>2.94<br>2.77<br>2.40<br>2.20<br>2.28                           | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(275)<br>(275)<br>(279)<br>(297)<br>(290)<br>(291)<br>(293)   | 4.80<br>4.018<br>3.777<br>3.504<br>5.114<br>5.114<br>2.74<br>2.74<br>2.74<br>2.75<br>3.514<br>2.74<br>2.74<br>2.74<br>2.74<br>2.74<br>2.74 | (287)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(293)<br>(293)<br>(298)<br>(299)<br>(300)<br>(301)  | 2,442<br>2,442<br>2,442<br>2,291<br>2,291<br>2,291<br>2,291<br>2,124<br>1,972<br>1,802<br>1,822<br>1,822<br>1,822                                     | (502)<br>(508)<br>(509)<br>(510)<br>(511)<br>(512)<br>(515)<br>(515)<br>(515)<br>(516)<br>(516)<br>(517)<br>(518)<br>(518)   | 1.822<br>2.281<br>7.114<br>2.442<br>1.970<br>1.820<br>1.820<br>1.800<br>1.875<br>1.504<br>1.396<br>1.396<br>1.395                   | (325)<br>(324)<br>(327)<br>(320)<br>(327)<br>(320)<br>(321)<br>(321)<br>(322)<br>(324)<br>(325)<br>(327)   | $\begin{array}{c} 1.578\\ 1.254\\ 1.254\\ 1.019\\ 1.019\\ 1.019\\ 1.017\\ 1.019\\ 0.906\\ 0.905\\ 0.905\\ 0.906\\ 0.906\\ 0.906\\ 0.906\\ \end{array}$                      | (343)<br>(344)<br>(344)<br>(344)<br>(344)<br>(344)<br>(344)<br>(344)<br>(350)<br>(351)<br>(353)<br>(354)<br>(355)                                     | 0,7<br>0,607<br>0,500<br>0,500<br>0,502<br>0,607<br>0,607<br>0,607<br>0,607<br>0,607<br>0,607<br>0,607<br>0,607<br>0,607<br>0,607<br>0,607<br>0,607<br>0,502<br>0,607                   |
| 91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.43<br>95) 7.541<br>95) 4.301<br>97) 3.77<br>98) 3.114<br>99) 2.77<br>100) 2.403<br>101) 2.442<br>102) 2.281<br>103] 2.28  | (107)<br>(110)<br>(111)<br>(112)<br>(115)<br>(114)<br>(115)<br>(115)<br>(117)<br>(118)<br>(117)<br>(118)<br>(117)<br>(1120)<br>(121)                  | 1.676<br>1.675<br>2.442<br>2.771<br>2.77<br>2.442<br>2.605<br>6.39<br>5.00<br>4.02<br>3.314<br>2.94<br>3.114                                   | (127)<br>(128)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(134)<br>(135)<br>(138)<br>(138)<br>(138)          | 1.97<br>1.97<br>1.97<br>2.124<br>2.124<br>2.124<br>1.97<br>1.802<br>1.97<br>10.6<br>5.08<br>3.08<br>3.114<br>2.77                | (145)<br>(146)<br>(147)<br>(148)<br>(147)<br>(150)<br>(151)<br>(152)<br>(155)<br>(155)                            | 7.54<br>6.57<br>7.54<br>6.97<br>9.91<br>6.20<br>9.91<br>4.30<br>4.30<br>4.30<br>4.30<br>4.30<br>3.77<br>3.11 | (163)<br>(164)<br>(164)<br>(166)<br>(166)<br>(167)<br>(164)<br>(154)<br>(174)<br>(172)<br>(174)<br>(174)                   | 5.53<br>4.53<br>4.02<br>3.54<br>3.31<br>3.11<br>2.94<br>2.77<br>2.44<br>2.20<br>2.28<br>2.124          | (2713<br>(272)<br>(273)<br>(274)<br>(274)<br>(276)<br>(276)<br>(276)<br>(276)<br>(276)<br>(276)<br>(276)<br>(276)<br>(276)<br>(276)<br>(277)<br>(276)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277)<br>(277) | 4.50<br>4.013<br>3.778<br>3.514<br>3.514<br>2.74<br>2.74<br>2.74<br>2.74<br>2.753<br>3.514<br>2.771<br>3.538<br>4<br>22.771                | (287)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(293)<br>(294)<br>(297)<br>(298)<br>(299)<br>(298)<br>(299)<br>(301)<br>(301)   | 2.442<br>2.442<br>2.442<br>2.201<br>2.201<br>2.201<br>2.201<br>2.201<br>2.201<br>1.92<br>1.922<br>1.822<br>1.822<br>1.822<br>1.822                    | (792)<br>(798)<br>(799)<br>(711)<br>(711)<br>(711)<br>(715)<br>(714)<br>(715)<br>(716)<br>(715)<br>(716)<br>(716)<br>(717)<br>(718)<br>(718)<br>(718)<br>(718)<br>(718)<br>(719)<br>(719)<br>(719) | 1.822<br>2.281<br>7.114<br>2.442<br>1.970<br>1.870<br>1.870<br>1.875<br>1.504<br>1.395<br>1.396<br>1.396<br>1.395                   | (325)<br>(324)<br>(327)<br>(320)<br>(320)<br>(320)<br>(321)<br>(323)<br>(324)<br>(325)<br>(324)<br>(325)<br>(327)<br>(328)   | $\begin{array}{c} 1.578\\ 1.254\\ 1.254\\ 1.017\\ 1.017\\ 1.017\\ 1.017\\ 1.017\\ 0.905\\ 0.905\\ 0.905\\ 0.905\\ 0.906\\ 0.906\\ 0.906\\ 0.996\\ 0.799\end{array}$         | (345)<br>(344)<br>(344)<br>(346)<br>(347)<br>(347)<br>(347)<br>(347)<br>(351)<br>(351)<br>(351)<br>(355)<br>(355)<br>(355)                            | $\begin{array}{c} 0.7\\ 0.607\\ 0.522\\ 0.522\\ 0.522\\ 0.522\\ 0.507\\ 0.507\\ 0.503\\ 0.502\\ 0.503\\ 0.522\\ 0.522\\ 0.522\\ 0.553\\ 0.552\\ 0.553\end{array}$                       |
| 91)       2.442         92)       2.124         93)       2.124         94)       14.42         95)       7.541         95)       7.541         95)       3.124         97)       3.77         98)       3.114         99)       2.605         100)       2.605         101)       2.442         102)       2.281         103)       2.28         104)       2.124  | (107)<br>(110)<br>(111)<br>(112)<br>(117)<br>(114)<br>(115)<br>(115)<br>(117)<br>(118)<br>(117)<br>(118)<br>(120)<br>(121)<br>(122)                   | 1.676<br>1.675<br>2.442<br>2.771<br>2.442<br>2.442<br>2.605<br>5.00<br>4.02<br>3.314<br>2.94<br>3.114<br>2.605                                 | (127)<br>(128)<br>(129)<br>(129)<br>(120)<br>(121)<br>(121)<br>(121)<br>(134)<br>(135)<br>(138)<br>(138)<br>(138)<br>(135)<br>(140) | 1.97<br>1.97<br>2.124<br>2.124<br>1.97<br>1.802<br>1.97<br>5.08<br>5.08<br>3.77<br>3.114<br>2.77<br>2.505                        | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(151)<br>(152)<br>(155)<br>(155)<br>(155)<br>(155)                   | 7.54<br>6.57<br>7.54<br>6.99<br>5.25<br>5.25<br>4.901<br>4.55<br>4.02<br>3.77<br>3.77<br>3.11<br>5.65        | (163)<br>(164)<br>(164)<br>(166)<br>(166)<br>(167)<br>(164)<br>(154)<br>(174)<br>(172)<br>(174)<br>(174)                   | 5.53<br>4.53<br>4.02<br>5.54<br>3.54<br>5.11<br>2.94<br>2.77<br>2.44<br>2.28<br>2.124<br>2.124<br>1.97 | (2713<br>(272)<br>(273)<br>(274)<br>(274)<br>(274)<br>(275)<br>(277)<br>(279)<br>(279)<br>(291)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)  | 4.80<br>4.018<br>3.778<br>3.504<br>3.114<br>3.124<br>2.74<br>2.74<br>3.514<br>3.514<br>2.74<br>3.514<br>2.74<br>2.771                      | (287)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(293)<br>(293)<br>(297)<br>(298)<br>(299)<br>(300)<br>(300)<br>(302)<br>(303)   | 2.442<br>2.442<br>2.442<br>2.201<br>2.201<br>2.201<br>2.201<br>2.201<br>1.972<br>1.802<br>1.922<br>1.822<br>1.822<br>1.822<br>1.822<br>1.822          | (592)<br>(598)<br>(510)<br>(511)<br>(511)<br>(511)<br>(512)<br>(513)<br>(513)<br>(513)<br>(513)<br>(518)<br>(518)<br>(518)<br>(520)<br>(521)   | 1.822<br>2.281<br>7.114<br>2.442<br>1.970<br>1.870<br>1.675<br>1.575<br>1.504<br>1.396<br>1.396<br>1.395<br>1.524<br>1.264          | (325)<br>(324)<br>(327)<br>(320)<br>(330)<br>(330)<br>(321)<br>(322)<br>(323)<br>(324)<br>(325)<br>(324)<br>(326)<br>(328)<br>(329)  | $\begin{array}{c} 1.578\\ 1.254\\ 1.254\\ 1.019\\ 1.019\\ 1.019\\ 1.019\\ 0.905\\ 0.905\\ 0.905\\ 0.906\\ 0.906\\ 0.906\\ 0.906\\ 0.906\\ 0.799\\ 0.799\\ 0.799\end{array}$ | (345)<br>(344)<br>(344)<br>(344)<br>(344)<br>(344)<br>(344)<br>(344)<br>(344)<br>(351)<br>(354)<br>(354)<br>(3554)<br>(357)                           | $\begin{array}{c} 0.7\\ 0.607\\ 0.522\\ 0.522\\ 0.522\\ 0.522\\ 0.507\\ 0.502\\ 0.502\\ 0.502\\ 0.522\\ 0.522\\ 0.5222\\ 0.5222\\ 0.523\\ 0.523\\ 0.553\\ 0.353\end{array}$             |
| 91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.43<br>95) 7.441<br>95) 4.301<br>97) 3.77<br>93] 3.114<br>94) 2.403<br>101) 2.403<br>101) 2.442<br>102) 2.281<br>103] 2.28<br>104] 2.124<br>105) 1.97  | (107)<br>(110)<br>(111)<br>(112)<br>(115)<br>(114)<br>(115)<br>(115)<br>(116)<br>(117)<br>(118)<br>(117)<br>(120)<br>(121)<br>(122)<br>(123)          | 1.676<br>1.675<br>2.442<br>2.771<br>2.442<br>2.605<br>6.39<br>5.00<br>4.02<br>3.314<br>2.94<br>3.114<br>2.605<br>2.442                         | (127)<br>(128)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(134)<br>(135)<br>(138)<br>(138)<br>(138)          | 1.97<br>1.97<br>2.124<br>2.124<br>2.124<br>1.97<br>1.802<br>1.97<br>5.08<br>5.08<br>3.77<br>3.114<br>2.505<br>2.505<br>2.77      | (145)<br>(146)<br>(147)<br>(147)<br>(147)<br>(150)<br>(151)<br>(152)<br>(152)<br>(154)<br>(155)<br>(155)<br>(156) | 7.54<br>6.57<br>7.54<br>6.97<br>6.91<br>5.25<br>5.25<br>4.90<br>4.97<br>3.77<br>3.77<br>3.77<br>3.65<br>5.95 | (163)<br>(164)<br>(165)<br>(166)<br>(166)<br>(167)<br>(153)<br>(167)<br>(170)<br>(174)<br>(174)<br>(174)<br>(176)<br>(177) | 5.53<br>4.53<br>4.02<br>5.54<br>3.54<br>5.11<br>2.94<br>2.77<br>2.44<br>2.28<br>2.124<br>2.124<br>1.97 | (2713)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(276)<br>(276)<br>(279)<br>(260)<br>(260)<br>(261)<br>(282)<br>(283)<br>(284)<br>(285)<br>(285)  | 4.80<br>4.018<br>3.725<br>3.508<br>3.114<br>5.114<br>5.114<br>2.74<br>2.74<br>2.94<br>2.94<br>2.94<br>2.94<br>2.94<br>2.771<br>2.771       | (287)<br>(290)<br>(291)<br>(292)<br>(292)<br>(293)<br>(293)<br>(293)<br>(297)<br>(297)<br>(297)<br>(297)<br>(297)<br>(297)<br>(297)<br>(297)<br>(297)<br>(297)<br>(297)<br>(297)<br>(297)<br>(290)<br>(290)<br>(290)<br>(291)<br>(291)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292)<br>(292) | 2.440<br>2.442<br>2.442<br>2.201<br>2.201<br>2.201<br>2.201<br>2.201<br>1.972<br>1.972<br>1.922<br>1.922<br>1.822<br>1.822<br>1.822<br>1.625<br>1.676 | (592)<br>(598)<br>(599)<br>(510)<br>(511)<br>(512)<br>(513)<br>(514)<br>(515)<br>(516)<br>(516)<br>(517)<br>(518)<br>(518)<br>(512)<br>(521)<br>(522)  | 1.822<br>2.281<br>7.114<br>2.442<br>1.970<br>1.870<br>1.870<br>1.675<br>1.575<br>1.504<br>1.395<br>1.395<br>1.395<br>1.395<br>1.264 | (325)<br>(324)<br>(327)<br>(320)<br>(320)<br>(320)<br>(321)<br>(321)<br>(324)<br>(325)<br>(324)<br>(326)<br>(328)<br>(328)<br>(339)<br>(340)                                     | $\begin{array}{c} 1.598\\ 1.254\\ 1.254\\ 1.019\\ 1.019\\ 1.019\\ 1.019\\ 0.905\\ 0.905\\ 0.906\\ 0.906\\ 0.906\\ 0.906\\ 0.799\\ 0.799\\ 0.7\end{array}$                   | (345)<br>(344)<br>(344)<br>(344)<br>(347)<br>(346)<br>(347)<br>(344)<br>(347)<br>(351)<br>(352)<br>(354)<br>(355)<br>(354)<br>(356)<br>(358)          | $\begin{array}{c} 0.7\\ 0.607\\ 0.522\\ 0.522\\ 0.5522\\ 0.607\\ 0.507\\ 0.507\\ 0.507\\ 0.507\\ 0.507\\ 0.522\\ 0.5222\\ 0.5222\\ 0.5522\\ 0.5522\\ 0.5522\\ 0.553\\ 0.445\end{array}$ |
| 91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.43<br>95) 7.441<br>95) 7.441<br>95) 7.441<br>95) 3.114<br>96) 2.77<br>100) 2.608<br>101) 2.442<br>102) 2.281<br>104) 2.124<br>105) 1.97<br>106) 1.822<br>107) | (107)<br>(110)<br>(111)<br>(112)<br>(115)<br>(115)<br>(115)<br>(115)<br>(115)<br>(116)<br>(117)<br>(120)<br>(121)<br>(122)<br>(122)<br>(123)<br>(124) | 1.676<br>1.675<br>2.442<br>2.771<br>2.77<br>2.443<br>2.605<br>6.39<br>5.03<br>4.02<br>3.314<br>2.94<br>3.114<br>2.94<br>3.114<br>2.442<br>2.28 | (127)<br>(128)<br>(129)<br>(129)<br>(124)<br>(124)<br>(124)<br>(125)<br>(139)<br>(139)<br>(139)<br>(139)<br>(139)<br>(134)          | 1.97<br>1.97<br>2.124<br>2.124<br>2.124<br>1.97<br>1.802<br>1.97<br>50.6<br>5.08<br>3.77<br>3.114<br>2.77<br>2.605<br>2.77<br>58 | (145)<br>(146)<br>(147)<br>(147)<br>(147)<br>(150)<br>(151)<br>(152)<br>(155)<br>(155)<br>(155)<br>(157)<br>(158) | 7.54<br>6.57<br>7.54<br>6.91<br>6.91<br>5.30<br>4.90<br>4.90<br>4.90<br>3.77<br>3.11<br>5.65<br>5.95<br>4.53 | (163)<br>(164)<br>(164)<br>(166)<br>(166)<br>(167)<br>(164)<br>(174)<br>(174)<br>(174)<br>(176)<br>(178)<br>(178)<br>(179) | 5.53<br>4.53<br>4.02<br>3.54<br>3.11<br>2.94<br>2.77<br>2.44<br>2.28<br>2.28<br>2.124<br>2.124<br>1.97 | (2713<br>(272)<br>(273)<br>(274)<br>(274)<br>(274)<br>(275)<br>(277)<br>(279)<br>(279)<br>(291)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)  | 4.80<br>4.018<br>3.775<br>3.508<br>3.514<br>3.514<br>3.514<br>2.74<br>2.74<br>2.771<br>2.771<br>2.605                                      | (287)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(293)<br>(2974)<br>(2974)<br>(2974)<br>(2974)<br>(299)<br>(300)<br>(300)<br>(3001)<br>(301)<br>(303)<br>(304)<br>(305)  | 2.442<br>2.442<br>2.442<br>2.201<br>2.201<br>2.201<br>2.201<br>2.201<br>1.972<br>1.802<br>1.922<br>1.822<br>1.822<br>1.822<br>1.822<br>1.822          | $\begin{array}{c} (597)\\ (598)\\ (599)\\ (514)\\ (514)\\ (514)\\ (515)\\ (515)\\ (515)\\ (515)\\ (516)\\ (516)\\ (516)\\ (518)\\ (518)\\ (520)\\ (521)\\ (522)\\ (325) \end{array}$               | 1.822<br>2.281<br>7.114<br>2.442<br>1.970<br>1.870<br>1.675<br>1.575<br>1.504<br>1.396<br>1.396<br>1.395<br>1.524<br>1.264          | (325)<br>(324)<br>(327)<br>(320)<br>(320)<br>(321)<br>(321)<br>(321)<br>(321)<br>(324)<br>(325)<br>(324)<br>(325)<br>(326)<br>(326)<br>(327)<br>(328)<br>(339)<br>(340)<br>(341) | $\begin{array}{c} 1.578\\ 1.254\\ 1.254\\ 1.019\\ 1.019\\ 1.019\\ 1.019\\ 0.905\\ 0.905\\ 0.905\\ 0.906\\ 0.906\\ 0.906\\ 0.906\\ 0.906\\ 0.799\\ 0.799\\ 0.799\end{array}$ | (345)<br>(344)<br>(344)<br>(346)<br>(347)<br>(347)<br>(347)<br>(347)<br>(347)<br>(351)<br>(351)<br>(355)<br>(355)<br>(355)<br>(355)<br>(356)<br>(359) | $\begin{array}{c} 0.7\\ 0.607\\ 0.522\\ 0.522\\ 0.5522\\ 0.607\\ 0.607\\ 0.607\\ 0.607\\ 0.522\\ 0.522\\ 0.5222\\ 0.5222\\ 0.5522\\ 0.5522\\ 0.5523\\ 0.445\\ 0.445\end{array}$         |

.

### River discharge data at 12-hourly intervals for Station: 23A Period : 6

| Phosphorus transport Berg River |  |
|---------------------------------|--|

|             | (109) 0.163 | (127) 0.064  | (145) 0.097 | (142) 0.079 |
|-------------|-------------|--------------|-------------|-------------|
| ( 92) 0.097 | (110) 0.19  | (123) 0.05   | (145) 1.421 | (154) 0.079 |
| ( 93) 0.079 | (111) 0.117 | (129) + 0.05 | (147) 0.449 | (165) 0.079 |
| ( 94) 0.079 | (112) 0.117 | (170) 0.05   | (148) 0.404 | (155) 0.079 |
| ( 75) 0.079 | (117) 0.117 | (101) 0.05   | (149) 1.72  | (167) 0.054 |
| 96) 0.079   | (114) 0.117 | (132) 0.05   | (150) 0.504 | (153) 0.054 |
| ( 97) 0.056 | (115) 0.404 | (133) 0.05   | (151) 0.361 | (169) 0.064 |
| ( 98) 0.05  | (116) 0.219 | (134) 0.05   | (152) 0.25  | (170) 0.05  |
| ( 99) 0.05  | (117) 0.139 | (135) 0.039  | (153) 0.19  | (171) 0.05  |
| (100) 0.05  | (118) 0.117 | (136) 0.039  | (154) 0.143 | (172) 0.079 |
| (101) 0.05  | (119) 0.117 | (137) 0.029  | (155) 0.163 | (173) 0.079 |
| (102) 0.079 | (120) 0.097 | (138) 0.029  | (156) 0.139 | (174) 0.064 |
| (103) 0.079 | (121) 0.079 | (139) 0.029  | (157) 0.139 | (175) 0.064 |
| (104) 0.165 | (122) 0.079 | (140) 0.029  | (158) 0.117 | (176) 0.05  |
| (105) 0.604 | (123) 0.074 | (141) 0.029  | (159) 0.117 | (177) 0.05  |
| (106) 0.998 | (124) 0.079 | (142) 0.029  | (150) 0.097 | (178) 0.05  |
| (107) 0.361 | (125) 0.064 | (143) 0.05   | (151) 0.097 | (179) 0.039 |
| (108) 0.19  | (126) 0.064 | (144) 0.039  | (162) 0.097 | (180) 0.039 |

| (271) 1.729 | (289) 0.05  | (C07) 5E-3 | (325) 0 | (342+ Q          |
|-------------|-------------|------------|---------|------------------|
| (272) 0.551 | (290) 0.072 | (COB) 5E-3 | (328) 0 | (그러나) 한          |
| (275) 0.479 | (291) 0.019 | (309) 2E-3 | (027) 0 | (0 <b>4</b> 5) U |
| 274) 2.173  | (292) 0.029 | (310) 5E-3 | (328) 0 | (34¢) Ú          |
| 275) 0.796  | (297) 0.039 | (311) 2E 3 | (329) 0 | (347) (3         |
| 275) 0.404  | (294) 0.029 | (312) SE-3 | (330) 0 | (348) 0          |
| 277) 0.285  | (295) 0.029 | (313) 1E-3 | (331) 0 | (349) 0          |
| 278) 0.19   | (296) 0.029 | (314) 5E-3 | (332) 0 | (350) 0          |
| 279) 0.139  | (297) 0.029 | (315) 1E-3 | (333) 0 | (351) U          |
| 280) 0.117  | (196) 0.029 | (316) 2E~3 | (334) O | (351) 0          |
| 281) 0.117  | (299) 0.021 | (517) 0    | (335) 0 | (353) 0          |
| (282) 0.097 | (300) 0.014 | (310) 2E-3 | (336) 0 | (354) 0          |
| 283) 0.079  | (301) 0.014 | (319) 0    | (337) 0 | (355) 0          |
| (284) 0.064 | (302) 0.014 | (320) 16-3 | (338) 0 | (356) 0 .        |
| 285) 0.064  | (303) 96~3  | (321) 0    | (339) 0 | (357) 0          |
| (286) 0.064 | (304) 0.014 | (322) 0    | (340) 0 | (358) 0          |
| 2871 0.064  | (305) 96-3  |            | (341) 0 | (357) 0          |
| (267) 0.064 | (306) 5E-3  |            | (342) 0 | (360) 0          |

.

|          |          | ( 19) 0.19  | ( 37) 0.064 | ( 55) 0.029 | ( 73) 0.025 |
|----------|----------|-------------|-------------|-------------|-------------|
| (        | 1) 0.36. |             | ( 38) 0.05  | ( 55) 0.029 | ( 74) 0.029 |
| •        | 2) 0.36  |             |             | ( 57) 0.029 | (75) 0.039  |
| (        | 3) 0.28  |             | ( 39) 0.05  |             | (76) 0.351  |
| 4        | 4) 0.323 | e (22)0.165 | (40) 0.05   | (58) 0.039  | ( 77) 0.19  |
| - 2      | 5) 0.29  |             | (41) 0.05   | ( 59) ( 039 |             |
|          | 6) 0.32  |             | ( 42) 0.05  | ( 50) 0.039 | ( 78) 0.19  |
| <u> </u> |          |             | ( 43) 6.039 | (61)0.039   | ( 79) 0.285 |
|          | 7) 0.28  |             | (44) 0.039  | ( 52) 0.029 | ( 80) 3,001 |
| •        | 8) 0,28  |             |             | ( 60) 0.029 | ( 01) 0.786 |
| (        | 9) 0.28  | 5 (27)0.17  | (45) 0.029  | ( 54) 0.029 | ( 82) 0.361 |
| (        | 10) 0.28 | 5 (23)0.139 | (45) 0.029  |             | (83) 0.19   |
|          | 11) 0.28 |             | ( 47) 0.029 | ( 65) 0.029 |             |
|          | 12) 0.25 |             | (49)0.021   | ( 65) 0.029 | ( 84) 0.155 |
|          |          |             | ( 49) 0.021 | ( 67) 0.029 | ( 85) 0.139 |
|          | 13) 0.21 |             | ( 50) 0.021 | ( 68) 0.029 | ( 85) 0.117 |
|          | 14) 0.21 |             |             | ( 69) 0.034 | (87) 0.117  |
| 1        | 15) 0.21 | 9 (33)0.064 | ( 51) 0.021 |             | ( 33) 0.117 |
| i        | 15) 0.19 | ( 24) 0.064 | ( 52) 0.021 | ( 70) 0.029 |             |
|          | 17) 0.19 |             | (55) 0.021  | (71)0.029   | ( 89) 0.097 |
|          | 100 0000 | 74 0 064    | i san 0.021 | (72) 0.029  | ( 90) 0.097 |

| 2) 0.364 (<br>3) 0.205 (<br>4) 0.322 (<br>5) 0.295 (<br>6) 0.322 (<br>7) 0.285 (<br>9) 0.295 (<br>9) 0.285 (<br>10) 0.285 ( | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ |  |
|---|--|--|
| 12) 0.25 (<br>13) 0.219 (<br>14) 0.219 (<br>15) 0.219 (<br>15) 0.219 (<br>16) 0.49 (<br>17) 0.19 (                          | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ |  |

1

| 191) 0.007  | (177) 0.014 | (217) 0.235  | (205) 0.064         | - (253) (0.029 |
|-------------|-------------|--------------|---------------------|----------------|
| 1821 0.039  | (200) 0.014 | (216) 0.19   | (236) 0.064         | 1254) 0.029    |
| 181) 0.039  | (2011 0.014 | (219) 0.219  | (237) 0.055         | (255) 0.027    |
| 184) 0.029  | (202) 0.014 | (220) 0.998  | (1:3 <b>3)</b> 0105 | (256) 0.029    |
| 1847 0.027  | (203) 0.014 | (221) 0.604  | (239) 0.054         | (257) 0.029    |
| 185) 0.027  | (204) 0.029 | (222) 0.322  | (240) 0.05          | (258) 0.029    |
| 137) 0.027  | (205) 0.029 | (223) 0.25   | (241) 0.05          | (259) 0.029    |
| (188) 0.029 | (206) 0.021 | (224) 0.19   | (242) 0.05          | (250) 0.025    |
| (139) 0.027 | (207) 0.029 | (225) 0.19   | (245) 0.05          | (251) 0.029    |
| (190) 0.029 | (208) 0.117 | (225) 0.153  | (244) 0.05          | (295) 91072    |
| 191) 0.027  | (207) 0.549 | (227) 0.139  | (245) 0.039         | (263) Queud    |
| (192) 0.029 | (210) 8.07  | (229) 0.139  | (245) 0.029         | (264) 0.025    |
| (193) 0.021 | (211) 1.329 | (229) 0.11/  | (247) 0.029         | (265) 0.029    |
| (194) 0.021 | (212) 1.156 | (220) 0.097  | (248) 0.029         | (266) 0.025    |
| (195) 0.021 | (213) 0.661 | (231) 0.092  | (249) 0.027         | (257) 0.029    |
| (176) 0.014 | (214) 1-329 | (232) 0.079  | (250) 0.021         | (268) (J.954   |
| (197) 0.014 | (215) 2.449 | (23.5) 0.029 | (251) 0.029         | (0.57) 0.05    |
| (1/8) 0.014 | (215) 0.322 | (134) 0.079  | CC521 01029         | (120) 1771     |

-

Variable: SAND2.varl (length = 323) 

TR 143 March 1989

| ladie: Sen   | )4.var1   |  | h = 344)<br>   | · ·   |   |  | (131)  | 0,285  | (179)   |  | (217)   | 0,098  | (200)   | 0.1.7   | (       |       |
|--|---|--|--|---|---|--|--|--|---|--|---|--|---|---|---------|-------|
| 1) 0   | (19)  |  | ( 37) 16-3   | (50) 0.447  | ( / 2/  | ···  | (182)  |  | (200)   | 0.19   | (216)   | 0.077  | (256)   | 0.504   | (254)   | 0.00  |
|  | (20)  | ŏ  | (3a) 1E−3  | (56) 0.322  | (74)  |  |  |  | (201)   | 0.163  | (217)   | 0.117  | (237)   | 0.361   | (250)   | 0.05  |
| 2) 0   | (21)  | 0  | ( 39) 1E-3   | (57) 0.25   | (75)  |  | (197)  |  | (202)   | 0.153  | (210)   | 0.117  | (ຍ)   | 0.217   | (256)   | 0.0.9 |
| 3) 0   |   | ů –  | (40) LE-3  | (59) 1.617  | (76)  | 0.117  | (184)  |  | (203)   | 0.153  | (221)   | 0.072  | (239)   | 0.163   | (257)   | 0.057 |
| 4) 0   | (22)  |  | (41) IE-3  | ( 59) 2.853   | ( 77)   | 0.08H  | (195)  |  |   | 0.103  | (222)   | 0.097  |   | 1.1.9   | (258)   | 0.05  |
| 5) ()  |   | 1E-3   | (42) 16-3  | ( 50) 0.735   | (78)  | 0,079  | (186)  |  | (204)   |  |   | 0.077  | (241)   | 0.097   | (252)   | 0.05  |
| 6) Ú   | (24)  | 5E~-3  |  | ( 61) 0.404   | 1 79)   | 6,079  | (187)  |  | (209)   | 0.153  |   | Q. Q. 19   | (242)   | 0.097   | (280)   | 0.05  |
| 7) ()  | • • •   | 1E-3   | (43) 1E-3  | ( 52) 0.295   | (80)  | 0.079  | (166)  |  | (204)   | 0.163  | (24)  |  | (245)   | 0.079   | (.51)   | 0.00  |
| 8) V   | (26)  | 2E-0   | (44) 1E-5  |   | ( 61)   | 0.077  | (194)  | 0.25   | (297)   | 0.139  | (225)   | 0.064  |   | 0.079   | (262)   | 0.05  |
| 9) Ú   | (27)  | 16-3   | (45) 1E-3  | •   | (82)  | 0.054  | (190)  | $0.21^{\circ}$   | (208)   | 0.129  | (212)   | 0.054  | (244)   |   | (26.)   | 0.054 |
| 0 0  | (28)  | 1E   | (4a) 15-3  | ( 54) 0.217   | -   | 0.064  | (171)  | 0.217  | (209)   | 0.117  | (227)   | 0 004  | (243)   |   | (264)   | 0.064 |
| 1) 0   | (29)  | 16-3   | (47) 1E-3  | ( 65) 0.171   | (82)  | 0.064  | (172)  |  | (210)   | 0.117  | (229)   | 0.054  | (245)   | 9.064   |         | 0.004 |
| 21 0   | ( 30)   | 16-3   | (48) 1E-3  | ( 66) 0.438   |   |  | (193)  |  | (211)   | 0.117  | (229)   | 0.054  | • - •   | 0.05  |         |       |
| 3) 0   | ( 31)   | 1E-3   | (49) 2E-3  | (67) 0.285  |   | 9.064  |  | 0.285  | (212)   | 0.117  | (200)   | 0.05   | (248)   | 0.05  | (256)   | 0.05  |
| 4) ŭ   | ( 32)   | 16-3   | ( 50) 12.54  | (68) 0.19   |   | 0.064  | (175)  |  | (213)   | 0.117  | (251)   | 0.054  | (247)   | 0.05  | (257)   |       |
| 5) Ú   | (33)  | 16-3   | ( 51) 1.617  | ( 69) 0.16  | • - • •   | 0.064  | (195)  | 0.361  | (214)   |  | (222)   | 0.064  | (159)   | 0.05  |         | 0.05  |
| 5) 0   | ( 34)   | (E-3   | ( 52) 1.241  | (70) 0,285  |   | 0.064  |  | 0.235  | (215)   |  | (230)   | 0.054  |   | 0.05  | (267)   | 0.0.7 |
| 7) 0   | ( 35)   | 1E-3   | (53) 4.037   | (71) 0.219  | (87)  |  | (198)  |  |   | 0 117  | (214)   | 0.079  | (252)   | 0.0.9   |         | 0.0.9 |
|  |   | 16-7   | ( 54) 0.924  | (72) 0.351  | ( 99)   |  | (170)  | ·  |   |  |   |  | · • • • • • • • •   |   |         |       |
|  |   |  |  |   |   | !  |  | -  |   |  |   |  |   |   |         |       |
|  |   |  |  |   |   | !  |  | -  |   |  | (367)   | 16-3   | (325)   |   | (343)   |       |
|  |   |  | (1_7) 0.25   | (145) 0.163   | (10-)   | 1.075  | (271)  | 0.007  | (289)   | 0.014  | (367)   | 1E-3   | (325)   | Q.  |         |       |
| 1) 0.039   | (109)   | 2.035  | (1_7) 0.25   | (145) 0.163<br>(146) 0.139  | (160)   | 1.075  | (271)<br>(272)   | 0.037<br>0.039   | (289)<br>(290)  | 0.014<br>9E~3  | (ごら7)<br>(こっち)  | 16-3<br>16-3   | (325)   | Q<br>Q  | 1 24 21 |       |
| 1) 0.039<br>2) 0.039   | (109)<br>(110)  | 2.835<br>1.617   | (127) 0.25<br>(128) 0.25   | (145) 0.185<br>(146) 0.139  | (160)   | 1.075  | (271)<br>(272)<br>(272)  | 0.037<br>0.039<br>0.027  | (289)<br>(290)<br>(291)   | 0.014<br>9E-3<br>9E-3  | 4367)<br>(268)<br>(369)   | 18-3<br>18-3<br>18-3   | (325)<br>(325)<br>(325)<br>(325)  | 0<br>0  | 1 24 21 | · ·   |
| 1) 0.039<br>2) 0.039<br>3) 0.039   | (109)<br>(110)<br>(111)   | 1.835<br>1.617<br>1.359  | (127) = 0.25<br>(128) = 0.25<br>(129) = 0.219  | (145) = 0.185<br>(146) = 0.139<br>(147) = 0.14  | (165)<br>(165)  | 1.075  | (271)<br>(272)<br>(272)<br>(274)   | 0.037<br>0.039<br>0.039<br>0.039   | (289)<br>(290)<br>(291)<br>(291)  | 0.014<br>98-3<br>98-3<br>98-3  | (367)<br>(268)<br>(369)<br>(310)  | 18-3<br>18-3<br>18-3<br>18-3   | (328)<br>(328)<br>(328)<br>(328)<br>(328)   | 0<br>0<br>0   | 1 24 21 | · ·   |
| 1) 0.039<br>2) 0.039<br>3) 0.039<br>4) 0.039   | (109)<br>(110)<br>(111)<br>(112)  | 2.835<br>1.617<br>1.359<br>1.075   | $\begin{array}{c} (127) & 0.25 \\ (128) & 0.25 \\ (129) & 0.219 \\ (130) & 0.219 \end{array}$  | (145) = 0.165<br>(146) = 0.139<br>(147) = 0.14<br>(143) = 0.157   | (160)<br>(164)<br>(165)<br>(166)  | 1.075<br>1.421<br>5.588  | (271)<br>(272)<br>(272)<br>(273)<br>(274)<br>(275)   | 0.037<br>0.039<br>0.039<br>0.039<br>0.039  | (289)<br>(290)<br>(291)<br>(292)<br>(293)   | 0.014<br>98-3<br>98-3<br>98-3<br>98-3<br>98-3  | (367)<br>(268)<br>(369)<br>(310)<br>(311)   | 18-3<br>18-3<br>18-3<br>18-3<br>18-3   | (325)<br>(525)<br>(127)<br>(128)<br>(128)   | 0<br>0<br>0   | 1 24 21 | · ·   |
| 1)         0.039           2)         0.039           3)         0.039           4)         0.039           5)         0.039   | (109)<br>(110)<br>(111)<br>(112)<br>(112)<br>(112)  | 21835<br>11617<br>11357<br>11075<br>01958  | $\begin{array}{ccc} (127) & 0.25 \\ (128) & 0.25 \\ (129) & 0.219 \\ (150) & 0.219 \\ (151) & 0.219 \end{array}$   | $\begin{array}{c} (145) & 0.185 \\ (146) & 0.139 \\ (147) & 0.14 \\ (143) & 0.159 \\ (149) & 0.159 \end{array}$   | (160)<br>(164)<br>(165)<br>(166)<br>(167)   | 1.075<br>1.421<br>5.588<br>0.724   | (271)<br>(272)<br>(273)<br>(273)<br>(275)<br>(275)<br>(276)  | 0.037<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039   | (289)<br>(290)<br>(291)<br>(291)<br>(295)<br>(295)<br>(294)   | 0.014<br>98-3<br>98-3<br>98-3<br>98-3<br>98-3<br>58-3  | $\begin{array}{c} (367) \\ (768) \\ (199) \\ (1140) \\ (1140) \\ (1140) \\ (114) \\ (114) \end{array}$  | 18-3<br>18-3<br>18-3<br>18-3<br>18-3<br>18-3   | (325)<br>(526)<br>(127)<br>(128)<br>(129)<br>(129)  |   | 1 24 21 | · ·   |
| 1)         0.039           2)         0.039           3)         0.039           4)         0.039           5)         0.039           6)         0.039  | (109)<br>(110)<br>(111)<br>(112)<br>(112)<br>(113)<br>(114)   | 2:835<br>1:417<br>1:329<br>1:075<br>0:998<br>0:924   | $\begin{array}{cccc} (127) & 0.25 \\ (128) & 0.25 \\ (129) & 0.219 \\ (150) & 0.219 \\ (151) & 0.219 \\ (151) & 0.219 \\ (152) & 0.219 \end{array}$  | $\begin{array}{c} (145) & 0.185 \\ (146) & 0.139 \\ (147) & 0.14 \\ (143) & 0.159 \\ (149) & 0.159 \\ (150) & 0.117 \end{array}$  | (160)<br>(164)<br>(165)<br>(166)<br>(167)<br>(162)  | 1.075<br>1.421<br>5.589<br>0.924<br>1.241<br>1.939   | (271)<br>(272)<br>(273)<br>(273)<br>(275)<br>(275)<br>(276)  | 0.037<br>0.039<br>0.039<br>0.039<br>0.039  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)  | 0.014<br>96-3<br>96-3<br>96-3<br>96-3<br>96-3<br>56-3<br>56-3  | (367)<br>(268)<br>(309)<br>(310)<br>(311)<br>(113)<br>(213)   | 18-3<br>18-3<br>18-3<br>18-3<br>18-3<br>18-3<br>18-3<br>18-3   | (325)<br>(524)<br>(127)<br>(128)<br>(128)<br>(129)<br>(129)<br>(129)  | 0<br>0<br>0<br>0<br>0<br>0<br>0   | 1 24 21 | · ·   |
| 1)       0.039         2)       0.039         3)       0.039         4)       0.039         5)       0.039         6)       0.039         6)       0.039         7)       5.039  | (109) (110) (111) (112) (117) (114) (115)   | 2.835<br>1.617<br>1.359<br>1.075<br>0.998<br>0.924<br>0.855  | $\begin{array}{cccc} (127) & 0.25 \\ (128) & 0.25 \\ (129) & 0.219 \\ (150) & 0.219 \\ (151) & 0.219 \\ (151) & 0.219 \\ (152) & 0.219 \\ (152) & 0.19 \end{array}$  | $\begin{array}{c} (145) & 0.185 \\ (146) & 0.139 \\ (147) & 0.14 \\ (143) & 0.159 \\ (149) & 0.159 \\ (150) & 0.159 \\ (151) & 0.522 \end{array}$   | (165)<br>(165)<br>(165)<br>(165)<br>(167)<br>(152)<br>(152)   | 1.075<br>1.421<br>5.580<br>0.924<br>1.241<br>1.939<br>0.924  | (271)<br>(272)<br>(273)<br>(273)<br>(275)<br>(275)<br>(276)  | 0.037<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(295)<br>(295)  | 01014<br>98-3<br>98-3<br>98-3<br>98-3<br>58-5<br>58-5<br>58-3<br>58-3  | (367)<br>(268)<br>(269)<br>(369)<br>(310)<br>(311)<br>(313)<br>(213)<br>(214)   | 18-3<br>18-3<br>18-3<br>18-3<br>18-3<br>18-3<br>18-3<br>18-3   | (325)<br>(525)<br>(525)<br>(527)<br>(527)<br>(527)<br>(527)<br>(527)<br>(527)<br>(522)  | 9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9                          | 1 24 21 | · ·   |
| 1)       0.039         2)       0.039         3)       0.039         4)       0.039         5)       0.039         6)       0.039         6)       0.039         6)       0.039         7)       5.039         9.1       9.1   | $(109) \\ (110) \\ (111) \\ (112) \\ (112) \\ (117) \\ (114) \\ (115$ | 2.835<br>1.617<br>1.327<br>1.075<br>0.998<br>0.924<br>0.853<br>0.766   | $\begin{array}{cccc} (127) & 0.25 \\ (128) & 0.25 \\ (129) & 0.219 \\ (150) & 0.219 \\ (151) & 0.219 \\ (151) & 0.219 \\ (152) & 0.219 \\ (132) & 0.19 \\ (134) & 0.19 \end{array}$  | $\begin{array}{c} (145) & 0.165 \\ (146) & 0.139 \\ (147) & 0.14 \\ (143) & 0.127 \\ (149) & 0.127 \\ (150) & 0.127 \\ (151) & 0.222 \\ (152) & 0.722 \end{array}$  | (160)<br>(164)<br>(165)<br>(165)<br>(167)<br>(153)<br>(167)<br>(170)  | 1.075<br>1.421<br>5.580<br>0.924<br>1.241<br>1.939<br>0.924<br>1.075   | (271)<br>(272)<br>(273)<br>(273)<br>(274)<br>(274)<br>(277)  | 0.037<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(295)<br>(295)<br>(295)<br>(297)  | 0.014<br>9E-3<br>9E-3<br>9E-3<br>9E-3<br>5E-3<br>5E-3<br>5E-3  | (367)<br>(268)<br>(269)<br>(369)<br>(314)<br>(314)<br>(315)   | 18-3<br>38-3<br>18-3<br>18-3<br>18-3<br>18-3<br>18-3<br>18-3   | (325)<br>(525)<br>(527)<br>(528)<br>(528)<br>(528)<br>(528)<br>(528)<br>(538)<br>(538)  | 9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9                               | 1 24 21 | · ·   |
| 1)       0.039         2)       0.039         3)       0.039         4)       0.039         5)       0.039         6)       0.039         6)       0.039         7)       5.039         8)       9.139         9)       9.82   | (109) (110) (111) (112) (112) (112) (114) (114) (115) (115) (117)   | 2.835<br>1.617<br>1.327<br>1.075<br>0.958<br>0.924<br>0.853<br>0.853<br>0.853<br>0.853   | $\begin{array}{cccc} (127) & 0.25 \\ (128) & 0.25 \\ (129) & 0.219 \\ (150) & 0.219 \\ (131) & 0.219 \\ (132) & 0.219 \\ (132) & 0.19 \\ (135) & 0.18 \end{array}$   | $\begin{array}{c} (145) & 0.165 \\ (146) & 0.139 \\ (147) & 0.14 \\ (143) & 0.129 \\ (149) & 0.129 \\ (150) & 0.127 \\ (150) & 0.127 \\ (151) & 0.322 \\ (153) & 0.322 \end{array}$   | (160)<br>(164)<br>(165)<br>(165)<br>(167)<br>(153)<br>(167)<br>(170)  | 1.075<br>1.421<br>5.580<br>0.924<br>1.241<br>1.939<br>0.924<br>1.075<br>0.722  | (271)<br>(272)<br>(273)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(277)  | 0.037<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039<br>0.029<br>0.039  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)<br>(296)<br>(298)  | 0.014<br>9E-3<br>9E-3<br>9E-3<br>9E-3<br>5E-3<br>5E-3<br>5E-3<br>5E-3  | (367)<br>(768)<br>(309)<br>(310)<br>(211)<br>(213)<br>(213)<br>(214)<br>(315)<br>(316)  | LE-3<br>JE-3<br>LE-3<br>JE-3<br>JE-3<br>JE-3<br>JE-3<br>JE-3<br>JE-3<br>JE-3<br>J  | $\begin{array}{c} (325) \\ (526) \\ (127) \\ (120) \\ (527) \\ (520) \\ (521) \\ (531) \\ (531) \\ (532) \\ (533) \\ (533) \\ (534) \end{array}$  |   | 1 24 21 | · ·   |
| 1)         0.039           2)         0.039           3)         0.039           4)         0.039           5)         0.039           6)         0.039           6)         0.039           6)         0.039           6)         0.039           6)         0.039           6)         0.039           6)         9.139           6)         9.19           9)         9.82           0)         1.827   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(115)<br>(115)<br>(112)<br>(112)   | 2.835<br>1.617<br>1.309<br>1.075<br>0.994<br>0.924<br>0.853<br>0.786<br>0.661<br>0.604   | $\begin{array}{cccc} (127) & 0.25 \\ (128) & 0.25 \\ (129) & 0.219 \\ (150) & 0.219 \\ (131) & 0.219 \\ (132) & 0.219 \\ (132) & 0.19 \\ (134) & 0.19 \\ (135) & 0.18 \\ (135) & 0.17 \end{array}$   | $\begin{array}{c} (145) & 0.163 \\ (146) & 0.139 \\ (147) & 0.14 \\ (143) & 0.129 \\ (149) & 0.129 \\ (150) & 0.127 \\ (151) & 0.322 \\ (152) & 0.722 \\ (153) & 0.322 \\ (154) & 8.07 \end{array}$   | (160)<br>(164)<br>(165)<br>(166)<br>(167)<br>(153)<br>(153)<br>(157)<br>(171)<br>(172)  | 1.075<br>1.421<br>5.589<br>0.924<br>1.241<br>1.939<br>0.924<br>1.939<br>0.924<br>1.975<br>0.722<br>0.855                                     | (2/1)<br>(2/2)<br>(2/3)<br>(2/3)<br>(2/3)<br>(2/3)<br>(2/3)<br>(2/7)<br>(2/7)<br>(277)   | 0.037<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039<br>0.029<br>0.039  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(295)<br>(295)<br>(295)<br>(297)  | 0.013<br>9824555555555555555555555555555555555555  | $\begin{array}{c} (367) \\ (569) \\ (569) \\ (369) \\ (340) \\ (541) \\ (541) \\ (541) \\ (513) \\ (513) \\ (514) \\ (315) \\ (316) \\ (314) \\ (517) \end{array}$  | 16-5<br>16-5<br>16-5<br>16-5<br>16-5<br>16-5<br>16-5<br>16-5   | (325)<br>(525)<br>(127)<br>(428)<br>(526)<br>(526)<br>(536)<br>(531)<br>(535)<br>(533)<br>(534)<br>(535)  | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0                               | 1 24 21 | · ·   |
| 1)         0.039           2)         0.039           3)         0.039           4)         0.039           5)         0.039           5)         0.039           6)         0.039           7)         5.039           8)         9.1           9)         9.82           0)         1.827           1)         1.075   | <pre>(109) (110) (111) (112) (117) (114) (115) (115) (115) (115) (117) (119) (119)</pre>  | 2.835<br>1.617<br>1.359<br>1.075<br>0.998<br>0.998<br>0.924<br>0.653<br>0.766<br>0.661<br>0.604<br>0.404   | $      \begin{array}{lllllllllllllllllllllllllllllll$  | $\begin{array}{c} (145) & 0.165 \\ (146) & 0.139 \\ (147) & 0.14 \\ (143) & 0.129 \\ (149) & 0.129 \\ (150) & 0.127 \\ (150) & 0.127 \\ (151) & 0.222 \\ (153) & 0.322 \\ (153) & 0.322 \\ (154) & 8.07 \\ (155) & 1.517 \end{array}$   | $(164) \\ (154) \\ (165) \\ (165) \\ (164) \\ (152) \\ (152) \\ (152) \\ (152) \\ (167) \\ (170) \\ (171) \\ (172) \\ (175$ | 1.075<br>1.421<br>5.580<br>0.924<br>1.241<br>1.939<br>0.924<br>1.075<br>0.924<br>1.075<br>0.925<br>0.855<br>0.449                            | (2/1)<br>(2/2)<br>(2/2)<br>(2/3)<br>(2/3)<br>(2/3)<br>(2/3)<br>(2/7)<br>(278)<br>(279)<br>(280)  | 0.037<br>0.039<br>0.029<br>0.029<br>0.029<br>0.029<br>0.039<br>0.029<br>0.039<br>0.039<br>0.039  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)<br>(296)<br>(298)  | 0.014<br>980-3000<br>980-3000<br>980-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>880-3000<br>8000<br>8 | $\begin{array}{c} (367) \\ (769) \\ (569) \\ (569) \\ (310) \\ (311) \\ (113) \\ (213) \\ (214) \\ (314) \\ (316) \\ (318) \\ (318) \end{array}$  | 18-5000<br>18-5000<br>18-5000<br>18-5000<br>18-5000<br>18-5000<br>18-500<br>18-500<br>18-500<br>18-500<br>18-500<br>18-500<br>18-500<br>18-500<br>18-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-500<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>19-5000<br>10-5000<br>10-5000<br>10000<br>10-5000<br>10-5000<br>10-5000<br>10-5000<br>10000   | (325)<br>(724)<br>(127)<br>(128)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129)<br>(129) | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0                               | 1 24 21 | · ·   |
| 1)         0.039           2)         0.039           3)         0.039           4)         0.039           5)         0.039           5)         0.039           6)         0.039           7)         5.039           8)         9.1           9)         9.82           0)         1.827           0)         1.875   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(115)<br>(115)<br>(117)<br>(119)<br>(119)<br>(120)  | 2.835<br>1.617<br>1.359<br>1.075<br>0.924<br>0.853<br>0.766<br>0.661<br>0.604<br>0.404<br>0.361  | $\begin{array}{ccccc} (1.27) & 0.25\\ (128) & 0.25\\ (129) & 0.219\\ (150) & 0.219\\ (151) & 0.219\\ (132) & 0.219\\ (132) & 0.219\\ (132) & 0.19\\ (133) & 0.19\\ (134) & 0.19\\ (135) & 0.18\\ (136) & 0.17\\ (137) & 0.163\\ (138) & 0.143\\ \end{array}$   | $\begin{array}{c} (145) & 0.165 \\ (146) & 0.139 \\ (147) & 0.14 \\ (143) & 0.129 \\ (149) & 0.129 \\ (150) & 0.117 \\ (151) & 0.222 \\ (152) & 0.722 \\ (153) & 0.322 \\ (153) & 0.322 \\ (154) & 8.07 \\ (155) & 1.517 \\ (155) & 0.924 \end{array}$  | $(164) \\ (164) \\ (165) \\ (166) \\ (166) \\ (167) \\ (150) \\ (150) \\ (170) \\ (171) \\ (171) \\ (172) \\ (175) \\ (174) \\ (174) \\ (174) \\ (151$ | 1.075<br>1.421<br>5.580<br>0.924<br>1.241<br>1.939<br>0.924<br>1.075<br>0.722<br>0.853<br>0.449<br>0.661                                     | (2/1)<br>(2/2)<br>(2/3)<br>(2/3)<br>(2/3)<br>(2/3)<br>(2/3)<br>(2/7)<br>(278)<br>(279)<br>(280)<br>(281)   | 0.037<br>0.039<br>0.029<br>0.029<br>0.029<br>0.039<br>0.029<br>0.029<br>0.029<br>0.029<br>0.029<br>0.029   | (289)<br>(290)<br>(291)<br>(293)<br>(293)<br>(295)<br>(295)<br>(295)<br>(296)<br>(298)<br>(298)   | 0.014<br>92013303030555555555555555555555555555555   | $\begin{array}{c} (367) \\ (569) \\ (569) \\ (310) \\ (310) \\ (310) \\ (310) \\ (313) \\ (314) \\ (316) \\ (318) \\ (319) \\ (319) \end{array}$  | 1日日1日1日1日1日1日1日1日1日1日1日1日1日1日1日1日1日1日1   | (325)<br>(325)<br>(327)<br>(329)<br>(329)<br>(329)<br>(321)<br>(321)<br>(323)<br>(334)<br>(334)<br>(337)  | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 1 24 21 | · ·   |
| 1)       0.039         2)       0.039         (5)       0.039         (5)       0.039         (6)       0.039         (7)       5.039         (8)       9.1         (9)       9.82         (0)       1.827         (1)       1.075         (2)       0.924         (3)       8.4   | $(109) \\ (110) \\ (111) \\ (112) \\ (113) \\ (114) \\ (115) \\ (114) \\ (115) \\ (114) \\ (115) \\ (114) \\ (117) \\ (119) \\ (120) \\ (121) \end{cases}$  | 2.835<br>1.617<br>1.359<br>1.075<br>0.924<br>0.924<br>0.925<br>0.766<br>0.661<br>0.604<br>0.404<br>0.361<br>0.361  | $\begin{array}{ccccc} (127) & 0.25 \\ (128) & 0.25 \\ (129) & 0.219 \\ (150) & 0.219 \\ (151) & 0.219 \\ (132) & 0.219 \\ (132) & 0.19 \\ (135) & 0.19 \\ (135) & 0.18 \\ (136) & 0.163 \\ (138) & 0.163 \\ (139) & 0.163 \end{array}$   | $\begin{array}{c} (145) & 0.163 \\ (146) & 0.139 \\ (147) & 0.14 \\ (143) & 0.129 \\ (149) & 0.129 \\ (150) & 0.127 \\ (151) & 0.222 \\ (152) & 0.722 \\ (153) & 0.322 \\ (153) & 0.322 \\ (154) & 8.07 \\ (155) & 1.517 \\ (155) & 0.924 \\ (157) & 0.604 \end{array}$   | $\begin{array}{c} (16.)\\ (164)\\ (165)\\ (165)\\ (167)\\ (167)\\ (167)\\ (167)\\ (170)\\ (171)\\ (172)\\ (172)\\ (174)\\ (174)\\ (175) \end{array}$  | 1.075<br>1.421<br>5.580<br>0.924<br>1.241<br>1.939<br>0.924<br>1.075<br>0.722<br>0.853<br>0.722<br>0.853<br>0.449<br>0.661<br>0.404          | (2/1)<br>(2/2)<br>(2/2)<br>(2/3)<br>(2/3)<br>(2/3)<br>(2/3)<br>(279)<br>(280)<br>(281)<br>(283)  | 0.037<br>0.039<br>0.029<br>0.059<br>0.059<br>0.059<br>0.039<br>0.029<br>0.029<br>0.029<br>0.029<br>0.021   | (289)<br>(290)<br>(291)<br>(291)<br>(293)<br>(293)<br>(295)<br>(295)<br>(297)<br>(298)<br>(298)<br>(299)<br>(300)   | 0.013303030525553330<br>99999955553333555555555555555555   | $\begin{array}{c} (367) \\ (566) \\ (569) \\ (210) \\ (211) \\ (211) \\ (214) \\ (214) \\ (314) \\ (314) \\ (314) \\ (314) \\ (318) \\ (319) \\ (320) \end{array}$  | 18-11111<br>18111111111<br>18111111111<br>1811111111   | (325)<br>(525)<br>(527)<br>(527)<br>(526)<br>(526)<br>(526)<br>(527)<br>(523)<br>(523)<br>(523)<br>(523)<br>(523)<br>(523)<br>(523)<br>(526)<br>(526)<br>(527)<br>(528)   | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | 1 24 21 | · ·   |
| 1)       0.039         2)       0.039         3)       0.039         4)       0.039         5)       0.039         6)       0.039         7)       5.039         80       9.039         91       9.1         92)       9.82         91)       1.627         92)       0.924         93)       8.4  | (169)<br>(110)<br>(111)<br>(112)<br>(117)<br>(114)<br>(115)<br>(114)<br>(115)<br>(117)<br>(119)<br>(119)<br>(120)<br>(122)  | 2.835<br>1.617<br>1.359<br>1.075<br>0.958<br>0.924<br>0.855<br>0.766<br>0.661<br>0.604<br>0.404<br>0.361<br>0.361<br>0.322                                     | $      \begin{array}{lllllllllllllllllllllllllllllll$  | $\begin{array}{c} (145) & 0.163 \\ (146) & 0.139 \\ (147) & 0.14 \\ (143) & 0.129 \\ (149) & 0.129 \\ (150) & 0.127 \\ (150) & 0.222 \\ (151) & 0.322 \\ (153) & 0.322 \\ (153) & 0.322 \\ (155) & 1.517 \\ (155) & 1.517 \\ (156) & 0.924 \\ (157) & 0.404 \\ (158) & 0.404 \end{array}$   | $(164) \\ (165) \\ (165) \\ (165) \\ (164) \\ (153) \\ (153) \\ (170) \\ (171) \\ (172) \\ (172) \\ (172) \\ (174) \\ (175) \\ (176$ | 1.075<br>1.421<br>5.580<br>0.924<br>1.241<br>1.939<br>0.924<br>1.075<br>0.722<br>0.853<br>0.722<br>0.853<br>0.449<br>0.661<br>0.404<br>0.449 | (2/1)<br>(2/2)<br>(2/2)<br>(2/3)<br>(2/3)<br>(2/3)<br>(2/7)<br>(278)<br>(289)<br>(280)<br>(281)<br>(282)<br>(282)<br>(283)                                     | 0.037<br>0.039<br>0.029<br>0.029<br>0.029<br>0.029<br>0.029<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039<br>0.021   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(293)<br>(295)<br>(295)<br>(297)<br>(298)<br>(297)<br>(298)<br>(299)<br>(300)   | 0.9999955555555555555555555555555555555  | $\begin{array}{c} (367) \\ (566) \\ (569) \\ (510) \\ (211) \\ (213) \\ (214) \\ (214) \\ (214) \\ (316) \\ (316) \\ (316) \\ (316) \\ (319) \\ (320) \\ (320) \\ (321) \end{array}$  | 1日-11日<br>11日-11日<br>11日-11日<br>11日-11日<br>11日-11日<br>11日-11日<br>11日-11日<br>11日  | (325)<br>(525)<br>(527)<br>(529)<br>(529)<br>(529)<br>(529)<br>(529)<br>(529)<br>(529)<br>(529)<br>(529)<br>(529)<br>(529)  | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 1 24 21 | · ·   |
| 1)       0.039         2)       0.039         73)       0.039         75)       0.039         76)       0.039         76)       0.039         77)       5.039         78)       9.1         99)       9.82         90)       1.827         51)       1.075         52)       0.924         03)       8.4         04)       2.297   | $(109) \\ (110) \\ (111) \\ (111) \\ (112) \\ (112) \\ (113) \\ (114) \\ (115) \\ (114) \\ (115) \\ (117) \\ (113) \\ (117) \\ (113) \\ (112) \\ (121) \\ (122) \\ (123) \end{cases}$   | 2.835<br>1.617<br>1.329<br>1.075<br>0.958<br>0.924<br>0.655<br>0.704<br>0.655<br>0.664<br>0.604<br>0.404<br>0.361<br>0.361<br>0.361<br>0.322<br>0.322          | $      \begin{array}{lllllllllllllllllllllllllllllll$  | $\begin{array}{c} (145) & 0.185 \\ (146) & 0.137 \\ (146) & 0.137 \\ (147) & 0.14 \\ (143) & 0.127 \\ (149) & 0.127 \\ (150) & 0.127 \\ (151) & 0.222 \\ (153) & 0.722 \\ (153) & 0.322 \\ (154) & 8.07 \\ (155) & 1.517 \\ (156) & 0.924 \\ (157) & 0.604 \\ (158) & 0.404 \\ (159) & 0.361 \end{array}$   | $\begin{array}{c} (16.)\\ (164)\\ (165)\\ (166)\\ (164)\\ (164)\\ (156)\\ (164)\\ (170)\\ (171)\\ (172)\\ (172)\\ (172)\\ (175)\\ (176)\\ (177)\end{array}$   | 1.075<br>1.421<br>5.530<br>0.924<br>1.241<br>1.939<br>0.924<br>1.075<br>0.924<br>1.075<br>0.925<br>0.853<br>0.449<br>0.461<br>0.404<br>0.422 | (2/1)<br>(2/2)<br>(2/2)<br>(2/3)<br>(2/3)<br>(2/3)<br>(273)<br>(273)<br>(277)<br>(278)<br>(280)<br>(280)<br>(281)<br>(282)<br>(283)<br>(283)<br>(285)          | 0.037<br>0.039<br>0.029<br>0.029<br>0.029<br>0.039<br>0.029<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039<br>0.021                                     | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(295)<br>(295)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(300)<br>(301)<br>(302)   | 0.9999995555555555555555555555555555555  | $\begin{array}{c} (367) \\ (566) \\ (569) \\ (210) \\ (211) \\ (211) \\ (214) \\ (214) \\ (314) \\ (314) \\ (314) \\ (314) \\ (318) \\ (319) \\ (320) \end{array}$  | 1日-11日<br>11日-11日<br>11日-11日<br>11日-11日<br>11日-11日<br>11日-11日<br>11日-11日<br>11日  | (325)<br>(527)<br>(527)<br>(527)<br>(527)<br>(527)<br>(527)<br>(527)<br>(527)<br>(537)<br>(536)<br>(537)<br>(537)<br>(539)<br>(539)   | 00000000000000000000000000000000000000  | 1 24 21 | · ·   |
| 0.039         (2)       0.039         (2)       0.039         (3)       0.039         (4)       0.039         (5)       0.039         (4)       0.039         (5)       0.039         (7)       5.039 <td><math display="block">(109) \\ (110) \\ (111) \\ (111) \\ (112) \\ (112) \\ (113) \\ (114) \\ (115) \\ (114) \\ (115) \\ (117) \\ (113) \\ (117) \\ (113) \\ (112) \\ (121) \\ (122) \\ (123) \end{cases}</math></td> <td>2.835<br/>1.617<br/>1.359<br/>1.075<br/>0.958<br/>0.924<br/>0.855<br/>0.766<br/>0.661<br/>0.604<br/>0.404<br/>0.361<br/>0.361<br/>0.322</td> <td><math display="block">\begin{array}{ccccc} (1.27) &amp; 0.25 \\ (128) &amp; 0.25 \\ (129) &amp; 0.219 \\ (150) &amp; 0.219 \\ (151) &amp; 0.219 \\ (132) &amp; 0.219 \\ (132) &amp; 0.219 \\ (132) &amp; 0.19 \\ (135) &amp; 0.19 \\ (135) &amp; 0.18 \\ (136) &amp; 0.17 \\ (137) &amp; 0.163 \\ (138) &amp; 0.163 \\ (139) &amp; 0.163 \\ (140) &amp; 0.163 \\ (142) &amp; 0.219 \end{array}</math></td> <td><math display="block"> \begin{array}{c} (145) &amp; 0.185 \\ (146) &amp; 0.139 \\ (147) &amp; 0.14 \\ (143) &amp; 0.129 \\ (147) &amp; 0.139 \\ (150) &amp; 0.127 \\ (151) &amp; 0.222 \\ (152) &amp; 0.722 \\ (153) &amp; 0.222 \\ (153) &amp; 0.222 \\ (153) &amp; 0.222 \\ (155) &amp; 1.517 \\ (155) &amp; 1.517 \\ (155) &amp; 1.517 \\ (156) &amp; 0.924 \\ (157) &amp; 0.404 \\ (158) &amp; 0.404 \\ (159) &amp; 0.361 \\ (160) &amp; 0.361 \end{array} </math></td> <td><math display="block">(164) \\ (164) \\ (165) \\ (166) \\ (166) \\ (150) \\ (150) \\ (170) \\ (170) \\ (171) \\ (172) \\ (172) \\ (175) \\ (176) \\ (177) \\ (174) \\ (177) \\ (174</math></td> <td>1.075<br/>1.421<br/>5.580<br/>0.924<br/>1.241<br/>1.939<br/>0.924<br/>1.075<br/>0.722<br/>0.853<br/>0.449<br/>0.661<br/>0.404<br/>0.422<br/>0.322<br/>0.361</td> <td>(2/1)<br/>(2/2)<br/>(2/2)<br/>(2/3)<br/>(2/3)<br/>(2/3)<br/>(273)<br/>(278)<br/>(279)<br/>(281)<br/>(281)<br/>(282)<br/>(283)<br/>(284)<br/>(284)<br/>(285)</td> <td>0.037<br/>0.039<br/>0.029<br/>0.029<br/>0.029<br/>0.039<br/>0.029<br/>0.029<br/>0.029<br/>0.029<br/>0.029<br/>0.021<br/>0.021<br/>0.021<br/>0.021<br/>0.021</td> <td>(289)<br/>(290)<br/>(291)<br/>(292)<br/>(293)<br/>(293)<br/>(295)<br/>(295)<br/>(297)<br/>(298)<br/>(297)<br/>(298)<br/>(297)<br/>(298)<br/>(297)<br/>(300)<br/>(301)<br/>(302)<br/>(303)</td> <td>0.9999955555555555555555555555555555555</td> <td><math display="block">\begin{array}{c} (367) \\ (566) \\ (569) \\ (510) \\ (211) \\ (213) \\ (214) \\ (214) \\ (214) \\ (316) \\ (316) \\ (316) \\ (316) \\ (319) \\ (320) \\ (320) \\ (321) \end{array}</math></td> <td>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>16-700<br/>10-700<br/>10-700<br/>16-700<br/>16-700<br/>16-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-700<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10-7000<br/>10000000000</td> <td><math display="block">\begin{array}{c} (325) \\ (524) \\ (527) \\ (127) \\ (128) \\ (129) \\</math></td> <td>0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td> <td>1 24 21</td> <td>· ·</td> | $(109) \\ (110) \\ (111) \\ (111) \\ (112) \\ (112) \\ (113) \\ (114) \\ (115) \\ (114) \\ (115) \\ (117) \\ (113) \\ (117) \\ (113) \\ (112) \\ (121) \\ (122) \\ (123) \end{cases}$   | 2.835<br>1.617<br>1.359<br>1.075<br>0.958<br>0.924<br>0.855<br>0.766<br>0.661<br>0.604<br>0.404<br>0.361<br>0.361<br>0.322                                     | $\begin{array}{ccccc} (1.27) & 0.25 \\ (128) & 0.25 \\ (129) & 0.219 \\ (150) & 0.219 \\ (151) & 0.219 \\ (132) & 0.219 \\ (132) & 0.219 \\ (132) & 0.19 \\ (135) & 0.19 \\ (135) & 0.18 \\ (136) & 0.17 \\ (137) & 0.163 \\ (138) & 0.163 \\ (139) & 0.163 \\ (140) & 0.163 \\ (142) & 0.219 \end{array}$ | $ \begin{array}{c} (145) & 0.185 \\ (146) & 0.139 \\ (147) & 0.14 \\ (143) & 0.129 \\ (147) & 0.139 \\ (150) & 0.127 \\ (151) & 0.222 \\ (152) & 0.722 \\ (153) & 0.222 \\ (153) & 0.222 \\ (153) & 0.222 \\ (155) & 1.517 \\ (155) & 1.517 \\ (155) & 1.517 \\ (156) & 0.924 \\ (157) & 0.404 \\ (158) & 0.404 \\ (159) & 0.361 \\ (160) & 0.361 \end{array} $ | $(164) \\ (164) \\ (165) \\ (166) \\ (166) \\ (150) \\ (150) \\ (170) \\ (170) \\ (171) \\ (172) \\ (172) \\ (175) \\ (176) \\ (177) \\ (174) \\ (177) \\ (174$ | 1.075<br>1.421<br>5.580<br>0.924<br>1.241<br>1.939<br>0.924<br>1.075<br>0.722<br>0.853<br>0.449<br>0.661<br>0.404<br>0.422<br>0.322<br>0.361 | (2/1)<br>(2/2)<br>(2/2)<br>(2/3)<br>(2/3)<br>(2/3)<br>(273)<br>(278)<br>(279)<br>(281)<br>(281)<br>(282)<br>(283)<br>(284)<br>(284)<br>(285)                   | 0.037<br>0.039<br>0.029<br>0.029<br>0.029<br>0.039<br>0.029<br>0.029<br>0.029<br>0.029<br>0.029<br>0.021<br>0.021<br>0.021<br>0.021<br>0.021                                     | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(295)<br>(295)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(300)<br>(301)<br>(302)<br>(303)                                     | 0.9999955555555555555555555555555555555  | $\begin{array}{c} (367) \\ (566) \\ (569) \\ (510) \\ (211) \\ (213) \\ (214) \\ (214) \\ (214) \\ (316) \\ (316) \\ (316) \\ (316) \\ (319) \\ (320) \\ (320) \\ (321) \end{array}$  | 16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>16-700<br>10-700<br>10-700<br>16-700<br>16-700<br>16-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-700<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10-7000<br>10000000000   | $\begin{array}{c} (325) \\ (524) \\ (527) \\ (127) \\ (128) \\ (129) \\$   | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 1 24 21 | · ·   |
| 0.039         21       0.039         22       0.039         33       0.039         41       0.039         941       0.039         942       0.039         943       0.039         944       0.039         945       0.039         947       5.039         971       5.039         971       9.82         001       1.827         011       1.075         021       0.924         031       8.4         041       2.297         053       0.924   | $(109) \\ (110) \\ (111) \\ (111) \\ (112) \\ (112) \\ (113) \\ (114) \\ (115) \\ (114) \\ (115) \\ (117) \\ (113) \\ (117) \\ (113) \\ (112) \\ (121) \\ (122) \\ (123) \end{cases}$   | 2.835<br>1.617<br>1.329<br>1.075<br>0.958<br>0.924<br>0.653<br>0.764<br>0.661<br>0.604<br>0.361<br>0.361<br>0.361<br>0.361<br>0.361<br>0.361<br>0.322<br>0.322 | $      \begin{array}{lllllllllllllllllllllllllllllll$  | $\begin{array}{c} (145) & 0.185 \\ (146) & 0.137 \\ (146) & 0.137 \\ (147) & 0.14 \\ (143) & 0.127 \\ (149) & 0.127 \\ (150) & 0.127 \\ (151) & 0.222 \\ (153) & 0.722 \\ (153) & 0.322 \\ (154) & 8.07 \\ (155) & 1.517 \\ (156) & 0.924 \\ (157) & 0.604 \\ (158) & 0.404 \\ (159) & 0.361 \end{array}$   | $(164) \\ (164) \\ (165) \\ (166) \\ (166) \\ (150) \\ (150) \\ (170) \\ (170) \\ (171) \\ (172) \\ (172) \\ (175) \\ (176) \\ (177) \\ (174) \\ (177) \\ (174$ | 1.075<br>1.421<br>5.580<br>0.924<br>1.241<br>1.939<br>0.924<br>1.075<br>0.722<br>0.853<br>0.449<br>0.461<br>0.404<br>0.422<br>0.341<br>0.322 | (2/1)<br>(2/2)<br>(2/2)<br>(2/3)<br>(2/3)<br>(2/3)<br>(278)<br>(278)<br>(279)<br>(287)<br>(281)<br>(282)<br>(283)<br>(284)<br>(284)<br>(285)<br>(286)<br>(286) | 0.037<br>0.039<br>0.039<br>0.029<br>0.029<br>0.029<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039<br>0.039<br>0.021<br>0.021<br>0.021<br>0.021<br>0.021<br>0.014<br>0.014 | (289)<br>(290)<br>(291)<br>(291)<br>(293)<br>(293)<br>(295)<br>(295)<br>(295)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(300)<br>(301)<br>(302)<br>(303)<br>(303)<br>(304)<br>(305) | 0.9999955555555555555555555555555555555  | $\begin{array}{c} (367)\\ (566)\\ (569)\\ (510)\\ (211)\\ (211)\\ (213)\\ (214)\\ (214)\\ (214)\\ (316)\\ (316)\\ (316)\\ (316)\\ (316)\\ (319)\\ (320)\\ (322)\\ (322)\\ (322)\\ (322)\\ (322)\\ (322)\\ (323)\\ (3$ | 16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-50<br>16-500 | $\begin{array}{c} (325) \\ (525) \\ (527) \\ (429) \\ (127) \\ (120) \\ (120) \\ (120) \\ (230) \\ (233) \\ (233) \\ (233) \\ (234) \\ (337) \\ (337) \\ (339) \\ (339) \\ (342) \\ (342) \end{array}$  |   | (344)   |       |

| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{c} (253) & 0.05 \\ (254) & 0.05 \\ (255) & 0.05 \\ (256) & 0.05 \\ (257) & 0.05 \\ (252) & 0.05 \\ (252) & 0.05 \\ (259) & 0.997 \\ (250) & 0.285 \end{array}$ |
|--|---|---|
| $ \begin{pmatrix} 1 & 0 & (19) & 2E-3 & (37) & 1E-3 & (35) & 1E-3 & (76) & 2E-3 & (132) & 0.029 & (200) & 0.139 & (218) & 0.139 \\ (2) & 0 & (20) & 2E-3 & (38) & 1E-3 & (75) & 2E-3 & (132) & 0.05 & (201) & 0.17 & (219) & 0.139 \\ (3) & 0 & (21) & 2E-3 & (39) & 1E-3 & (57) & 5E-5 & (75) & 2E-3 & (132) & 0.05 & (201) & 0.17 & (219) & 0.139 \\ (4) & 0 & (22) & 2E-3 & (40) & 1E-3 & (53) & 2E-3 & (164) & 5.039 & (202) & 0.139 & (219) & 0.139 \\ (5) & 0 & (23) & 1E-3 & (41) & 1E-3 & (59) & 2E-3 & (164) & 5.039 & (202) & 0.504 & (221) & 0.117 \\ (5) & 0 & (23) & 1E-3 & (41) & 1E-3 & (59) & 2E-3 & (166) & 1.421 & (204) & 6.772 & (222) & 0.17 \\ (6) & 0 & (24) & 2E-3 & (42) & 1E-3 & (61) & 2E-3 & (166) & 1.421 & (204) & 6.772 & (222) & 0.117 \\ (7) & 0 & (25) & 1E-3 & (44) & 1E-3 & (52) & 2E-3 & (160) & 2E-3 & (169) & 0.722 & (207) & 0.498 & (225) & 0.117 \\ (7) & 0 & (25) & 1E-3 & (45) & 1E-3 & (63) & 2E-3 & (161) & 2E-3 & (169) & 0.722 & (207) & 0.498 & (225) & 0.117 \\ (7) & 0 & (27) & 1E-3 & (45) & 1E-3 & (63) & 2E-3 & (161) & 2E-3 & (169) & 0.722 & (207) & 0.498 & (225) & 0.117 \\ (7) & 0 & (27) & 1E-3 & (45) & 1E-3 & (63) & 2E-3 & (161) & 2E-3 & (169) & 0.722 & (207) & 0.498 & (225) & 0.117 \\ (7) & 0 & (27) & 1E-3 & (45) & 1E-3 & (63) & 2E-3 & (161) & 2E-3 & (169) & 0.722 & (207) & 0.498 & (225) & 0.117 \\ (7) & 0 & (27) & 1E-3 & (45) & 1E-3 & (63) & 2E-3 & (161) & 2E-3 & (169) & 0.748 & (225) & 0.117 \\ (7) & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & $  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (254) 0.05<br>(255) 0.05<br>(256) 0.05<br>(257) 0.05<br>(259) 0.05<br>(259) 0.997   |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | (288) 0.139<br>(239) 0.097<br>(240) 0.097<br>(241) 0.07<br>(242) 0.079<br>(243) 0.054                                       | (256) 0.05<br>(257) 0.05<br>(258) 0.05<br>(259) 0.097   |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | (239) 0.097<br>(240) 0.097<br>(241) 0.07<br>(242) 0.079<br>(243) 0.054  | (257) 0.05<br>(258) 0.05<br>(257) 0.997   |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | (239) 0.097<br>(240) 0.097<br>(241) 0.07<br>(242) 0.079<br>(243) 0.054  | (257) 0.05<br>(258) 0.05<br>(257) 0.997   |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | (240) 0.097<br>(241) 0.07<br>(242) 0.079<br>(243) 0.054   | (258) 0.05<br>(259) 0.997   |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | (241) 0.07<br>(242) 0.079<br>(243) 0.054  | (259) 0.997   |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | (242) 0.079<br>(243) 0.054  |   |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | (243) 0.054   |   |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | (243) 0,054   |   |
| $ \begin{array}{c} (19) \\ ($  |   | (251) 0.322   |
| (-9) $(-24)$ $(-24)$ $(-25)$ $(-46)$ $(-27)$ $(-54)$ $(-27)$ $(-92)$ $(-92)$ $(-26)$ $(-100)$ $(-56)$ $(-200)$ $(-54)$ $(-27)$ $(-07)$   | (244) 0.064   | (252) 0.25  |
|  | (245) 0.954   | (253) 0.153   |
| 10) 2E-3 ( 247 45 5 ( 287 46 5 ( 287 46 5 ( 287 46 5 ( 287 46 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6  | (246) 0.064   | (264) 0.117   |
| (12) 2E-5  (24) 1E-5  (24) (210) 0.219  (210) 0.404  (220) 0.404   | (240) 0.05  | (235) 0.077   |
| (12) ZE-3 ( $(30)$ ZE-3 ( $(40)$ ZE 4 (  |   | (256) 0.079   |
| (13) 26-3 (31) $16-3$ (49) $16-3$ (57) $16-3$ (57) $16-3$ (194) $1,150$ (212) $0,285$ (230) $0,097$  |   |   |
| 14) $5E-3$ ( 32) $4E-3$ ( 50) $5E-3$ ( 48) $4E-3$ ( 86) $2E-3$ ( 194) 0.139 (215) 0.25 (231) 0.097   | (247) 0.05  | (267) 0.079   |
| 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  |   | (248) 0.079   |
|  | (251) 0.05  | (259) 0.084   |
|  |   | (270) 0.06  |
| $(17) 2E_3 (190) 1E_3 (100) 1E_3$   |   |   |
| (18) SE-3 (36) 1E-3 (54) 1E-3 (72) 1E-3 (901 2E-3  |   |   |
|  |   | (343) 0   |
| $\mathbf{L}_{\mathbf{r}}^{\mathbf{r}} = \mathbf{L}_{\mathbf{r}}^{\mathbf{r}} + \mathbf{L}_{\mathbf$ | (325) 16-3  | (343) 1E-3  |
| し ブルナ キローシー・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・   |   |   |
| 92) 2E-3 (110) 1E-3 (128) 2E-3 (148) 0.077 (134) 0.077 (273) 0.064 (291) 5E-7 (307) 1E-7   | (327) 16-3  | (345) 0   |
| 92) 2E-3 (111) 56+3 (129) 2E-4 (144) 55+4 (144) 55+4 (145) 55+5 (204) 55+5 (2   | (328) 1E-3  | (246) 0   |
| (94) 56-5 (112) 26-3 (100) 36-3 (140) 0.235 (155) 0.437 (205) 0.055 (205) 56-3 (211) 16-3  | (329) IE-3  | (347) 0   |
| $\mu_{53} = 0.009 = (1.3) \pm 2k - 3 = (1.31) \pm 2k - 3 = (1.49) \pm 0.151 = (1.57) \pm 0.159 = (1.512) \pm 0.15$   | (336) 1E-3  | (249) v   |
|  |   |   |
| (24) ( $(14)$ ) $(26-3)$ ( $(132)$ ) $(26-3)$ ( $(150)$ ) ( $(150)$ ) ( $(0,079)$ ) ( $(20,0)$ ) ( $(20,0)$ ) ( $(20,0)$ ) ( $(20,0)$ ) ( $(15$  | (331) 16-3  | (349) 0   |
| 96) $0.014$ (114) $2E-3$ (150) $0.285$ (158) $0.079$ (277) $0.029$ (275) $5E-3$ (313) $1E-3$ 97) $0.5$ (115) $5E-3$ (151) $0.139$ (159) $0.064$ (277) $0.029$ (275) $5E-3$ (314) $1E-3$  |   | (349) 0<br>(350) 0  |
| 96) $0.014$ (114) $2E-3$ (150) $0.285$ (158) $0.079$ (277) $0.029$ (275) $5E-3$ (313) $1E-3$ 97) $0.05$ (115) $5E-3$ (151) $0.139$ (169) $0.065$ (278) $0.029$ (276) $5E-3$ (314) $1E-3$ 97) $0.05$ (115) $5E-3$ (151) $0.397$ (159) $0.029$ (296) $5E-3$ (514) $1E-3$   | (3.32) 26-3   | •   |
| 96) $0.014$ (114) $2E-3$ (150) $0.285$ (150) $0.079$ (277) $0.029$ (275) $5E-3$ (313) $1E-3$ 97) $0.05$ (113) $5E-3$ (151) $0.137$ (169) $0.064$ (277) $0.029$ (295) $5E-3$ (314) $1E-3$ 97) $0.05$ (113) $5E-3$ (151) $0.137$ (159) $0.064$ (277) $0.029$ (296) $5E-3$ (314) $1E-3$ 98) $5E-3$ (114) $5E-3$ (153) $0.079$ (171) $0.029$ (297) $5E-3$ (315) $1E-3$   | (332) 26-3<br>(333) 26-3  | (350) 0<br>(351) 0  |
| 96) $0.014$ $(114)$ $2E-3$ $(130)$ $0.285$ $(158)$ $0.079$ $(277)$ $0.029$ $(275)$ $5E-3$ $(313)$ $1E-3$ 97) $0.05$ $(115)$ $5E-3$ $(130)$ $2E-3$ $(151)$ $0.137$ $(159)$ $0.064$ $(277)$ $0.029$ $(295)$ $5E-3$ $(314)$ $1E-3$ 98) $5E-3$ $(116)$ $5E-3$ $(134)$ $0.021$ $(152)$ $0.077$ $(170)$ $0.029$ $(295)$ $5E-3$ $(314)$ $1E-3$ 99) $5E-3$ $(117)$ $9E-3$ $(1153)$ $0.079$ $(171)$ $0.037$ $(290)$ $0.029$ $(297)$ $5E-3$ $(315)$ $1E-3$ 97) $5E-3$ $(117)$ $9E-3$ $(1153)$ $0.044$ $(172)$ $0.037$ $(280)$ $0.021$ $(298)$ $2E-3$ $(316)$ $1E-3$  | (332) 26-3<br>(333) 2E-3<br>(334) 1E-3  | (350) 0<br>(351) 0<br>(352) 0   |
| 96) $0.014$ (114) $2E-3$ (150) $0.285$ (150) $0.079$ (277) $0.029$ (275) $5E-3$ (313) $1E-3$ 97) $0.05$ (113) $5E-3$ (130) $2E-3$ (151) $0.137$ (159) $0.064$ (277) $0.029$ (295) $5E-3$ (314) $1E-3$ 98) $5E-3$ (116) $5E-3$ (135) $0.077$ (170) $0.055$ (279) $0.029$ (296) $5E-3$ (315) $1E-3$ 99) $5E-3$ (117) $9E-3$ (1135) $0.079$ (171) $0.037$ (280) $0.029$ (297) $5E-3$ (316) $1E-3$ 100) $2E-3$ (118) $5E-3$ (136) $0.164$ (172) $0.037$ (280) $0.021$ (298) $2E-3$ (316) $1E-3$ 100) $2E-3$ (118) $5E-3$ (137) $0.05$ (173) $0.029$ (281) $0.021$ (299) $1E-3$ (317) $1E-3$  | (332) 26-3<br>(333) 26-3<br>(334) 16-3<br>(335) 16-3  | (350) 0<br>(351) 0<br>(352) 0<br>(357) 0  |
| 961 $0.014$ $(114)$ $2E-3$ $(130)$ $0.285$ $(150)$ $0.079$ $(277)$ $0.029$ $(275)$ $5E-3$ $(313)$ $1E-3$ $97)$ $0.05$ $(115)$ $5E-3$ $(130)$ $0.21$ $(151)$ $0.079$ $(276)$ $0.029$ $(296)$ $5E-3$ $(314)$ $1E-3$ $97)$ $0.05$ $(115)$ $5E-3$ $(134)$ $0.021$ $(152)$ $0.079$ $(171)$ $0.029$ $(297)$ $5E-3$ $(315)$ $1E-3$ $99)$ $5E-3$ $(117)$ $9E-3$ $(117)$ $9E-3$ $(117)$ $9E-3$ $(135)$ $0.490$ $(153)$ $0.639$ $(229)$ $0.029$ $(297)$ $5E-3$ $(315)$ $1E-3$ $99)$ $5E-3$ $(117)$ $9E-3$ $(117)$ $9E-3$ $(117)$ $9E-3$ $(316)$ $1E-3$ $100)$ $2E-3$ $(118)$ $5E-3$ $(135)$ $0.05$ $(173)$ $0.039$ $(280)$ $0.021$ $(299)$ $1E-3$ $(316)$ $1E-3$ $101)$ <  | (332) 26-3<br>(333) 28-3<br>(334) 18-3<br>(335) 18-3<br>(336) 18-3  | (350) 0<br>(351) 0<br>(352) 0<br>(357) 0<br>(357) 0   |
| 96) 0.014 $(114) 2E - 3$ $(152) 2E - 3$ $(160) 0.283$ $(158) 0.079$ $(277) 0.029$ $(275) 5E - 3$ $(313) 1E - 3$ 97) 0.05 $(113) 5E - 3$ $(130) 2E - 3$ $(151) 0.139$ $(169) 0.064$ $(277) 0.029$ $(295) 5E - 3$ $(313) 1E - 3$ 98) 5E - 3 $(116) 5E - 3$ $(134) 0.021$ $(152) 0.097$ $(170) 0.039$ $(279) 0.029$ $(296) 5E - 3$ $(315) 1E - 3$ 99) 5E - 3 $(116) 5E - 3$ $(135) 0.498$ $(153) 0.079$ $(171) 0.039$ $(280) 0.024$ $(298) 2E - 3$ $(316) 1E - 3$ 100) 2E - 3 $(119) 5E - 3$ $(135) 0.498$ $(155) 0.05$ $(173) 0.039$ $(280) 0.021$ $(298) 2E - 3$ $(316) 1E - 3$ 101) 2E - 3 $(112) 5E - 3$ $(138) 0.064$ $(175) 0.029$ $(282) 0.021$ $(300) 1E - 3$ $(318) 1E - 3$ 102) 2E - 3 $(120) 5E - 3$ $(138) 0.064$ $(174) 0.029$ $(282) 0.021$ $(300) 1E - 3$ $(318) 1E - 3$ 102) 2E - 3 $(120) 5E - 3$ $(138) 0.064$ $(174) 0.029$ $(283) 0.017$ $(300) 1E - 3$ $(317) 1E - 3$  | (332) 26-3<br>(333) 2E-3<br>(334) 1E-3<br>(335) 1E-3<br>(336) 1E-3<br>(337) 1E-3  | (350) 0<br>(351) 0<br>(352) 0<br>(352) 0<br>(353) 0<br>(354) 0<br>(355) 0   |
| 961 $0.014$ $(114)$ $2E-3$ $(132)$ $2E-3$ $(140)$ $0.283$ $(158)$ $0.079$ $(277)$ $0.029$ $(275)$ $5E-3$ $(313)$ $1E-3$ $97)$ $0.05$ $(115)$ $5E-3$ $(133)$ $2E-3$ $(151)$ $0.139$ $(169)$ $0.064$ $(277)$ $0.029$ $(295)$ $5E-3$ $(314)$ $1E-3$ $98)$ $5E-3$ $(116)$ $5E-3$ $(154)$ $0.079$ $(170)$ $0.059$ $(279)$ $0.029$ $(296)$ $5E-3$ $(315)$ $1E-3$ $99)$ $5E-3$ $(117)$ $9E-3$ $(135)$ $0.498$ $(153)$ $0.079$ $(171)$ $0.039$ $(220)$ $0.029$ $(297)$ $5E-3$ $(316)$ $1E-3$ $100)$ $2E-3$ $(119)$ $5E-3$ $(137)$ $0.079$ $(173)$ $0.039$ $(281)$ $0.021$ $(299)$ $1E-3$ $(317)$ $1E-3$ $101)$ $2E-3$ $(120)$ $5E-3$ $(138)$ $0.044$ $(156)$ $0.05$ $(174)$ $0.029$ $(281)$ $0.021$ $(300)$ $1E-3$ $102)$ $2E-3$ $(121)$ $5E-3$ $(139)$ $0.039$ $(175)$ $0.029$ $(283)$ $0.017$ $(501)$ $1E-3$ $103)$ $2E-3$ $(121)$ $5E-3$ $(139)$ $0.039$ $(175)$ $0.029$ $(284)$ $0.014$ $(302)$ $1E-3$   | (332) 26-3<br>(333) 2E-3<br>(334) 1E-3<br>(335) 1E-3<br>(336) 1E-3<br>(337) 1E-3<br>(338) 1E-3                              | (350) 0<br>(351) 0<br>(352) 0<br>(353) 0<br>(354) 0<br>(354) 0<br>(355) 0   |
| 961 $0.014$ $(114)$ $2E-3$ $(130)$ $0.285$ $(150)$ $0.079$ $(270)$ $0.029$ $(275)$ $5E-3$ $(313)$ $1E-3$ $970$ $0.05$ $(115)$ $5E-3$ $(130)$ $0.245$ $(150)$ $0.064$ $(277)$ $0.029$ $(275)$ $5E-3$ $(313)$ $1E-3$ $970$ $0.05$ $(115)$ $5E-3$ $(134)$ $0.021$ $(173)$ $0.029$ $(275)$ $5E-3$ $(314)$ $1E-3$ $991$ $5E-3$ $(113)$ $0.21$ $(153)$ $0.079$ $(171)$ $0.039$ $(279)$ $0.029$ $(297)$ $5E-3$ $(316)$ $1E-3$ $991$ $5E-3$ $(113)$ $0.0491$ $(153)$ $0.079$ $(171)$ $0.039$ $(229)$ $0.029$ $(297)$ $5E-3$ $(316)$ $1E-3$ $1001$ $2E-3$ $(119)$ $5E-3$ $(138)$ $0.064$ $(172)$ $0.039$ $(281)$ $0.021$ $(299)$ $1E-3$ $(316)$ $1E-3$ $1012$ $2E-3$ $($  | (332) 26-3<br>(333) 2E-3<br>(334) 1E-3<br>(335) 1E-3<br>(336) 1E-3<br>(337) 1E-3<br>(338) 1E-3<br>(338) 1E-3                | (350) 0<br>(351) 0<br>(352) 0<br>(353) 0<br>(353) 0<br>(354) 0<br>(355) 0<br>(355) 0  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (332) 26-3<br>(333) 2E-3<br>(334) 1E-3<br>(335) 1E-3<br>(336) 1E-3<br>(337) 1E-3<br>(338) 1E-3<br>(339) 1E-3                | (350) 0<br>(351) 0<br>(352) 0<br>(357) 0<br>(154) 0<br>(255) 0<br>(356) 0<br>(356) 0<br>(358) 0   |
| 961 $0.014$ $(114)$ $2E-3$ $(150)$ $0.285$ $(150)$ $0.079$ $(277)$ $0.029$ $(275)$ $5E-3$ $(313)$ $1E-3$ $97)$ $0.05$ $(115)$ $5E-3$ $(130)$ $2E-3$ $(151)$ $0.139$ $(169)$ $0.064$ $(277)$ $0.029$ $(295)$ $5E-3$ $(314)$ $1E-3$ $98)$ $5E-3$ $(116)$ $5E-3$ $(154)$ $0.077$ $(170)$ $0.05$ $(279)$ $0.029$ $(297)$ $5E-3$ $(315)$ $1E-3$ $99)$ $5E-3$ $(117)$ $9E-3$ $(135)$ $0.499$ $(153)$ $0.077$ $(171)$ $0.039$ $(229)$ $0.029$ $(297)$ $5E-3$ $(316)$ $1E-3$ $100)$ $2E-3$ $(118)$ $5E-3$ $(137)$ $0.079$ $(155)$ $0.05$ $(173)$ $0.029$ $(280)$ $0.021$ $(298)$ $2E-3$ $(316)$ $1E-3$ $101)$ $2E-3$ $(112)$ $5E-3$ $(137)$ $0.079$ $(155)$ $0.05$ $(173)$ $0.029$ $(282)$ $0.021$ $(298)$ $2E-3$ $(318)$ $1E-3$ $102)$ $2E-3$ $(120)$ $5E-3$ $(138)$ $0.064$ $(175)$ $0.029$ $(283)$ $0.017$ $(300)$ $1E-3$ $103)$ $2E-3$ $(121)$ $5E-3$ $(139)$ $0.039$ $(175)$ $0.029$ $(285)$ $0.014$ $(302)$ $1E-3$ $104)$ $2E-3$ $(122)$ $2E-3$ $(144)$ $0.029$ $(178)$ $0.029$ $(286)$ $0.01$   | (3.32) 26-3<br>(333) 2E-3<br>(333) 1E-3<br>(335) 1E-3<br>(336) 1E-3<br>(336) 1E-3<br>(338) 1E-3<br>(339) 1E-3<br>(340) 1E-3 | (350) 0<br>(351) 0<br>(352) 0<br>(353) 0<br>(353) 0<br>(354) 0<br>(355) 0<br>(355) 0  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (350) 0<br>(351) 0<br>(352) 0<br>(357) 0<br>(154) 0<br>(255) 0<br>(356) 0<br>(356) 0<br>(358) 0   |
| 961 $0.014$ $(114)$ $2E-3$ $(150)$ $0.285$ $(150)$ $0.079$ $(277)$ $0.029$ $(275)$ $5E-3$ $(313)$ $1E-3$ $97)$ $0.05$ $(113)$ $5E-3$ $(134)$ $0.021$ $(152)$ $0.077$ $(170)$ $0.064$ $(277)$ $0.029$ $(295)$ $5E-3$ $(314)$ $1E-3$ $98)$ $5E-3$ $(116)$ $5E-3$ $(135)$ $0.077$ $(170)$ $0.039$ $(279)$ $0.029$ $(297)$ $5E-3$ $(315)$ $1E-3$ $99)$ $5E-3$ $(117)$ $9E-3$ $(135)$ $0.498$ $(153)$ $0.077$ $(171)$ $0.039$ $(280)$ $0.021$ $(298)$ $2E-3$ $(316)$ $1E-3$ $100)$ $2E-3$ $(119)$ $5E-3$ $(137)$ $0.079$ $(155)$ $0.05$ $(173)$ $0.029$ $(281)$ $0.021$ $(298)$ $2E-3$ $(316)$ $1E-3$ $101)$ $2E-3$ $(120)$ $5E-3$ $(138)$ $0.064$ $(175)$ $0.029$ $(283)$ $0.017$ $(300)$ $1E-3$ $102)$ $2E-3$ $(121)$ $5E-3$ $(139)$ $0.039$ $(175)$ $0.029$ $(283)$ $0.017$ $(301)$ $1E-3$ $104)$ $2E-3$ $(122)$ $2E-3$ $(140)$ $0.029$ $(177)$ $0.029$ $(285)$ $0.014$ $(302)$ $1E-3$ $104)$ $2E-3$ $(122)$ $2E-3$ $(140)$ $0.029$ $(177)$ $0.029$ $(285)$ $0.014$ $(305)$ $1E-3$ $(322)$ $1$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (350) 0<br>(351) 0<br>(352) 0<br>(352) 0<br>(354) 0<br>(355) 0<br>(355) 0<br>(356) 0<br>(357) 0<br>(358) 0<br>(359) 0<br>(359) 0  |

### Phosphorus transport Berg River

Variable: SAND6.vari (length = 320)

A3.82

| TR | 143 | March | 1989 |
|----|-----|-------|------|
|----|-----|-------|------|

Phosphorus transport Berg River

River discharge data at 12-hourly intervals for Station: 23D Period : 2

(150) 24 (145) 14.3 (12") 25.2 (109) 189 ( 91) 27.1 (164) 23.3 (146 13.5 (128) 24 (110) 171 ( 92) 25.9 (155) 22.7 (147) 21.5 (12%) 24 (111) 104 25.8 ( 93) (165) 22.4 (149) 25.2 (1.50) 23.3 (112) 55-15 25.2 ( 94) (167) 22.1 (101) 22.7 (149) 24.0 (113) 45 ( 95) 20.2 (153) 24 (150) 112 (1.32) 22.1 (114) 38.2 ( 96) 22.1 (169) 22.7 (151) 105.3 (175) 22.1 34.6 ( 97) 20.4 (115) (152) 129 (170) 22.1 (1:3) 21.5 33.9 (115) ( 93) 18.2 (171) 22.1 (153) 147 (135) 20.4 33.9 ( 99) 18.2 (117)(172) 21.5 (154) 97 (13a) 20.4 (118) 44 (100) 16.2 (173) 20.4 (155) 62.5 (1.27) 19.2 (119) 50.6 (101) 15.2 (174) 19.2 (156) 47.4 (138) 19.2 (120) 44 (102) 14.3 (175) 18.2 (157) 38.2 (139) 18.2 (121) 36.7 (103) 14.3 (176) 17.1 (158) 32.5 (122) 32.5 (140) 17.1 (104) 14.3 (177) 17.1 (159) 29.1 (141) 17.1 (123) 30.4 (105) 23.3 (150) 27.8 (1/8) 16.2 (124) 29.1 (142) 16.2 (106) 31.8 (161) 25.8 (179) 16.2 (140) 16.2 (125) 27.8 (107) 147 (162) 25.2 (160) 15.2 (144) 15.2 (126) 27.1 (108) 143 \_\_\_\_\_

|       |       |           |         |       |      | 17:56.1 | 7.4          | (343)  | 3212                |
|-------|-------|-----------|---------|-------|------|---------|--------------|--------|---------------------|
| 2747  | 14.2  | (287)     | 25.2    | (207) | 11.1 | (325)   |              | •      |                     |
| 2/2)  | 52.2  | (290)     | 24.6    | (308) | 10.4 | (325)   | 7.4          | (244)  |                     |
| 2/2   | 59    | (271)     | 20.0    | (109) | 9.8  | (327)   | 7.4          | (245)  | 3.17                |
| 2.4)  | 106   | (252)     | 22.7    | (210) | 4.1  | (3.33)  | ύ <b>.</b> Υ | (245)  | 2.54                |
| 2750  | • • - | (29.)     | 775 - 7 | (310) | 9.1  | (329)   | ·, ·)        | (242)  | 2.74                |
|       | 191   | (294)     | 22.1    | (111) | н. э | (3,0)   | ó.4          | (二)(台) | ~ 25 전              |
|       |       | (295)     | 2.0.4   | (317) | 8.5  | (3.31)  | 6.4          | (34%)  | ्यः (स. ‡           |
| 2773  |       | (276)     | 17.1    | ( 11) | ย    | (32.5)  | 5.4          | (309)  | <b>0</b>            |
|       | 142   | • • • • • | 16.2    | (115) | 8    | (333)   | 6.4          | (351)  | - 2.55 <sup>4</sup> |
| 2791  | 112.9 | (297)     |         | (316) | 7.4  | (334)   | 6.4          | (352)  | 2.55                |
| (28¢) | 77.1  | (298)     | 14.3    | (317) | 8    | (335)   | 5.4          | (157)  | 2.55                |
| (591) | 5/.5  | (299)     | 12.7    | •     | 7.4  | (234)   | 5.54         | (354)  | 2.55                |
| (282) | 49    | (000)     | 12.7    | (318) |      | • •     | 5.54         | (355)  | 2.3/                |
| (283) | 42.7  | (301)     | 12.7    | (719) | 7.4  | (337)   |              | (356)  | 2.1                 |
| (284) | 41.2  | (302)     | 11.9    | (320) | 7.3  | (338)   | 5.54         | •      | 1.95                |
| (285) | 33.2  | (303)     | 11.1    | (321) | 8    | (339)   | 5.13         | (387)  | -                   |
| (266) | 27.8  | (304)     | 11-1    | (322) | 8    | (340)   | 4.74         | (356)  | 1.3                 |
| (287) | 26.5  | (305)     | 11.1    | (525) | 8    | (341)   | 4.38         | (359)  | 1.7                 |
| (268) | 25.8  | (306)     | 11.1    | (324) | 8    | (742)   | 4,04         | (360)  | 1.65                |

| Variab   | ie: DKI   | E2.varl  | (leng  | th = 5.00  |  |  |   |   |  |
|--|---|--|--|--|--|--|---|---|--|
| Variab<br>( 1)<br>( 2)<br>( 3)<br>( 4)<br>( 5)<br>( 6)<br>( 6)<br>( 6)<br>( 8)<br>( 7)<br>( 18)<br>( 10)<br>( 12)<br>( 13)<br>( 13)<br>( 15) | 1e: DRI<br>33.9<br>29.8<br>27.1<br>25.2<br>23.3<br>22.7<br>21.5<br>20.4<br>18.2<br>18.2<br>18.2<br>18.2<br>17.1<br>18.2<br>17.1 | <pre>E2.vart ( 19) ( 20) ( 21) ( 22) ( 25) ( 24) ( 25) ( 24) ( 25) ( 26) ( 27) ( 23) ( 31) ( 32) ( 32)</pre> | (leng<br>12.7<br>11.9<br>11.9<br>11.9<br>11.1<br>10.4<br>10.4<br>10.4<br>10.4<br>9.8<br>9.8<br>9.8<br>11.1<br>11.1<br>11.9 | $\frac{1}{1} = \frac{1}{2} $ | 9.4<br>9.1<br>9.1<br>9.5<br>8.5<br>8<br>9<br>8<br>7.4<br>7.4<br>7.4<br>7.4 | $ \begin{pmatrix} 55 \\ (56) \\ (57) \\ (57) \\ (59) \\ (59) \\ (50) \\ (50) \\ (50) \\ (50) \\ (50) \\ (55) \\ (55) \\ (55) \\ (55) \\ (56) \\$ | 0.4<br>6.4<br>0.4<br>0.4<br>0.4<br>6<br>6 | ( 75)<br>( 74)<br>( 75)<br>( 75)<br>( 77)<br>( 76)<br>( 77)<br>( 76)<br>( 77)<br>( 76)<br>( 77)<br>( 76)<br>( 77)<br>( 76)<br>( 77)<br>( 76)<br>( 77)<br>( 80)<br>( 81)<br>( 82)<br>( 85)<br>( 87)<br>( 87) | 6<br>5.54<br>6<br>6.4<br>5.7<br>135<br>146<br>157<br>167<br>167<br>167<br>167<br>167<br>167<br>167<br>16 |
| (15)<br>(16)<br>(17)<br>(18)   | 17.1<br>16.2<br>15.2<br>13.5  | (34)<br>(35)<br>(35)   | 11.9<br>11.1<br>10.3   | ( 52)<br>( 57)<br>( 54)  | 5.9<br>6.9<br>6.9  | ( 70)<br>( 71)<br>( 72)  | ద.+<br>చ                                  | ( 88)<br>( 89)<br>( 90)   | 29.8   |
|  |   |  |  |  |  |  |   |   |  |

|         |      |        |         |             |       | ~~ ~                      | 4.3 m 4.5               |        |   |
|---------|------|--------|---------|-------------|-------|---------------------------|-------------------------|--------|---|
| (131)   | 15.2 | (199)  | 13      | (217) 139   | (275) | 29.8                      | (25.2)                  | 1      |   |
| (182)   | 17.5 | (200)  | 9.1     | (218) 140   | (236) | 28.4                      | (254)                   | 12.    |   |
| (192)   | 13.5 | (201)  | ·>.1    | (219) 147   | (237) | 26.5                      | (285)                   | 1      |   |
| (183)   | 10.5 | (202)  | 8.5     | (220) 178   | (238) | 24.0                      | (256)                   | 1      |   |
| • •     | 13.5 | (203)  | 8.5     | (221) 183   | (239) | 22.7                      | (257)                   | 17     |   |
| (135)   |      | (204)  | 8.5     | (222) 147   | (240) | 22.1                      | (258)                   | 12.7   |   |
| (126)   | 12.7 | (205)  | 7.1     | (222) 157   | (241) | 21.5                      | (                       | L.2. 1 |   |
| (197)   | 12.7 |        | ч.<br>Ц | (2::4) 1:37 | (241) | 20.4                      | (360))                  | 11.7   |   |
| (189)   | 12.7 | (206)  | -       | (225) 105.2 | (243) | 22.1                      | (261)                   | 66.7   |   |
| (193)   | 1215 | (207)  | 9.9     |             | (244) | 23.3                      | (26.1)                  | 11.1   |   |
| (190)   | 11.4 | (208)  | 11.1    |             | (245) |                           | (260)                   |        | - |
| (191)   | 11.3 | (209)  | 19.2    | (227) 62.5  | (246) | 22.1                      | (254)                   |        |   |
| (192)   | 11.9 | (210)  | 22.9    | (228) 55.6  |       |                           | (250)                   | -      | • |
| (192)   | 11.7 | (211)  |         | (229) 50.6  | (247) | 207 <b>.</b> <del>1</del> |                         | 11.1   |   |
| (194)   | 11.7 | (2.12) | 205     | (200) 48.2  |       | 13.2                      | ( నిరిది )<br>( ఎరి 7 ) |        |   |
| (195) · | 11.1 | (213)  | 155     | (231) 42.7  |       | 17.1                      | (257)                   | 11.1   |   |
| (196)   | 10.7 | (214)  | 140     | (232) 35.3  |       | 16.2                      | (은상태)                   | 11.9   |   |
| (197)   | 10.4 | (215)  | 2 2     | (233) 33.2  | (251) | 15.2                      | (259)                   |        |   |
| (196)   | 10.4 | (216)  |         | (224) 36.7  | (252) | 14.3                      | (1279)                  | 1      |   |

. . . · .... . .

| ble: DRIE   | 4.vari (lengt   | h = 344)   |   |   |  | 40.4   | (179)   | 35.3   | (217)   | 19.2   | 12201  | <b>L</b> /   | (29.2)           | 13.2<br>17.2     |
|---|---|--|---|---|--|--|---|--|---|--|--|--|------------------|------------------|
|   |   | -  | ( 55) 27a   | (73) 5  | 54.7 (18)  |  | (200)   | 29.8   | (218)   | 17.1   | (235)  | 35.2   | (254)            | 19.2             |
| 4,04  | (19) 19.2   | ( 37) 10.4<br>( 38) 10.4   | ( 56) 244   | (74) 5  | (182   |  | (201)   | 29.1   |   | 17.1   | (237)  | 22.9   | (255)            | 19.2             |
| 3.9   | (20) 15.5   |  | ( 57) 292   | (75) 0  | 67.8 (18)  |  | (202)   | 28.4   | (220)   | 12.1   | (239)  | 40.0   | (256)            | 16.2             |
| 3.72  | (21) 16.2   | • •  | ( 58) 277   |   | 57.8 (184  |  | (202)   | 25.5   |   | 17.1   | (_37)  | 4014   | (257)            | 1975             |
| 3.9   | (22) 27.8   | (40) LL L  | ( 54) 171   | (77) 5  | 52.2 (185  |  |   | 24.9   |   | 17.1   | (240)  | 35.2   | (258)            |                  |
| 3.72  | (23) 28.4   | (41) 11.1  | ( 50) 167   | (73) 4  | 44.2 (100  |  | (204)<br>(205)  | 24.5   |   | 14.2   | (241)  | 29.1   | (259)            | 15.2             |
| 3.9   | (24) 16-2   | (42) 11.1  | ( 51) 125   | ( 79) 3   | 3 <b>8.</b> 2 (187   |  | -   | 23.3   |   | 16.2   | (242)  | 25.5   | (240)            | 16.22            |
| ,<br>j 4.04   | (25) 14.5   | (42) 10.4  | ( 52) 129   |   | 15.3 (16 <sup>6</sup>  |  | (206)   | 22.7   |   | 15.2   | (24.5)   | <u>_</u> 4   | (251)            |                  |
| 4.04  | (26) 17-1   | (4+) 7.8   | ( 63) 153   |   | 35.3 (LJY  |  | (207)   | 22.1   |   | 14.3   | (244)  | 22.1   | (25.)            |                  |
| ) 4.3⊎  | ( 27) 18.2  | 45) 9.8  | ( 64) 120   |   | 33.9 (19)  |  | (208)   |  | •   | 14.3   | (245)  | 21.5   |                  | 12               |
| 4.74  | (28) 15.2   | (46) 9.8   | ( 55) 89.8  |   | 33.2 (191  |  | (209)   | 22.1   | <b>,</b> · ·  | 14.3   | (240)  | 18.7   | (2a4)            |                  |
| ) 63.4  | (29) 14.3   | (47) 9.8   |   | · ·   | 31.1 (19)  | ) 17.8   | (210)   | 21.5   |   | 14.3   | (247)  | 17.1   | (257)            | 17               |
| 33.9  | ( 30) 12.7  | (48) 9.1   |   |   | 29.8 (17)  |  | (211)   | 20.4   | (220)   | 14.3   | (248)  | 17.1   | (∵b∍)            | 14.2             |
| ) 27.8  | ( 31) 11.9  | (49) 9.1   | • - • •   |   | 28.4 (194  | ) 25.B   | (212)   | 20.4   | (231)   | 13.5   | (247)  | 17.1   | (25))            | 11               |
| 45.8  | (32) 11.1   | (50) 9.1   | · · · · · · ·   |   | 28.4 (19:  | ) 28.4   | (213)   | 20.4 1   |   | 13.5   | (250)  | 16.0   | (265·            | 19.2             |
| ) 50.6  | ( 33) 10.4  | (51) 59  | ( 69) 70.6  |   | 28.4 (190  | ) 29.7   | (214)   | 19.2   | <b>、</b>  | 17.5   | (251)  | 15.2   |                  |                  |
|   | (34) 10.4   | ( 52) 129.7  | (70) 72.4   |   | 27.8 (19)  | ) 33.2   | (215)   | 18.2   |   |  | (252)  | 19.2   | (27.9)           | 17.2             |
|   | ( (5) 9.3   | (53) 72.4  | (71) 60.7   |   | 25.5 (19)  | 5 35.7   | (216)   |  | (2241   | 1  |  |  |                  |                  |
| ) 26.5  |   | ( 54) 136  | (72) 547  |   |  |  |   |  |   |  |  |  |                  |                  |
| ) 22.1  | ( 36) 10.4  |  |   |   |  | -  |   |  |   |  |  |  |                  |                  |
|   |   | •  |   |   |  |  | (264)   | 12.7   | ( 307 )   | 11.7   | ( )  |  |                  |                  |
|   |   | •  | (145) 22.1  | (160) 3   |  | ) 10.8   | (269)<br>(299)  | 12.7<br>12.7   | (307)<br>(308)  | 10.4   | (326)  | 4.58   | ( 140)<br>( 144) |                  |
| ) 25.2  | (109) 198   | (127) 26<br>(123) 25.3   | (145) 22.1<br>(146) 22.1  | (160) 3<br>(164) 3  | 507 (2?<br>189 (27   | ) 10.8<br>) 19.2   | (269)<br>(290)<br>(291)   | 12.7<br>12.7<br>11.9   | (302)<br>(308)<br>(399)   | 10.4<br>3.5  | (326)<br>(327)   | 4.58<br>4.58   |                  |                  |
| ) 25.2  | (109) 198<br>(110) 354  | (127) (6   | (145) 22.1<br>(146) 22.1<br>(147) 22.1  | (150) 3<br>(154) 3<br>(155) 2   | 307 (.2?<br>189 (.27<br>147 (.27   | ) 10.8<br>() 19.2<br>() 20.4   | (269)<br>(290)<br>(291)<br>9 (292)  | 12.7<br>12.7<br>11.9<br>11.9   | (307)<br>(308)<br>(309)<br>(310)  | 10.4<br>3.5<br>7.4   | (326)<br>(327)<br>(328)  | 4.58<br>4.33<br>4.8  |                  |                  |
| ) 25.2<br>) 24.5<br>) 29.2  | (109) 198<br>(110) 356<br>(111) 254   | (127) /6<br>(123) 35.3   | (145) 22.1<br>(146) 22.1<br>(117) 22.1<br>(148) 22.1  | (160) 30<br>(164) 30<br>(165) 20<br>(165) 2   | (07 (27)<br>(89 (27)<br>(89 (27)<br>(87) (27)<br>(39) (27)   | ) 10.8<br>() 19.2<br>() 20.4<br>() 20.9  | (289)<br>(290)<br>(291)<br>(292)<br>(292)<br>(293)  | 12.7<br>12.7<br>11.9<br>11.9<br>11.1   | (307)<br>(308)<br>(309)<br>(310)<br>(311)   | 10.4<br>3.5<br>7.4<br>8.7  | (326)<br>(327)<br>(328)<br>(329)   | 4.58<br>4.58<br>4.58<br>4.58   |                  |                  |
| ) 25.2<br>) 24.5<br>) 23.3<br>) 22.7  | (109) 198<br>(110) 354<br>(111) 254<br>(112) 232  | (127) (6<br>(123) 25.3<br>(127) 23.2<br>(136 31.3<br>(131: 31.1  | (145) 22.1<br>(146) 22.1<br>(147) 27.1<br>(148) 22.1<br>(149) 21.5  | (150) 3<br>(154) 3<br>(155) 2<br>(155) 2<br>(157) 2   | 307 (2?<br>399 (27<br>347 (27<br>39,5 (27<br>39,5 (27  | $\begin{array}{c} 10.8 \\ 19.2 \\ 20.4 \\ 120.9 \\ 20.9 \\ 0 20.4 \end{array}$   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)   | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.1   | (307)<br>(308)<br>(359)<br>(316)<br>(311)<br>(312)  | 11.7<br>10.4<br>3.5<br>7.4<br>8.7<br>4.4   | (328)<br>(327)<br>(328)<br>(328)<br>(329)<br>(329)   | 4.58<br>4.58<br>4.58<br>4.58<br>4.58   |                  |                  |
| ) 25.2<br>) 24.5<br>) 29.7<br>) 22.7  | (109) 198<br>(110) 534<br>(111) 254<br>(112) 252<br>(112) 252   | (127) 76<br>(123) 35.3<br>(129) 73.2<br>(136 71.9<br>(131 73.1<br>(132 29.1  | (145) 22.1<br>(146) 22.1<br>(147) 22.1<br>(148) 22.1<br>(148) 22.1<br>(149) 21.5<br>(150) 18.2  | (150) 3<br>(154) 3<br>(155) 2<br>(155) 2<br>(157) 2<br>(153) 2  | 507 (2)<br>(89 (27<br>(34) (27<br>(59.5) (27<br>(54) (27<br>(54) (27<br>(54) (27)  | ) 10.8<br>) 19.2<br>) 20.4<br>) 20.9<br>0 20.9<br>0 20.4<br>0 20.4   | (269)<br>(290)<br>(291)<br>(272)<br>(272)<br>(273)<br>(294)<br>(295)  | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.9   | (307)<br>(308)<br>(310)<br>(312)<br>(312)<br>(313)  | 11.7<br>10.4<br>3.5<br>7.4<br>8.9<br>6.4   | (326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(329)<br>(329)  | 4,38<br>4,38<br>4,38<br>4,38<br>4,38<br>4,38   |                  |                  |
| ) 25.2<br>) 24.5<br>) 22.7<br>) 22.1<br>) 21.5  | (109) 198<br>(110) 354<br>(111) 254<br>(112) 232<br>(112) 232<br>(114) 191  | (127) 76<br>(123) 35.3<br>(129) 35.2<br>(136 31.9<br>(131 31.1   | (145) 22.1<br>(146) 22.1<br>(147) 22.1<br>(148) 22.1<br>(148) 22.1<br>(149) 21.5<br>(150) 18.2<br>(151) 18.2  | (150) 3<br>(154) 3<br>(155) 2<br>(155) 2<br>(157) 2<br>(153) 2<br>(153) 2   | 507 (27<br>1899 (27<br>147 (27<br>159,5 (27<br>164 (27<br>154 (27<br>154 (27   | $\begin{array}{c} 10.8 \\ 19.2 \\ 20.4 \\ 120.4 \\ 20.9 \\ 20.4 \\ 20.4 \\ 20.4 \\ 20.4 \\ 20.4 \\ 120.4 \\ 19.2 \end{array}$  | (269)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(295)<br>(295)<br>(296)   | 12-7<br>12-7<br>11-9<br>11-9<br>11-1<br>11-9<br>10-4<br>9-8  | $\begin{array}{c} (307) \\ (308) \\ (309) \\ (310) \\ (312) \\ (312) \\ (313) \\ (314) \end{array}$   | 11.7<br>10.4<br>3.5<br>7.4<br>6.7<br>4.4<br>5.4<br>5.97  | (326)<br>(322)<br>(328)<br>(329)<br>(329)<br>(331)<br>(331)<br>(332)   | 4,58<br>4,58<br>4,58<br>4,58<br>4,58<br>4,58<br>4,58<br>4,58   |                  |                  |
| ) 25.2<br>) 24.5<br>) 22.7<br>) 22.7<br>) 21.5<br>) 21.5  | (109) 198<br>(110) 356<br>(111) 254<br>(112) 232<br>(112) 232<br>(113) 191<br>(115) 147   | $(127) = 16 \\ (123) = 35.3 \\ (127) = 73.2 \\ (136) = 51.9 \\ (131) = 31.1 \\ (132) = 29.1 \\ (132) $ | (145) 22.1<br>(146) 22.1<br>(147) 22.1<br>(149) 22.1<br>(149) 22.1<br>(149) 21.5<br>(150) 13.2<br>(151) 13.2<br>(151) 13.2  | (150) 3<br>(154) 3<br>(155) 2<br>(155) 2<br>(157) 2<br>(153) 2<br>(159) 2<br>(170) 2  | 307 (27<br>399 (27<br>399 (27<br>39,5 (27<br>304 (27<br>354 (27<br>354 (27<br>347 (27<br>341 (27   | $\begin{array}{c} 10.8\\ 19.2\\ 20.4\\ 0\\ 20.4\\ 0\\ 20.4\\ 0\\ 20.4\\ 0\\ 20.4\\ 0\\ 20.4\\ 0\\ 19.2\\ 0\\ 16.2\end{array}$  | (264)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(295)<br>(296)<br>(297)  | 12-7<br>12-7<br>11-9<br>11-9<br>11-1<br>11-9<br>10-4<br>9-8<br>8.5   | $\begin{array}{c} (307) \\ (308) \\ (309) \\ (310) \\ (312) \\ (312) \\ (314) \\ (314) \\ (315) \end{array}$  | 11.7<br>10.4<br>3.5<br>7.4<br>5.7<br>4.4<br>5.4<br>5.97<br>5.97  | (326)<br>(322)<br>(322)<br>(329)<br>(329)<br>(331)<br>(332)<br>(333)   | 4.58<br>4.58<br>4.58<br>4.58<br>4.58<br>4.58<br>4.58<br>4.04<br>4.04   |                  |                  |
| ) 25.2<br>) 24.5<br>) 25.7<br>) 22.7<br>) 22.1<br>) 20.4<br>) 20.4<br>3) 45.8   | (109) 198<br>(110) 354<br>(111) 254<br>(112) 232<br>(112) 232<br>(113) 252<br>(114) 191<br>(115) 147<br>(116) 118   | (1.27) 76<br>(1.23) 35.3<br>(1.23) 75.2<br>(1.36 71.9<br>(1.31 71.1<br>(1.32) 29.1<br>(1.33) 25.4<br>(1.34) 28.1<br>(1.35) 27.8  | $\begin{array}{c} (145) & 22.1 \\ (146) & 22.1 \\ (146) & 22.1 \\ (147) & 22.1 \\ (149) & 22.1 \\ (149) & 21.5 \\ (150) & 13.2 \\ (151) & 13.2 \\ (151) & 13.2 \\ (153) & 22.7 \end{array}$   | (150) 3<br>(154) 3<br>(155) 2<br>(155) 2<br>(153) 2<br>(153) 2<br>(153) 2<br>(153) 2<br>(170) 2<br>(171) 2  | 307         (27)           399         (27)           394         (27)           304         (27)           304         (27)           304         (27)           304         (27)           324         (27) <td><math display="block">\begin{array}{c} 10.8\\ 17.2\\ 20.4\\ 20.9\\ 20.9\\ 20.9\\ 20.4\\</math></td> <td>(26%)<br/>(290)<br/>(291)<br/>(292)<br/>(293)<br/>(293)<br/>(295)<br/>(295)<br/>(296)<br/>(290)</td> <td>12.7<br/>12.7<br/>11.9<br/>11.9<br/>11.9<br/>11.1<br/>11.9<br/>10.4<br/>9.8<br/>8.5<br/>8.5</td> <td>(307)<br/>(308)<br/>(309)<br/>(310)<br/>(311)<br/>(312)<br/>(313)<br/>(314)<br/>(314)<br/>(315)<br/>(314)</td> <td>11.7<br/>10.4<br/>3.5<br/>7.4<br/>5.7<br/>4.4<br/>5.4<br/>5.4<br/>5.97<br/>5.54</td> <td>(326)<br/>(3227)<br/>(328)<br/>(329)<br/>(329)<br/>(329)<br/>(329)<br/>(321)<br/>(331)<br/>(332)<br/>(333)<br/>(334)</td> <td>4.38<br/>4.38<br/>4.38<br/>4.38<br/>4.38<br/>4.38<br/>4.38<br/>4.04<br/>4.04<br/>3.42</td> <td></td> <td></td> | $\begin{array}{c} 10.8\\ 17.2\\ 20.4\\ 20.9\\ 20.9\\ 20.9\\ 20.4\\$ | (26%)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(295)<br>(295)<br>(296)<br>(290)  | 12.7<br>12.7<br>11.9<br>11.9<br>11.9<br>11.1<br>11.9<br>10.4<br>9.8<br>8.5<br>8.5  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(314)<br>(315)<br>(314)   | 11.7<br>10.4<br>3.5<br>7.4<br>5.7<br>4.4<br>5.4<br>5.4<br>5.97<br>5.54   | (326)<br>(3227)<br>(328)<br>(329)<br>(329)<br>(329)<br>(329)<br>(321)<br>(331)<br>(332)<br>(333)<br>(334)                                    | 4.38<br>4.38<br>4.38<br>4.38<br>4.38<br>4.38<br>4.38<br>4.04<br>4.04<br>3.42   |                  |                  |
| ) 25.2<br>) 24.5<br>) 25.7<br>) 22.7<br>) 22.7<br>) 21.5<br>) 20.4<br>3) 45.8<br>) 135  | (109) 198<br>(110) 354<br>(111) 254<br>(112) 252<br>(112) 252<br>(112) 252<br>(114) 191<br>(115) 147<br>(115) 147<br>(116) 118<br>(117) 172   | (127) 76<br>(123) 35.3<br>(127) 72.2<br>(130 31.9<br>(131: 31.1<br>(132) 29.1<br>(133) 25.4<br>(134) 28.1  | $\begin{array}{c} (145) & 22.1 \\ (146) & 22.1 \\ (146) & 22.1 \\ (147) & 22.1 \\ (147) & 21.5 \\ (150) & 13.2 \\ (150) & 13.2 \\ (151) & 13.2 \\ (152) & 19.2 \\ (153) & 22.7 \\ (154) & 28.4 \end{array}$   | (150) 3<br>(154) 3<br>(155) 2<br>(155) 2<br>(153) 2<br>(153) 2<br>(153) 2<br>(170) 2<br>(171) 2<br>(172) 2  | 307         1.27           309         1.27           319         1.27           159.5         1.27           254         1.27           254         1.27           244         1.27           241         1.27           259         1.27           211         1.27           218         1.28   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (264)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(295)<br>(296)<br>(296)  | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>10.4<br>9.8<br>8.5<br>8.5<br>8.5   | $\begin{array}{c} (307) \\ (308) \\ (309) \\ (310) \\ (311) \\ (312) \\ (313) \\ (313) \\ (313) \\ (314) \\ (315) \\ (314) \\ (317) \end{array}$  | 11.7<br>10.4<br>3.5<br>7.4<br>8.7<br>4.4<br>5.4<br>5.97<br>5.97<br>5.54<br>5.54  | (326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329)<br>(331)<br>(332)<br>(333)<br>(334)<br>(325)                            | 4.38<br>4.38<br>4.38<br>4.38<br>4.38<br>4.38<br>4.38<br>4.04<br>4.04<br>4.04<br>3.42<br>3.15                               |                  |                  |
| ) 25.2<br>) 24.5<br>) 29.7<br>) 22.7<br>) 22.7<br>) 22.1<br>) 21.5<br>) 20.4<br>() 45.8<br>) 135<br>) 135   | (109) 198<br>(110) 354<br>(111) 254<br>(112) 252<br>(112) 252<br>(114) 191<br>(115) 147<br>(116) 118<br>(117) 172<br>(118) 82   | (127) 76<br>(123) 25.3<br>(123) 25.3<br>(126) 31.9<br>(137) 22.2<br>(136) 31.1<br>(137) 29.1<br>(137) 29.4<br>(135) 29.4<br>(135) 27.8<br>(135) 26.5   | (145) 22.1<br>(146) 22.1<br>(147) 22.1<br>(148) 22.1<br>(149) 22.1<br>(149) 21.5<br>(150) 18.2<br>(151) 18.2<br>(151) 18.2<br>(152) 19.2<br>(153) 22.7<br>(154) 28.4<br>(155) 40.4  | (150) 30<br>(154) 33<br>(155) 2<br>(155) 2<br>(155) 2<br>(153) 2<br>(153) 2<br>(153) 2<br>(170) 2<br>(171) 2<br>(171) 2<br>(172) 2  | 507     (27)       507     (27)       509     (27)       (29)     (27)       (29)     (27)       (24)     (27)       (24)     (27)       (24)     (27)       (24)     (27)       (24)     (27)       (24)     (27)       (24)     (27)       (21)     (27)       (21)     (27)       (21)     (28)       (28)     (28)       (156)     (28)  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (26%)<br>(290)<br>(291)<br>5 (292)<br>(293)<br>(294)<br>(297)<br>(297)<br>(297)<br>(298)<br>(298)<br>(298)<br>(298)   | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.9<br>10.4<br>9.8<br>8.5<br>8.5<br>8.5<br>8.5  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)<br>(317)<br>(318)  | 11.7<br>10.4<br>3.5<br>7.4<br>5.7<br>4.4<br>5.97<br>5.97<br>5.97<br>5.54<br>5.54   | (326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(329)<br>(321)<br>(322)<br>(337)<br>(337)<br>(334)<br>(329)<br>(336)                            | 4, 58<br>4, 58<br>4, 58<br>4, 58<br>4, 58<br>4, 58<br>4, 58<br>4, 58<br>4, 69<br>4, 69<br>4, 69<br>3, 42<br>3, 42<br>3, 42 |                  |                  |
| ) 25.2<br>) 24.5<br>) 22.7<br>) 22.7<br>) 22.7<br>) 22.4<br>) 21.5<br>) 20.4<br>) 45.8<br>) 135<br>) 479<br>) 284   | (109) 198<br>(110) 354<br>(111) 254<br>(112) 232<br>(112) 232<br>(113) 132<br>(114) 191<br>(115) 147<br>(116) 118<br>(117) 172<br>(118) 82<br>(119) 202   | (127) 16<br>(123) 35.3<br>(129) 75.2<br>(136) 11.9<br>(131) 31.1<br>(132) 29.1<br>(133) 29.4<br>(134) 28.1<br>(135) 27.8<br>(135) 27.8<br>(135) 26.5   | $\begin{array}{c} (145) & 22.1 \\ (146) & 22.1 \\ (147) & 22.1 \\ (149) & 22.1 \\ (149) & 22.1 \\ (149) & 21.5 \\ (150) & 13.2 \\ (151) & 13.2 \\ (151) & 13.2 \\ (152) & 19.2 \\ (153) & 22.7 \\ (154) & 26.4 \\ (155) & 40.4 \\ (156) & 101 \end{array}$                                  | (150) 3<br>(154) 3<br>(155) 2<br>(155) 2<br>(155) 2<br>(153) 2<br>(153) 2<br>(170) 2<br>(170) 2<br>(171) 2<br>(172) 2<br>(173) 1<br>(174) 1   | 307     (27)       309     (27)       309     (27)       304     (27)       304     (27)       304     (27)       304     (27)       304     (27)       211     (27)       218     (28)       158     (28)       158     (28)       158     (28)   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (26%)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(296)<br>(297)<br>(297)<br>(299)<br>(299)  | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.9<br>11.1<br>9.8<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5   | (507)<br>(508)<br>(509)<br>(510)<br>(511)<br>(512)<br>(513)<br>(513)<br>(513)<br>(514)<br>(514)<br>(516)<br>(318)<br>(519)  | 11.7<br>10.4<br>3.5<br>7.4<br>5.9<br>4.4<br>5.97<br>5.97<br>5.97<br>5.54<br>5.54<br>5.54<br>5.15                         | (326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(329)<br>(320)<br>(331)<br>(332)<br>(333)<br>(334)<br>(335)<br>(336)<br>(337)                   | 4.58<br>4.58<br>4.58<br>4.58<br>4.58<br>4.78<br>4.04<br>4.04<br>4.04<br>3.42<br>3.42<br>3.42<br>6.4                        |                  |                  |
| ) 25.2<br>) 24.5<br>) 22.7<br>) 22.7<br>) 21.5<br>) 20.4<br>) 45.8<br>) 135<br>) 479<br>1) 284<br>2) 232  | (109) 198<br>(110) 354<br>(111) 254<br>(112) 232<br>(113) 252<br>(114) 191<br>(115) 147<br>(116) 148<br>(117) 172<br>(118) 62<br>(119) 62<br>(120) 61.6   | (127) 76<br>(128) 35.3<br>(128) 35.3<br>(129) 75.2<br>(130 71.9<br>(131 71.1<br>(132) 29.1<br>(133) 29.4<br>(134) 28.1<br>(135) 27.8<br>(135) 27.8<br>(135) 26.5<br>(137) 26.5<br>(138) 25.2<br>(139) 24.6   | (145) 22.1<br>(146) 22.1<br>(146) 22.1<br>(147) 22.1<br>(149) 22.1<br>(149) 21.5<br>(150) 13.2<br>(151) 13.2<br>(151) 13.2<br>(152) 19.2<br>(153) 22.7<br>(154) 28.4<br>(155) 40.4<br>(155) 40.1<br>(157) 83.9  | (150) 3<br>(155) 2<br>(155) 2<br>(155) 2<br>(153) 2<br>(153) 2<br>(153) 2<br>(170) 2<br>(171) 2<br>(172) 2<br>(172) 1<br>(174) 1<br>(175)   | 307     127       309     127       399     127       3915     127       304     127       304     127       304     127       329     127       329     127       329     127       3108     128       158     122       90.8     128   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (269)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(294)<br>(297)<br>(297)<br>(299)<br>(299)<br>(300)<br>(301)   | 12.7<br>12.7<br>11.9<br>11.9<br>11.9<br>10.4<br>9.8<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5                            | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(314)<br>(314)<br>(314)<br>(319)<br>(319)<br>(320)  | 11.7<br>10.4<br>3.5<br>7.4<br>5.7<br>6.7<br>6.4<br>5.97<br>5.54<br>5.54<br>5.13<br>5.13<br>5.13<br>5.13                  | (326)<br>(327)<br>(329)<br>(329)<br>(329)<br>(329)<br>(321)<br>(322)<br>(337)<br>(334)<br>(326)<br>(336)<br>(337)<br>(328)                   | 4.58<br>4.58<br>4.58<br>4.58<br>4.58<br>4.58<br>4.58<br>4.04<br>4.04<br>3.42<br>3.42<br>3.42<br>7.4                        |                  |                  |
| ) 25.2<br>) 24.5<br>) 24.5<br>) 22.7<br>) 22.7<br>) 22.4<br>) 20.4<br>) 45.8<br>) 479<br>) 479<br>) 284<br>2) 232<br>3) 292   | (109) 198<br>(110) 354<br>(111) 354<br>(112) 232<br>(113) 252<br>(114) 191<br>(115) 147<br>(114) 118<br>(117) 172<br>(118) 82<br>(119) 202<br>(120) 61.6<br>(121) 57.3                            | (127) 16<br>(123) 35.3<br>(129) 73.2<br>(136) 31.3<br>(131) 31.1<br>(132) 29.1<br>(133) 29.4<br>(134) 28.1<br>(135) 27.8<br>(134) 28.1<br>(135) 27.8<br>(134) 26.5<br>(137) 26.5<br>(138) 25.2<br>(139) 24.6<br>(140) 23.3   | $\begin{array}{c} (145) & 22.1 \\ (146) & 22.1 \\ (146) & 22.1 \\ (147) & 22.1 \\ (149) & 22.5 \\ (150) & 13.2 \\ (150) & 13.2 \\ (151) & 13.2 \\ (151) & 13.2 \\ (153) & 22.7 \\ (153) & 22.7 \\ (154) & 28.4 \\ (155) & 40.4 \\ (156) & 101 \\ (157) & 83.9 \\ (158) & 96.9 \end{array}$  | $\begin{array}{c} (160) & 3) \\ (164) & 3) \\ (155) & 2 \\ (167) & 2 \\ (167) & 2 \\ (169) & 2 \\ (170) & 2 \\ (170) & 2 \\ (171) & 2 \\ (172) & 2 \\ (172) & 1 \\ (175) & 1 \\ (175) \\ (174) & 1 \end{array}$       | 307     1.27       308     1.27       309     1.27       159.5     1.27       159.5     1.27       254     1.27       254     1.27       254     1.27       254     1.27       254     1.27       254     1.27       254     1.27       259     1.27       210     1.28       158     1.28       159     1.28       75     1.28  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (269)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(294)<br>(297)<br>(294)<br>(299)<br>(299)<br>(300)<br>(300)<br>(301)<br>(302)   | 12.7<br>12.7<br>11.9<br>11.9<br>11.9<br>10.4<br>9.8<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5                                   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(314)<br>(314)<br>(319)<br>(319)<br>(320)<br>(321)  | 11.7<br>10.4<br>3.5<br>7.4<br>5.7<br>4.7<br>5.97<br>5.97<br>5.97<br>5.54<br>5.15<br>5.15<br>5.15<br>5.13<br>4.74         | (326)<br>(327)<br>(329)<br>(329)<br>(320)<br>(331)<br>(337)<br>(334)<br>(337)<br>(339)<br>(339)  | 4.58<br>4.58<br>4.58<br>4.58<br>4.58<br>4.58<br>4.73<br>4.04<br>3.15<br>3.42<br>6.4<br>7.4<br>6.9                          |                  |                  |
| ) 25.2<br>) 24.5<br>) 29.7<br>) 20.7<br>) 20.4<br>) 20.4<br>) 20.4<br>) 45.8<br>) 135<br>) 479<br>) 284<br>2 32<br>3 292<br>4 339                                   | (109) 198<br>(110) 354<br>(111) 354<br>(112) 252<br>(112) 252<br>(113) 252<br>(114) 191<br>(115) 147<br>(116) 118<br>(117) 172<br>(118) 82<br>(119) 202<br>(120) 61.6<br>(121) 57.3<br>(122) 50.6 | (127) 76<br>(123) 35.3<br>(127) 72.2<br>(136 31.4<br>(131) 31.1<br>(132) 29.1<br>(133) 25.4<br>(134) 28.1<br>(135) 27.8<br>(134) 28.1<br>(135) 27.8<br>(137) 26.5<br>(137) 26.5<br>(138) 25.2<br>(139) 24.6  | $\begin{array}{c} (145) & 22.1 \\ (146) & 22.1 \\ (146) & 22.1 \\ (147) & 22.1 \\ (148) & 22.1 \\ (150) & 13.2 \\ (150) & 13.2 \\ (151) & 13.2 \\ (153) & 22.7 \\ (153) & 22.7 \\ (154) & 28.4 \\ (155) & 40.4 \\ (156) & 101 \\ (157) & 83.9 \\ (158) & 96.9 \\ (159) & 104.3 \end{array}$ | $\begin{array}{c} (160) & 3 \\ (164) & 3 \\ (165) & 2 \\ (165) & 2 \\ (167) & 2 \\ (169) & 2 \\ (170) & 2 \\ (171) & 2 \\ (172) & 2 \\ (172) & 2 \\ (173) & 1 \\ (175) & 1 \\ (175) \\ (177) \end{array}$             | 307     127       309     127       39.3     127       139.3     127       254     127       254     127       254     127       211     127       239     127       216     128       158     128       159     126       90.4     126       90.4     126       63.4     126  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (269)<br>(290)<br>(291)<br>(291)<br>(293)<br>(293)<br>(294)<br>(294)<br>(294)<br>(294)<br>(294)<br>(294)<br>(294)<br>(294)<br>(301)<br>(301)<br>(301)<br>(302)<br>(303)                                     | 12.7<br>12.7<br>11.9<br>11.9<br>11.9<br>11.1<br>1.9<br>10.4<br>9.8<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8 | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(314)<br>(314)<br>(317)<br>(318)<br>(319)<br>(320)<br>(322)   | 11.7<br>10.4<br>3.5<br>7.4<br>5.7<br>5.4<br>5.97<br>5.54<br>5.15<br>5.15<br>5.15<br>5.15<br>4.38<br>4.38                 | (326)<br>(327)<br>(328)<br>(328)<br>(329)<br>(329)<br>(331)<br>(331)<br>(334)<br>(334)<br>(335)<br>(336)<br>(337)<br>(339)<br>(339)<br>(340) | 4.58<br>4.58<br>4.58<br>4.58<br>4.58<br>4.58<br>4.58<br>4.64<br>4.04<br>4.04<br>4.04<br>3.45<br>3.42<br>6.4<br>7.9<br>6.4  |                  |                  |
| ) 25.2<br>) 24.5<br>) 22.7<br>) 22.7<br>) 22.7<br>) 20.4<br>) 20.4<br>) 20.4<br>) 45.8<br>) 135<br>) 45.8<br>) 135<br>) 292<br>4) 232<br>3) 292<br>4) 339<br>5) 372 | (109) 198<br>(110) 354<br>(111) 254<br>(112) 232<br>(115) 232<br>(115) 147<br>(116) 118<br>(117) 172<br>(118) 82<br>(119) 202<br>(120) 61.6<br>(121) 57.3<br>(122) 50.6<br>(123) 49               | (127) 16<br>(128) 35.3<br>(129) 75.2<br>(136 71.9<br>(131 71.1<br>(132 79.1<br>(133) 25.4<br>(134) 28.1<br>(135) 27.8<br>(135) 27.8<br>(135) 26.5<br>(137) 26.5<br>(138) 25.2<br>(139) 24.4<br>(140) 23.3  | $\begin{array}{c} (145) & 22.1 \\ (146) & 22.1 \\ (147) & 22.1 \\ (149) & 22.1 \\ (149) & 22.1 \\ (150) & 13.2 \\ (151) & 13.2 \\ (151) & 13.2 \\ (152) & 19.2 \\ (153) & 22.7 \\ (154) & 28.4 \\ (155) & 40.4 \\ (156) & 101 \\ (157) & 83.9 \\ (159) & 104.3 \\ (160) & 77.1 \end{array}$ | $ \begin{array}{c} (150) & 30\\ (154) & 30\\ (155) & 2\\ (155) & 2\\ (155) & 2\\ (153) & 2\\ (153) & 2\\ (170) & 2\\ (170) & 2\\ (171) & 2\\ (172) & 1\\ (175) & 1\\ (175) & 1\\ (176)\\ (176) \\ (176) \end{array} $ | 507     (27)       109     (27)       109     (27)       109     (27)       104     (27)       104     (27)       104     (27)       104     (27)       104     (27)       104     (27)       110     (28)       112     (28)       112     (28)       112     (28)       112     (28)       113     (28)       114     (28)       1158     (28)       112     (28)       113     (28)       114     (28)       1159     (28)       116     (28)       117     (28)       118     (28)       119     (28)       110     (28)       111     (28)       112     (28)       113     (28)       114     (28)       115     (28)       116     (28)       117     (28)       118     (28)       119     (28)       110     (28)       111     (28)       111     (28)       111     (28)       115     (28)   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (26%)<br>(290)<br>(291)<br>(291)<br>(293)<br>(293)<br>(294)<br>(295)<br>(296)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(298)<br>(300)<br>(302)<br>(302)<br>(303)<br>(303)<br>(304) | 12.7<br>12.7<br>11.9<br>11.9<br>11.9<br>11.1<br>10.4<br>9.8<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5             | $\begin{array}{c} (507)\\ (508)\\ (509)\\ (509)\\ (510)\\ (511)\\ (513)\\ (513)\\ (513)\\ (514)\\ (515)\\ (514)\\ (515)\\ (514)\\ (517)\\ (517)\\ (319)\\ (321)\\ (321)\\ (322)\\ (322)\\ (323)\end{array}$ | 11.7<br>10.4<br>3.5<br>7.4<br>5.7<br>4.4<br>5.97<br>5.97<br>5.97<br>5.97<br>5.13<br>5.13<br>5.13<br>4.38<br>4.38<br>4.39 | (326)<br>(327)<br>(328)<br>(328)<br>(329)<br>(329)<br>(321)<br>(331)<br>(334)<br>(337)<br>(338)<br>(339)<br>(339)<br>(340)<br>(340)<br>(341) | 4.58<br>4.58<br>4.58<br>4.58<br>4.58<br>4.59<br>4.59<br>4.64<br>4.04<br>2.42<br>5.42<br>6.4<br>7.4<br>5.54                 |                  |                  |
| ) 25.2<br>) 24.5<br>) 29.7<br>) 20.7<br>) 20.4<br>) 20.4<br>) 20.4<br>) 45.8<br>) 135<br>) 479<br>) 284<br>2 32<br>3 292<br>4 339                                   | (109) 198<br>(110) 354<br>(111) 354<br>(112) 252<br>(112) 252<br>(113) 252<br>(114) 191<br>(115) 147<br>(116) 118<br>(117) 172<br>(118) 82<br>(119) 202<br>(120) 61.6<br>(121) 57.3<br>(122) 50.6 | (127) 16<br>(123) 35.3<br>(129) 73.2<br>(130 31.3<br>(131 31.1<br>(132 29.1<br>(133) 29.4<br>(134) 28.1<br>(135) 27.8<br>(135) 27.8<br>(135) 26.5<br>(137) 26.5<br>(138) 25.2<br>(138) 25.2<br>(139) 24.4<br>(140) 23.3<br>(141) 23.3  | $\begin{array}{c} (145) & 22.1 \\ (146) & 22.1 \\ (146) & 22.1 \\ (147) & 22.1 \\ (148) & 22.1 \\ (150) & 13.2 \\ (150) & 13.2 \\ (151) & 13.2 \\ (153) & 22.7 \\ (153) & 22.7 \\ (154) & 28.4 \\ (155) & 40.4 \\ (156) & 101 \\ (157) & 83.9 \\ (158) & 96.9 \\ (159) & 104.3 \end{array}$ | (155) 3<br>(154) 3<br>(155) 2<br>(155) 2<br>(155) 2<br>(153) 2<br>(153) 2<br>(170) 2<br>(170) 2<br>(171) 2<br>(177) 2<br>(173) 1<br>(175) 1<br>(175)<br>(176)<br>(177)  | 307     127       309     127       304     127       304     127       304     127       304     127       304     127       304     127       304     127       304     127       304     127       239     127       211     128       158     128       159     128       75     128       63.4     128       53.9     128       53.9     128       53.9     128   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (26%)<br>(290)<br>(291)<br>(292)<br>(295)<br>(295)<br>(295)<br>(295)<br>(297)<br>(297)<br>(299)<br>(299)<br>(300)<br>(300)<br>(301)<br>(302)<br>(304)<br>(304)<br>(304)<br>(304)<br>(304)                   | 12.7<br>12.7<br>11.9<br>11.9<br>11.9<br>11.1<br>1.9<br>11.1<br>9.8<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8 | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(314)<br>(314)<br>(317)<br>(318)<br>(319)<br>(320)<br>(322)   | 11.7<br>10.4<br>3.5<br>7.4<br>5.7<br>5.4<br>5.97<br>5.54<br>5.15<br>5.15<br>5.15<br>5.15<br>4.38<br>4.38                 | (326)<br>(327)<br>(328)<br>(328)<br>(329)<br>(329)<br>(331)<br>(331)<br>(334)<br>(334)<br>(335)<br>(336)<br>(337)<br>(339)<br>(339)<br>(340) | 4.58<br>4.58<br>4.58<br>4.58<br>4.58<br>4.58<br>4.58<br>4.64<br>4.04<br>4.04<br>4.04<br>3.45<br>3.42<br>6.4<br>7.9<br>6.4  |                  | 4, , ?4<br>4, 54 |

.

| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ |
|--|--|
|--|--|

| Variab  | le: DRIE  | £6.6_27dq12_8                    | (lenyth   | = 360)   |  |  |  |  |
|---|---|----------------------------------|---|--|--|--|--|--|
| ( 1)<br>( 2)<br>( 3)<br>( 4)<br>( 5)<br>( 6)<br>( 7)<br>( 8)<br>( 9)<br>( 10)<br>( 11)<br>( 12)<br>( 12)<br>( 12)<br>( 14)<br>( 15) | 3,72<br>3,42<br>3,15<br>2,74<br>2,94<br>2,94<br>2,55<br>2,55<br>2,55<br>4,38<br>11.9<br>7,4<br>15.2<br>27,1 |                                  | $ \left\{\begin{array}{c} 37\\ (38)\\ (38)\\ (40)\\ (40)\\ (41)\\ (42)\\ (42)\\ (42)\\ (43)\\ (44)\\ (45)\\ (45)\\ (45)\\ (46)\\ (49)\\ (50)\\ (51)\\ (51)\\ \end{array}\right. $ | 6.4<br>5.77<br>5.97<br>5.97<br>5.94<br>5.54<br>5.54<br>5.54<br>5.13<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.7 | ( 55)<br>( 55)<br>( 54)<br>( 54)<br>( 54)<br>( 60)<br>( 61)<br>( 62)<br>( 62)<br>( 64)<br>( 64)<br>( 64)<br>( 65)<br>( 64)<br>( 67)<br>( 68)<br>( 69)<br>( 70) | 22.1<br>17.1<br>13.5<br>17.1<br>25.4<br>20.4<br>22.5<br>46.6<br>44.5<br>25.8<br>25.8<br>25.8<br>25.8<br>25.3<br>25.1<br>19.2<br>16.2<br>14.5 | ( 73)<br>( 74)<br>( 75)<br>( 75)<br>( 76)<br>( 77)<br>( 80)<br>( 81)<br>( 82)<br>( 82)<br>( 82)<br>( 84)<br>( 85)<br>( 82)<br>( 82)<br>( 88) | 10.4<br>10.4<br>9.8<br>9.8<br>10.4<br>11.9<br>14.3<br>22.7<br>40.4<br>46<br>57.3<br>40.4<br>31.1<br>27.8<br>25.2<br>24 |
| (16)<br>(17)<br>(18)  | 30.4<br>27.8<br>23.3  | ( 34) 7.<br>( 35) 6.<br>( 36) 6. | 9 (5%)  | 5.13<br>22.7   | (71)<br>(72)   | 12.7<br>11.1   | (89)<br>(90)   | 24.6<br>27.1   |

| (191) 18.2                            | (199) 71.5    | (217) 45.8 | (205) 30.4   | (253) 25.5                                 |
|---------------------------------------|---------------|------------|--------------|--|
|                                       | (200) 71.5    | (219) 42.7 | (2:6) 42.7   | (254) 27.5                                 |
| · · · · · · · · · · · · · · · · · · · | (201) 64-2    | (217) 41.2 | (207) 78.1   | (255) 28.4                                 |
| (137) 21.3                            | , - · - · - · | (220) 08.9 | (208) 80.9   | (155) 19.1                                 |
| (184) 261                             | (202) 53.1    | (221) 34.7 | (239) 58.1   | (257) 27.8                                 |
| (185) 424                             | (203) 56-4    | ·          | (240) 43.5   | (256) 26.5                                 |
| (186) 412                             | (204) 372     |            |              | (257) 25.8                                 |
| (187) 394                             | (205) 239.8   | (225) 53.9 |              | (260) 52.5                                 |
| (198) 400                             | (206) 213     | (224) 32.5 | (242) 29.1   |  |
| (139) 398                             | (207) 258     | (225) 31.0 | (243) 28.4   | (261) 59.5                                 |
| (190) 351                             | (208) 218     | (126) 31.1 | (244) 29.8   | (262) 65.1                                 |
| (191) 261                             | (209) 153     | (227) 29-4 | (245) 29.1   | (250) 75.2                                 |
| • • • • •                             | (210) 112     | (226) 29.8 | (こ46) 27.5   | (264) 39.0                                 |
| (192) 178                             | (211) 90.8    | (229) 29.3 | (247) 25.5   | (265) 52.2                                 |
| (173) 135                             |               | (230) 29.1 | (248) 25.8   | (255) 40.4                                 |
| (194) 108                             |               |            | (249) 25.2   | (257) 35.3                                 |
| (175) 91.8                            | (213) 64.2    |            |              | (268) 40.4                                 |
| (196) 83.9                            | (214) 58.1    | (282) 29.8 |              | <b>1 - - - - - - - - - -</b>               |
| (197) 76.2                            | (215) 53.1    | (253) 29.1 | (251) 25.2   | <b>V</b> · · · · · · · · · · · · · · · · · |
| (198) 76.2                            | (216) 49      | (2.4) 29.8 | (252) 25.2 - | (270) 57.3                                 |

TR 143 March 1989

Phosphorus transport Berg River

### TR 143 March 1989

1 Period :

| River    | discharge   | data | at | 12-hourly | intervals | for | Station: | 17B |
|----------|-------------|------|----|-----------|-----------|-----|----------|-----|
| IVT A GI | Or Denon ge |      |    |           |           |     |          | 4   |

|   | 18 6  | (343) | 0.05  | 17061 |       |         |       |       |       |         |        |       |       |       |           |       |       |       |   |      |
|---|-------|-------|-------|-------|-------|---------|-------|-------|-------|---------|--------|-------|-------|-------|-----------|-------|-------|-------|---|------|
|   |       |       | •     | (325) | 0.017 | - (307) | 5E~3  | (289) | 5E-3  | (271)   | 18-3   | (163) | 9     | (145) | 0.017     | (127) | 0     | (109) |   | 011  |
|   |       | (344) | 0.008 | (326) | 0.017 | (308)   | 0.014 | (290) | 5E-3  | (272)   | 1E-3   | (164) | 9     | (146) | 0.02      | (128) | 7E-3  | (110) |   | 91)  |
|   | 15.85 |       | 0.038 | (327) | 0.116 | (309)   | 0.014 | (291) | SE-C  | (273)   | 3E~3   | (165) |       | (147) | 0.014     | (129) | 0.014 |       |   | 92)  |
|   |       | (346) | 0.263 | (328) | 0.076 | (310)   | 0.014 | (292) | 5E-3  | (274)   | 5E-3   | (166) | 0.012 | (148) | 0.02      | (130) | 0.014 | (111) |   | 93)  |
|   |       | (347) | 0.447 | (329) | 7.9   | (711)   | 9     | (293) | SE -3 | (275)   | 5E-3   | (157) | 9     | (149) | 0.02      | (131) |       | (112) |   | 94)  |
|   | 14.81 | •     | 0.24  | (330) | 0.044 | (312)   | 0.014 | (294) | 56-3  | (275)   | 5E - 3 | (169) | 0.012 | (150) | 0.02      |       | 0.011 | (113) |   | 95)  |
|   | 11.15 |       | 0.249 | (331) | 0.029 | (117)   | 0.014 | (295) | 0.014 | (277)   | 5E-J   | (147) | 9     | (151) | 0.0-      | (132) | 0.014 | (114) |   | 96)  |
|   | 11.30 | (350) | 0.204 | (332) | 0,025 | (314)   | 0.014 | (296) | 0.014 | (278)   | 56-3   | (170) | ,     |       | 7<br>57 ~ | (133) | 0.014 | (115) |   | 97)  |
|   | 11.15 | (351) | 0.138 | (333) | 0.02  | (315)   | 0.014 | (297) | 0.017 | (279)   | 9      |       |       | (152) | 5E-3      | (134) | 0.014 | (116) | 0 | 9B)  |
| 2 | 8.092 | (352) | 0,138 | (334) | 0.025 | (316)   | 9     | (298) | 0.02  | (280)   | 0.012  | (172) | 9     | (153) | 9         | (135) | 0.014 | (117) | 0 | 99)  |
| 2 | 5.202 | (353) | 0.116 | (335) | 0.029 | (317)   | 5E-3  | (299) | 0.014 | •••     | 3E-3   | (173) | 7     | (154) | 0.014     | (136) | 0.014 | (118) | Q | (00) |
| 2 | 3.972 | (354) | 0,096 | (336) | 0.029 | (318)   | 5E-3  | (300) |       | (281)   |        |       | 9     | (155) | 0.014     | (137) | 0.014 | (119) | 0 | 01)  |
| 9 | 3.309 | (355) | 7.9   | (337) | 0.063 | (319)   | 2E-3  | •     | 0.014 | (282)   |        | (174) |       | (156) | 0.017     | (138) | 0.02  | (120) | 0 | (02) |
| 7 | 2.617 | (356) | 7.9   | (338) | 0.063 | (320)   |       | (301) | 0.02  | (283)   | 36-2   | (175) | 9     | (157) | 0.014     | (139) | 0.02  | (121) | Û | 103) |
|   | 2.178 | (357) | 0.32  | (339) | 0,038 | •       | 2E-3  | (302) | 0.017 | (284)   | 5E-3   | (176) | 9     | (158) | 0.014     | (140) | 0.017 | (122) | 0 | 104) |
| - | 2.2   | (358) | 1.324 | (340) |       | (321)   | 1E-3  | (303) | 0.02  | (285)   | 3E-3   | (177) | Ú.014 | (157) | 9         | (141) | 9     | (123) | Û | 105) |
|   | 1.611 | (359) | 0,718 | •     | 0.038 | (322)   | 1E-3  | (304) | 0.029 | (286)   | 9      |       | 9     | (160) | 7E-3      | (142) | 5E-3  | (124) |   | 106) |
|   | 1.65  | •     |       | (341) | 0.028 | (323)   | 1E~3  | (305) | 0.014 | · (287) | 9      | (179) | 7E-3  | (161) | 9         | (143) | 5E-3  | (125) |   | 07)  |
|   | 1.00  | (340) | 1.732 | (342) | 0.05  | (324)   | 1E-3  | (304) | 0.012 | (288)   | 0.012  | (180) | 3E-3  | (162) | 0.014     | (144) | 0.025 | (126) |   | 108) |

| 1)   | 0.15  | (19)  | <br>? | (37)  | 26-3  | ( 55) | 9     | (73)  | Û |
|------|-------|-------|-------|-------|-------|-------|-------|-------|---|
| 2)   | 0.116 | ( 20) | 0.014 | (38)  | 2E-3  | (56)  | 9     | (74)  | Û |
| 3)   | 0.071 | (21)  | 9     | ( 39) | 0.014 | ( 57) | 0.069 | (75)  | 0 |
|      | 0.05  | (22)  | 5E-3  | ( 40) | 0.025 | (58)  | 5E-3  | (76)  | o |
| (4)  | 0.044 | (23)  | 2E-3  | (41)  | 0.014 | ( 59) | 36-3  | (77)  | ø |
| (5)  | 0.029 | (24)  | 26-3  | (42)  | 0.025 | ( 60) | 2E~3  | (78)  | 0 |
|      | 0.027 | (25)  | 0.014 | (43)  | 0.024 | (61)  | 1E-3  | ( 79) | 0 |
| (7)  | 0.017 | (26)  | 0.014 | (44)  | 0.02  | (62)  | 1E-3  | (80)  | Ú |
|      | 9     | (27)  | 0.014 | (45)  | 0.05  | (63)  | 1E-3  | ( 81) | Ó |
| (9)  | -     | (27)  | 0.014 | ( 46) | 0.32  | ( 64) | 0     | (82)  | 0 |
| (10) | 9     | (29)  | 0.029 | (47)  | 0.162 | ( 65) | ò     | (83)  | • |
| (11) | 9     | (27)  | 0.017 | (48)  | 0,106 | ( 66) | ō     | (84)  | 0 |
| (12) | 4     | (30)  | 0.029 | (49)  | 0.05  | ( 67) | ò     | (85)  | о |
| (13) | 9     |       | 0.029 | ( 50) | 0.038 | ( 68) | ò     | (86)  | Ú |
| (14) | 9     | (32)  | 0.029 | ( 51) | 0.05  | ( 69) | ò     | (87)  | 0 |
| (15) | 5E-3  | (33)  |       | (52)  | 0.05  | ( 70) | ò     | (88)  | Ŭ |
| (16) | 0.014 | (34)  | 0.02  | (52)  | 0.029 | (71)  | ŏ     | (89)  | ō |
| (17) | 0.014 | (35)  | 5E-3  |       |       | (72)  | õ     | ( 90) | ŏ |
| (18) | 9     | (36)  | 5E-3  | (54)  | 0.014 | ( /2) |       |       |   |

| (181) | 0.017 | (199) | 0.02  | (217) | 4.205 | (235) | 0.02          | (253) | 0.034 |
|-------|-------|-------|-------|-------|-------|-------|---------------|-------|-------|
| (182) | 4     | (200) | 0.027 | (218) | 0.016 | (236) | 0.029         | (254) | 0.029 |
| (193) | 0.02  | (201) | 0.02  | (219) | 0.249 | (237) | 0.029         | (255) | 0.02  |
| (184) | 0.025 | (202) | 0.014 | (220) | 0.115 | (238) | 0.017         | (256) | 0.02  |
| (185) | 0.02  | (203) | 7E-3  | (221) | 7.9   | (239) | 0.017         | (257) | 0.014 |
| (186) | 0.034 | (204) | 5E-3  | (222) | 0.05  | (240) | 0.02          | (250) | 0.014 |
| (187) | 0.02  | (205) | 2E-3  | (223) | 0.038 | (241) | 0.017         | (259) | 9     |
| (138) | 0.017 | (206) | 26-3  | (224) | 0.034 | (242) | 0.02          | (260) | 9     |
| (189) | 0.017 | (207) | 5E-3  | (225) | 0.02  | (243) | 0.02          | (261) | 4     |
| (190) | 0.014 | (208) | 0.014 | (226) | 0.05  | (244) | 0.014         | (262) | 7E-0  |
| (191) | 0.014 | (209) | 0.014 | (227) | 0.05  | (245) | 7E-3          | (263) | 0.017 |
| (192) | 0.025 | (210) | 0.014 | (220) | 0.029 | (246) | 7E~3          | (264) | 0.02  |
| (193) | 0.014 | (211) | 9     | (229) | 0.030 | (247) | 0.3           | (265) | 0.614 |
| (194) | 0,012 | (212) | 9     | (230) | 0.029 | (248) | 0.218         | (266) | 0.014 |
| (195) | 0.015 | (213) | 0.014 | (231) | 0.02  | (249) | 0.106         | (267) | 0.014 |
| (196) | 0.014 | (214) | 0.014 | (232) | 0.014 | (250) | 7.9           | (268) | 0.014 |
| (197) | 0.014 | (215) | 0.02  | (233) | 0.014 | (251) | 0.045         | (269) | 0.014 |
| (198) | 0.017 | (216) | 0.029 | (204) | 9     | (252) | 0.03 <b>8</b> | (270) | 0.014 |

Variable: KOMPAG1.var1 (length = 360) 

|   |   |  |                         |                |                        |                |       |       |                |                | ·       |                |                |       |                |                |                        |      |
|---|---|--|-------------------------|----------------|------------------------|----------------|-------|-------|----------------|----------------|---------|----------------|----------------|-------|----------------|----------------|------------------------|------|
| lable: KOMP                                   | AG2.varl (  |  |                         |                |                        |                |       |       |                | (199)          | 0.218   |                |                | (235) | 0.943          | (253)          | 0.575                  |      |
| 1) 1.236                                      | ( 19) 0.44  |  | 0.36                    | ( 55)          | 0,218                  | ( /0)          | 0.102 |       | 0.36<br>0.36   |                | 0.234   | (218)          | 2.346          | (206) | 0.92           | (254)          | 0.546                  |      |
| 2) 1.112                                      | ( 20) 0.47.   |  | 0.35                    | ( 56)          | 0.218                  | (74)           | 0.15  | (182) |                | (201),         |         | (219)          | 6.578          | (237) | 0.92           | (255)          | 0,495                  |      |
| 3) 1.071                                      | (21) 0.44   | 7 (39)   | 0.32                    | ( 57)          | 0.21                   |                | 1.87  | (183) | 0.36           | (201),         | 0.249   | (220)          | 4.691          | (238) | 0.849          | (256)          | 0.495                  |      |
| 4) 0.92                                       | (22) 0.42   | 5 (40)   | 0.34                    | ( 58)          | 0.218                  | (76)           | 0,993 | (184) | 0.381          | • • • •        | 0.218   |                | 3.523          | (209) | 1.324          | (237)          | 0.447                  |      |
| 5) 0.849                                      | (23) 0.40   |  | 0.32                    | ( 59)          | 0.218                  | ( 77)          | 0.849 | (185) | 0.402          | (203)          | 1.152   | (221)<br>(222) | 2.902          | (240) | 1.071          | (258)          | 0.447                  |      |
| 6) 0.816                                      | (24) 0.40   |  | 0.295                   | ( 60)          | 0.218                  | (78)           | B.411 | (186) | 0.36           | (204)<br>(204) |         | (223)          | 2.524          | (241) | 0.997          | (259)          | 0.447                  |      |
| 7) 0,792                                      | ( 25) 0.40  |  | 0.283                   | (61)           | 0.169                  | ( 79)          | 10.4  | (187) | 0.05           | (205)          |         | (224)          | 2.178          | (242) | 0.92           | (260)          | 0.447                  |      |
| 8) 0.849                                      | (26) 0.68   |  | 0.249                   | ( 62)          | 0.204                  | (80)           | 6.87  | (188) | 0.36           | (206)          |         |                | 2.07           | (243) | 0.849          | (261)          | 0.447                  |      |
| 9) 0.92                                       | (27) 0.54   | • • •  | 0.218                   | ( 63)          | 0.189                  | (81)           | 7,47  | (189) | 0.36           |                | 1.87    | (225)          |                | (244) | 0,782          | (262)          | 0.402                  |      |
| •• • • •                                      | ( 28) 0.55  |  | 0.218                   | (64)           | 0.176                  | (82)           | 4.205 | (190) | 0.32           | (208)          |         |                | 2.178          | (245) | 0.782          | (263)          | 0,462                  |      |
|   | (29) 0.49   |  | 0.218                   | ( 65)          | 0.162                  | (83)           | 3.31  | (191) | 0.32           | (207)          | 2.019 ~ |                | 1.73           |       | 0.458          | (264)          | 0.782                  |      |
| 11) 0.849                                     | (30) 0.47   | • • • •  | 0.216                   | ( 46)          | 0.162                  | (84)           | 2.902 | (192) | 0.263          | (210)          |         | (228)          | 1.416          | (246) | 0.658          | (265)          | 0.576                  |      |
| 12) 0.782                                     | •   | •  | -                       |                | 0.162                  | (85)           | 2.346 | (193) | 0.283          | (211)          |         |                | 1.324          | (247) |                | (266)          | 0.546                  |      |
| 13) 0.718                                     |   | • • • •  |                         | ( 48)          | 0.162                  | (86)           | 2.178 | (194) | 0.263          | (212)          | 5.202   |                | 1.236          | (248) | 0.601          | (267)          | 0.52                   |      |
| 14) 0.658                                     | ,   | • •  | 0.189                   |                | 0.162                  | (87)           | 1.87  | (195) | 0.283          | (213)          | 5.73    |                | 1.152          | (249) | 0.601          |                | 0.558                  |      |
| 15) 0.546                                     |   | •  | 0.208                   |                | 0.162                  | (88)           | 1.732 | (196) | 0.263          |                | 4.205   | (232)          | 1.071          | (250) | 0.546          | (26B)          |                        |      |
| 16) 0.546                                     | (34) 0.38   | •  | -                       | (71)           |                        | (89)           | 1.611 | (197) | 0.249          |                | 3.523   | (233)          | 1.071          | (251) | 0.495          |                | 0.501                  |      |
| 17) 0.495                                     | (35) 0.36   |  | 0.189                   | (72)           |                        |                | 1.416 | (198) | 0.234          | (216)          | 2.302   | (234)          | 0.993          | (252) | 0.546          |                | 5.735                  |      |
| 18) (0.495                                    | (36) 0.36   |  |                         |                |                        |                |       |       |                |                |         |                |                |       |                |                |                        |      |
|   |   |  |                         |                |                        |                |       |       |                |                |         |                |                |       |                | (343)          | 7 0                    |      |
|   | (109) 3.1   | (177)  | 0.782                   | (145)          | 1.416                  | (163)          | 0.849 | (271) |                |                | 0.558   | (307)          | 0.32           | (325) | 0.189          | (343)          |                        |      |
| 91) 1.324                                     |   |  | 0.782                   | (146)          |                        | (164)          | 0.782 | (272) | 2,902          | (290)          | 0.658   | (308)          | 0.32           | (326) | 0.189          | (345)          |                        |      |
| 92) 1.152                                     | (110) 2.80<br>(111) 2.34  |  |                         | (147)          |                        | (155)          | 0.718 | (273) | 13.41          | (291)          | 0.601   |                | 0,28%          | (327) | 0.189<br>0.210 | (345)          | 0.05                   |      |
| 93) 1.071                                     | (112) 2.17  |  | 0.683                   | (148)          |                        | (156)          | 0.716 | (274) | 4.691          | (292)          | 0.554   | (310)          |                | (328) | 0.218          |                |                        |      |
| 94) 0.993                                     |   |  | 0.658                   | (149)          | _                      | (157)          | 0.658 | (275) | 3,102          | (293)          | 0.546   | (311)          | 0.283          | (327) | 0.218          | (347)          | 0.05<br>0.038          | - 2- |
| 95) 0.92                                      | <b>, –</b> – , – , – , – , – , – , – , – , – ,  |  | 0.558                   | (150)          |                        | (163)          | 0.458 | (276) | 2.178          | (294)          | 0.521   | (312)          | 0.260          | (330) | 0.218          | (ご4日)<br>(ご4日) |                        | ្រី  |
| 76) 0.849                                     |   |  | 0.601                   | (151)          |                        | (169)          |       | (277) | 1.732          | (295)          | 0.447   | (313)          | 0.249          | (331) | 0.189          |                | 0.03 <b>8</b><br>6.074 | ំភ   |
| 97) 0.782                                     | (115) 2.17  |  |                         |                | 1.945                  | (170)          | 0.546 |       | 1.416          | (296)          | 0.447   | (314)          |                | (332) | 0.189          | (350)          | 6.034                  | Ň    |
| 98) 0.718                                     | (116) 1.87  |  |                         |                | 1.732                  | (171)          | 0.546 |       | 1.324          | (297)          | 0.402   | (315)          | 0,218          | (333) | 0.189          | (351)          | 0.029                  |      |
| 99) 0.658                                     | (117) 1.61  |  |                         |                | 1.512                  | (172)          | 0.546 | (280) | 1.071          | (298)          | 0,425   | (316)          | 0.234          | (334) | 0.162          | (352)          | 0.029                  |      |
| 00) 0.658                                     | (118) 1.41  |  |                         |                | 1.324                  | (173)          | 0.495 | (201) | 0.92           | (299)          | 0,447   | (317)          |                | (335) | 0.152          | (353)          | 0.029                  |      |
| 01) 0.601                                     | (119) 1.33  |  |                         | (156)          | 1.236                  | (174)          | 0.471 | (282) | 0.92           | (300)          | 0.447   | (318)          | 0.234          | (336) | 0.162          | (354)          | 0.029                  |      |
|   | (120) 1.23  |  |                         |                | 1.236                  | (175)          |       | (283) | 0.849          | (301)          | 0.402   | (319)          | 0.218          | (337) | 0.096          | (355)          | 0.038                  |      |
| 02) 11.51                                     |   |  | 0.447                   |                |                        | (176)          | _     | (284) |                | (302)          | 0,381   | (320)          |                | (338) | 0.096          | (356)          | 0.029                  |      |
| 02) 11.51<br>03) 3.309                        | (121) 1.1   |  |                         | 4.660          |                        |                | ~     |       |                |                | 0.36    | (221)          | 0.218          | (339) | 0.096          | (357)          | 0.029                  |      |
| 02) 11.51<br>03) 3.309<br>04) 2.346           | (121) 1.1<br>(122) 1.07   | 1 (140)  | 0.447                   | (158)          |                        | •              | 0 402 |       | 0 780          | F. SUL S I     |         |                |                |       | 0.070          | . (2017        | 0.0-1                  |      |
| 02) 11.51<br>03) 3.309                        | (121) 1.13<br>(122) 1.07<br>(123) 0.99  | 1 (140)<br>3 (141)   | 0.447<br>0.447          | (159)          | 1.071                  | (177)          |       | (285) | 0.782<br>0.782 | (303)<br>(304) | -       |                | 0.204          | (340) | 0.088          | (358)          | 0.029                  |      |
| 02) 11.51<br>03) 3.309<br>04) 2.346           | $\begin{array}{c} (121) & 1.13 \\ (122) & 1.07 \\ (123) & 0.99 \\ (124) & 0.92 \end{array}$ | 1 (140)<br>3 (141)<br>(142)  | 0.447<br>0.447<br>0.471 | (159)<br>(160) | 1.071<br>0.993         | (177)<br>(178) | 0.402 | (286) | 0.782          | (304)          | 0.05    | (322)          |                |       | 0.088          |                | 0.029                  |      |
| 02) 11.51<br>03) 3.309<br>04) 2.346<br>05) 25 | (121) 1.13<br>(122) 1.07<br>(123) 0.99  | $\begin{array}{ccc} 1 & (140) \\ 03 & (141) \\ 2 & (142) \\ 2 & (143) \end{array}$ | 0.447<br>0.447<br>0.471 | (159)          | 1.071<br>0.993<br>0.92 | (177)          | 0.402 | (286) |                | •              | -       |                | 0.204<br>0.189 | (340) | 0.088<br>7.9   | (358)<br>(359) | 0.029                  |      |

Phosphorus transport Berg River

2

| Variable: KOM   |   |   |  |   |  |
|---|---|---|--|---|--|
| (1) 0.095   | ( 19) 78-3  | ( 57, 7.9   | ( 55) 0.014  | (73) 0.138<br>(74) 0.15   | (18)<br>(192   |
|   |   |   |  |   | (183   |
| ( 3) 0.029  | (21) 9  | ( 39) 0.063   | ( 57) 0 014  | (75) 0.116<br>(76) 0.116<br>(77) 7.9<br>(78) 0.063  | (184   |
| 4) 0.025  | (22) 5E-3   | (40)0.05  | ( 58) 0.02   | (76) 0.116  | (165   |
| 5) 0.029  | (23) 9  | (41) 0.05   | ( 59) 0.029  | ( 77) 7.4   | (136   |
| 61 0.029  | ( 24) 0.017   | (42)0.038   | ( 60) 0.884  | (78) 0.063  | (187   |
| 7) 0.029  | (25) 0.02   | (43)0.008   | (61)0.32   | ( 79) 0.063   | (136   |
| 8) 0.029  | (26) 0.014  | (44)0.038   | ( 62) 0.189  | (78) 0.063<br>(79) 0.063<br>(80) 0.057  | (189   |
| 9) 0.029  | ( 27) 0.014   |   |  |   |  |
| 10) 0.038   | (28) 0.025  | ( 45) 0.029   | ( 64) 1.194  | (82) 0.044<br>(83) 0.038  | (19)   |
| 11) 0.029   | ( 29) 0.05  | (47) 0.029  | ( 65) 0.718  | (83) 0.038  | (192   |
|   |   | ( 48) 0.029   | ( 66) 0.471  | (84) 0.038  | (193   |
| 13) 0.029   | (31) 0.601  | ( 49) 0.029   | ( 67) 0.402  | (85) 0.029<br>(85) 0.029<br>(85) 0.029<br>(87) 0.029<br>(88) 0.029  | 1175   |
| 14) 0.029   | ( 32) 0.36  | ( 50) 0.029   | ( 68) 0.263  | (86) 0.029  | (194)  |
| 15) 0.029   | ( 33) 0.189   | ( 51) 0.029   | ( 69) 0.249  | (87) 0.029  | (198   |
| 161 0.029   | ( 34) 0.162   | ( 52) 0.029   | ( 70) 0.176  | ( 89) 0.02<br>( 89) 0.02<br>( 89) 0.029<br>( 90) 0.017  | (170   |
| 171 0.02  | ( 35) 0.138   | ( 53) 0.02  | (71) 0.152   | ( 89) 0,029   | (197   |
| 101 0 017   | ( TA) 0.10A   | ( 54) 0.029   | ( 72) 0.162  | ( 90) 0.017   | (196   |
| ( 18) 0,017   |   |   |  |   |  |
|   |   |   |  | <b></b>   |  |
|   |   | (107) 0 (39   | (145) 9  | (163) 9.917   | (27)   |
| 91) 9   | (109) 0.029   | (127) 0,138   | (145) 9  | (163) 0.017   | (27)   |
| 91) 9   | (109) 0.029   | (127) 0,138   | (145) 9  | (163) 0.017   | (27)   |
| 91) 9   | (109) 0.029   | (127) 0,138   | (145) 9  | (163) 0.017   | (27)   |
| 91) 9<br>92) 0.012<br>93) 0.014<br>94) 0.025  | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(112) 0.014  | (127) 0.138<br>(129) 0.116<br>(129) 0.116<br>(120) 0.116<br>(120) 0.114   | (145) 9<br>(146) 9<br>(147) 9<br>(148) 0.017<br>(149) 0.02   | (163) 0.017<br>(164) 0.063<br>(165) 0.063<br>(165) 0.038<br>(167) 0.029   | (27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)                         |
| 91) 9<br>92) 0.012<br>93) 0.014<br>94) 0.025<br>95) 0.029   | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.05   | (127) 0.138<br>(129) 0.115<br>(129) 0.116<br>(120) 0.116<br>(131) 9.4<br>(131) 0.611  | (145) 9<br>(146) 9<br>(147) 9<br>(146) 0.017<br>(149) 0.02<br>(150) 0.029  | (163) 0.017 (164) 0.063 (165) 0.063 (165) 0.038 (166) 0.029 (166) 0.014   | (27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)                         |
| 91) 9<br>92) 0.012<br>93) 0.014<br>94) 0.025<br>95) 0.029   | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.05   | (127) 0.138<br>(129) 0.115<br>(129) 0.116<br>(120) 0.116<br>(131) 9.4<br>(131) 0.611  | (145) 9<br>(146) 9<br>(147) 9<br>(146) 0.017<br>(149) 0.02<br>(150) 0.029  | (163) 0.017 (164) 0.063 (165) 0.063 (165) 0.038 (166) 0.029 (166) 0.014   | (27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)                         |
| 91) 9<br>92) 0.012<br>93) 0.014<br>94) 0.025<br>95) 0.029<br>96) 0.025<br>97) 0.014   | (109) 0.029(110) 0.029(111) 0.02(112) 0.014(113) 0.05(114) 0.263(115) 0.138   | (127) 0.138<br>(129) 0.116<br>(129) 0.116<br>(120) 0.116<br>(121) 9.4<br>(132) 0.096<br>(133) 7.9   | (145) 9<br>(146) 9<br>(147) 9<br>(148) 0.017<br>(149) 0.02<br>(150) 0.029<br>(151) 0.62<br>(152) 0.017   | (163) 0.017<br>(164) 0.065<br>(165) 0.063<br>(165) 0.029<br>(167) 0.029<br>(168) 0.014<br>(169) 9<br>(170) 75-3   | (27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)                 |
| 91) 9<br>92) 0.012<br>93) 0.014<br>94) 0.025<br>95) 0.029<br>96) 0.025<br>97) 0.014   | (109) 0.029(110) 0.029(111) 0.02(112) 0.014(113) 0.05(114) 0.263(115) 0.138   | (127) 0.138<br>(129) 0.116<br>(129) 0.116<br>(120) 0.116<br>(121) 9.4<br>(132) 0.096<br>(133) 7.9   | (145) 9<br>(146) 9<br>(147) 9<br>(148) 0.017<br>(149) 0.02<br>(150) 0.029<br>(151) 0.62<br>(152) 0.017   | (163) 0.017<br>(164) 0.065<br>(165) 0.063<br>(165) 0.029<br>(167) 0.029<br>(168) 0.014<br>(169) 9<br>(170) 75-3   | (27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)         |
| 91) 9<br>92) 0.012<br>93) 0.014<br>94) 0.025<br>95) 0.025<br>96) 0.025<br>97) 0.014   | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.05<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9<br>(118) 0.071  | (127) 0.138<br>(129) 0.116<br>(129) 0.116<br>(130) 0.116<br>(131) 9.4<br>(132) 0.096<br>(133) 7.9<br>(134) 0.05<br>(135) 0.05<br>(136) 0.038  | (145) 9<br>(146) 9<br>(147) 9<br>(147) 9<br>(149) 0.02<br>(150) 0.029<br>(151) 0.02<br>(152) 0.017<br>(153) 0.014<br>(154) 0.014   | (163) 0.017<br>(164) 0.063<br>(165) 0.063<br>(165) 0.038<br>(167) 0.029<br>(168) 0.014<br>(169) 9<br>(170) 7E-3<br>(171) 9<br>(172) 7E-3  | (27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)         |
| 91) 9<br>92) 0.012<br>93) 0.014<br>94) 0.025<br>95) 0.029<br>96) 0.025<br>97) 0.014<br>98) 0.012<br>98) 0.012<br>99) 0.02   | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.05<br>(114) 0.263<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9<br>(118) 0.071   | $ \begin{array}{c} (127) & 0.138 \\ (129) & 0.116 \\ (129) & 0.116 \\ (120) & 0.116 \\ (131) & 9.4 \\ (132) & 0.096 \\ (133) & 7.9 \\ (134) & 0.05 \\ (135) & 0.058 \\ (135) & 0.058 \\ (137) & 0.029 \end{array} $ | (145) 9<br>(145) 9<br>(147) 9<br>(146) 0.017<br>(149) 0.02<br>(150) 0.029<br>(151) 0.02<br>(152) 0.017<br>(153) 0.014<br>(154) 0.014<br>(155) 0.014  | $\begin{array}{c} (163) & 0.017 \\ (163) & 0.063 \\ (165) & 0.063 \\ (166) & 0.038 \\ (167) & 0.007 \\ (168) & 0.014 \\ (169) & 9 \\ (170) & 7E-3 \\ (171) & 9 \\ (172) & 7E-3 \\ (173) & 3E-3 \end{array}$   | (27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(26)<br>(26) |
| 91) 9<br>92) 0.012<br>93) 0.014<br>94) 0.025<br>95) 0.029<br>96) 0.025<br>97) 0.014<br>98) 0.012<br>97) 0.02<br>100) 0.32<br>100) 0.32<br>101) 0.189                                      | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.05<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9<br>(118) 0.071<br>(119) 7.9<br>(120) 0.381                              | (127) 0.138<br>(129) 0.116<br>(129) 0.116<br>(120) 0.116<br>(131) 9.4<br>(132) 0.096<br>(133) 7.9<br>(134) 0.05<br>(135) 0.05<br>(136) 0.029<br>(138) 0.029<br>(138) 0.029  | (145) 9<br>(146) 9<br>(147) 9<br>(147) 9<br>(149) 0.02<br>(150) 0.029<br>(151) 0.02<br>(152) 0.017<br>(153) 0.014<br>(154) 0.014<br>(155) 0.014  | $\begin{array}{c} (163) & 0.017 \\ (164) & 0.063 \\ (164) & 0.063 \\ (165) & 0.063 \\ (166) & 0.038 \\ (167) & 0.019 \\ (168) & 0.014 \\ (169) & 9 \\ (170) & 7E-3 \\ (171) & 9 \\ (172) & 7E-3 \\ (173) & 3E-3 \\ (174) & 5E-3 \end{array}$  | (27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)         |
| 91) 9<br>92) 0.012<br>93) 0.014<br>94) 0.025<br>95) 0.025<br>97) 0.014<br>98) 0.012<br>97) 0.02<br>100) 0.32<br>100) 0.32<br>101) 0.189   | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.05<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9<br>(118) 0.071<br>(119) 7.9<br>(120) 0.381                              | (127) 0.138<br>(129) 0.116<br>(129) 0.116<br>(120) 0.116<br>(131) 9.4<br>(132) 0.096<br>(133) 7.9<br>(134) 0.05<br>(135) 0.05<br>(136) 0.029<br>(138) 0.029<br>(138) 0.029  | (145) 9<br>(146) 9<br>(147) 9<br>(146) 0.017<br>(149) 0.02<br>(150) 0.029<br>(151) 0.02<br>(152) 0.017<br>(153) 0.014<br>(154) 0.014<br>(155) 0.014  | $\begin{array}{c} (163) & 0.017 \\ (164) & 0.063 \\ (164) & 0.063 \\ (165) & 0.063 \\ (166) & 0.038 \\ (167) & 0.019 \\ (168) & 0.014 \\ (169) & 9 \\ (170) & 7E-3 \\ (171) & 9 \\ (172) & 7E-3 \\ (173) & 3E-3 \\ (174) & 5E-3 \end{array}$  | (27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)         |
| 91) 9<br>92) 0.012<br>93) 0.014<br>94) 0.025<br>95) 0.029<br>96) 0.025<br>97) 0.014<br>98) 0.012<br>100) 0.32<br>100) 0.32<br>101) 0.169<br>102) 0.138                                    | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.05<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9<br>(118) 0.071<br>(119) 7.9<br>(120) 0.381<br>(121) 0.546               | (127) 0.138<br>(128) 0.116<br>(129) 0.116<br>(170) 0.116<br>(171) 9.4<br>(132) 0.096<br>(133) 7.9<br>(134) 0.05<br>(135) 0.058<br>(136) 0.038<br>(137) 0.029<br>(138) 0.029<br>(137) 0.02                           | $\begin{array}{c} (145) & 9 \\ (146) & 9 \\ (146) & 0 & 017 \\ (146) & 0 & 02 \\ (150) & 0 & 029 \\ (151) & 0 & 02 \\ (152) & 0 & 017 \\ (153) & 0 & 014 \\ (154) & 0 & 014 \\ (155) & 0 & 014 \\ (156) & 0 & 014 \\ (157) & 0 & 014 \\ ($               | $\begin{array}{c} (163) & 0.017 \\ (163) & 0.063 \\ (165) & 0.063 \\ (166) & 0.038 \\ (167) & 0.029 \\ (168) & 0.014 \\ (169) & 9 \\ (170) & 7E-3 \\ (171) & 9 \\ (172) & 7E-3 \\ (173) & 3E-3 \\ (174) & 5E-3 \\ (175) & 2E-3 \\ (175) & 2E-3 \end{array}$   | (27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)         |
| 91) 9<br>92) 0.012<br>93) 0.014<br>94) 0.025<br>95) 0.025<br>97) 0.014<br>98) 0.012<br>97) 0.02<br>100) 0.32<br>100) 0.32<br>101) 0.189<br>102) 0.138<br>103) 0.043                       | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.05<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9<br>(118) 0.071<br>(119) 7.9<br>(120) 0.381<br>(121) 0.546<br>(122) 0.36 | (127) 0.138<br>(129) 0.116<br>(129) 0.116<br>(130) 0.116<br>(131) 9.4<br>(132) 0.096<br>(133) 7.9<br>(134) 0.05<br>(135) 0.05<br>(136) 0.058<br>(137) 0.029<br>(138) 0.029<br>(137) 0.02<br>(140) 0.014             | $\begin{array}{c} (145) & 9 \\ (145) & 9 \\ (146) & 9 \\ (147) & 9 \\ (149) & 0.02 \\ (150) & 0.029 \\ (151) & 0.02 \\ (152) & 0.017 \\ (153) & 0.014 \\ (154) & 0.014 \\ (155) & 0.014 \\ (157) & 0.014 \\ (158) & 0$ | $\begin{array}{c} (163) & 0.017 \\ (164) & 0.063 \\ (164) & 0.063 \\ (165) & 0.063 \\ (166) & 0.038 \\ (167) & 0.019 \\ (168) & 0.014 \\ (169) & 9 \\ (170) & 7E-3 \\ (171) & 9 \\ (172) & 7E-3 \\ (171) & 9 \\ (172) & 7E-3 \\ (174) & 5E-3 \\ (175) & 2E-3 \\ (176) & 2E-3 \\ (176) & 2E-3 \end{array}$ | (27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)         |
| 91) 9<br>92) 0.012<br>93) 0.014<br>94) 0.025<br>95) 0.025<br>97) 0.014<br>98) 0.012<br>97) 0.02<br>100) 0.32<br>100) 0.32<br>101) 0.189<br>102) 0.138<br>103) 0.043                       | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.05<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9<br>(118) 0.071<br>(119) 7.9<br>(120) 0.381<br>(121) 0.546<br>(122) 0.36 | (127) 0.138<br>(129) 0.116<br>(129) 0.116<br>(130) 0.116<br>(131) 9.4<br>(132) 0.096<br>(133) 7.9<br>(134) 0.05<br>(135) 0.05<br>(136) 0.058<br>(137) 0.029<br>(138) 0.029<br>(137) 0.02<br>(140) 0.014             | $\begin{array}{c} (145) & 9 \\ (145) & 9 \\ (146) & 9 \\ (147) & 9 \\ (149) & 0.02 \\ (150) & 0.029 \\ (151) & 0.02 \\ (152) & 0.017 \\ (153) & 0.014 \\ (154) & 0.014 \\ (155) & 0.014 \\ (157) & 0.014 \\ (158) & 0$ | $\begin{array}{c} (163) & 0.017 \\ (164) & 0.063 \\ (164) & 0.063 \\ (165) & 0.063 \\ (166) & 0.038 \\ (167) & 0.019 \\ (168) & 0.014 \\ (169) & 9 \\ (170) & 7E-3 \\ (171) & 9 \\ (172) & 7E-3 \\ (171) & 9 \\ (172) & 7E-3 \\ (174) & 5E-3 \\ (175) & 2E-3 \\ (176) & 2E-3 \\ (176) & 2E-3 \end{array}$ | (27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)         |
| ( 91) 9<br>( 92) 0.012<br>( 93) 0.014<br>( 94) 0.025<br>( 95) 0.029<br>( 96) 0.025<br>( 97) 0.014<br>( 98) 0.012<br>( 97) 0.02<br>(100) 0.32<br>(101) 0.189<br>(102) 0.188<br>(103) 0.063 | (109) 0.029<br>(110) 0.029<br>(111) 0.02<br>(112) 0.014<br>(113) 0.05<br>(114) 0.263<br>(115) 0.138<br>(116) 0.096<br>(117) 7.9<br>(118) 0.071<br>(119) 7.9<br>(120) 0.381<br>(121) 0.546<br>(122) 0.36 | (127) 0.138<br>(129) 0.116<br>(129) 0.116<br>(130) 0.116<br>(131) 9.4<br>(132) 0.096<br>(133) 7.9<br>(134) 0.05<br>(135) 0.05<br>(136) 0.058<br>(137) 0.029<br>(138) 0.029<br>(137) 0.02<br>(140) 0.014             | $\begin{array}{c} (145) & 9 \\ (145) & 9 \\ (146) & 9 \\ (147) & 9 \\ (149) & 0.02 \\ (150) & 0.029 \\ (151) & 0.02 \\ (152) & 0.017 \\ (153) & 0.014 \\ (154) & 0.014 \\ (155) & 0.014 \\ (157) & 0.014 \\ (158) & 0$ | $\begin{array}{c} (163) & 0.017 \\ (163) & 0.063 \\ (165) & 0.063 \\ (166) & 0.038 \\ (167) & 0.029 \\ (168) & 0.014 \\ (169) & 9 \\ (170) & 7E-3 \\ (171) & 9 \\ (172) & 7E-3 \\ (173) & 3E-3 \\ (174) & 5E-3 \\ (175) & 2E-3 \\ (175) & 2E-3 \end{array}$   | (27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)<br>(27)         |

| (181) 2E-3 | (199) SE-3  | (217) 0.116 | (205) 1,071 | (253) 0.138 |
|------------|-------------|-------------|-------------|-------------|
| (182) 28-3 | (200) SE-3  | (218) 0.076 | (236) 1.071 | (254) 0.127 |
| (183) 2E-3 | (201) 5E-3  | (217) 0.096 | (207) 0,990 | (255) 0.13B |
| (184) 1E-3 | (202) 5E~J  | (220) 7.9   | (238) 0.75  | (255) 0.116 |
| (185) 18-3 | (200) 5E-3  | (221) 0.063 | (239) 0.546 | (257) 0.096 |
| (185) IE-3 | (204) 5E~3  | (222) 0.05  | (240) 0.540 | (258) 0.098 |
| (187) 1E-3 | (205) 5E-3  | (223) 0.038 | (241) 0.495 | (259) 7.9   |
| (130) 18-3 | (206) 7     | (224) 0.003 | (242) 0.425 | (260) 0.071 |
| (189) 58-3 | (207) 0.182 | (225) 0.029 | (243) 0,285 | (261) 0.065 |
| (190) 7E~3 | (208) 0.993 | (226) 0.02  | (244) 0.263 | (262) 0.060 |
| (191) Y    | (209) 0.658 | (227) 0.02  | (245) 0.249 | (263) 7.9   |
| (192) 7E-3 | (210) 1.152 | (228) 0.02  | (245) 0.234 | (264) 7.9   |
| (193) 9    | (211) 0.601 | (229) 0.017 | (247) 0.218 | (265) 7.9   |
| (194) 7E-3 | (212) 0.447 | (230) 0.017 | (248) 0,218 | (266) 7.9   |
| (195) 9    | (213) 0.32  | (231) 0.02  | (249) 0.189 | (267) 7.9   |
| (196) 75-3 | (214) 0.218 | (232) 0,249 | (250) 0.176 | (258) 7.9   |
| (197) 5E-3 | (215) 0.138 | (233) 1.236 |             | (239) 7.9   |
| (198) 5E-3 | (215) 0.138 | (234) 1,512 | (252) 0.162 | (279) 0.071 |

| (271) 0.029 | (289) 7.9   | (307) 0.05          | (325) 0.32   | (343) 0.138 |
|-------------|-------------|---------------------|--------------|-------------|
| (272) 0.027 | (290) 7.9   | (309) 0.05          | (326) 0.263  | (344) 0.127 |
| (272) 0.029 | (291) 0.029 | (309) 0.05          | (027) 0.245  | (345) 0.115 |
|             | (292) 0.071 | (310) 0.115         | (328) 0.218  | (345) 0.115 |
| (274) 0.029 |             |                     | (329) 0.189  | (347) 0.096 |
| (275) 0.029 | (293) 0.063 | (311) 0.718         |              | (348) 0.095 |
| (276) 0.025 | (294) 0.063 | (312) 0.127         | (3.30) 0.204 |             |
| (277) 0.02  | (295) 0.05  | (313) 1.235         | (331) 0.189  | (349) 0.096 |
| (278) 0.038 | (295) 0.05  | (314) <b>0.88</b> 4 | (332) 0.162  | (350) 0.088 |
| (279) 0.32  | (297) 0.038 | (315) 0.658         | (333) 0.162  | (351) 7.9   |
| (280) 0.234 | (298) 0.029 | (316) 0.564         | (334) 0.162  | (352) 0.088 |
|             | (299) 0.029 | (317) 0.447         | (335) 0.162  | (353) 7.9   |
| (281) 0.162 |             | (318) 0.381         | (336) 0.15   | (354) 0.088 |
| (282) 0.162 | (300) 0.029 | • = ·· = •          | (337) 0.155  | (355) 7.9   |
| (283) 0.138 | (301) 0.029 | (319) 0.32          |              |             |
| (284) 0.138 | (302) 0,029 | (320) 0.263         | (338) 0.138  | (356) 7.9   |
| (285) 0.114 | (303) 0.029 | (321) 0.283         | (339) 0.138  | (357) 7.9   |
| (286) 0.095 | (304) 0.029 | (322) 0.546         | (340) 0.138  | (358) 7.9   |
| (287) 0.096 | (305) 0.038 | (323) 0.492         | (341) 0.116  | (359) 0.063 |
|             | (306) 0.038 | (324) 0.36          | (342) 0.138  | (360) 0.053 |
| (288) 7.9   | (308) 0.038 | (324) 0.30          |              |             |
|             |             |                     |              |             |

River discharge data at 12-hourly intervals for Station: 17B Period : 3

Variable: KOMPAG3.vari (length # 360)

| Ρ | age |  |
|---|-----|--|
|   |     |  |

| •  |        |           | •        |       |          |       |        |        |       | •             |                |        |       |                     |         |       |       |       |         |       |
|----|--------|-----------|----------|-------|----------|-------|--------|--------|-------|---------------|----------------|--------|-------|---------------------|---------|-------|-------|-------|---------|-------|
| ۰, | Variab | lei KOMPA | AG4.var1 | (leng | th = 344 | 1)    |        |        |       |               |                |        |       | · · · · · · · · · · |         |       |       |       |         |       |
|    |        |           |          | 0.447 |          | 0.249 | ( 55)  | 4.445  | (73)  | 2.346         | (131)          | 1.324  | (199) | 1.152               | (217)   |       | (235) |       | (253)   |       |
|    |        | 0.072     |          | 0.495 |          | 0.234 | ( 56)  |        | (74)  |               | (182)          |        | (200) | 1.032               | (218)   |       | (234) |       |         | 0.447 |
|    |        | 0.063     |          | 1.206 |          | 0.249 | ( 57)  |        | (75)  |               | (183)          | 1.15   | (201) | 0.993               | (21%)   | 0.52  | (237) |       | (255)   |       |
|    |        | 0.063     |          | 0.849 |          | 0.234 | ( 58)  |        |       | 1.562         | (184)          | 1.071  | (202) | 0.92                | (220)   | 0.601 |       | 1.071 | (256)   | 0.447 |
|    |        | 0.063     |          |       |          | 0.219 | ( 59)  |        |       | 1.416         | (185)          |        | (207) | 0.947               | (221)   | 0.6   | (239) | 0.993 |         | 0.447 |
|    |        | 0.063     | (23)     |       |          | 0.218 | (60)   |        | (76)  |               | (166)          |        | (204) | .0.849              | (222)   | 0.601 | (240) | 0.849 |         | 0.601 |
|    |        | 0.071     |          | 0.631 |          | 0.187 | (61)   |        |       | 1.152         | (187)          |        | (205) |                     | (223)   | 0.546 | (241) | 0.782 | (259)   | 0.92  |
|    |        | 0.063     |          | 0.546 |          | 0.204 | ( 62)  |        | (80)  |               | (188)          |        | (206) |                     | (224)   | 0.546 | (242) | 0.688 | (250)   | 1.032 |
|    |        | 0.106     |          | 0.546 | · (45)   |       | ( 63)  |        | (81)  |               | (189)          |        | (207) | 0.78                | (225)   | 0.495 | (243) | 0.458 | (261)   | 0.9   |
|    |        | 2.524     |          | 0.495 |          | 0.176 | (64)   |        | (82)  |               | (190)          |        | (208) |                     | (226)   | 0.447 | (244) | 0.651 | (252)   | O.884 |
|    |        | 4.205     |          | 0.447 |          | 0.162 | ( 65)  |        | (83)  |               | (191)          |        | (207) |                     | (227)   | 0.495 | (245) | 0.6   | (253)   | 0.78  |
|    | (11)   |           |          | 0.402 |          |       | ( 66)  |        |       | 0.92          | (192)          |        |       | 0.688               | (228)   | 0.47  | (246) | 0.546 | (254)   | 0.659 |
|    |        | 1.512     | (30)     |       | , (48)   |       | (67)   |        |       | 0.782         | (193)          |        | (211) |                     | (229)   |       | (247) | 0.495 | (255)   | 0.401 |
|    |        | 1.152     | (31)     |       |          | 0.142 | (68)   |        |       | 0,782         | (194)          |        | (212) |                     | (200)   | 0.495 | (248) | 0.495 | (256)   | 0.546 |
|    | (14)   |           | (32)     |       | ( 50)    |       | (67)   |        |       | 0.718         | (175)          | -      | (213) |                     | (271)   |       | (249) | 0.546 | (257)   | 0.546 |
|    |        | 0.782     | ( 33)    |       | (51)     |       | (70)   |        |       | .0.781        | (196)          |        |       | 0.671               |         | 0.495 | (250) | 0.815 | (268)   | 0.521 |
|    |        | 0.658     |          | 0.292 | ( 52)    |       | (71)   |        | (89)  | 0.458         | (197)          | 1.512  | (215) |                     | (233)   |       | (251) | 0.658 | (267)   | 0.475 |
|    |        | 0.546     |          | 0.283 | ( 53)    |       | ( 71)  | 2.7909 |       | 0.658         | (197)<br>(198) | 1.324  | (216) |                     |         | 1.464 | (252) | 0.546 | (270)   | 0.521 |
|    | ( 18)  | 0.495     | (36)     | 0.263 | ( 54)    | 071   | ( / 2) |        |       |               |                |        |       |                     |         |       |       |       |         |       |
|    |        |           |          |       |          |       |        |        |       |               |                |        |       |                     |         |       |       |       |         |       |
|    |        |           |          |       |          |       |        |        |       |               |                | -      |       |                     |         |       |       |       |         |       |
|    |        |           |          |       |          |       |        |        |       |               | ,              |        |       |                     |         |       |       |       |         |       |
|    |        |           |          | •     |          |       |        |        |       | \$            |                | 1.     |       |                     |         |       |       |       | _       |       |
|    |        |           |          |       |          |       |        |        | (163) | A 94          |                | 0.501  |       | 0.249               |         | 0.218 | (325) | 0.096 |         | 0.116 |
|    |        | 0.601     |          | 17.57 |          | 1.236 |        | 0.659  |       | 3.972         |                | 10.546 |       | 0.249               |         | 0.234 |       | 0.076 |         | 0.106 |
|    |        | 0.601     | (110)    |       |          | 1.174 | (146)  |        |       | 3.7/2         |                | 0.495  |       | 0,218               | · (207) |       |       | 0.095 | • • • • |       |
|    |        | 0.546     |          | 6.291 |          | 1.15  |        | 0.601  |       | 2.806         |                | 0.495  |       | 0,109               |         | 0.176 | (328) |       |         |       |
|    |        | 0.546     |          | 4.691 |          | 1.071 | (148)  |        |       | 15.43         |                | 0.447  |       | 0.152               |         | 0.152 |       | 0.076 |         |       |
|    |        | 0.546     |          | 3,972 |          | 1.07  |        | 0.546  |       | 7.019         |                | 0.447  |       | 0.170               |         | 0,162 |       | 0.096 |         |       |
|    |        | 0.546     |          | 3.523 |          | 1.071 |        | 0.564  |       |               |                | 0.402  |       | 0.138               |         | 0,162 | (531) |       |         |       |
|    |        | 5.735     |          | 3.102 |          | 0.99  | (151)  |        |       | 4.94<br>3.744 |                | 0.425  |       | 0.2.4               |         | 0.162 |       | 0.138 |         |       |
|    | ( 98)  | 28        |          | 2.806 |          | 0.92  |        | 2.709  |       |               |                |        |       | 0.218               |         | 0.138 |       | 0.116 |         |       |
|    | ( 99)  | 15.43     |          | 2.524 |          | 0.7B  | (153)  |        |       | 3.309         |                | 0.402  |       | 0.189               |         | 0.162 |       | 0.096 |         |       |
|    | (100)  | 6,87      |          | 2.262 |          | 0.782 |        | 5.878  |       | 2.902         |                | 0.402  |       | 0.167               |         | 0.116 |       | 0.096 |         |       |
|    | (101)  | 4.671     |          | 2.019 |          | 0.78  | (155)  |        |       | 2.524         | (281)          |        |       |                     |         | 0.138 | (336) |       |         |       |
|    | (102)  | 3,744     | (120)    | 1.07  |          | 0.75  |        | 3.206  |       | 2.346         | (282)          |        |       | 0.204               |         | 0.138 | (337) |       |         |       |
|    | (103)  | 21        | (121)    | 1.65  |          | 0.99  |        | 2.324  |       | 2.17B         | (283)          |        |       | 0.447               |         | 0.138 | (338) |       |         |       |
|    | (104)  | 8.73      | (122)    | 1.611 | (140)    | 0.849 |        | 2.019  |       | 1.945         | (284)          | 0.263  |       | 0.425               |         |       | (339) |       |         |       |
|    | (105)  | 5.46      | (123)    | 1.512 |          | 0.78  | (159)  |        |       | 1.732         |                | 0.293  | (302) |                     |         | 0.116 |       |       |         |       |
|    |        | 4.205     | (124)    | 1.416 | (142)    | 0.718 |        | 1.611  |       | 1.611         |                | 0.263  |       | 0.292               | (322)   | 0.116 | (340) |       |         |       |
|    | (107)  |           |          | 1.324 |          | 0.658 | (141)  |        |       | 1.512         |                | 0.283  |       | 0.283               | (323)   | 0.116 | (341) |       |         |       |
|    | (108)  |           | (126)    | 1,28  |          | 0.658 | (162)  |        |       | 1.416         |                | 0.263  | (306) | 0.249               |         | 0.116 |       | 0.098 |         |       |
|    |        |           |          |       | -        |       |        |        |       |               |                |        |       |                     |         |       |       |       |         |       |

| Phosphorus | transport | Bera | River |
|------------|-----------|------|-------|
|            |           |      |       |

### TR 143 March 1989

River discharge data at 12-hourly intervals for Station: 17B Period : 5

:

•

| 91) 0   | (109) 0 | (127) 0 | (145) 0 | (163) 0 |
|---------|---------|---------|---------|---------|
| ( 92) 0 | (110) 0 | (128) 0 | (146) 0 | (164) 0 |
| (93) 0  | (111) 0 | (129) 0 | (147) 0 | (165) Ŭ |
| ( 94) 0 | (112) 0 | (130) 0 | (148) Q | (156) 0 |
| ( 95) 0 | (113) 0 | (131) 0 | (149) 0 | (157) 0 |
| (96)0   | (114) 0 | (132) 0 | (150) 0 | (168) 🔍 |
| ( 97) 0 | (115) 0 | (133) 0 | (151) 0 | (169) 0 |
| ( 98) 0 | (116) 0 | (134) 0 | (152) 0 | (170) 0 |
| (99)0   | (117) 0 | (175) 0 | (153) 0 | (171) 0 |
| (100) 0 | (118) 0 | (136) 0 | (154) Ŭ | (172) 0 |
| (101) 0 | (119) 0 | (137) 0 | (155) 0 | (173) 0 |
| (102) 0 | (120) 0 | (138) 0 | (156) O | (174) Ú |
| (103) 0 | (121) 0 | (139) 0 | (157) 0 | (175) 0 |
| (104) 0 | (122) 0 | (140) 0 | (158) 0 | (176) 0 |
| (105) 0 | (123) 0 | (141) 0 | (159) 0 | (177) Q |
| (106) 0 | (124) 0 | (142) 0 | (160) 0 | (178) Q |
| (107) 0 | (125) 0 | (143) 0 | (161) 0 | (179) Ú |
| (108) 0 | (126) 0 | (144) 0 | (162) 0 | (180) 0 |

| (271) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(274) 0<br>(275) 0<br>(274) 0<br>(277) 0<br>(279) 0<br>(279) 0<br>(290) 0<br>(290) 0<br>(281) 2E-3<br>(283) 5E-3<br>(283) 5E-3<br>(284) 5E-3 | $\begin{array}{c} (289) 1E-3 \\ (290) 0.249 \\ (291) 0.138 \\ (292) 0.104 \\ (292) 0.104 \\ (293) 0.063 \\ (294) 0.063 \\ (294) 0.004 \\ (297) 0.029 \\ (298) 0.029 \\ (298) 0.029 \\ (299) 0.02 \\ (300) 0.017 \\ (301) 0.014 \\ (302) 9 \\ (302) 9 \\ (303) 5E-3 \end{array}$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | (343) 0.063<br>(344) 0.063<br>(345) 0.05<br>(346) 0.057<br>(347) 0.05<br>(348) 0.05<br>(348) 0.05<br>(349) 0.05<br>(350) 0.05<br>(351) 7.9<br>(352) 0.218<br>(353) 0.063<br>(354) 0.096<br>(355) 0.063<br>(356) 7.9<br>(357) 0.05 |
|--|---|--|--|---|
| (283) 5E~3   |   |  | (338) 0.116  | (356) 7.9   |

| variable: Kur | IP A00. Val. 1 |                          |             |             |
|---------------|----------------|--------------------------|-------------|-------------|
| ( 1) 0.116    | ( 19) 0.029    | (37) 9                   | ( 55) 0.014 | ( 73) 0.02  |
| 2) 0.162      | ( 20) 0,014    | (38) 9                   | ( 56) 0.017 | ( 74) 0.029 |
|               | (21) 0.014     | ( 37) 0.014              | ( 57) 0.014 | ( 75) 0.02  |
| 3) 0.162      | 1 22) 0.02 -   | (40) 0.02                | (58) 0.012  | ( 76) 0.017 |
| 4) 0.15       | (23) 0.02      | (41) 0.014               | (59) 9      | (77) 9      |
| 5) 0.116      | (24) 0.02      | (42) 9                   | ( 60) 7E-3  | ( 78) 56-3  |
| 6) 0.088      |                | (43) 76-3                | ( 61) 5E~3  | ( 79) SE-J  |
| 7) 0.096      | (25) 0.02      | ( 43) /E-3<br>( 44) 5E-3 | (62) 5E-3   | (80) 5E-3   |
| 8) 7.9        | (26) 0.02      |                          | ( 62) 5E-3  | (81) 9      |
| 9) 7.9        | ( 27) 0.014    | (45) 2E-3                | ( 64) 0.012 | (82) 9      |
| 10) 7.9       | (28) 9         | ( 46) 2E-3               |             | (83) 5E-3   |
| 11) 7.9       | ( 29) 78-3     | ( 47) 1E-3               | ( 65) 0.02  | (84)5E~3    |
| 12) 0.071     | ( 30) SE-3     | ( 48) 1E-3               | ( 66) 0.025 | • •         |
| 13) 0.063     | ( 31) 5E~3     | ( 49) 1E-3               | ( 67) 0.03  | (85)2E-3    |
| 14) 0.063     | ( 32) 3E-3     | ( 50) 1E-3               | ( 68) 0.025 | (86)1E-3    |
| 15) 0.063     | ( 33) 18-3     | ( 51) 1E-3               | ( 69) 0.038 | ( 87) 2E-3  |
| 16) 0.05      | ( 34) 0        | ( 52) 18-3               | (70) 0.02   | ( 88) 1E-3  |
| 17) 0.038     | (35) 5E-3      | ( 53) 1E-3               | ( 71) 0.013 | (89)0       |
|               | •              | ( 54) 5E-3               | (72) 0.029  | (90)0       |
| (18) 0.035    | (36) 9         | ( 54) 5E-3               | ( 72) 0.029 | ( 90) Q     |

|         |         | ·       |         |         |
|---------|---------|---------|---------|---------|
| (161) 0 | (199) 0 | (217) 0 | (235) 0 | (253) 0 |
| (182) 0 | (200) 0 | (218) 0 | (236) 0 | (254) 0 |
| (183) 0 | (201) 0 | (219) 0 | (237) 0 | (255) 0 |
| (184) 0 | (202) 0 | (220) 0 | (238) 0 | (256) Ú |
| (185) 0 | (205) 0 | (221) 0 | (239) V | (257) 0 |
| (136) 0 | (204) 0 | (222) 0 | (240) 0 | (258) 0 |
| (187) 0 | (205) 0 | (223) 0 | (241) 0 | (259) 0 |
| (163) 0 | (206) 0 | (224) 0 | (242) 0 | (260) 0 |
| (189) 0 | (207) 0 | (225) 0 | (243) O | (261) 0 |
| (190) 0 | (208) 0 | (225) 0 | (244) 0 | (252) 0 |
| (191) 0 | (209) 0 | (227) 0 | (245) 0 | (263) 0 |
| (192) 0 | (210) 0 | (228) 0 | (246) 0 | (264) 0 |
| (193) 0 | (211) 0 | (229) 0 | (247) Q | (265) 0 |
| (194) 0 | (212) 0 | (230) 0 | (248) 0 | (266) 0 |
| (195) 0 | (213) 0 | (231) 0 | (249) 0 | (267) 0 |
| (196) 0 | (214) 0 | (232) 0 | (250) 0 | (268) 0 |
| (197) Ú | (215) 0 | (233) 0 | (251) Ú | (269) 0 |
| (199) 0 | (216) 0 | (234) 0 | (252) 0 | (270) 0 |

### Variable: KOMPAG5.varl (length = 360)

|  |   | (37)0  | (55)Ŭ   | ( 73) 0  | (181) 0   | (199) 0  | (217) 0  | (235) 0   |
|--|---|--|---|--|---|--|--|---|
| 1) 0   | (19)0   |  | (56)0   | (74) 0   | (162) ウ   | (200) 0  | (218) 0  | (236) 0   |
| 200  | (20)0   | (38)0  |   | (75) 0   | (183) の一  | (201) 0  | (219) 0  | (237) 0   |
| 3) 0   | (21)0   | (39)0  | ( 57) 0   |  | (134) 0   | (202) 0  | (220) 0  | (208) 0   |
| 4) (   | (22)0   | (40)0  | (58)0   | (76) 0   | (185) 0   | (203) 0  | (221) 0  | (239) 0   |
| 5) 0   | (23) 0  | (41)0  | (59)0   | (77) 0   |   | (204) 0  | (222) 0  | (240) 0   |
|  | (24) 0  | (42) 0   | ( 60) 0   | (76)Ŭ  | (186) 0   |  | (223) 0  | (241) 0   |
| 6) ()  |   | (45) 0   | (61)0   | (79) Ŭ   | (187) 😣   | (205) 0  |  | (242) 0   |
| 7)0  | (25)0   |  | (62)0   | (80)0  | (188) ()  | (205) 0  | (224) 0  |   |
| 9) ()  | (26)0   | (44)0  | (63)0   | (81) 0   | (189) Ú   | (207) 0  | (225) 0  | (243) 0   |
| 9)0  | (27)0   | (45)0  |   | (82) 0   | (190) 0   | (208) 0  | (226) 0  | (244) 0   |
| 10) 0  | (28)0   | (46) O   | ( 64) Ŭ   |  | (191) 0   | (207) 0  | (227) 0  | (245) 0   |
| 11) 0  | ( 29) ()  | ( 47) 0  | (65)0   | (83)0  | (192) 0   | (210) 0  | (228) 0  | 1246) 0   |
| 12) 0  | ( 30) 0   | (48)Ŭ  | (66)0.  | (84)0  |   | (211) 0  | (229) 0  | (247) 0   |
|  | (31) 0  | (49)0  | ( 67) 0   | (85)0  | (193) 0   |  | (230) 0  | (248) 0   |
| 13) 0  |   | (50)0  | (68)0   | (86)0  | (194) 0   | (212) 0  |  | (249) 0.  |
| 14) 0  | (32)0   |  | ( 69) 0   | (87)0  | (195) Ŭ   | (213) 0  | (231) 0  |   |
| 15) 0  | (33)0   | ( 51) 0  |   | (88) 0   | (195) 0   | (214) 0  | (232) 0  | (250) 0   |
| 16) 0  | (34)0   | (52)0  | ( 70) 0   | (89)0  | (197) 0   | (215) 0  | (233) 0  | (251) 0   |
| 17) 0  | (35)0   | (53)0  | (71)0   |  | (198) 0   | (215) 0  | (234) 0  | (252) 0   |
| 18) Ŭ  | ( 36) 0   | ( 54) 0  | (72)0   | (90) V   |   |  |  |   |
|  |   | ζ.   |   |  | _   |  |  |   |
|  |   |  |   |  |   |  |  |   |
|  |   | ·  |   |  |   | (289) 0  | (207) 0  | (325) 0   |
|  |   |  | (14D) V   | (163) 0  | (271) 0   | (289) 0  |  | (325) 0<br>(326) 0.04   |
| 91) V  | (107) 0   | (127) 0  | (145) 0<br>(146) 0  | (163) 0  | (271) 0<br>(272) 0  | (289) 0<br>(290) 0   | (207) 0<br>(208) 0   | (325) 0<br>(326) 0.04   |
| 91) V<br>92) V   | (107) Q<br>(110) Q  | (127) 0<br>(128) 0   | (14D) V   | (165) 0<br>(165) 0   | (271) 0<br>(272) 0<br>(273) 0   | (289) 0<br>(290) 0<br>(291) 0  | (207) 0<br>(208) 0<br>(209) 0  | (325) 0<br>(326) 0.04<br>(327) 18-3   |
| 91) 0<br>92) 0<br>93) 0  | (107) 0<br>(110) 0<br>(111) 0   | (127) 0<br>(128) 0<br>(129) 0  | (145) 0<br>(146) 0<br>(147) 0   | (163) 0  | (271) 0<br>(272) 0<br>(273) 0<br>(273) 0  | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0   | (207) 0<br>(208) 0<br>(209) 0<br>(210) 0   | (325) 0<br>(326) 0.04<br>(327) 1E-3<br>(328) 0.083  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0   | (107) 0<br>(110) 0<br>(111) 0<br>(112) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(120) 0   | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0  | (165) 0<br>(165) 0   | (271) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(275) 0   | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0  | (307) 0<br>(308) 0<br>(309) 0<br>(310) 0<br>(311) 0  | (325) 0<br>(326) 0.04<br>(327) 1E-3<br>(329) 0.093<br>(329) 5E-3  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0  | (107) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0  | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(148) 0   | (163) 0<br>(165) 0<br>(165) 0<br>(165) 0<br>(167) 0  | $\begin{array}{c} (271) & 0 \\ (272) & 0 \\ (273) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \end{array}$  | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(294) 0   | $\begin{array}{ccc} (307) & 0 \\ (308) & 0 \\ (309) & 0 \\ (310) & 0 \\ (311) & 0 \\ (312) & 0 \end{array}$  | (325) 0<br>(326) 0.04<br>(327) 1E=3<br>(328) 0.083<br>(329) 5E=3<br>(320) 2E=3  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0  | (107) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(113) 0<br>(114) 0   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(131) 0   | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(149) 0<br>(150) 0  | (163) 0<br>(165) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(168) 0   | (271) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(275) 0   | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(294) 0<br>(294) 0  | $\begin{array}{c} (207) & 0 \\ (308) & 0 \\ (309) & 0 \\ (310) & 0 \\ (311) & 0 \\ (312) & 0 \\ (312) & 0 \end{array}$   | (325) 0<br>(326) 0.04<br>(327) 1E-3<br>(328) 0.083<br>(329) 5E-3<br>(330) 2E-3<br>(331) 1E-3  |
| 91) V<br>92) V<br>93) V<br>94) V<br>95) V<br>(94) V  | (107) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0   | (127) 0<br>(128) 0<br>(129) 0<br>(120) 0<br>(131) 0<br>(132) 0<br>(133) 0  | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(149) 0<br>(150) 0<br>(151) 0   | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(168) 0<br>(169) 0  | $\begin{array}{c} (271) & 0 \\ (272) & 0 \\ (273) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \\ (277) & 0 \end{array}$   | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(294) 0   | $\begin{array}{cccc} (207) & 0 \\ (208) & 0 \\ (209) & 0 \\ (316) & 0 \\ (311) & 0 \\ (312) & 0 \\ (213) & 0 \\ (213) & 0 \\ (214) & 0 \end{array}$  | (525) 0<br>(326) 0.04<br>(327) 1E-3<br>(329) 0.085<br>(329) 5E-3<br>(330) 2E-3<br>(331) 1E-3<br>(332) 1E-3  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>96) 0<br>96) 0<br>97) 0   | (107) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(113) 0<br>(114) 0   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(131) 0   | $\begin{array}{c} (145) & 0 \\ (146) & 0 \\ (147) & 0 \\ (148) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (152) & 0 \end{array}$   | (163) 0<br>(164) 0<br>(165) 0<br>(166) 0<br>(167) 0<br>(168) 0<br>(169) 0<br>(170) 0   | $\begin{array}{cccc} (271) & 0 \\ (272) & 0 \\ (273) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \\ (278) & 0 \end{array}$   | $\begin{array}{c} (289) & 0 \\ (290) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \\ (293) & 0 \\ (294) & 0 \\ (295) & 0 \\ (295) & 0 \\ (294) & 0 \end{array}$  | $\begin{array}{c} (207) & 0 \\ (308) & 0 \\ (309) & 0 \\ (310) & 0 \\ (311) & 0 \\ (312) & 0 \\ (312) & 0 \end{array}$   | (325) 0<br>(326) 0.04<br>(327) 1E-3<br>(328) 0.083<br>(329) 5E-3<br>(330) 2E-3<br>(331) 1E-3  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>97) 0<br>98) 0  | (107) 0(110) 0(111) 0(112) 0(113) 0(113) 0(114) 0(115) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(120) 0<br>(131) 0<br>(132) 0<br>(133) 0  | $\begin{array}{c} (145) & 0 \\ (146) & 0 \\ (147) & 0 \\ (148) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (152) & 0 \\ (153) & 0 \end{array}$                               | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(168) 0<br>(169) 0<br>(169) 0<br>(170) 0<br>(171) 0   | $\begin{array}{cccc} (271) & 0 \\ (272) & 0 \\ (273) & 0 \\ (273) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \\ (277) & 0 \\ (278) & 0 \\ (279) & 0 \end{array}$  | $\begin{array}{c} (289) & 0 \\ (290) & 0 \\ (291) & 0 \\ (292) & 0 \\ (292) & 0 \\ (293) & 0 \\ (294) & 0 \\ (295) & 0 \\ (294) & 0 \\ (297) & 0 \end{array}$  | $\begin{array}{cccc} (207) & 0 \\ (208) & 0 \\ (209) & 0 \\ (310) & 0 \\ (311) & 0 \\ (312) & 0 \\ (213) & 0 \\ (213) & 0 \\ (314) & 0 \\ (315) & 0 \end{array}$   | (325) 0<br>(326) 0.04<br>(327) 1E-3<br>(329) 0.093<br>(329) 5E-3<br>(330) 2E-3<br>(330) 1E-3<br>(332) 1E-3  |
| 91) 0<br>(92) 0<br>93) 0<br>(94) 0<br>(95) 0<br>(95) 0<br>(97) 0<br>(98) 0<br>(98) 0   | (107) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(115) 0<br>(117) 9  | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(134) 0   | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(150) 0<br>(151) 0<br>(151) 0<br>(153) 0<br>(154) 0   | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(168) 0<br>(169) 0<br>(170) 0<br>(170) 0<br>(171) 0<br>(172) 0  | $\begin{array}{cccc} (271) & 0 \\ (272) & 0 \\ (273) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \\ (277) & 0 \\ (278) & 0 \\ (278) & 0 \\ (279) & 0 \\ (280) & 0 \end{array}$   | $\begin{array}{c} (289) & 0 \\ (290) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \\ (293) & 0 \\ (294) & 0 \\ (295) & 0 \\ (294) & 0 \\ (297) & 0 \\ (298) & 0 \end{array}$   | $\begin{array}{cccc} (207) & 0 \\ (208) & 0 \\ (209) & 0 \\ (310) & 0 \\ (311) & 0 \\ (312) & 0 \\ (213) & 0 \\ (213) & 0 \\ (314) & 0 \\ (315) & 0 \\ (316) & 0 \end{array}$  | (325) 0<br>(326) 0.04<br>(327) 1E-3<br>(328) 0.083<br>(329) 5E-3<br>(330) 2E-3<br>(331) 1E-3<br>(332) 1E-3<br>(333) 0   |
| 91) 0<br>(92) 0<br>93) 0<br>(94) 0<br>(95) 0<br>(95) 0<br>(95) 0<br>(98) 0<br>(98) 0<br>(99) 0<br>(100) 0  | (107) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(118) 0   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(133) 0<br>(135) 0<br>(135) 0<br>(136) 0  | $\begin{array}{c} (145) & 0 \\ (146) & 0 \\ (147) & 0 \\ (148) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (152) & 0 \\ (153) & 0 \end{array}$                               | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(166) 0<br>(167) 0<br>(170) 0<br>(171) 0<br>(172) 0<br>(173) 0   | $\begin{array}{cccc} (271) & 0 \\ (272) & 0 \\ (273) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \\ (277) & 0 \\ (278) & 0 \\ (278) & 0 \\ (279) & 0 \\ (281) & 0 \end{array}$   | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(294) 0<br>(294) 0<br>(294) 0<br>(294) 0<br>(298) 0<br>(298) 0  | $\begin{array}{cccc} (207) & 0 \\ (208) & 0 \\ (209) & 0 \\ (210) & 0 \\ (311) & 0 \\ (312) & 0 \\ (213) & 0 \\ (213) & 0 \\ (314) & 0 \\ (315) & 0 \\ (316) & 0 \\ (317) & 0 \end{array}$   | (325) 0<br>(326) 0.04<br>(327) 1E-3<br>(328) 0.083<br>(329) 5E-3<br>(330) 2E-3<br>(330) 2E-3<br>(331) 1E-3<br>(332) 1E-3<br>(333) 0<br>(334) 0<br>(334) 0<br>(335) 0                |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>96) 0<br>97) 0<br>98) 0<br>98) 0<br>99) 0<br>(100) 0  | (107) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(118) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(127) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(133) 0<br>(135) 0<br>(136) 0<br>(136) 0<br>(137) 0   | (145) 0(146) 0(147) 0(148) 0(149) 0(150) 0(151) 0(151) 0(153) 0(155) 0  | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(168) 0<br>(169) 0<br>(170) 0<br>(170) 0<br>(171) 0<br>(172) 0  | $\begin{array}{cccc} (271) & 0 \\ (272) & 0 \\ (273) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \\ (274) & 0 \\ (274) & 0 \\ (278) & 0 \\ (279) & 0 \\ (280) & 0 \\ (281) & 0 \\ (282) & 0 \end{array}$   | $\begin{array}{c} (289) & 0 \\ (290) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \\ (294) & 0 \\ (294) & 0 \\ (294) & 0 \\ (294) & 0 \\ (297) & 0 \\ (298) & 0 \\ (299) & 0 \\ (300) & 0 \end{array}$   | $\begin{array}{cccc} (207) & 0 \\ (208) & 0 \\ (209) & 0 \\ (310) & 0 \\ (311) & 0 \\ (312) & 0 \\ (213) & 0 \\ (213) & 0 \\ (314) & 0 \\ (315) & 0 \\ (316) & 0 \\ (317) & 0 \\ (318) & 0 \end{array}$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>97) 0<br>98) 0<br>97) 0<br>98) 0<br>100) 0<br>100) 0<br>100) 0  | (107) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(118) 0<br>(117) 0   | (127) 0(128) 0(129) 0(130) 0(131) 0(132) 0(133) 0(133) 0(134) 0(135) 0(135) 0(136) 0(137) 0  | (145) 0(146) 0(147) 0(148) 0(150) 0(151) 0(151) 0(153) 0(155) 0(155) 0(156) 0   | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(166) 0<br>(168) 0<br>(168) 0<br>(169) 0<br>(170) 0<br>(171) 0<br>(172) 0<br>(173) 0<br>(174) 0                                  | $\begin{array}{ccccc} (271) & 0 \\ (272) & 0 \\ (273) & 0 \\ (273) & 0 \\ (275) & 0 \\ (275) & 0 \\ (274) & 0 \\ (277) & 0 \\ (277) & 0 \\ (279) & 0 \\ (280) & 0 \\ (281) & 0 \\ (283) & 0 \end{array}$  | $\begin{array}{c} (289) & 0 \\ (290) & 0 \\ (291) & 0 \\ (292) & 0 \\ (292) & 0 \\ (293) & 0 \\ (294) & 0 \\ (295) & 0 \\ (294) & 0 \\ (297) & 0 \\ (298) & 0 \\ (299) & 0 \\ (300) & 0 \\ (301) & 0 \end{array}$  | $\begin{array}{ccccc} (207) & 0 \\ (208) & 0 \\ (209) & 0 \\ (310) & 0 \\ (311) & 0 \\ (312) & 0 \\ (312) & 0 \\ (313) & 0 \\ (314) & 0 \\ (315) & 0 \\ (316) & 0 \\ (317) & 0 \\ (318) & 0 \\ (319) & 0 \end{array}$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| 91) 0<br>92) 0<br>93) 0<br>93) 0<br>(94) 0<br>(95) 0<br>(95) 0<br>(97) 0<br>(97) 0<br>(97) 0<br>(97) 0<br>(100) 0<br>(101) 0<br>(102) 0<br>(103) 0                                 | (107) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(118) 0<br>(117) 0<br>(1120) 0<br>(121) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(120) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(133) 0<br>(134) 0<br>(135) 0<br>(136) 0<br>(137) 0<br>(138) 0<br>(139) 0                       |   | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(166) 0<br>(169) 0<br>(169) 0<br>(170) 0<br>(171) 0<br>(172) 0<br>(173) 0<br>(173) 0<br>(175) 0                                  | $\begin{array}{cccc} (271) & 0 \\ (272) & 0 \\ (273) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \\ (274) & 0 \\ (274) & 0 \\ (278) & 0 \\ (279) & 0 \\ (280) & 0 \\ (281) & 0 \\ (282) & 0 \end{array}$   | $\begin{array}{c} (289) & 0 \\ (290) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \\ (293) & 0 \\ (294) & 0 \\ (295) & 0 \\ (294) & 0 \\ (297) & 0 \\ (298) & 0 \\ (299) & 0 \\ (301) & 0 \\ (301) & 0 \\ (302) & 0 \end{array}$                           | $\begin{array}{ccccc} (207) & 0 \\ (308) & 0 \\ (309) & 0 \\ (311) & 0 \\ (312) & 0 \\ (312) & 0 \\ (312) & 0 \\ (315) & 0 \\ (315) & 0 \\ (315) & 0 \\ (316) & 0 \\ (317) & 0 \\ (318) & 0 \\ (319) & 0 \\ (320) & 0 \end{array}$                           | (325) 0<br>(326) 0.04<br>(327) 1E-3<br>(329) 0.093<br>(329) 5E-3<br>(330) 2E-3<br>(330) 1E-3<br>(332) 1E-3<br>(332) 1E-3<br>(333) 0<br>(335) 0<br>(335) 0<br>(337) 0<br>(339) 0     |
| 91) 0<br>92) 0<br>93) 0<br>93) 0<br>95) 0<br>95) 0<br>95) 0<br>(96) 0<br>(97) 0<br>(97) 0<br>(97) 0<br>(100) 0<br>(101) 0<br>(102) 0   | (107) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(113) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(117) 0<br>(118) 0<br>(117) 0<br>(119) 0<br>(120) 0<br>(121) 0<br>(122) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(133) 0<br>(135) 0<br>(135) 0<br>(136) 0<br>(137) 0<br>(138) 0<br>(139) 0<br>(149) 0            | (145) 0 $(146) 0$ $(147) 0$ $(149) 0$ $(150) 0$ $(151) 0$ $(151) 0$ $(152) 0$ $(153) 0$ $(155) 0$ $(155) 0$ $(156) 0$ $(157) 0$ $(158) 0$   | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(169) 0<br>(169) 0<br>(170) 0<br>(171) 0<br>(171) 0<br>(172) 0<br>(173) 0<br>(173) 0<br>(175) 0<br>(176) 0            | $\begin{array}{ccccc} (271) & 0 \\ (272) & 0 \\ (273) & 0 \\ (273) & 0 \\ (275) & 0 \\ (275) & 0 \\ (274) & 0 \\ (277) & 0 \\ (277) & 0 \\ (279) & 0 \\ (280) & 0 \\ (281) & 0 \\ (283) & 0 \end{array}$  | $\begin{array}{c} (289) & 0 \\ (290) & 0 \\ (291) & 0 \\ (292) & 0 \\ (292) & 0 \\ (293) & 0 \\ (294) & 0 \\ (295) & 0 \\ (294) & 0 \\ (297) & 0 \\ (298) & 0 \\ (299) & 0 \\ (300) & 0 \\ (301) & 0 \end{array}$  | $ \begin{array}{c} (207) & 0 \\ (308) & 0 \\ (309) & 0 \\ (311) & 0 \\ (312) & 0 \\ (312) & 0 \\ (312) & 0 \\ (315) & 0 \\ (314) & 0 \\ (315) & 0 \\ (316) & 0 \\ (317) & 0 \\ (317) & 0 \\ (318) & 0 \\ (319) & 0 \\ (320) & 0 \\ (321) & 0 \end{array} $   | (325) 0<br>(326) 0.04<br>(327) 1E-3<br>(328) 0.085<br>(329) 5E-3<br>(330) 2E-3<br>(330) 2E-3<br>(332) 1E-3<br>(332) 1E-3<br>(333) 0<br>(334) 0<br>(335) 0<br>(337) 0<br>(339) 0.376 |
| (91) 0<br>(92) 0<br>(93) 0<br>(94) 0<br>(95) 0<br>(95) 0<br>(97) 0<br>(98) 0<br>(99) 0<br>(100) 0<br>(101) 0<br>(102) 0<br>(103) 0<br>(104) 0                                      | (107) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(118) 0<br>(117) 0<br>(1120) 0<br>(121) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(129) 0<br>(131) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(135) 0<br>(135) 0<br>(135) 0<br>(135) 0<br>(135) 0<br>(139) 0<br>(140) 0<br>(144) 0 | (145) 0 $(146) 0$ $(147) 0$ $(148) 0$ $(150) 0$ $(151) 0$ $(151) 0$ $(152) 0$ $(153) 0$ $(155) 0$ $(155) 0$ $(156) 0$ $(157) 0$ $(158) 0$   | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(168) 0<br>(169) 0<br>(170) 0<br>(171) 0<br>(171) 0<br>(172) 0<br>(173) 0<br>(173) 0<br>(175) 0<br>(175) 0            | $\begin{array}{ccccc} (271) & 0 \\ (272) & 0 \\ (273) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \\ (277) & 0 \\ (278) & 0 \\ (279) & 0 \\ (278) & 0 \\ (278) & 0 \\ (281) & 0 \\ (281) & 0 \\ (283) & 0 \\ (283) & 0 \\ (285) & 0 \end{array}$   | $\begin{array}{c} (289) & 0 \\ (290) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \\ (293) & 0 \\ (294) & 0 \\ (295) & 0 \\ (294) & 0 \\ (297) & 0 \\ (298) & 0 \\ (299) & 0 \\ (301) & 0 \\ (301) & 0 \\ (302) & 0 \end{array}$                           | $\begin{array}{ccccc} (207) & 0 \\ (308) & 0 \\ (309) & 0 \\ (311) & 0 \\ (312) & 0 \\ (312) & 0 \\ (312) & 0 \\ (315) & 0 \\ (315) & 0 \\ (315) & 0 \\ (316) & 0 \\ (317) & 0 \\ (318) & 0 \\ (319) & 0 \\ (320) & 0 \end{array}$                           | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| ( 91) 0<br>( 92) 0<br>( 92) 0<br>( 93) 0<br>( 94) 0<br>( 95) 0<br>( 94) 0<br>( 97) 0<br>( 98) 0<br>( 99) 0<br>( 100) 0<br>( 100) 0<br>( 101) 0<br>( 102) 0<br>( 104) 0<br>( 105) 0 | (107) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(113) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(117) 0<br>(118) 0<br>(117) 0<br>(119) 0<br>(120) 0<br>(121) 0<br>(122) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(133) 0<br>(135) 0<br>(135) 0<br>(136) 0<br>(137) 0<br>(138) 0<br>(139) 0<br>(149) 0            | (145) 0 $(146) 0$ $(147) 0$ $(149) 0$ $(150) 0$ $(151) 0$ $(152) 0$ $(153) 0$ $(154) 0$ $(155) 0$ $(155) 0$ $(156) 0$ $(157) 0$ $(157) 0$ $(157) 0$ $(157) 0$ $(157) 0$ $(159) 0$ $(160) 0$ | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(168) 0<br>(168) 0<br>(169) 0<br>(170) 0<br>(171) 0<br>(177) 0<br>(173) 0<br>(174) 0<br>(175) 0<br>(177) 0<br>(178) 0 | $\begin{array}{ccccc} (271) & 0 \\ (272) & 0 \\ (273) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \\ (277) & 0 \\ (278) & 0 \\ (278) & 0 \\ (279) & 0 \\ (280) & 0 \\ (281) & 0 \\ (283) & 0 \\ (284) & 0 \\ (285) & 0 \\ (285) & 0 \\ (286) & 0 \\ (286) & 0 \\ (286) & 0 \\ \end{array}$ | $\begin{array}{c} (289) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \\ (293) & 0 \\ (293) & 0 \\ (294) & 0 \\ (295) & 0 \\ (294) & 0 \\ (297) & 0 \\ (298) & 0 \\ (298) & 0 \\ (300) & 0 \\ (301) & 0 \\ (302) & 0 \\ (303) & 0 \\ (304) & 0 \end{array}$ | $\begin{array}{cccccc} (207) & 0 \\ (308) & 0 \\ (309) & 0 \\ (311) & 0 \\ (312) & 0 \\ (312) & 0 \\ (313) & 0 \\ (314) & 0 \\ (315) & 0 \\ (316) & 0 \\ (317) & 0 \\ (317) & 0 \\ (318) & 0 \\ (319) & 0 \\ (320) & 0 \\ (321) & 0 \end{array}$             | (325) 0<br>(326) 0.04<br>(327) 1E-3<br>(328) 0.085<br>(329) 5E-3<br>(330) 2E-3<br>(330) 2E-3<br>(332) 1E-3<br>(332) 1E-3<br>(333) 0<br>(334) 0<br>(335) 0<br>(337) 0<br>(339) 0.376 |
| ( 91) 0<br>( 92) 0<br>( 93) 0<br>( 94) 0<br>( 95) 0<br>( 96) 0<br>( 97) 0<br>( 98) 0<br>( 98) 0<br>( 100) 0<br>( 101) 0<br>( 102) 0<br>( 103) 0<br>( 104) 0                        | $\begin{array}{c} (107) & 0 \\ (110) & 0 \\ (111) & 0 \\ (112) & 0 \\ (113) & 0 \\ (113) & 0 \\ (114) & 0 \\ (115) & 0 \\ (116) & 0 \\ (117) & 0 \\ (118) & 0 \\ (117) & 0 \\ (119) & 0 \\ (1120) & 0 \\ (122) & 0 \\ (122) & 0 \\ (123) & 0 \end{array}$ | (127) 0<br>(128) 0<br>(129) 0<br>(129) 0<br>(131) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(135) 0<br>(135) 0<br>(135) 0<br>(135) 0<br>(135) 0<br>(139) 0<br>(140) 0<br>(144) 0 | (145) 0 $(146) 0$ $(147) 0$ $(148) 0$ $(150) 0$ $(151) 0$ $(151) 0$ $(152) 0$ $(153) 0$ $(155) 0$ $(155) 0$ $(156) 0$ $(157) 0$ $(158) 0$   | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(168) 0<br>(169) 0<br>(170) 0<br>(171) 0<br>(171) 0<br>(172) 0<br>(173) 0<br>(173) 0<br>(175) 0<br>(175) 0            | $\begin{array}{ccccc} (271) & 0 \\ (272) & 0 \\ (273) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \\ (277) & 0 \\ (278) & 0 \\ (279) & 0 \\ (278) & 0 \\ (278) & 0 \\ (281) & 0 \\ (281) & 0 \\ (283) & 0 \\ (283) & 0 \\ (285) & 0 \end{array}$   | $\begin{array}{c} (289) & 0 \\ (291) & 0 \\ (292) & 0 \\ (292) & 0 \\ (293) & 0 \\ (293) & 0 \\ (294) & 0 \\ (295) & 0 \\ (294) & 0 \\ (298) & 0 \\ (298) & 0 \\ (299) & 0 \\ (299) & 0 \\ (301) & 0 \\ (301) & 0 \\ (302) & 0 \\ (303) & 0 \end{array}$ | $\begin{array}{ccccc} (207) & 0 \\ (308) & 0 \\ (209) & 0 \\ (311) & 0 \\ (312) & 0 \\ (312) & 0 \\ (313) & 0 \\ (314) & 0 \\ (315) & 0 \\ (314) & 0 \\ (317) & 0 \\ (318) & 0 \\ (317) & 0 \\ (319) & 0 \\ (320) & 0 \\ (322) & 0 \\ (322) & 0 \end{array}$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |

Phosphorus transport Berg River

Variable: VIS1.vari (length = 360)

TR 143 March 1989

(253) 0 (254) 0 (255) 0 (256) 0 (257) 0 (258) 0 (259) 0 (260) 0 (261) 0 (262) 0 (265) 0 (264) 0 (265) 0 (266) 0 (267) 0 (263) 0 (269) 0 (270) 0 \_\_\_\_\_

> \_\_\_\_\_ (343) 2.087 (344) 2.09

(345) 0.518 . (346) 0.50

(347) 0.518

(348) 1.87

(249) 1.771

(050) 1,675

(351) 1.57

(357) 0,121

(358) 0.12

(359) 0.083 (360) 0.07

(352) 1.121 (353) 0.518 (354) 0.296 (355) 0.197 (356) 0.159

2 ~

Ś

| Variable         | KONHAG6.V | ari (len  | igth = 360) |          |       | <b>-</b> |       |         |       |       |       |       |       |        |       |                |       |
|------------------|-----------|-----------|-------------|----------|-------|----------|-------|---------|-------|-------|-------|-------|-------|--------|-------|----------------|-------|
| ( 1) 0           |           | 2.346     | ( 37) 0.1   |          | 0.063 | (73)     | 0.219 |         | 0.782 | (179) | 1 777 | (217) | 1.732 | (205)  | 3.209 | (250)          | 0.92  |
|                  |           | ) 1.416   | ( 33) 0.1   |          | 0.193 | (74)     | 0.249 | (192)   | 0,92  |       | 1.611 | (218) |       | (236)  | 1.945 | (254)          |       |
| $(\overline{3})$ |           | 1 1 324   | ( 39) 0.1   |          | 0.849 | ( 75)    |       | (193)   |       |       | 1.611 | (217) |       | (237)  |       |                | 0.782 |
| (4) 0            |           | 2) 1.071  | (40) 0.1    |          | 0.92  | (76)     | 0.631 | (184)   |       |       | 2.346 | (220) |       | (238)  |       | (256)          | 0,690 |
| ( 5) 0           |           | 0.884     | (41) 0.1    |          | 1,071 | ( 77)    | 0.546 | (185)   | 11.15 | (203) |       | (221) |       | (7)    |       |                | 0.659 |
| ( 6) 0           |           | 0.719     | (42) 0.1    |          | 0,78  | (78)     |       | (186)   |       | (204) |       | (222) |       |        | 1.032 | 1258)          | 0.92  |
| 1 7) 0           | • • • •   | 5) 0.531  | (43) 0.1    | 16 (61)  | 0.601 | (79)     | 1.611 | (187)   | 14.27 | (205) |       | (223) |       | (241)  | 0.993 | (259)          | 5.07  |
| ( 8) 0           |           |           | (44) 0.1    | 16 (62)  | 0.546 | (80)     |       | (188)   | -     |       | 6.291 | (224) |       | (242)  |       | (260)          | 3.309 |
|                  |           | 7) 0.471  | (45) 0.1    | 16 (53)  | 0.782 | ( 81)    |       | (187)   |       |       | 4 944 | (225) |       | (24.3) |       | (261)          | 2.324 |
| ( 10) 1          |           | 0.425     | (46) 0.1    | 06 (64)  | 0.601 |          | 0.849 |         | 4.944 |       | 4.325 | (226) |       | (244)  |       | (262)<br>(263) | 1.87  |
| (11) 1           |           | 0.36      | (47) 0.1    | 06 (65)  | 0.495 | (83)     |       |         | 3.972 |       | 5.6.4 | (227) |       | (245)  |       |                | 1.562 |
|                  |           | 0.32      | (48) 0.0    |          | 0.447 | ( 84)    |       |         | 3,309 | (210) | 3.102 | (228) |       | (246)  |       | (264)<br>(265) |       |
| (13) 2           |           | 0.283     | ( 49) 0.0   | 96 (67)  | 0.36  | (85)     |       | (193)   |       | (211) | 2.905 | (229) |       | (247)  |       | (265)          |       |
| (14) 1           |           | 0.255     | ( 50) 0.1   | 62 (68)  | 0.34  | ( 86)    |       |         | 2.524 | (212) |       | (270) |       | (248)  |       | (260)          |       |
| (15) 2           |           | 5) 0.219  | ( 51) 0.9   | 2 (67)   | 0.292 | (87)     |       |         | 2.805 | (213) | 2.346 | (231) |       | (249)  |       |                |       |
| (16) 1           |           | 1) 0.218  | ( 52) 0.8   | 01 (70)  | 0.283 | (88)     |       |         | 2.262 |       | 2.178 | (232) |       | (250)  |       | (259)          |       |
| (17) 0           |           | 5) 0.210  | ( 53) 1.0   |          | 0.249 | ( 89)    |       |         | 2.178 |       | 2.019 | (235) |       | (251)  |       | (270)          |       |
| ับสา 0           | .PIA ( 3) | 0.219     | ( 54) 0.3   |          | 0.234 | ( 90)    |       | (198)   | 1.87  |       | 1.801 | (234) |       | (252)  | 0.937 |                |       |
|                  |           |           |             |          |       |          |       |         |       |       |       |       |       |        |       |                |       |
| ( 91) 0          |           | ) U.36    | (127) 0.4   |          | 4.691 | (163)    | 6.291 | (271)   | 2.019 | (287) | 0.658 | (307) | 0.56  | (725)  |       | (343)          |       |
| (92) 0           |           | 0.36      | (128) 0.4   |          | 3.858 | (164)    |       | (272)   | 1.732 |       | 0.5.1 | (009) |       | (006)  |       | (344)          |       |
| (93) 0           |           | L) 0.4447 | • - •       |          | 13.9  | (165)    | 2.902 | (273)   | 1.912 |       | 0.545 | (309) |       | (327)  |       | (343)          |       |
| (94) 3           |           | 2) 0.884  | (130) 1.0   |          | 0.092 | (156)    | 2.435 | (274)   | 1.324 | (292) | 0.546 | (310) |       | (328)  |       |                | 0.178 |
| ( 95) 1          |           | 0.688     | (131) 0.7   |          | 5.202 | (167)    | 2.178 | (275)   | 1.324 | (293) | 0.546 | (311) |       | (329)  |       | (347)          |       |
| (95) 1           |           | 0.601     | (132) 0.7   |          | 3.744 | (168)    | 1.87  | (276)   | 1.152 | (294) | 0.546 | (312) |       | (300)  |       |                | 0.096 |
| (97) 1           |           | 3) 4.205  | (133) 0.6   |          | 3.309 | (169)    | 1.732 |         | 1.152 | (295) | 0.546 | (313) |       | (331)  |       |                | 0.096 |
|                  |           | 1.945     | (134) 12.2  |          | 2.902 | (170)    | 1.562 |         | 0.993 | (296) | ù 475 | (314) |       | (332)  |       | (350)          | 0.116 |
| ( 99) 0          |           | 7) 1.512  | (135) 5.2   | 02 (153) | 2.524 | (171)    | 1.416 |         | 0.993 | (297) | 0.495 | (315) |       | (333)  |       | (351)          | 0.116 |
| (100) 0          |           | 1.236     | (136) 3.2   | 06 (154) | 2.178 | (172)    | 1,324 | (280)   |       |       |       | (316) |       | (354)  |       |                | 0.116 |
|                  |           | 0.993     | (137) 2.4   | 35 (155) | 2.019 | (173)    |       | (281)   |       | (299) | ú.447 | (317) |       | (335)  |       | (353)          | 0.116 |
| (102) 0          |           | ) 0,957   | (138) 1.9   | 45 (156) | 1.801 | (174)    |       | (282)   |       | (300) | 0.447 | (318) |       | (336)  |       | (354)          |       |
|                  |           | 0.816     | (139) 1.8   | 7 (157)  | 1.611 | (175)    | 1.071 | . (283) |       | (301) | 0.402 | (319) |       | (337)  |       | (355)          | 0.096 |
|                  |           | 2) 0.718  | (140) 1.6   | 11 (158) | 17.13 | (176)    | 0,993 |         | 0.849 | (302) | 0.402 |       | 0.283 | (338)  |       | (356)          | 0.096 |
| (105) 0          |           | 3) 0.658  | (141) 9.4   | (159)    | 4.919 | (177)    |       |         | 0.782 | (202) | 0.36  | (321) |       | (339)  |       | (357)          | 0.096 |
| (106) 0          |           | 0.564     | (142) 20.5  | (160)    | 3.309 | (178)    |       |         | 0,782 |       |       |       | 0.283 | (340)  |       | (358)          | 0.096 |
| (107) 0          | • • • • • | 5) 0.546  | (143) 9.7   | 4 (161)  | 2.709 | (179)    |       | (287)   |       | (305) |       | (323) |       | (341)  |       | • • •          | 0.096 |
|                  |           |           |             |          |       |          |       |         |       |       | A 197 |       | A 507 |        |       |                | 0 096 |
| (108) 0          | .381 (12) | ) 0.495   | (144) 6.1   | 5 (162)  | 2.262 | (180)    | 0.782 | (288)   | 0.658 | (306) | 0.36  | (324) |       |        | 0.167 | (360)          |       |

Э.<u>1</u>

### River discharge data at 12-hourly intervals for Station: 17B Period : 6

· •.

:

Phosphorus transport Berg River

13

1

River discharge data at 12-hourly intervals for Station: 20A Period : 2

|  | •   | -   |  |  |
|--|---|---|--|--|
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 127) $0.03$ $(145)$ $1.04$ $(163)$ $0.03$ $128$ ) $0.03$ $(144)$ $0.23$ $(154)$ $0.032$ $129$ ) $0.03$ $(147)$ $0.228$ $(155)$ $0.03$ $129$ ) $0.03$ $(147)$ $0.228$ $(155)$ $0.03$ $130$ ) $0.05$ $(148)$ $2.31$ $(156)$ $0.03$ $131$ ) $0.05$ $(148)$ $2.31$ $(156)$ $0.03$ $131$ ) $0.05$ $(149)$ $1.763$ $(167)$ $0.03$ $133$ ) $0.021$ $(150)$ $0.45$ $(153)$ $0.028$ $133$ ) $0.021$ $(153)$ $0.228$ $(171)$ $0.021$ $134$ ) $0.025$ $(152)$ $0.27$ $(170)$ $0.021$ $135$ ) $0.021$ $(153)$ $0.228$ $(171)$ $0.021$ $136$ ) $0.018$ $(154)$ $0.18$ $(172)$ $0.021$ $138$ ) $0.015$ $(157)$ $0.052$ $(174)$ $0.018$ $139$ ) $0.015$ $(158)$ $0.052$ $(175)$ $0.015$ $140$ $0.015$ $(159)$ $0.052$ $(177)$ $0.015$ $141$ ) $0.015$ $(160)$ $0.0406$ $(179)$ $0.015$ $143$ $0.015$ $(162)$ $0.034$ $(180)$ $0.015$ | $ \begin{array}{c} (272) & 0.421 & (290) & 0.034 & (3) \\ (273) & 2.423 & (291) & 0.03 & (3) \\ (274) & 0.02 & (292) & 0.121 & (3) \\ (274) & 0.02 & (292) & 0.121 & (3) \\ (275) & 0.468 & (293) & 0.03 & (3) \\ (276) & 0.26 & (294) & 0.024 & (3) \\ (277) & 0.144 & (295) & 0.021 & (3) \\ (278) & 0.195 & (296) & 0.018 & (3) \\ (279) & 0.17 & (297) & 0.015 & (3) \\ (280) & 0.17 & (297) & 0.015 & (3) \\ (281) & 0.121 & (299) & 0.015 & (3) \\ (293) & 0.068 & (300) & 0.015 & (3) \\ (284) & 0.059 & (302) & 0.015 & (3) \\ (284) & 0.059 & (303) & 9 & (3) \\ (286) & 0.052 & (304) & 0.012 & (7) \\ (287) & 0.04 & (305) & 9 & (7) \end{array} $ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ |

| ( 1) 0.052<br>( 2) 0.052<br>( 3) 0.052<br>( 4) 0.035<br>( 5) 0.03<br>( 6) 0.03  | $\begin{array}{c} (19) 9 \\ (20) 76-3 \\ (21) 9 \\ (22) 76-5 \\ (13) 9 \\ (23) 9 \\ (24) 76-3 \end{array}$  | ( 37) 0.015<br>( 38) 0.014<br>( 37) 9<br>( 40) 9<br>( 40) 9<br>( 41) 9<br>( 42) 8   | ( 55) 5E-3<br>( 56) 5E-3<br>( 57) 5E-3<br>( 59) 5E-3<br>( 59) 5E-3<br>( 60) 5E-3   | ( 70) 48-3<br>( 74) 0.121<br>( 75) 0.03<br>( 76) 0.018<br>( 77) 0.015<br>( 78) 0.59  |   |
|---|---|---|--|--|---|
| ( 9) 0.021<br>( 10) 0.021<br>( 11) 0.021<br>( 12) 0.02<br>( 13) 0.015<br>( 14) 0.015<br>( 14) 0.015<br>( 15) 0.015<br>( 16) 0.012<br>( 17) 9<br>( 18) 9 | $ \left(\begin{array}{c} 27 \\ 0.052 \\ (28) \\ 0.024 \\ (29) \\ 0.021 \\ (30) \\ 0.021 \\ (31) \\ 0.015 \\ (32) \\ 0.015 \\ (33) \\ 0.015 \\ (34) \\ 0.015 \\ (35) \\ 0.015 \\ (34) \\ 0.015 $ | ( 45) 5E-3<br>( 46) 5E-3<br>( 47) 5E-3<br>( 48) 5E-3<br>( 49) 5E-3<br>( 50) 5E-3<br>( 51) 5E-3<br>( 51) 5E-3<br>( 52) 4E-3<br>( 53) 8<br>( 54) 5E-3 | ( 63) 5E-3<br>( 64) 5E-3<br>( 66) 5E-3<br>( 66) 5E-3<br>( 67) 5E-3<br>( 67) 5E-3<br>( 69) 5E-3<br>( 70) 5E-3<br>( 71) 5E-3<br>( 72) 5E-3 | ( 82) 0.083<br>( 83) 0.052<br>( 84) 0.05<br>( 85) 0.035<br>( 86) 0.035<br>( 87) 0.03<br>( 88) 0.035<br>( 89) 0.03<br>( 89) 0.03<br>( 90) 0.035 | • |

(253) 0.021 (199) 5E-3 (217) 0.819 (235) 0.144 (1a1) 0.015 (254) 0.021 (218) 0.98 (236) 0.17 (200) 5E-3 (182) 0.015 (237) 0.121 (255) 0.021 (217) 0.572 (201) SE-3 (185) 0.015 (208) 0.17 (256) 0.018 (220) 1,121 (202) 5E-3 (184) 0.015 (257) 0.015 (239) 0.064 (221) 0.296 (200) SE-3 (185) 0.015 (240) 0.06 (258) 0.015(222) 1.121 (204) SE-3 (186) 0.015 (241) 0.04 (259) 0.015 (227) 0.261 (205) SE-3 (187) 0.015 (242) 0.03 (260) 0.015 (224) 1.121 (206) SE-1 (188) 0.014 (243) 0.03 (261) 0.015 (225) 0.228 (207) SE-3 (187) 0.015 (262) 0.015 (244) 0.03 (226) 0.228 (203) 0.012 (190) 0.012 (245) 0.03 (253) 0.015 (227) 0,229 (209) 0.021 (191) 9 (264) 0.018 (246) 0.03 (228) 0.228 (210) 0.085 (192) 0.012 (265) 0.021 (247) 0.021 (229) 0.228 (211) 0,819 (193) 9 (266) 0.021 (248) 0.021 (230) 0.228 (212) 0.82 (194) 0.01 (267) 0.021 (249) 0.021 (231) 0.197 (213) 0.963 (195) 9 (268) 0.021 (250) 0.018 (232) 0.213 (214) 0.98 (196) 0.01 (269) 0.04 (251) 0.021 (233) 0.17 (215) 1.04 (197) 7E-3 (270) 1.874 (252) 0.018 (234) 0.197 (198) 7E-3 (215) 0.98

Variable: VIS2.var1 (length = 360)

| 1) 0<br>2) 0<br>3) 0  |   |   | ( CE) ()   | ( 73) 0  | (181) Ú  | (199) 0  | (217) 0   | (275) 0.17  | (253) 0  |
|---|---|---|--|--|--|--|---|---|--|
|   |   | (37)0   | (55)0  | (74) 0   | (182) 0  | (200) 0  | (213) 0   | (236) 0.065   |  |
| 31.0  | · · · · ·   | (38)0   | (55) 0   |  | (183) 0  | (201) 0  | (219) 0   | (237) 9   | (255) O  |
|   | (21)0   | ( 39) Ó   | (57)0  | (75) 0   |  | (202) 0  | (220) = 0   | (258) 4E-3  | (25a) ()   |
| 4) 0  | (22) 0  | (40) O  | (58)0  | (76) 1E-3  | (165) 0  | (203) 0  | (221) 0   | (239) IE-3  | (257) 0  |
| 5) 0  | (23)0   | (41)0   | (59)Q  | (77) 9   |  | (204) 0  | (222) 0   | (240) 1E-3  | (258) Ŭ  |
| 6) 0  | (24) 0  | (42)Q   | ( 60) 0  | ( 78) 0.015  | (186) 0  | (205) 0  | (223) 0   | (241) 0   | (257) 0  |
| 7) 0  | (25) 0  | (43)0   | ( 61) 1E-3   | (79) 5E-3  | (187) 0  | (205) 0  | (224) 0   | (242) 1E-3  | (260) 0  |
| 8) 0  | (26) 0  | (44)0   | ( 62) IE-3   | ( 80) 0.017  | (198) 0  | (208) 0<br>(207) 0.819   | (225) 0   | (243) 0   | (261) 0  |
| 9) 0  | (27) 0  | (45) 0  | ( 60) 1E-3   | ( 81) JE-3   | (189) 0  |  | (226) 0   | (244) 0   | (252) 0  |
| 10) 0   | (28)0   | (46) 0  | ( 64) 9  | ( 82) 7E~3   | (190) 0  | (208) 0.021  | (227) 0   | (245) 0   | (253) 0  |
| 111 0   | (29) 0  | (47)0   | ( 55) 5E-J   | ( 83) 16-3   | (191) 0  | (209) 3E~3   |   | (245) 0   | (264) 0  |
|   | (30)0   | (48)0   | ( 66) 5E-3   | ( 84) 0.015  | (192) 9  | (210) 1E-3   | (228) 0   | (247) 0   | (265) 0  |
| 12) Ú   | (31)0   | (49) 0  | ( 57) CE-3   | (85)V  | (193) 0  | (211) 1E-3   | (229) 0   | (248) 0   | (255) 0  |
| 13) 0   | (32) 0  | (50) 0  | (68) 1E-3  | (86)9  | (193) 0<br>(194) 0<br>(195) 0<br>(196) 0<br>(196) 0<br>(197) 0<br>(196) 0  | (212) 2E-3   | (230) 0   | (249) 0   | (257) 0  |
| 14) 0   | (33)0   | ( 51) 0   | ( 69) 1E-3   | (87)0  | (195) 0  | (213) 0  | (231) 0.296   |   | (258) 0  |
| 15) 0   |   | (52)0   | (70) 0   | ( 8B) 7E-3   | (176) O  | (214) 0  | (232) 0.52<br>(233) 0.121<br>(234) 0.296  | (200) 0<br>(251) 0  | (259) 0  |
| 16) 0   |   | (53)0   |  | (89)0  | (197) Ú  | (215) 0  | (233) 0.121   | (201) V<br>(201) Ó  | (270) 0  |
|   |   |   |  | (90)0  | (178) 0  | (216) 0  | (234) 0.296   | (252) 0   |  |
|   |   |   |  |  | _  |  |   |   |  |
| ·   |   |   |  |  |  |  |   | (325) 0   | (343) 0.08   |
|   |   |   | (145) 0  | (185) 0  | (271) Q  | (289) V  | (307) Q   | (325) 0   | (343) 0.08   |
| 91) 0   | (109) 0   | (127) 0   | (145) 0<br>(146) 0   | 112 TO 10  | (271) Q  | (289) (<br>(290) ()  | (302) 0<br>(308) 0  | (325) 0<br>(326) 18-3   | (343) 0.08<br>(344) 0.03   |
| 91) 0<br>92) 0  | (109) 0<br>(110) 0  | (127) 0<br>(128) 0  | (145) 0  | 112 TO 10  | (271) Q  | (289) 0<br>(290) 0<br>(291) 0  | (307) 0<br>(308) 0<br>(309) 0   | (325) 0<br>(326) 1E-3<br>(327) 0  | (343) 0.08<br>(344) 0.03<br>(345) 5E+3   |
| 91) 0<br>92) 0<br>93) 0   | (109) 0<br>(110) 0<br>(111) 0   | (127) 0<br>(128) 0<br>(129) 0   | (145) 0<br>(146) 0   | 112 TO 10  | (271) Q  | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0   | (307) 0<br>(308) 0<br>(309) 0<br>(310) 0.015  | (325) 0<br>(326) 18~3<br>(327) 0<br>(328) 66-3  | (343) 0.08<br>(344) 0.03<br>(345) 5E~3<br>(346) 5E~3   |
| 91) 0<br>92) 0<br>93) 0<br>94) 0  | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0  | (145) 0<br>(146) 0<br>(147) り  | 112 TO 10  | (271) Q  | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0  | (307) 0<br>(308) 0<br>(309) 0<br>(310) 0.015<br>(111) 5E-3  | (325) 0<br>(326) 1E-3<br>(327) 0<br>(323) 6E-3<br>(323) 0   | (343) 0.08<br>(344) 0.03<br>(345) 5E-3<br>(345) 5E-3<br>(346) 5E-3<br>(347) 3E-3   |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0   | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(112) 0   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0   | (145) 0<br>(146) 0<br>(147) 0<br>(147) 0<br>(148) 0<br>(149) 0   | 112 TO 10  | (271) Q  | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(293) 0   | (307) 0<br>(308) 0<br>(309) 0<br>(310) 0.015<br>(311) 5E=3<br>(312) 0.052   | (325) 0<br>(326) 1E-3<br>(327) 0<br>(329) 6E-3<br>(329) 0<br>(329) 6E-3   | (343) 0.08<br>(344) 0.03<br>(345) 5E-3<br>(346) 5E-3<br>(346) 5E-3<br>(347) 3E-3<br>(348) 1E-3   |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>96) 0  | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0  | $\begin{array}{cccc} (145) & 0 \\ (146) & 0 \\ (147) & 0 \\ (148) & 0 \\ (149) & 0 \\ (150) & 0 \end{array}$ | 112 TO 10  | $\begin{array}{c} \sqrt{271} & 0 \\ (272) & 0 \\ (273) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \\ (277) & 0.021 \end{array}$   | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(293) 0<br>(294) 0<br>(295) 0   | (307) 0<br>(308) 0<br>(309) 0<br>(310) 0.015<br>(311) 5E-3<br>(312) 0.052<br>(313) 1E-3   | (325) 0<br>(326) 18-3<br>(327) 0<br>(323) 68-3<br>(329) 0<br>(322) 68-3<br>(322) 68-3<br>(321) 9  | (343) 0.08<br>(344) 0.03<br>(345) 5E-3<br>(345) 5E-3<br>(345) 5E-3<br>(347) 1E-3<br>(347) 1E-3<br>(347) 1E-3   |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>95) 0  | $\begin{array}{c} (109) & 0 \\ (110) & 0 \\ (111) & 0 \\ (112) & 0 \\ (113) & 0 \\ (114) & 0 \\ (115) & 6 \\ (114) & 0 \end{array}$   | $\begin{array}{cccc} (127) & 0 \\ (128) & 0 \\ (129) & 0 \\ (130) & 0 \\ (131) & 0 \\ (132) & 0 \\ (133) & 0 \end{array}$   | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(149) 0<br>(150) 0<br>(151) 0                                    | 112 TO 10  | $\begin{array}{c} (271) & 0 \\ (272) & 0 \\ (273) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \\ (277) & 0.021 \\ (278) & 0.021 \end{array}$   | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(294) 0<br>(294) 0<br>(295) 0<br>(295) 0  | $\begin{array}{cccc} (307) & 0 \\ (309) & 0 \\ (309) & 0 \\ (310) & 0.015 \\ (511) & 58-5 \\ (312) & 0.052 \\ (313) & 18-3 \\ (314) & 18-3 \end{array}$   | (325) 0<br>(326) 1E-3<br>(327) 0<br>(329) 6E-3<br>(329) 0<br>(329) 6E-3<br>(321) 9<br>(332) 9   | $\begin{array}{c} (343) & 0.08\\ (344) & 0.03\\ (345) & 58-2\\ (345) & 58-2\\ (345) & 58-2\\ (347) & 18-2\\ (347) & 18-2\\ (347) & 18-2\\ (349) & 0\\ (349) & 0\\ (350) & 18-3\end{array}$ |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>97) 0<br>98) 0   |   | (127) 0 (128) 0 (129) 0 (130) 0 (131) 0 (132) 0 (133) 0 (133) 0 (133) 0   | (145) 0<br>(146) 0<br>(147) 0<br>(149) 0<br>(159) 0<br>(150) 0<br>(151) 0                                    | (165) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(157) 0<br>(169) 0<br>(169) 0  | (271) Q<br>(272) Q<br>(273) Q<br>(273) Q<br>(274) Q<br>(275) Q<br>(275) Q<br>(277) Q<br>(277) Q<br>(278) Q<br>(278) Q<br>(274) SE-3  | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(294) 0<br>(294) 0<br>(295) 0<br>(295) 0<br>(297) 0   | $\begin{array}{cccc} (307) & 0 \\ (309) & 0 \\ (309) & 0 \\ (310) & 0.015 \\ (511) & 5E{-}3 \\ (312) & 0.052 \\ (313) & 1E{-}3 \\ (314) & 1E{-}3 \\ (315) & 0 \end{array}$  | (325) 0<br>(326) 18-3<br>(327) 0<br>(323) 68-3<br>(329) 0<br>(329) 0<br>(329) 68-3<br>(321) 9<br>(332) 9<br>(332) 9<br>(332) 9  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>96) 0<br>97) 0<br>98) 0<br>99) 0  |   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(134) 0<br>(135) 0   |  | (165) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(166) 0<br>(167) 0<br>(169) 0<br>(167) 0   | <pre>\271) Q (272) Q (272) Q (273) Q (274) Q (275) Q (275) Q (277) Q (277) Q (278) Q (278) Q (278) Q (279) SE-3 (280) SE-3</pre>   | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(293) 0<br>(294) 0<br>(295) 0<br>(296) 0<br>(297) 0<br>(298) 0  | (307) 0<br>(309) 0<br>(319) 0<br>(319) 0.015<br>(312) 0.052<br>(312) 1E-3<br>(314) 1E-3<br>(314) 1E-3<br>(315) 0<br>(315) 1E-3  | (325) 0<br>(326) 18-3<br>(327) 0<br>(323) 66-3<br>(324) 0<br>(324) 0<br>(324) 0<br>(325) 9<br>(332) 9<br>(335) 9<br>(337) 9<br>(334) 58-3   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>97) 0<br>98) 0<br>99) 0<br>00) 0   | $\begin{array}{c} (109) & 0 \\ (110) & 0 \\ (111) & 0 \\ (112) & 0 \\ (112) & 0 \\ (113) & 0 \\ (114) & 0 \\ (114) & 0 \\ (115) & 0 \\ (116) & 0 \\ (118) & 0 \end{array}$  | (127) 0 (128) 0 (129) 0 (130) 0 (131) 0 (132) 0 (135) 0 (135) 0 (135) 0 (136) 0 (136) 0 (136) 0 (136) 0 (136) 0 (136) 0 (136) 0 (136) 0 (136) 0 (136) 0 (137) 0 ( |  | (185) 0<br>(164) 0<br>(155) 0<br>(155) 0<br>(156) 0<br>(157) 0<br>(169) 0<br>(169) 0<br>(170) 0<br>(171) 0   | <pre>\271) Q (272) Q (272) Q (273) Q (273) Q (275) Q (275) Q (275) Q (277) Q.Q21 (278) Q.Q21 (278) Q.Q21 (278) G=3 (280) SE=3 (281) SE=3 (281) SE=3</pre>  | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(295) 0<br>(294) 0<br>(295) 0<br>(295) 0<br>(296) 0<br>(298) 0<br>(298) 0<br>(299) 0   | (307) 0<br>(309) 0<br>(309) 0<br>(310) 0.015<br>(312) 0.052<br>(312) 0.052<br>(313) 1E-3<br>(314) 1E-3<br>(315) 1E-3<br>(315) 1E-3<br>(315) 1E-3  | (325) 0<br>(326) 1E-3<br>(323) 6E-3<br>(323) 6E-3<br>(324) 0<br>(324) 9<br>(335) 9<br>(335) 9<br>(335) 9<br>(334) 5E-3<br>(335) 5E-3  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>95) 0<br>97) 0<br>98) 0<br>99) 0<br>00) 0<br>01) 0   | (109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(114) 0<br>(114) 0<br>(115) 6<br>(114) 0<br>(114) 0<br>(118) 0<br>(119) 0  | (127) 0  (128) 0  (129) 0  (130) 0  (131) 0  (132) 0  (133) 0  (134) 0  (135) 0  (136) 0  (137) 0   |  | (155) 0 $(164) 0$ $(155) 0$ $(155) 0$ $(157) 0$ $(160) 0$ $(160) 0$ $(170) 0$ $(171) 0$ $(172) 0$ $(172) 0$  | <pre>\271) Q (272) Q (272) Q (273) Q (274) Q (274) Q (275) Q (277) Q (277) Q (277) Q (277) Q (278) Q (277) G (279) G (279) G (279) G (280) G (280) G (281) 1E=G (281) 1E=G (282) G (282) G (28-3)</pre>  | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(294) 0<br>(295) 0<br>(295) 0<br>(295) 0<br>(297) 0<br>(298) 0<br>(299) 0<br>(299) 0  | $\begin{array}{cccc} (307) & 0 \\ (309) & 0 \\ (309) & 0 \\ (310) & 0.015 \\ (511) & 5E-5 \\ (312) & 0.052 \\ (312) & 1E-3 \\ (312) & 1E-3 \\ (315) & 0 \\ (315) & 0 \\ (315) & 1E-3 \\ (317) & 0 \\ (310) & 1E-3 \end{array}$  | (325) 0<br>(326) 1E-3<br>(323) 6E-3<br>(329) 0<br>(329) 0<br>(329) 0<br>(321) 9<br>(331) 9<br>(337) 9<br>(337) 9<br>(337) 5E-3<br>(375) 5E-3<br>(376) 5E-3  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| 91) 0<br>92) 0<br>93) 0<br>93) 0<br>95) 0<br>95) 0<br>95) 0<br>97) 0<br>98) 0<br>99) 0<br>00) 0<br>01) 0  | (109) 0 $(110) 0$ $(111) 0$ $(112) 0$ $(113) 6$ $(114) 0$ $(115) 6$ $(114) 0$ $(115) 0$ $(116) 0$ $(116) 0$ $(117) 0$ $(119) 0$ $(120) 0$   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(135) 0<br>(134) 0<br>(135) 0<br>(134) 0<br>(136) 0<br>(138) 0  | (145) 0 (146) 0 (147) 0 (149) 0 (150) 0 (151) 0 (152) 0 (152) 0 (152) 0 (153) 0 (155) 0 (155) 0              | (165) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(169) 0<br>(169) 0<br>(170) 0<br>(171) 0<br>(172) 0<br>(172) 0<br>(174) 0   | (271) Q<br>(272) Q<br>(273) Q<br>(273) Q<br>(274) Q<br>(275) Q<br>(275) Q<br>(277) | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(294) 0<br>(295) 0<br>(295) 0<br>(295) 0<br>(297) 0<br>(297) 0<br>(298) 0<br>(299) 0<br>(299) 0<br>(200) 0<br>(301) 0   | $\begin{array}{c} (307) & 0 \\ (309) & 0 \\ (309) & 0 \\ (310) & 0.015 \\ (511) & 5E-3 \\ (312) & 0.050 \\ (313) & 1E-3 \\ (314) & 1E-3 \\ (315) & 0 \\ (315) & 1E-3 \\ (317) & 0 \\ (318) & 1E-3 \\ (319) & 0 \end{array}$   | (325) 0<br>(326) 18-3<br>(327) 0<br>(323) 68-3<br>(324) 6<br>(324) 68-3<br>(324) 68-3<br>(325) 9<br>(334) 58-3<br>(325) 58-3<br>(325) 58-3<br>(337) 58-3  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| 91) 0<br>92) 0<br>93) 0<br>93) 0<br>95) 0<br>95) 0<br>95) 0<br>97) 0<br>97) 0<br>98) 0<br>99) 0<br>00) 0<br>00) 0<br>01) 0<br>00) 0<br>01) 0<br>002) 0  | $(109) 0 \\(110) 0 \\(111) 0 \\(112) 0 \\(112) 0 \\(113) 0 \\(114) 0 \\(115) 0 \\(116) 0 \\(116) 0 \\(117) 0 \\(118) 0 \\(118) 0 \\(119) 0 \\(120) 0 \\(121) 0 \\($ | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(134) 0<br>(135) 0<br>(135) 0<br>(136) 0<br>(136) 0<br>(138) 0<br>(138) 0   |  | (155) 0 $(155) 0$ $(155) 0$ $(155) 0$ $(157) 0$ $(157) 0$ $(169) 0$ $(169) 0$ $(170) 0$ $(171) 0$ $(172) 0$ $(172) 0$ $(174) 0$ $(175) 0$                                    | <pre>\271) Q (272) Q (272) Q (273) Q (274) Q (275) Q (275) Q (277) Q (277) Q (277) Q (278) Q (279) SE-3 (280) SE-3 (280) SE-3 (281) 1E-3 (282) Q (283) Q (284) QE-3</pre>  | $\begin{array}{c} (289) & 0 \\ (290) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \\ (293) & 0 \\ (295) & 0 \\ (295) & 0 \\ (297) & 0 \\ (297) & 0 \\ (298) & 0 \\ (299) & 0 \\ (300) & 0 \\ (301) & 0 \\ (302) & 0 \end{array}$ | (307) 0<br>(309) 0<br>(310) 0.015<br>(310) 0.015<br>(311) 5E-3<br>(312) 0.052<br>(313) 1E-3<br>(314) 1E-3<br>(315) 0<br>(315) 1E-3<br>(317) 0<br>(318) 1E-3<br>(319) 0<br>(320) 1E-3  | (325) 0<br>(326) 18-3<br>(327) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(331) 9<br>(332) 9<br>(334) 5E-3<br>(336) 5E-3<br>(338) 5E-3 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>95) 0<br>97) 0<br>97) 0<br>99) 0<br>00) 0<br>00) 0<br>00) 0<br>00) 0<br>00) 0<br>00) 0<br>00) 0<br>002) 0<br>003) 0            | (109) 0  (110) 0  (111) 0  (112) 0  (112) 0  (113) 0  (114) 0  (115) 0  (116) 0  (117) 0  (118) 0  (119) 0  (120) 0  (122) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(134) 0<br>(135) 0<br>(136) 0<br>(136) 0<br>(138) 0<br>(138) 0<br>(140) 0  |  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (271) Q<br>(272) Q<br>(273) Q<br>(273) Q<br>(274) Q<br>(275) Q<br>(275) Q<br>(277) | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(294) 0<br>(295) 0<br>(295) 0<br>(295) 0<br>(297) 0<br>(297) 0<br>(298) 0<br>(299) 0<br>(299) 0<br>(200) 0<br>(301) 0   | $\begin{array}{ccccc} (307) & 0 \\ (309) & 0 \\ (309) & 0 \\ (310) & 0.015 \\ (111) & 5E-3 \\ (312) & 0.052 \\ (313) & 1E-3 \\ (314) & 1E-3 \\ (315) & 0 \\ (315) & 0 \\ (315) & 1E-3 \\ (317) & 0 \\ (318) & 1E-3 \\ (317) & 0 \\ (321) & 0 \\ (321) & 0 \end{array}$      | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>95) 0<br>95) 0<br>97) 0<br>98) 0<br>98) 0<br>99) 0<br>000 0<br>000 0<br>001 0<br>001 0<br>001 0<br>000 0<br>000 0<br>000 0     |   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(135) 0<br>(134) 0<br>(135) 0<br>(135) 0<br>(136) 0<br>(137) 0<br>(138) 0<br>(139) 0<br>(141) 0   |  | (155) 0<br>(164) 0<br>(155) 0<br>(155) 0<br>(157) 0<br>(157) 0<br>(159) 0<br>(159) 0<br>(170) 0<br>(171) 0<br>(172) 0<br>(172) 0<br>(173) 0<br>(174) 0<br>(175) 0<br>(177) 0 | (271) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(275) 0<br>(275) 0<br>(275) 0, 0,021<br>(278) 0,021<br>(278) 0,021<br>(279) 5E-3<br>(280) 5E-3<br>(281) 1E-3<br>(281) 2E-3<br>(283) 0<br>(284) 2E-3<br>(285) 0   | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(294) 0<br>(295) 0<br>(295) 0<br>(297) 0<br>(297) 0<br>(297) 0<br>(298) 0<br>(297) 0<br>(297) 0<br>(301) 0<br>(302) 0<br>(303) 0  | $\begin{array}{cccc} (307) & 0 \\ (309) & 0 \\ (309) & 0 \\ (310) & 0.015 \\ (511) & 5E-5 \\ (312) & 0.052 \\ (313) & 1E-3 \\ (314) & 1E-3 \\ (315) & 0 \\ (316) & 1E-3 \\ (317) & 0 \\ (318) & 1E-3 \\ (319) & 0 \\ (320) & 1E-3 \\ (321) & 0 \\ (322) & 1E-3 \end{array}$ | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| 91) 0<br>92) 0<br>93) 0<br>93) 0<br>95) 0<br>95) 0<br>95) 0<br>97) 0<br>97) 0<br>97) 0<br>97) 0<br>98) 0<br>00) 0<br>00) 0<br>00) 0<br>00) 0<br>03) 0<br>104) 0<br>005) 0<br>106) 0<br>107) 0 | (109) 0  (110) 0  (111) 0  (112) 0  (112) 0  (113) 0  (114) 0  (115) 0  (116) 0  (117) 0  (118) 0  (119) 0  (120) 0  (122) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(134) 0<br>(135) 0<br>(136) 0<br>(136) 0<br>(138) 0<br>(138) 0<br>(140) 0  |  | (155) 0<br>(164) 0<br>(155) 0<br>(155) 0<br>(157) 0<br>(157) 0<br>(159) 0<br>(159) 0<br>(170) 0<br>(171) 0<br>(172) 0<br>(172) 0<br>(173) 0<br>(174) 0<br>(175) 0<br>(177) 0 | (271) 0<br>(272) 0<br>(273) 0<br>(274) 0<br>(275) 0<br>(275) 0<br>(275) 0, 0,021<br>(278) 0,021<br>(278) 0,021<br>(279) 5E-3<br>(280) 5E-3<br>(281) 1E-3<br>(281) 2E-3<br>(283) 0<br>(284) 2E-3<br>(285) 0   | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(293) 0<br>(295) 0<br>(295) 0<br>(297) 0<br>(297) 0<br>(297) 0<br>(298) 0<br>(298) 0<br>(299) 0<br>(300) 0<br>(301) 0<br>(302) 0  | $\begin{array}{ccccc} (307) & 0 \\ (309) & 0 \\ (309) & 0 \\ (310) & 0.015 \\ (111) & 5E-3 \\ (312) & 0.052 \\ (313) & 1E-3 \\ (314) & 1E-3 \\ (315) & 0 \\ (315) & 0 \\ (315) & 1E-3 \\ (317) & 0 \\ (318) & 1E-3 \\ (317) & 0 \\ (321) & 0 \\ (321) & 0 \end{array}$      | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |

.

.

.

| River | discharge | data | at | 12-hourly | intervals | for | Station: | 2ØA |
|-------|-----------|------|----|-----------|-----------|-----|----------|-----|
| 112   |           |      |    |           |           |     | Period : | 3   |

.

| Vaciable: VIS- | 4.vari (leng                     | th = 344)          |                       |  |                                       |                         |                    |                          |              |             |             |
|----------------|----------------------------------|--------------------|-----------------------|--|---------------------------------------|-------------------------|--------------------|--------------------------|--------------|-------------|-------------|
|                |                                  |                    |                       | ( 73) 0.083<br>( 74) 0.067<br>( 75) 0.066<br>( 74) 0.052<br>( 77) 0.052<br>( 79) 0.052<br>( 79) 0.046<br>( 80) 0.05<br>( 81) 0.04<br>( 82) 0.035<br>( 83) 0.03<br>( 84) 0.035<br>( 85) 0.03<br>( 86) 0.03<br>( 86) 0.03<br>( 88) 0.03<br>( 89) 0.03<br>( 89) 0.03<br>( 90) 0.025 |                                       | a1) 0.12                | 21 (               | 199) 0.083               | (217) 0.052  | (205) 0.296 | (253) 0.021 |
| 1) 0.00        | ( 19) 1E-3                       | ( 37) 0            | ( 55) 0.197           | ( 74) 0.067  | 1                                     | 8.) 0.1                 | 21 0               | 200) 0.08                | (218) 0.052  | (236) 0.214 | (254) 0.021 |
| 2) 0.015       | ( 20) <b>1</b> E-3               | ( 18) IE-3         | ( 36) (1.23           | ( 75) 0 045  | i                                     | a:) 0.10                | 01 C               | 2011 0.066               | ·(219) 0.052 | (237) 0.101 | (255) 0.021 |
| 3) 3E-3        | (21)9                            | (39)0              | ( 5/) 0.17/           | ( 76) 0.000  | 1                                     | 841 9                   |                    | 202) 0.07                | (220) 0.046  | (238) 0.066 | (256) 0.021 |
| 4) 1E-3        | (22) 9                           | ( 40) 1E-3         | ( 58) 2 1             | ( 73) 0.052  | , i                                   | 1851 0.08               | ടെ റ               | 2031 0.052               | (221) 0.04   | (239) 0.052 | (257) 0.021 |
| 5) 0           | ( 23) 3E-3                       | (41)0              | ( 59) 0.529           | ( 77) 0.032  | 2                                     | 1861 0.1                |                    | 204) 0.07                | (222) 0.04   | (240) 0.052 | (258) 0.017 |
| 6) 0           | ( 24) 1E-3                       | ( 42) <u>1</u> E⊐3 | ( 60) 0.295           | (78) 0.002   | , i                                   | 187) 0.10               | 01 <i>i</i>        | 205) 0.052               | (223) 0.04   | (241) 0.052 | (259) 0.03  |
| 7) 0           | ( 25) 1E-3                       | (43) 0             | ( 61) 0.197           | ( 777 0.040  |                                       | (88) 0.1                | 7 (                | 205) 5.8                 | (224) 0.04   | (242) 0.041 | 1260) 0.03  |
| 8) 1E-3        | ( 26) 1E-3                       | ( 44) 1E-J         | ( 62) 0 228           |  | · · · · · · · · · · · · · · · · · · · |                         | 97 1               | 2071 0.652               | (225) 0.04   | (243) 0.04  | (251) 0.03  |
| ( 9) 0.052     | ( 27) 1E-3                       | (45)Ú              | ( 63) 0.101           | ( 81) 0.04   | Y.                                    |                         | 97 1               |                          | (226) 0.04   | (244) 0.04  | (262) 0.03  |
| 10) 0.03       | ( <sup>1</sup> 28) 1 <b>E</b> -3 | (46)0              | ( 64) 0.19/           |  | 1                                     |                         | 147 (              | 2091 0.144               | (227) 0.03   | (245) 0.03  | (263) 0.00  |
| (11) 35-3      | ( 29) 1E-3                       | (47)0              | ( 65) 0.518           |  | , i                                   | 1711 011                |                    | 2101 0.163               | (228) 0.016  | (246) 0.00  | (264) 0.03  |
| (12) 3E-3      | ( 30) 1E-3                       | (48)0              | (66) 0.21             | (84) 0.035   | (                                     | 4727777<br>119777 11 11 | 10-7 L             | 2107 017                 | (229) 0.03   | (247) 0.03  | (255) 0.03  |
| (13) 18-3      | ( 31) 1E~3                       | ( 49) 2E-3         | ( 67) 0.144           | (85) 0.03  | · · ·                                 | 1901 O.1<br>1010 O.1    |                    | 2121 0.052               | (230) 0.036  | (248) 0.026 | (266) 0.03  |
| (14) 1E-3      | (32) 1E~3                        | (50) 2.31          | ( 68) 0.121           | ( 86) 0.0-   | l l                                   | 1941 014                | .70 (              | 2131 0 052               | (251) 0.01   | (249) 0.052 | (267) 0.021 |
| (15) 1E-3      | ( 33) 1E-3                       | ( 51) 0.374        | ( 69) 0.093           | ( 87) 0.03   |                                       | 195) U.I.               | . <del>7</del> / ( | 213) 0.032               | (0.32) 0.074 | (250) 0.04  | (268) 0.03  |
| (16) 1E-3      | ( 34) 1E-3                       | ( \$2) 4.37        | ( 70) 0,376           | ( 88) 0.03   | Y.                                    | 1981 0.1                | l∠1 (<br>DI (      | 214) 0.000               | (237) 0.04   | (251) 0.04  | (269) 0.021 |
| (17) 1E~3      | (35)0                            | ( 52) 0.953        | (71) 0.197            | (89) 0.03  | ç                                     | (97) U.I.               | - I (              | 2107 V-V04<br>9141 0 003 | (234) 0.144  | (252) 0.03  | (270) 0.00  |
| ( 1H) 1E-3     | ( 36) 15-3                       | ( \$4) 0.35        | $(-72)^{\circ}$ 0.121 | ( 90) 0,025  | ι                                     | 1481 A                  | ,                  | 216) 0.000               |              |             |             |
|                |                                  |                    |                       |  |                                       |                         |                    |                          |              |             |             |
|                |                                  |                    |                       | (142) 0.819<br>(144) 0.52<br>(145) 0.421<br>(155) 0.421<br>(155) 0.295<br>(167) 2.779<br>(168) 1.04<br>(169) 0.659<br>(170) 0.57<br>(171) 0.518<br>(172) 0.468<br>(172) 0.468  | -                                     | ······                  | 121 (              | 289) 5E~J                | (207) 0      | (325) 0     | (543) 0     |
| ( 91) 0.019    | (109) 3.411                      | (127) 0.121        | (145) 0.066           | (163) 0.317  | (                                     | 2727 010                | 15 (               | 2901 58-3                | (COB) 0      | (526) 0     | (344) Q     |
| ( 92) 0.018    | (110) 1.476                      | (128) 0.121        | (146) 0.05            | (164) 0.92   |                                       | 2727 0.0                | 22 (<br>119 (      | 2911 SE-3                |              | (727) 0     |             |
| ( 93) 0.015    | (111) 0.953                      | (129) + 0.101      | (147) 0.059           | (135) 0.421  | (                                     | 272) 0.0<br>2785 0.0    | AND (<br>AND 1     | 2921 BE-3                | (240) 0      | (328) 0     |             |
| ( 94) 0.013    | (112) 0.639                      | (1.30) 0, $101$    | (143) 0.052           | (155) (1.295   |                                       | 12797 VIV<br>12751 O O  | 515 C              | 293) 3E-3                | (311) 0      | (029) 0     |             |
| ( 95) 0.015    | (113) 0.572                      | (101) 9            | (149) 0.052           | (167) 2.779  | · · · · · · · · · · · · · · · · · · · |                         | 0.17 U             | 794) 4F-7                | (312) 0      | (330) 0     |             |
| ( 96) 0.016    | (114) 0.52                       | (132) 0.080        | (150) 0.052           | (168) 1-04   |                                       | 177) O.O                | 515 (              | 2951 38-7                | (313) 0      | (331) 0     | · .         |
| ( 97) 3.543    | (115) 0.468                      | (133) 0.083        | (151) 0.752           | (164) 0.854  |                                       | 2741 0.0                | u17 (              | 2961 SE-3                | (314) 0      | (002) 0     |             |
| ( 98) 0.012    | (116) 0.421                      | (134) 0.083        | (152) 0.335           | (170) 0.57   |                                       | 2791 0.0                | 021 (              | 297) 3E-3                | (315) 0      | (333) 0     |             |
| ( 99) 1,383    | (117) 0.376                      | (135) 0.066        | (153) 0.261           | (1/1) 0.510  |                                       | 2901 0 0                | 001 0              | 1981 TE-3                | (316) 9      | (354) 0     |             |
| (100) 0.689    | (118) 0.261                      | (136) 0.066        | (154) 0.82            | (172) 0.468  |                                       | 29(1) 0.0               | 0                  | 299) 5E-3                | (317) 0      | (335) 0     |             |
| (101) 0.518    | (119) 0.197                      | (12)) 0.000        | (155) 0.689           | (173) 0.296  |                                       | 2017 0.0                | 071                | (300) 3E-3               | (318) Ŭ      | (336) 0     |             |
| (102) 0.448    | (120) 0.197                      | (138) 0.066        | (156) 0.44            | (174) 0.17   |                                       | 2831 0.0                | 015 0              | 301) 5E-3                | (319) 0      | (337) 0     |             |
| (103) 4.812    | (121) 0.197                      | (139) 0.066        | (157) 0.335           | (175) 0.21   |                                       | 203, 010<br>2841 0      | ·                  | 302) 0                   | (320) 0      | (338) 0     |             |
| (104) 1.16     | (122) 0.17                       | (140) 0.066        | (158) 0.17            | (176) 0.23   |                                       | 285) 0 0                | 015                | 303) 38-3                | (321) 0      | (339) 0     |             |
| (105) 0.629    | (123) 0.17                       | (141) 0.066        | (159) 0.144           | (177) 0.17   |                                       | 2001 0.0<br>2001 0.0    | 015                | (304) 0                  | (322) 0      | (340) 0     |             |
| (106) 0.518    | (124) 0.159                      | (142) 0.066        | (160) 0.083           | (178) 0.17   | '                                     | -001 U.C                | _7                 | (305) 16-3               | (323) 0      | (341) 0     |             |
|                | (125) 0.121                      | (143) 0.066        | (161) 3.411           | (171) 0.518<br>(172) 0.468<br>(173) 0.296<br>(174) 0.17<br>(175) 0.21<br>(176) 0.23<br>(177) 0.17<br>(178) 0.17<br>(179) 0.17<br>(179) 0.121   |                                       | 2071 35-                | -3                 | (306) 48 5               | (324) 0      | (342) 0     |             |
| (108) 4.96     | (126) 0.121                      | (144) 0.06         | (162) 1.57            | (180) 0.121  |                                       | 200/ V.C                | 0.2.0              |                          |              |             |             |

•

#### River discharge data at 12-hourly intervals for Station: 20A 4 Period :

.

1

•

.

.

٠.

 $\tau = - e^{-1} \tau$ 

| Variable:   | VIS5.varl (  | length # 380)   |  |   |  | ~~~~~~~~~   |   |          |         |         |                 |
|---|--|---|--|---|--|---|---|----------|---------|---------|-----------------|
|   |  |   |  |   | ( 91) 0  | (21/) 0   | (205) 0   | (253) 0  | (271) Ú | (287) 0 | (207) 0         |
| (1)0  | (19)0  | (37) 0  | ( 95) Ŭ  | (74)0   | ( 92) 0  | (218) 0   | (275) 0   | (254) 0  | (272) Ø | (290) 0 | (30 <b>8)</b> 0 |
| (2)0  | (20) 0   | (28)0   | (56)0<br>(57)0   | (75)0   | (9;)0  | (219) 0   | (2007) 0  | (255) 0  | (27J) V | (291) 0 | (309) 0         |
| (3)0  | (21) 0   | ( 39) 0   | (57)0  | (76) 0  | (94)0  | (220) 0   | (208) 0   | (255) 0  | (274) 0 | (292) 0 | (310) 0         |
| (4)0  | (22) 0   | (40)0   |  | (77)0   | ( 95) 0  | (221) 0   | (239) 0   | (257) 0  | (275) Ú | (293) 0 | (311) 0         |
| (5)0  | (23)0  | (41)0   | (59)0  | (78) 0  | ( 96) 0  | (222) 0   | (240) 0   | (258) 0  | (276) 0 | (294) 0 | (312) 0         |
| (6)0  | ( 24) 0  | (42)0   | (60)0  | (79)0   | (97)0  | (223) 0   | (241) 0   | (259) 0  | (277) 0 | (295) 0 | (313) 0         |
| (7)0  | (25)0  | (43)0   | (မပ္) ပို  | • •   | ( 99) 0  | (224) 0   | (242) 0   | (260) 0  | (278) 0 | (296) 0 | (314) 0         |
| (8)0  | (26) 9   | ( 44) 0   | ( 62) 0  | (80)0   | (99)0  | (225) 0   | (247) 0   | (261) 0  | (279) 0 | (297) 0 | (315) 0         |
| (9)0  | (27)0  | ( 45) 0   | (63)0  | (81)0   |  | (226) 0   | (244) 0   | (262) 0  | (236) 0 | (298) 0 | (316) 0         |
| ( 10) 0   | (28)0  | (46)0   | ( 64) Ŭ  | ( 82) Ø   | (100) 0  | (227) 0   | (245) 0   | (263) 0  | (281) 0 | (299) 0 | (317) 0         |
| ( 11) 0   | (29) 0   | ( 47) 0   | ( 65) ジ  | (83)0   | (101) 0  |   | (246) 0   | (264) 0  | (202) 0 | (300) 0 | (313) 0         |
| (12)0   | ( 30) 0  | (48)0   | ( 66) 0  | (84)0   | (102) 0  | (228) 0   | (243) 0   | (265) 0  | (283) 0 | (301) 0 | (319) O         |
| (13)0   | (31)0  | (49)0   | ( 67) 0  | (35)0   | (103) 0  | (229) 0   |   | (265) 0  | (284) 0 | (302) 0 | (320) = 0       |
| (14)0   | (32)0  | (50) 0  | ( 68) 0  | (86)0   | (104) Q  | (230) 0   | (248) 0   | (267) 0  | (235) 0 | (203) 0 | (321) 0         |
| (15)0   | (33)0  | ( 51) 0   | ( 67) 0  | (87)0   | (165) 0  | (231) Q   | (249) 0   | •        | (286) 0 | (304) 0 | (322) 0         |
| (15)0   | (34)0  | ( 52) 5E3   | (70)0  | (88)0   | (106) 0  | (232) Ú   | (250) 0   | (266) 0  | (287) 0 | (305) 0 | (323) 0         |
|   | (35)0  | (53)0   | (71)0  | (87)0   | (107) 0  | (233) 0   | (251) 0   | (269) 0  |         | (305) 0 | (324) 0         |
| (17)0   |  |   | (72) 0   | ( 90) 0   | (108) 0  | (234) 0   | (252) 0   | (270) 0  | (293) 0 |         |                 |
| 1 10 3  | ( 34) 0  | ( 54) 0   |  |   |  |   |   | <i>~</i> |         |         |                 |
| (18)0   |  |   |  |   |  |   |   |          |         |         |                 |
| ( 18) 0   |  |   |  |   |  | (325) 0   | (343) 0   |          |         |         |                 |
| (18) 0  | (127) 0  | (145) 0   | (163) Ŭ  |   |  | (325) 0<br>(326) 0  | (343) 0<br>(344) 0  |          |         |         |                 |
| (18) 0<br>(109) 0<br>(110) 0  | (127) 0<br>(128) 0   | (145) 0<br>(145) 0  | (163) Ŭ<br>(164) Ŭ   | (181) Ó   | (199) ن  | (325) 0<br>(326) 0<br>(327) 0   | (343) 0<br>(344) 0<br>(345) 0   |          |         |         |                 |
| ( 18) 0<br>(109) 0<br>(110) 0<br>(111) 0  | (127) 0<br>(128) 0<br>(129) 0  | (145) 0<br>(145) 0<br>(147) 0   | (163) 0<br>(164) 0<br>(165) 0  | (181) 0<br>(182) 0  | (199) Ú<br>(200) Ú   | (325) 0<br>(526) 0<br>(327) 0<br>(729) 0  | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0  |          |         |         |                 |
| (18) 0<br>(109) 0<br>(110) 0<br>(111) 0<br>(112) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(123) 0   | (145) 0<br>(145) 0<br>(147) 0<br>(148) 0  | (163) 0<br>(164) 0<br>(165) 0<br>(155) 0   | (181) 0<br>(182) 0<br>(183) 0   | (199) J<br>(200) O<br>(201) O  | (325) 0<br>(326) 0<br>(327) 0   | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(345) 0   |          |         |         |                 |
| (19) 0<br>(109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0   | (127) 0<br>(128) 0<br>(129) 0<br>(129) 0<br>(130) 0<br>(130) 0   | (145) 0<br>(145) 0<br>(147) 0<br>(148) 0<br>(149) 0   | (163) 0<br>(164) 0<br>(165) 0<br>(155) 0<br>(155) 0<br>(157) 0   | (181) 0<br>(182) 0<br>(183) 0<br>(183) 0<br>(184) 0<br>(185) 0  | (199) 0<br>(200) 0<br>(201) 0<br>(202) 0   | (325) 0<br>(526) 0<br>(327) 0<br>(729) 0  | (343) 0<br>(344) 0<br>(345) 0<br>(346) 0<br>(147) 0<br>(349) 0  |          |         |         | 2               |
| (18) 0<br>(109) 0<br>(110) 0<br>(111) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(114) 0   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(130) 0<br>(131) 0<br>(132) 0  | (145) 0<br>(145) 0<br>(147) 0<br>(148) 0<br>(149) 0<br>(149) 0  | (163) 0<br>(164) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(168) 0  | (181) 0<br>(182) 0<br>(183) 0<br>(183) 0<br>(184) 0<br>(185) 0<br>(186) 0   | (199) 0<br>(200) 0<br>(201) 0<br>(202) 0<br>(202) 0<br>(203) 0   | (325) 0<br>(326) 0<br>(327) 0<br>(327) 0<br>(329) 0   | (343) 0<br>(344) 0<br>(345) 0<br>(346) 0<br>(346) 0<br>(346) 0<br>(346) 0   |          |         |         | <b>A</b> 3.     |
| (18) 0<br>(109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0  | $(145) 0 \\ (145) 0 \\ (147) 0 \\ (148) 0 \\ (149) 0 \\ (150) 0 \\ (151$  | (163) 0<br>(164) 0<br>(165) 0<br>(155) 0<br>(155) 0<br>(158) 0<br>(158) 0<br>(152) 0   | (181) 0<br>(182) 0<br>(183) 0<br>(183) 0<br>(184) 0<br>(185) 0<br>(185) 0<br>(187) 0  | (199) 0<br>(200) 0<br>(201) 0<br>(202) 0<br>(203) 0<br>(204) 0<br>(204) 0<br>(205) 0   | (325) 0<br>(726) 0<br>(729) 0<br>(729) 0<br>(329) 0<br>(329) 0  | (343) 0<br>(344) 0<br>(345) 0<br>(346) 0<br>(147) 0<br>(349) 0  |          |         |         | . 6             |
| (18) 0<br>(109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(116) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(130) 0<br>(131) 0<br>(133) 0<br>(133) 0<br>(134) 0  | (145) 0<br>(145) 0<br>(144) 0<br>(149) 0<br>(150) 0<br>(151) 0<br>(151) 0<br>(152) 0  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (181) 0<br>(182) 0<br>(182) 0<br>(183) 0<br>(183) 0<br>(184) 0<br>(186) 0<br>(186) 0  | (199) 0<br>(200) 0<br>(201) 0<br>(202) 0<br>(203) 0<br>(204) 0<br>(205) 0<br>(205) 0<br>(206) 0  | (325) 0<br>(326) 0<br>(327) 0<br>(327) 0<br>(329) 0<br>(329) 0<br>(320) 0<br>(331) 0  | (343) 0<br>(344) 0<br>(345) 0<br>(346) 0<br>(346) 0<br>(346) 0<br>(346) 0   |          |         |         | A3.61           |
| (18) 0<br>(109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(114) 0<br>(115) 0<br>(114) 0<br>(117) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(133) 0<br>(134) 0<br>(135) 0   | $(145) 0 \\ (145) 0 \\ (147) 0 \\ (148) 0 \\ (149) 0 \\ (150) 0 \\ (151) 0 \\ (151) 0 \\ (152) 0 \\ (152) 0 \\ (123) 0 $  | (163) 0<br>(164) 0<br>(165) 0<br>(155) 0<br>(157) 0<br>(158) 0<br>(158) 0<br>(159) 0<br>(170) 0<br>(171) 0   | (181) 0<br>(182) 0<br>(183) 0<br>(185) 0<br>(185) 0<br>(185) 0<br>(187) 0<br>(188) 0<br>(188) 0<br>(189) 0  | (199) 0<br>(200) 0<br>(201) 0<br>(202) 0<br>(203) 0<br>(204) 0<br>(205) 0<br>(205) 0<br>(206) 0<br>(206) 0   | (325) 0<br>(526) 0<br>(327) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(330) 0<br>(331) 0<br>(331) 0<br>(332) 0  | (343) 0<br>(744) 0<br>(744) 0<br>(744) 0<br>(744) 0<br>(744) 0<br>(749) 0<br>(749) 0<br>(751) 0<br>(751) 0<br>(751) 0   |          |         |         | . 6             |
| ( 18) 0<br>(109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(118) 0   | (127) 0<br>(128) 0<br>(129) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(134) 0<br>(135) 0<br>(136) 0  | $(145) 0 \\ (145) 0 \\ (145) 0 \\ (147) 0 \\ (148) 0 \\ (149) 0 \\ (150) 0 \\ (151) 0 \\ (151) 0 \\ (152) 0 \\ (153) 0 \\ (154$  | (163) 0<br>(164) 0<br>(165) 0<br>(155) 0<br>(156) 0<br>(157) 0<br>(158) 0<br>(158) 0<br>(157) 0<br>(170) 0<br>(171) 0<br>(172) 0   | (181) 0<br>(182) 0<br>(182) 0<br>(183) 0<br>(184) 0<br>(185) 0<br>(186) 0<br>(188) 0<br>(189) 0<br>(199) 0  | (199) 0<br>(200) 0<br>(201) 0<br>(202) 0<br>(202) 0<br>(203) 0<br>(204) 0<br>(205) 0<br>(206) 0<br>(207) 0<br>(207) 0<br>(208) 0   | (325) 0<br>(526) 0<br>(327) 0<br>(327) 0<br>(329) 0<br>(330) 0<br>(331) 0<br>(332) 0<br>(333) 0   | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(345) 0<br>(345) 0<br>(350) 0<br>(350) 0<br>(351) 0   |          |         |         | . 6             |
| ( 18) 0<br>(109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(118) 0<br>(119) 0   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(134) 0<br>(136) 0<br>(136) 0<br>(137) 0  | $(145) 0 \\ (145) 0 \\ (147) 0 \\ (148) 0 \\ (149) 0 \\ (150) 0 \\ (151) 0 \\ (151) 0 \\ (152) 0 \\ (153) 0 \\ (154) 0 \\ (155$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (181) 0<br>(182) 0<br>(183) 0<br>(183) 0<br>(184) 0<br>(185) 0<br>(186) 0<br>(187) 0<br>(188) 0<br>(189) 0<br>(190) 0<br>(190) 0  | (199) 0<br>(200) 0<br>(201) 0<br>(202) 0<br>(203) 0<br>(204) 0<br>(205) 0<br>(206) 0<br>(206) 0<br>(208) 0<br>(208) 0<br>(209) 0   | (325) 0<br>(326) 0<br>(327) 0<br>(327) 0<br>(327) 0<br>(329) 0<br>(330) 0<br>(331) 0<br>(333) 0<br>(333) 0<br>(334) 0   | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(346) 0<br>(346) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(353) 0<br>(353) 0                                  |          |         |         | . 6             |
| (18) 0<br>(109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(116) 0<br>(117) 0<br>(118) 0<br>(119) 0<br>(120) 0  | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(134) 0<br>(135) 0<br>(136) 0<br>(136) 0<br>(137) 0<br>(138) 0                       | $(145) 0 \\(145) 0 \\(144) 0 \\(149) 0 \\(149) 0 \\(150) 0 \\(151) 0 \\(151) 0 \\(152) 0 \\(153) 0 \\(154) 0 \\(155) 0 \\($                 | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(167) 0<br>(169) 0<br>(170) 0<br>(170) 0<br>(171) 0<br>(172) 0<br>(173) 0<br>(174) 0  | (181) 0<br>(182) 0<br>(182) 0<br>(183) 0<br>(185) 0<br>(184) 0<br>(186) 0<br>(187) 0<br>(188) 0<br>(189) 0<br>(199) 0<br>(191) 0<br>(192) 0   | (199) 0<br>(200) 0<br>(201) 0<br>(202) 0<br>(203) 0<br>(204) 0<br>(205) 0<br>(205) 0<br>(206) 0<br>(206) 0<br>(207) 0<br>(208) 0<br>(209) 0<br>(210) 0   | (325) 0<br>(526) 0<br>(327) 0<br>(329) 0<br>(339) 0<br>(330) 0<br>(331) 0<br>(331) 0<br>(333) 0<br>(333) 0<br>(333) 0   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |          |         |         | . 6             |
| (18) 0<br>(109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(118) 0<br>(119) 0<br>(120) 0<br>(121) 0                                   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(132) 0<br>(133) 0<br>(134) 0<br>(135) 0<br>(135) 0<br>(136) 0<br>(137) 0<br>(138) 0<br>(139) 0                       | $(145) 0 \\ (145) 0 \\ (147) 0 \\ (149) 0 \\ (150) 0 \\ (151) 0 \\ (151) 0 \\ (152) 0 \\ (152) 0 \\ (153) 0 \\ (154) 0 \\ (155) 0 \\ (155) 0 \\ (157) \\ (157) \\ (1$ | (163) 0(164) 0(165) 0(155) 0(156) 0(157) 0(158) 0(158) 0(159) 0(171) 0(172) 0(173) 0(174) 0(175) 0   | (181) 0<br>(182) 0<br>(182) 0<br>(185) 0<br>(185) 0<br>(186) 0<br>(187) 0<br>(188) 0<br>(187) 0<br>(189) 0<br>(197) 0<br>(197) 0<br>(192) 0<br>(193) 0                                  | (199) 0<br>(200) 0<br>(201) 0<br>(202) 0<br>(203) 0<br>(204) 0<br>(205) 0<br>(206) 0<br>(206) 0<br>(207) 0<br>(208) 0<br>(209) 0<br>(210) 0<br>(211) 0   | (325) 0<br>(526) 0<br>(527) 0<br>(729) 0<br>(329) 0<br>(330) 0<br>(331) 0<br>(333) 0<br>(333) 0<br>(333) 0<br>(335) 0<br>(336) 0<br>(336) 0   | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(346) 0<br>(346) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(353) 0<br>(353) 0                                  |          |         |         | . 6             |
| ( 18) 0<br>(109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(114) 0<br>(115) 0<br>(114) 0<br>(117) 0<br>(118) 0<br>(117) 0<br>(118) 0<br>(119) 0<br>(121) 0<br>(122) 0                       | (127) 0<br>(128) 0<br>(129) 0<br>(127) 0<br>(130) 0<br>(131) 0<br>(133) 0<br>(134) 0<br>(135) 0<br>(136) 0<br>(136) 0<br>(137) 0<br>(138) 0<br>(137) 0<br>(139) 0<br>(140) 0 | $(145) 0 \\(145) 0 \\(147) 0 \\(148) 0 \\(149) 0 \\(150) 0 \\(151) 0 \\(151) 0 \\(152) 0 \\(152) 0 \\(155) 0 \\(155) 0 \\(155) 0 \\(155) 0 \\(155) 0 \\(156) 0 \\(156) 0 \\(158) 0 \\($                 | $\begin{array}{c} (163) & 0 \\ (164) & 0 \\ (165) & 0 \\ (155) & 0 \\ (156) & 0 \\ (157) & 0 \\ (158) & 0 \\ (158) & 0 \\ (157) & 0 \\ (171) & 0 \\ (172) & 0 \\ (173) & 0 \\ (175) & 0 \\ (175) & 0 \\ (176) & 0 \end{array}$ | (181) 0<br>(182) 0<br>(182) 0<br>(183) 0<br>(184) 0<br>(185) 0<br>(186) 0<br>(187) 0<br>(189) 0<br>(199) 0<br>(190) 0<br>(191) 0<br>(192) 0<br>(193) 0<br>(194) 0                       | (199) 0<br>(200) 0<br>(201) 0<br>(202) 0<br>(203) 0<br>(204) 0<br>(205) 0<br>(206) 0<br>(206) 0<br>(206) 0<br>(207) 0<br>(208) 0<br>(209) 0<br>(210) 0<br>(211) 0<br>(212) 0                       | (325) 0<br>(326) 0<br>(327) 0<br>(329) 0<br>(329) 0<br>(330) 0<br>(331) 0<br>(331) 0<br>(333) 0<br>(333) 0<br>(335) 0<br>(335) 0<br>(336) 0<br>(336) 0                                  | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(345) 0<br>(345) 0<br>(346) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(353) 0<br>(353) 0<br>(355) 0                       |          |         |         | . 6             |
| ( 18) 0<br>(109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(117) 0<br>(118) 0<br>(119) 0<br>(120) 0<br>(121) 0<br>(122) 0<br>(123) 0            | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(132) 0<br>(133) 0<br>(133) 0<br>(134) 0<br>(135) 0<br>(136) 0<br>(136) 0<br>(137) 0<br>(138) 0<br>(139) 0<br>(140) 0<br>(140) 0 | (145) 0  (145) 0  (147) 0  (148) 0  (149) 0  (150) 0  (151) 0  (152) 0  (153) 0  (155) 0  (155) 0  (155) 0  (156) 0  (157) 0  (159) 0  (159) 0  (159) 0  (159) 0  (159) 0  (159) 0  (159) 0  (159) 0  (159) 0  (159) 0  (159) 0  (159) 0  (150  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (181) 0<br>(182) 0<br>(182) 0<br>(183) 0<br>(184) 0<br>(186) 0<br>(186) 0<br>(187) 0<br>(188) 0<br>(189) 0<br>(199) 0<br>(199) 0<br>(191) 0<br>(192) 0<br>(193) 0<br>(194) 0<br>(195) 0 | (199) 0<br>(200) 0<br>(201) 0<br>(202) 0<br>(203) 0<br>(204) 0<br>(205) 0<br>(206) 0<br>(206) 0<br>(206) 0<br>(207) 0<br>(208) 0<br>(209) 0<br>(210) 0<br>(211) 0<br>(212) 0<br>(213) 0            | (325) 0<br>(326) 0<br>(327) 0<br>(329) 0<br>(329) 0<br>(330) 0<br>(331) 0<br>(331) 0<br>(333) 0<br>(333) 0<br>(335) 0<br>(335) 0<br>(336) 0<br>(336) 0<br>(339) 0                       | (343) 0<br>(344) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(346) 0<br>(354) 0<br>(355) 0<br>(355) 0<br>(355) 0<br>(355) 0<br>(355) 0                                  |          |         |         | . 6             |
| ( 18) 0<br>(109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(118) 0<br>(117) 0<br>(120) 0<br>(121) 0<br>(122) 0<br>(123) 0<br>(124) 0 | (127) 0<br>(128) 0<br>(129) 0<br>(127) 0<br>(130) 0<br>(131) 0<br>(133) 0<br>(134) 0<br>(135) 0<br>(136) 0<br>(136) 0<br>(137) 0<br>(138) 0<br>(137) 0<br>(139) 0<br>(140) 0 | $(145) 0 \\(145) 0 \\(147) 0 \\(148) 0 \\(149) 0 \\(150) 0 \\(151) 0 \\(151) 0 \\(152) 0 \\(152) 0 \\(153) 0 \\(155) 0 \\(155) 0 \\(155) 0 \\(155) 0 \\(156) 0 \\(156) 0 \\(156) 0 \\(160) 0 \\($                 | (163) 0<br>(164) 0<br>(165) 0<br>(155) 0<br>(155) 0<br>(158) 0<br>(158) 0<br>(158) 0<br>(170) 0<br>(177) 0<br>(173) 0<br>(173) 0<br>(174) 0<br>(175) 0<br>(176) 0<br>(177) 0<br>(178) 0  | (181) 0<br>(182) 0<br>(182) 0<br>(183) 0<br>(183) 0<br>(184) 0<br>(185) 0<br>(186) 0<br>(187) 0<br>(188) 0<br>(197) 0<br>(190) 0<br>(197) 0<br>(197) 0<br>(197) 0<br>(195) 0<br>(196) 0 | (199) 0<br>(200) 0<br>(201) 0<br>(202) 0<br>(203) 0<br>(204) 0<br>(205) 0<br>(206) 0<br>(206) 0<br>(206) 0<br>(207) 0<br>(209) 0<br>(210) 0<br>(211) 0<br>(211) 0<br>(212) 0<br>(213) 0<br>(214) 0 | (325) 0<br>(326) 0<br>(327) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(330) 0<br>(331) 0<br>(333) 0<br>(335) 0<br>(335) 0<br>(335) 0<br>(336) 0<br>(337) 0<br>(339) 0<br>(339) 0<br>(339) 0 | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(346) 0<br>(349) 0<br>(349) 0<br>(351) 0<br>(351) 0<br>(352) 0<br>(355) 0<br>(355) 0<br>(356) 0<br>(357) 0<br>(358) 0 |          |         |         | . 6             |
| ( 18) 0<br>(109) 0<br>(110) 0<br>(111) 0<br>(112) 0<br>(112) 0<br>(113) 0<br>(114) 0<br>(115) 0<br>(114) 0<br>(115) 0<br>(116) 0<br>(117) 0<br>(118) 0<br>(119) 0<br>(120) 0<br>(121) 0<br>(122) 0<br>(123) 0 | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(132) 0<br>(133) 0<br>(133) 0<br>(134) 0<br>(135) 0<br>(136) 0<br>(136) 0<br>(137) 0<br>(138) 0<br>(139) 0<br>(140) 0<br>(140) 0 | (145) 0  (145) 0  (147) 0  (148) 0  (149) 0  (150) 0  (151) 0  (152) 0  (153) 0  (155) 0  (155) 0  (155) 0  (156) 0  (157) 0  (159) 0  (159) 0  (159) 0  (159) 0  (159) 0  (159) 0  (159) 0  (159) 0  (159) 0  (159) 0  (159) 0  (159) 0  (150  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (181) 0<br>(182) 0<br>(182) 0<br>(183) 0<br>(184) 0<br>(186) 0<br>(186) 0<br>(187) 0<br>(188) 0<br>(189) 0<br>(199) 0<br>(199) 0<br>(191) 0<br>(192) 0<br>(193) 0<br>(194) 0<br>(195) 0 | (199) 0<br>(200) 0<br>(201) 0<br>(202) 0<br>(203) 0<br>(204) 0<br>(205) 0<br>(206) 0<br>(206) 0<br>(206) 0<br>(207) 0<br>(208) 0<br>(209) 0<br>(210) 0<br>(211) 0<br>(212) 0<br>(213) 0            | (325) 0<br>(326) 0<br>(327) 0<br>(329) 0<br>(329) 0<br>(330) 0<br>(331) 0<br>(331) 0<br>(333) 0<br>(333) 0<br>(335) 0<br>(335) 0<br>(336) 0<br>(336) 0<br>(339) 0                       | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |          |         |         | . 6             |

•

.

.

## River discharge data at 12-hourly intervals for Station: 20A Period : 5

Phosphorus transport Berg River

.

.

.

.`

|  | 6.varl (leng  |   |   | (73) 0   | (181) 0.03   | (199) 0.065   |  | (275) 0.083  | (252) 0.051  |
|--|---|---|---|--|--|---|--|--|--|
| 1) 0   | ( 19) 1E-3  |   | ( 55) 0   |  | (182) 0.03   | (200) 0.066   | (218) 9  | (276) 0.066  | (254) 0.052  |
| 21 0   | ( 20) 4E-2  |   |   | (74) 0   | (183) 0.05   | (201) 0.065   | (217) 0.083  | (237) 0,067  | (255) 0.052  |
| 3) 0   | (21)0   |   | ( 37) 0   | (75)0  | (184) 2.48   | (202) 0.28  | (220) 0.085  | (238) 0.046  | (256) 0.03   |
| 4) 0   | (22)9   |   | (56) 🗘  | (76) 0   | (185) 0.121  | (203) 5.265   | (221) 0.083  | (239) 0.066  | (257) 0.03   |
| 510  |   | (41) 0  | ( 59) 1E-C  | (77) 0   | (186) 0.819  | (204) 1.475   | (222) 0.076  | (240) 0.066  | (258) 0.03   |
| 6) 0   | (24) 0  | (42)0   | ( 60) 1E-3  | (78)0  |  | (205) 0.752   | (223) 0.083  | (241) 0.065  | (259) 0.22   |
| 7).0   |   | (43) 0  | ( 61) 18-3  | ( 79) 0  | (187) 1.04   | (206) 0.572   | (224) 0.075  | (242) 0.066  | (260) 0.07   |
|  | (26) 0  | ( 44) 0   | ( 62) 1E-J  | (80)0  | (188) 0.572  | (208) 0.071<br>(207) 0.468  | (225) 0.07   | (247) 0.054  | (261) 0.29   |
| 8) 0   | (27) 0  | (45) 0  | ( 63) 1E-3  | (81)0  | (189) 0.336  |   | (206) 0.083  | (244) 0.052  | (252) 0.17   |
| 9)0  | 1 791 0   | 4451 0  | ( 64) 0   | (82)0<br>(63)0   | (190) 0,228  | (208) 0.425   | (007) 0 07   | (245) 0.052  | (253) 0.15   |
| 0) 0   | ( 20) 0   | (47) 0  | ( 55) 0   | (63)0  | (191) 0.17   | (209) 0.305   | (227) 0.07   | (246) 0,052  | (264) 0.14   |
| 1) 0   | (24) 0  | ( 49) 0   | (56)0   | (84)0  | (192) 0.12   | (210) 0.28  |  | (247) 0.052  | (265) 0.13   |
| 2) 0.04  | 1 30) 0   | ( 40) 0   | ( 67) 0   | (85)0  | (193) 0.121  | (211) 0.302   | (229) 0.032  | (248) 0.052  | (266) 0.12   |
| 3) 0.052   | ( 31) 0   | ( 477 V<br>( 861 G  | ( 68) 0   | (86) 0   | (194) 0.12   | (212) 0.223   | (200) 0.052  | (248) 0.002<br>(249) 0.052   | (267) 0.13   |
| 4) 0,021   | (32) 0  | ( 50) 0   | ( 69) 0   | (87) 9   | (195) 0.144  | (210) 0.197   | (231) 0.052  | (249) 0.002<br>(280) 0.080   | (268) 0.17   |
| 5) 5E-3  | (33)0   | (51) 0  | (70)0   | ( 88) 0.03   | (196) 0.12   | (214) 0.24  | (272) 0.052  | (250) 0.052  |  |
| 6) 1E-3  | (34)0   | ( 52) 0   | (70) 0  | ( 89) 48-3   | (197) Ŭ,Ŭ8   | (215) 0.228   | (213) 0.052  | (251) 0.052  |  |
| 7) 1E-S  | (35)0   | ( 55) 0   | ( 71) 0   | ( 90) 16-3   | (198) 0.074  | (216) 0.17  | (234) 0.083  | (252) 0.052  | (270) 0.00   |
|  | * <i>~*</i> - <b>*</b> -*-**  |   |   | ( 83) 0<br>( 84) 0<br>( 85) 0<br>( 85) 0<br>( 87) 9<br>( 88) 0.03<br>( 89) 4E-3<br>( 90) 1E-3  |  |   |  |  |  |
|  |   |   |   |  |  |   |  |  |  |
|  |   |   |   |  | -  |   |  |  | (343) 0  |
|  |   |   | (145) 0.121   |  | -  | (287) 9   | (307) 1E~3   | (325) 1E-3   | (343) 0<br>(344) 0   |
| <br>1) 1E-3  | (107) 0   |   | (145) 0.121<br>(145) 0.171  |  | -  | (287) 9<br>(290) 7  | (307) 1E~3<br>(308) 1E~3   |  | (343) 0<br>(344) 0<br>(345) 0  |
| 1) 1E-3<br>2) 1E-3   | (107) 0<br>(110) 0  | (127) 55-3  | (145) 0.121<br>(145) 0.151<br>(147) 0.965   |  | -  | (287) 9<br>(290) 7<br>(271) 9   | (307) 1E~3<br>(303) 1E~3<br>(309) 1E~3   | (325) 1E-3<br>(326) 1E-3   | (044) 9  |
| 1) 1E-3<br>2) 1E-3<br>3) 5E-3  | (107) 0<br>(110) 0<br>(111) 5E-3  | (127) 5E-3<br>(128) 4E-3  | (145) 0.121<br>(145) 0.121<br>(145) 0.121<br>(147) 0.952<br>(148) 1.125   |  | -  | (289) 9<br>(290) 9<br>(291) 9<br>(292) 9  | (307) 1E~3<br>(303) 1E~3<br>(305) 1E~3<br>(310) 1E~3   | (325) 4E-3<br>(326) 4E-3<br>(327) 0<br>(329) 0   | (344) O<br>(345) Q   |
| 1) 1E-3<br>2) 1E-3<br>3) SE-3<br>4) 0.121  | (107) 0<br>(110) 0<br>(111) 5E-3<br>(112) 0.03  | (127) 5E-3<br>(128) 4E-3<br>(129) 7E-3  | (145) 0.121<br>(145) 0.131<br>(147) 0.963<br>(148) 1.125<br>(149) 0.375   |  | -  | (287) 9<br>(290) 7<br>(291) 9<br>(292) 9<br>(293) 9<br>(293) 9  | (307) 1E~3<br>(303) 1E~3<br>(309) 1E~3<br>(310) 1E~3<br>(314) 1E~3   | (325) 1E-3<br>(326) 1E-3<br>(327) 0  | (344) 0<br>(345) 0<br>(346) 0  |
| 1) 1E-3<br>2) 1E-3<br>3) SE-3<br>4) 0.121<br>5) 0.03   | (107) 0<br>(110) 0<br>(111) 5E-3<br>(112) 0.03<br>(113) 7E-3  | (127) 5E-3<br>(128) 4E-3<br>(129) 7E-3<br>(120) 0.021   | (145) 0.121<br>(146) 0.131<br>(147) 0.963<br>(148) 1.125<br>(149) 0.375<br>(150) 0.185  |  | -  | (287) 9<br>(290) 9<br>(291) 9<br>(292) 9<br>(293) 9<br>(293) 9<br>(293) 5E-3  | (207) 1E-3<br>(303) 1E-3<br>(305) 1E-3<br>(316) 1E-3<br>(311) 1E-3<br>(312) 2E-3   | (325) 4E-3<br>(326) 4E-3<br>(327) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0  | (344) 0<br>(345) 0<br>(346) 0<br>(347) 0   |
| 1) 1E-3<br>2) 1E-3<br>3) SE-3<br>4) 0.121<br>5) 0.03<br>4) 9   | (107) 0<br>(110) 0<br>(111) 5E-3<br>(112) 0.03<br>(113) 7E-3<br>(114) 3E-3  | (127) 5E-3<br>(128) 4E-3<br>(129) 7E-3<br>(120) 7E-3<br>(120) 0.021<br>(121) 0.012  | (145) 0.121<br>(145) 0.131<br>(147) 0.963<br>(148) 1.125<br>(149) 0.375   |  | -  | (289) 9<br>(290) 9<br>(291) 9<br>(292) 9<br>(293) 9<br>(293) 9<br>(294) 55-3<br>(295) 55-3  | (507) 1E-3<br>(508) 1E-3<br>(509) 1E-3<br>(510) 1E-3<br>(514) 1E-3<br>(312) 2E-3<br>(312) 1E-3   | (325) 4E-3<br>(526) 4E-3<br>(527) 0<br>(529) 0<br>(529) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(341) 0  | (344) 0<br>(345) 0<br>(346) 0<br>(347) 0<br>(348) 9  |
| 1) 1E-3<br>2) 1E-3<br>3) 5E-3<br>4) 0.121<br>5) 0.03<br>4) 9<br>7) 5E-3  | (107) 0<br>(110) 0<br>(111) 5E-3<br>(112) 0.03<br>(112) 7E-3<br>(114) 3E-3<br>(114) 3E-3<br>(115) 0.24  | (127) 5E-3<br>(128) 4E-3<br>(129) 7E-3<br>(130) 0.021<br>(131) 0.012<br>(132) 9 -<br>(133) 0  | (145) 0.121<br>(146) 0.151<br>(147) 0.965<br>(148) 1.125<br>(149) 0.375<br>(150) 0.185<br>(151) 0.125<br>(152) 0.101  |  | -  | (287) 9<br>(290) 7<br>(291) 9<br>(292) 9<br>(293) 9<br>(293) 9<br>(295) 5E-3<br>(295) 5E-3<br>(295) 5E-3  | $\begin{array}{c} (507) & 1E - 3 \\ (508) & 1E - 3 \\ (508) & 1E - 3 \\ (516) & 1E - 3 \\ (516) & 1E - 3 \\ (312) & 2E - 3 \\ (312) & 2E - 3 \\ (313) & 1E - 3 \end{array}$  | (325) 4E-3<br>(526) 4E-3<br>(327) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(320) 0<br>(31) 0<br>(332) 0   | (344) 0<br>(345) 0<br>(346) 0<br>(348) 0<br>(348) 0<br>(349) 0   |
| 1) 1E-3<br>2) 1E-3<br>3) 5E-3<br>4) 0.121<br>5) 0.03<br>4) 9<br>7) 5E-3<br>8) 3E-3   | (107) 0<br>(110) 0<br>(111) 5E-3<br>(112) 0.03<br>(112) 7E-3<br>(114) 2E-3<br>(114) 2E-3<br>(115) 0.24<br>(116) 0.067   | (127) SE-3<br>(128) 4E-3<br>(129) 7E-3<br>(120) 0.021<br>(131) 0.012<br>(132) 9<br>(133) 0<br>(134) 3.677   | (145) 0.121<br>(145) 0.121<br>(147) 0.967<br>(148) 1.125<br>(149) 0.275<br>(150) 0.185<br>(151) 0.125   |  | -  | (287) 9<br>(290) 9<br>(291) 9<br>(292) 9<br>(293) 9<br>(293) 9<br>(295) 5E-3<br>(295) 5E-3<br>(297) 5E-3  | (307) 1E~3<br>(303) 1E~3<br>(305) 1E~3<br>(310) 1E~3<br>(314) 1E~3<br>(312) 2E~3<br>(312) 1E~3<br>(314) 1E~3<br>(315) 1E~3   | (325) 4E-3<br>(326) 4E-3<br>(327) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(332) 0<br>(333) 0                                  | (344) (0<br>(245) (0<br>(346) (0<br>(348) (0<br>(348) (0<br>(349) (0<br>(350) (0   |
| 1) 1E-3<br>2) 1E-3<br>3) 5E-3<br>4) 0.121<br>5) 0.03<br>4) 9<br>7) 5E-3<br>8) 3E-3<br>9) 1E-3  | (107) 0<br>(110) 0<br>(111) 5E-3<br>(112) 0.03<br>(113) 7E-3<br>(114) 3E-3<br>(114) 3E-3<br>(115) 0.24<br>(116) 0.047<br>(117) 0.04   | (127) 5E-3<br>(128) 4E-3<br>(129) 7E-3<br>(120) 7E-3<br>(120) 0.021<br>(121) 0.012<br>(132) 9 -<br>(135) 0<br>(134) 3.677<br>(135) 0.52                               | (145) 0.121<br>(146) 0.151<br>(147) 0.965<br>(148) 1.125<br>(149) 0.375<br>(150) 0.185<br>(151) 0.125<br>(152) 0.101  |  | -  | (289) 9<br>(290) 9<br>(291) 9<br>(292) 9<br>(293) 9<br>(293) 9<br>(295) 9<br>(295) 9<br>5<br>5<br>3<br>(295) 9<br>5<br>5<br>5<br>3<br>(297) 5<br>5<br>5<br>5<br>3<br>(298) 5<br>5<br>5<br>5<br>5<br>5<br>5<br>5 | (307) 1E~3<br>(303) 1E~3<br>(309) 1E~3<br>(310) 1E~3<br>(311) 1E~3<br>(312) 2E~3<br>(312) 2E~3<br>(313) 1E~3<br>(314) 1E~3<br>(315) 1E~3   | (325) 4E-3<br>(526) 4E-3<br>(327) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(320) 0<br>(341) 0<br>(332) 0<br>(333) 0<br>(334) 0                                  | (344) 0<br>(346) 0<br>(346) 0<br>(347) 0<br>(348) 0<br>(349) 0<br>(350) 0<br>(351) 0   |
| 1) 1E-3<br>2) 1E-3<br>3) 5E-3<br>4) 0.121<br>5) 0.03<br>4) 9<br>7) 5E-3<br>8) 3E-3<br>9) 1E-3<br>0) 1E-3   | (107) 0<br>(110) 0<br>(111) 5E-3<br>(112) 0.03<br>(113) 7E-3<br>(114) 2E-3<br>(115) 0.24<br>(115) 0.04<br>(116) 0.04<br>(117) 0.04  | (127) SE-3<br>(128) 4E-3<br>(129) 7E-3<br>(130) 0.021<br>(131) 0.012<br>(132) 9 .<br>(137) 0<br>(134) 3.677<br>(135) 0.52<br>(136) 0.24                               | (145) 0.121 (145) 0.121 (145) 0.121 (147) 0.962 (148) 1.125 (149) 0.275 (150) 0.185 (151) 0.125 (151) 0.101 (153) 0.083   |  | -  | (289) 9<br>(290) 9<br>(291) 9<br>(293) 9<br>(293) 9<br>(293) 9<br>(295) 5E-3<br>(295) 5E-3<br>(297) 5E-3<br>(298) 5E-3<br>(299) 5E-3  | $\begin{array}{c} (507) & 1E-3 \\ (503) & 1E-3 \\ (504) & 1E-3 \\ (516) & 1E-3 \\ (514) & 1E-3 \\ (512) & 2E-3 \\ (512) & 1E-3 \\ (514) & 1E-3 \\ (514) & 1E-3 \\ (516) & 1E-3 \\ (517) & 1E-3 \\ (517) & 1E-3 \\ \end{array}$ | (325) 4E-3<br>(326) 4E-3<br>(327) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(310) 0<br>(332) 0<br>(332) 0<br>(334) 0<br>(335) 0                                  | (345) 0<br>(346) 0<br>(348) 0<br>(348) 0<br>(348) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0  |
| 1) 1E-3<br>2) 1E-3<br>3) 5E-3<br>4) 0.121<br>5) 0.03<br>4) 0.121<br>5) 0.03<br>4) 0.123<br>8) 3E-3<br>8) 3E-3<br>9) 1E-3<br>0) 1E-3<br>1) 1E-3   |   | (127) 5E-3<br>(128) 4E-3<br>(129) 7E-3<br>(120) 0.021<br>(121) 0.012<br>(132) 9 -<br>(133) 0<br>(134) 3.677<br>(135) 0.52<br>(136) 0.24<br>(137) 0.156                | (145) 0.121 (146) 0.171 (147) 0.965 (148) 1.125 (149) 0.778 (150) 0.185 (151) 0.125 (151) 0.101 (152) 0.101 (153) 0.083 (154) 0.047   |  | -  | (287) 9<br>(290) 7<br>(291) 9<br>(292) 9<br>(293) 9<br>(293) 9<br>(295) 5E-3<br>(295) 5E-3<br>(295) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(298) 5E-3  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (325) 4E-3<br>(326) 4E-3<br>(327) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(320) 0<br>(34) 0<br>(334) 0<br>(335) 0<br>(335) 0<br>(336) 0                        | (345) 0<br>(346) 0<br>(347) 0<br>(348) 9<br>(348) 9<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(352) 0   |
| 1) 1E-3<br>2) 1E-3<br>3) 5E-3<br>4) 0.121<br>5) 0.03<br>4) 9<br>7) 5E-3<br>8) 2E-3<br>8) 2E-3<br>9) 1E-3<br>10) 1E-3<br>11) 1E-3<br>12) 0  | (109) 0<br>(110) 0<br>(111) 5E-3<br>(112) 0.03<br>(112) 7E-3<br>(114) 2E-3<br>(114) 2E-3<br>(115) 0.24<br>(115) 0.047<br>(117) 0.04<br>(118) 0.04<br>(119) 0.03<br>(120) 0.03 | (127) 5E-3<br>(128) 4E-3<br>(129) 7E-3<br>(120) 0.021<br>(131) 0.012<br>(132) 9 -<br>(133) 0<br>(134) 3.677<br>(135) 0.52<br>(136) 0.24<br>(137) 0.156<br>(138) 0.101 | $(145) 0.121 (145) 0.121 (147) 0.967 (148) 1.125 (149) 0.275 (150) 0.135 (151) 0.125 (152) 0.101 (153) 0.063 (154) 0.054 (155) 0.058 (156) 0.052 \\(15$ | $\begin{array}{c} (163) \ 0.57 \\ (154) \ 0.23 \\ (165) \ 0.14 \\ (166) \ 0.101 \\ (167) \ 0.06 \\ (156) \ 0.055 \\ (170) \ 0.052 \\ (171) \ 0.04 \\ (172) \ 0.03 \\ (174) \ 0.03 \end{array}$ | $\begin{array}{c} (271) & 0.066 \\ (272) & 0.066 \\ (272) & 0.062 \\ (273) & 0.052 \\ (274) & 0.052 \\ (275) & 0.04 \\ (275) & 0.04 \\ (277) & 0.04 \\ (277) & 0.04 \\ (273) & 0.03 \\ (297) & 0.03 \\ (280) & 0.03 \\ (281) & 0.021 \\ (292) & 0.021 \\ (292) & 0.021 \\ (292) & 0.021 \end{array}$ | (289) 9<br>(290) 9<br>(291) 9<br>(292) 9<br>(293) 9<br>(293) 9<br>(295) 5E-3<br>(295) 5E-3<br>(296) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(299) 3E-3                                  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (325) 4E-3<br>(326) 4E-3<br>(327) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(332) 0<br>(333) 0<br>(334) 0<br>(335) 0<br>(336) 0<br>(337) 0 | (345) 0<br>(346) 0<br>(346) 0<br>(347) 0<br>(348) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(352) 0<br>(353) 0<br>(355) 0   |
| 1) 1E-3<br>2) 1E-3<br>3) 5E-3<br>4) 0.121<br>5) 0.03<br>4) 9<br>7) 5E-3<br>8) 2E-3<br>8) 2E-3<br>9) 1E-3<br>10) 1E-3<br>11) 1E-3<br>12) 0  | (109) 0<br>(110) 0<br>(111) 5E-3<br>(112) 0.03<br>(112) 7E-3<br>(114) 2E-3<br>(114) 2E-3<br>(115) 0.24<br>(115) 0.047<br>(117) 0.04<br>(118) 0.04<br>(119) 0.03<br>(120) 0.03 | (127) 5E-3<br>(128) 4E-3<br>(129) 7E-3<br>(120) 0.021<br>(131) 0.012<br>(132) 9 -<br>(133) 0<br>(134) 3.677<br>(135) 0.52<br>(136) 0.24<br>(137) 0.156<br>(138) 0.101 | $(145) 0.121 (145) 0.121 (147) 0.967 (148) 1.125 (149) 0.275 (150) 0.135 (151) 0.125 (152) 0.101 (153) 0.063 (154) 0.054 (155) 0.058 (156) 0.052 \\(15$ | $\begin{array}{c} (163) \ 0.57 \\ (154) \ 0.23 \\ (165) \ 0.14 \\ (166) \ 0.101 \\ (167) \ 0.06 \\ (156) \ 0.055 \\ (170) \ 0.052 \\ (171) \ 0.04 \\ (172) \ 0.03 \\ (174) \ 0.03 \end{array}$ | $\begin{array}{c} (271) & 0.066 \\ (272) & 0.066 \\ (272) & 0.062 \\ (273) & 0.052 \\ (274) & 0.052 \\ (275) & 0.04 \\ (275) & 0.04 \\ (277) & 0.04 \\ (277) & 0.04 \\ (273) & 0.03 \\ (297) & 0.03 \\ (280) & 0.03 \\ (281) & 0.021 \\ (292) & 0.021 \\ (292) & 0.021 \\ (292) & 0.021 \end{array}$ | (289) 9<br>(290) 9<br>(291) 9<br>(292) 9<br>(293) 9<br>(293) 9<br>(295) 5E-3<br>(295) 5E-3<br>(296) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(299) 3E-3                                  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (325) 4E-3<br>(326) 4E-3<br>(327) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(332) 0<br>(333) 0<br>(334) 0<br>(335) 0<br>(336) 0<br>(337) 0 | (345) 0<br>(346) 0<br>(346) 0<br>(347) 0<br>(348) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(352) 0<br>(353) 0<br>(355) 0   |
| (1) 1E-3<br>(2) 1E-3<br>(3) 5E-3<br>(4) 0.121<br>(5) 0.03<br>(4) 9<br>(7) 5E-3<br>(6) 2E-3<br>(6) 1E-3<br>(6) 1E-3<br>(6) 1E-3<br>(6) 1E-3<br>(6) 1E-3<br>(7) 1E-3 | (109) 0<br>(110) 0<br>(111) 5E-3<br>(112) 0.03<br>(112) 7E-3<br>(114) 2E-3<br>(114) 2E-3<br>(115) 0.24<br>(115) 0.047<br>(117) 0.04<br>(118) 0.04<br>(119) 0.03<br>(120) 0.03 | (127) 5E-3<br>(128) 4E-3<br>(129) 7E-3<br>(120) 0.021<br>(131) 0.012<br>(132) 9 -<br>(133) 0<br>(134) 3.677<br>(135) 0.52<br>(136) 0.24<br>(137) 0.156<br>(138) 0.101 | $(145) 0.121 (145) 0.121 (147) 0.967 (148) 1.125 (149) 0.275 (150) 0.135 (151) 0.125 (152) 0.101 (153) 0.063 (154) 0.054 (155) 0.058 (156) 0.052 \\(15$ | $\begin{array}{c} (163) \ 0.57 \\ (154) \ 0.23 \\ (165) \ 0.14 \\ (166) \ 0.101 \\ (167) \ 0.06 \\ (156) \ 0.055 \\ (170) \ 0.052 \\ (171) \ 0.04 \\ (172) \ 0.03 \\ (174) \ 0.03 \end{array}$ | $\begin{array}{c} (271) & 0.066 \\ (272) & 0.066 \\ (272) & 0.062 \\ (273) & 0.052 \\ (274) & 0.052 \\ (275) & 0.04 \\ (275) & 0.04 \\ (277) & 0.04 \\ (277) & 0.04 \\ (273) & 0.03 \\ (297) & 0.03 \\ (280) & 0.03 \\ (281) & 0.021 \\ (292) & 0.021 \\ (292) & 0.021 \\ (292) & 0.021 \end{array}$ | (289) 9<br>(290) 9<br>(291) 9<br>(292) 9<br>(293) 9<br>(293) 9<br>(295) 5E-3<br>(295) 5E-3<br>(296) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(299) 3E-3                                  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (325) 4E-3<br>(326) 4E-3<br>(327) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(332) 0<br>(333) 0<br>(334) 0<br>(335) 0<br>(336) 0<br>(337) 0 | (345) 0<br>(346) 0<br>(346) 0<br>(347) 0<br>(348) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(353) 0<br>(354) 0<br>(355) 0   |
| (1) 1E-3<br>(2) 1E-3<br>(3) 5E-3<br>(4) 0.121<br>(5) 0.03<br>(4) 9<br>(7) 5E-3<br>(6) 2E-3<br>(6) 1E-3<br>(6) 1E-3<br>(6) 1E-3<br>(6) 1E-3<br>(6) 1E-3<br>(7) 1E-3 | (109) 0<br>(110) 0<br>(111) 5E-3<br>(112) 0.03<br>(112) 7E-3<br>(114) 2E-3<br>(114) 2E-3<br>(115) 0.24<br>(115) 0.047<br>(117) 0.04<br>(118) 0.04<br>(119) 0.03<br>(120) 0.03 | (127) 5E-3<br>(128) 4E-3<br>(129) 7E-3<br>(120) 0.021<br>(131) 0.012<br>(132) 9 -<br>(133) 0<br>(134) 3.677<br>(135) 0.52<br>(136) 0.24<br>(137) 0.156<br>(138) 0.101 | $(145) 0.121 (145) 0.121 (147) 0.967 (148) 1.125 (149) 0.275 (150) 0.135 (151) 0.125 (152) 0.101 (153) 0.063 (154) 0.054 (155) 0.058 (156) 0.052 \\(15$ | $\begin{array}{c} (163) \ 0.57 \\ (154) \ 0.23 \\ (165) \ 0.14 \\ (166) \ 0.101 \\ (167) \ 0.06 \\ (156) \ 0.055 \\ (170) \ 0.052 \\ (171) \ 0.04 \\ (172) \ 0.03 \\ (174) \ 0.03 \end{array}$ | $\begin{array}{c} (271) & 0.066 \\ (272) & 0.066 \\ (272) & 0.062 \\ (273) & 0.052 \\ (274) & 0.052 \\ (275) & 0.04 \\ (275) & 0.04 \\ (277) & 0.04 \\ (277) & 0.04 \\ (273) & 0.03 \\ (297) & 0.03 \\ (280) & 0.03 \\ (281) & 0.021 \\ (292) & 0.021 \\ (292) & 0.021 \\ (292) & 0.021 \end{array}$ | (289) 9<br>(290) 9<br>(291) 9<br>(292) 9<br>(293) 9<br>(293) 9<br>(295) 5E-3<br>(295) 5E-3<br>(296) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(299) 3E-3                                  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (325) 4E-3<br>(326) 4E-3<br>(327) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(332) 0<br>(333) 0<br>(334) 0<br>(335) 0<br>(336) 0<br>(337) 0 | (345) 0<br>(346) 0<br>(346) 0<br>(347) 0<br>(348) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(353) 0<br>(354) 0<br>(355) 0   |
| 21) 1E-3<br>22) 1E-3<br>23) 5E-3<br>24) 0.121<br>25) 0.03<br>24) 9<br>27] 5E-3<br>28) 2E-3<br>29) 1E-3<br>20) 1E-3<br>21) 1E-3<br>22) 1E-3<br>23) 1E-3<br>24) 1E-3<br>24) 1E-3<br>25] 1E-3<br>26] 1E-3 | (109) 0<br>(110) 0<br>(111) 5E-3<br>(112) 0.03<br>(112) 7E-3<br>(114) 2E-3<br>(114) 2E-3<br>(115) 0.24<br>(115) 0.047<br>(117) 0.04<br>(118) 0.04<br>(119) 0.03<br>(120) 0.03 | (127) 5E-3<br>(128) 4E-3<br>(129) 7E-3<br>(120) 0.021<br>(131) 0.012<br>(132) 9 -<br>(133) 0<br>(134) 3.677<br>(135) 0.52<br>(136) 0.24<br>(137) 0.156<br>(138) 0.101 | $(145) 0.121 (145) 0.121 (147) 0.967 (148) 1.125 (149) 0.275 (150) 0.135 (151) 0.125 (152) 0.101 (153) 0.063 (154) 0.054 (155) 0.058 (156) 0.052 \\(15$ |  | $\begin{array}{c} (271) & 0.066 \\ (272) & 0.066 \\ (272) & 0.062 \\ (273) & 0.052 \\ (274) & 0.052 \\ (275) & 0.04 \\ (275) & 0.04 \\ (277) & 0.04 \\ (277) & 0.04 \\ (273) & 0.03 \\ (297) & 0.03 \\ (280) & 0.03 \\ (281) & 0.021 \\ (292) & 0.021 \\ (292) & 0.021 \\ (292) & 0.021 \end{array}$ | (289) 9<br>(290) 9<br>(291) 9<br>(292) 9<br>(293) 9<br>(293) 9<br>(295) 5E-3<br>(295) 5E-3<br>(296) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(298) 5E-3<br>(299) 3E-3                                  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (325) 4E-3<br>(326) 4E-3<br>(327) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(329) 0<br>(332) 0<br>(333) 0<br>(334) 0<br>(335) 0<br>(336) 0<br>(337) 0 | $\begin{array}{c} (345) & 0 \\ (346) & 0 \\ (346) & 0 \\ (347) & 0 \\ (348) & 0 \\ (349) & 0 \\ (359) & 0 \\ (351) & 0 \\ (355) & 0 \\ (355) & 0 \\ (355) & 0 \end{array}$ |

TR 143 March 1989

|  | ELVL1.var1 (   |  |   |  | (181) 0.05  | (199) 0.34   | (217) 0.43  | (235) 0.19  | (253) 0.07   |
|--|--|--|---|--|---|--|---|---|--|
| 1) 0.64  | ( 19) 0.64   | ( 37) 0.4  | ( 55) 0.4   | ( 72) 0.16   | (181) 0.05  | (200) 0.34   | (218) 0.40  | (236) 0.19  | (254) 0.0.   |
| 2) 0.64  | (20) 0.64  | (38)0.4  | ( 55) 0.4   | (74) 0.16  | (183) 0.05  | (201) 0.43   | (219) 0.43  | (237) 0.19  | (255) 0.07   |
| 3) 0.64  | (21) 0.64  | ( 39) 0.4  | ( 57) 0.16  | ( 75) 0.16   |   | (202) 0.43   | (220) 0.43  | (238) 0.19  | (256) 0.03   |
| 4) 0.64  | ( 22) 0.64   | (40)0.4  | ( 58) 0.16  | (76) 0.16  | (184) 0.05  | (203) 0.43   | (221) 0.45  | (239) 0.19  | (257) 0.07   |
| 5) 0.64  | (23) 0.64  | (41)0.4  | ( 59) 0.16  | (77) 0.16  | (185) 0.05  | (204) 0.40   | (222) 0.45  | (240) 0.19  | (258) 0.0  |
| 6) 0.54  | ( 24) 0.64   | (42) 0.4   | ( 60) 0.16  | (73) 0.16<br>(75) 0.16   | (186) 0.05  |  | (223) 0.43  | (241) 0.19  | (259) 0.0.   |
| 7) 0.64  | (25) 0.64  | (43)0.4  | ( 61) 0.16  | •  |   | (205) 0.43   | (224) 0.43  | (242) 0.19  | (260) 0.0  |
| 8) 0.64  | (26) 0.64  | (44) 0.4   | ( 62) 0.16  | ( 80) 0.16   | (188) 0.05  | (206) 0.47   | (225) 0.19  | (243) 0.19  | (261) 0.03   |
| 9) 0.64  | (27) 0.64  | ( 45) 0.4  | ( 63) 0.16  | (81)0.16   | (189) 0.05  | (207) 0.40   | (225) 0.19<br>(226) 0.19  | (244) 0.19  | (262) 0.0  |
| 10) 0.44   | (28) 0.64  | (46) 0.4   | ( 64) 0.15  | ( 32) 0.16   | (190) 0.05  | (208) 0.43   |   | (245) 0.19  | (263) 0.03   |
| 11) 0.64   | (29) 0.4   | (47) 0.4   | ( 65) 0.16  | ( 83) 0.07   | (191) 0.05  | (209) 0.45   | (227) 0,19  | (246) 0.19  | (264) 0.0  |
| 12) 0.64   | ( 30) 0.4  | ( 48) 0.4  | ( 66) (0.16   | ( 84) 0.07   | (192) 0.05  | (210) 0.43   | (228) 0.19  | (243) 0.17<br>(247) 0.19  | (265) 0.0  |
| 13) 0.64   | (31) 0.4   | ( 49) 0.4  | ( 67) 0.16  | ( B5) 0.07   | (193) 0.05  | (211) 0.43   | (229) 0.19  |   | (266) 0.0  |
| 14) 0.64   | ( 32) 0.4  | ( 50) 0.4  | (68) 0.16   | ( 35) 0.07   | (194) 0.05  | (212) 0.40   | (230) 0.19  | (248) 0.19  | (267) 0.0  |
| 15) 0.64   | ( 33) 0.4  | ( 51) 0.4  | ( 69) 0.16  | ( 87) 0.07   | (145) 0.05  | (213) 0.45   | (231) 0.19  | (249) 0.19  | (268) 0.0  |
| 16) 0.64   | ( 34) 0.4  | (52) 0.4   | (70) 0.16   | ( 68) 0.07   | (196) 0.05  | (214) 0.43   | (232) 0.19  | (250) 0.19  | (257) 0.0  |
| 17) 0.64   | (35)0.4  | ( 53) 0.4  | ( 71) 0.16  | ( 87) 0.07   |   | (215) 0.40   | (233) 0.19  | (251) 0.19  | (237) 0.0<br>(270) 0.0   |
| 18) 0.54   | (36)0.4  | ( 54) 0.4  | ( 72) 0.15  | ( 90) 0.07   | (198) 0.432   | (216) 0.43   | (204) 0.19  | (252) 0.19  |  |
|  |  |  |   |  |   |  |   |   |  |
|  |  |  |   |  | . <b>-</b>  |  |   |   |  |
|  |  |  |   | ,  | . <b>-</b>  | (289) 0.05   | (307) 0,05  | (325) 0.16  | (343) 1.1  |
|  | (109) 0.07   | (127) 0.34   | (145) 0.32  |  | · •   |  | (307) 0.05<br>(308) 0.05  | (325) 0.16<br>(326) 0.16  | (343) 1.1<br>(344) 1.1   |
| <b>71)</b> 0.07<br>72) 0.07  | (109) 0.07<br>(110) 9.07   | (127) 0.34<br>(128) 0.34   | (145) 0.32<br>(146) 0.32  | (163) 0.32<br>(164) 0.32   | (271) 0.07  | (289) 0.05   | (307) 0.05<br>(309) 0.05<br>(309) 0.16  | (325) 0.16<br>(326) 0.16<br>(327) 0.16  | (343) 1.1<br>(344) 1.1<br>(345) 1.1  |
| 91) 0.07<br>92) 0.07<br>93) 0.07   | (109) 0.07<br>(110) 0.07<br>(111) 0.07   | (127) 0.34<br>(128) 0.34<br>(129) 0.34   | (145) 0.32<br>(146) 0.32<br>(147) 0.32  | (162) 0.32   | (271) 0.07<br>(272) 0.07  | (287) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(292) 0.05   | (307) 0.05<br>(309) 0.05<br>(309) 0.16<br>(310) 0.16  | (325) 0.16<br>(326) 0.16<br>(327) 0.16<br>(329) 0.16  | (343) 1.1<br>(344) 1.1<br>(343) 1.1<br>(346) 1.1   |
| 71) 0.07<br>72) 0.07<br>73) 0.07<br>73) 0.07<br>74) 0.07   | (109) 0.07<br>(110) 0.07<br>(111) 0.07<br>(112) 0.07   | (127) 0.34<br>(128) 0.34<br>(129) 0.34<br>(130) 0.34   | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(148) 0.32  | (163) 0.32<br>(164) 0.32<br>(165) 0.32<br>(155) 0.32   | (271) 0.07<br>(272) 0.07<br>(273) 0.07  | (289) 0.05<br>(290) 0.05<br>(291) 0.05   | $\begin{array}{c} (307) & 0.05 \\ (308) & 0.05 \\ (309) & 0.16 \\ (310) & 0.16 \\ (311) & 0.16 \end{array}$   | (325) 0.16<br>(326) 0.16<br>(527) 0.16<br>(328) 0.16<br>(329) 0.16  | (343) 1.1<br>(344) 1.1<br>(343) 1.1<br>(346) 1.1<br>(346) 1.1  |
| 71) 0.07<br>72) 0.07<br>73) 0.07<br>73) 0.07<br>74) 0.07<br>75) 0.07   | (109) 0.07<br>(110) 0.07<br>(111) 0.07<br>(112) 0.07<br>(113) 0.34   | (127) 0.34<br>(128) 0.34<br>(129) 0.34<br>(130) 0.34<br>(131) 0.34   | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(147) 0.32<br>(149) 0.32  | (163) 0.32<br>(164) 0.32<br>(165) 0.32   | (271) 0.07<br>(272) 0.07<br>(273) 0.07<br>(273) 0.07<br>(274) 0.07  | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(293) 0.05<br>(293) 0.05<br>(294) 0.05   | (307) 0.05<br>(308) 0.05<br>(309) 0.16<br>(310) 0.16<br>(311) 0.16<br>(312) 0.16  | (325) 0.16<br>(326) 0.16<br>(527) 0.16<br>(328) 0.16<br>(329) 0.16<br>(329) 0.16  | (343) 1.1<br>(344) 1.1<br>(345) 1.1<br>(346) 1.1<br>(347) 1.1<br>(348) 1.1   |
| 71) 0.07<br>72) 0.07<br>73) 0.07<br>74) 0.07<br>75) 0.07<br>75) 0.07   | (109) 0.07<br>(110) 0.07<br>(111) 0.07<br>(112) 0.07<br>(113) 0.34<br>(114) 0.34   | (127) 0.34<br>(128) 0.34<br>(129) 0.34<br>(130) 0.34<br>(131) 0.34<br>(132) 0.34   | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(148) 0.32<br>(148) 0.32<br>(150) 0.32  | (167) 0.32<br>(164) 0.32<br>(165) 0.32<br>(165) 0.32<br>(167) 0.32   | (271) 0.07<br>(272) 0.07<br>(273) 0.07<br>(273) 0.07<br>(274) 0.07<br>(275) 0.07  | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(292) 0.05<br>(294) 0.05<br>(295) 0.05   | $\begin{array}{c} (307) & 0.05 \\ (309) & 0.16 \\ (310) & 0.16 \\ (311) & 0.16 \\ (312) & 0.16 \\ (312) & 0.16 \\ (313) & 0.16 \end{array}$   | (325) 0.16<br>(326) 0.16<br>(527) 0.16<br>(329) 0.16<br>(329) 0.16<br>(330) 0.15<br>(331) 0.16  | (343) 1.1<br>(344) 1.1<br>(345) 1.1<br>(346) 1.1<br>(346) 1.1<br>(347) 1.1<br>(348) 1.1<br>(349) 1.1   |
| 91) 0.07<br>92) 0.07<br>93) 0.07<br>93) 0.07<br>95) 0.07<br>95) 0.07<br>95) 0.07   | (109) 0.07<br>(110) 0.07<br>(111) 0.07<br>(112) 0.07<br>(113) 0.34<br>(114) 0.34<br>(115) 0.34   | (127) 0.34<br>(128) 0.34<br>(129) 0.34<br>(130) 0.34<br>(131) 0.34<br>(132) 0.34<br>(133) 0.34   | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(147) 0.32<br>(149) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.33  | (167) 0.32(164) 0.32(165) 0.32(165) 0.32(167) 0.32(153) 0.32(153) 0.32(169) 0.32   | (271) 0.07<br>(272) 0.07<br>(273) 0.07<br>(273) 0.07<br>(274) 0.07<br>(275) 0.07<br>(276) 0.07  | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(293) 0.05<br>(293) 0.05<br>(294) 0.05   | $\begin{array}{c} (307) & 0.05 \\ (308) & 0.05 \\ (309) & 0.16 \\ (310) & 0.16 \\ (311) & 0.16 \\ (312) & 0.16 \\ (313) & 0.16 \\ (314) & 0.16 \end{array}$   | (325) 0.16<br>(326) 0.16<br>(327) 0.16<br>(329) 0.16<br>(329) 0.16<br>(330) 0.16<br>(331) 0.16<br>(331) 0.16<br>(332) 0.16  | (343) 1.1<br>(344) 1.1<br>(343) 1.1<br>(346) 1.1<br>(346) 1.1<br>(347) 1.1<br>(349) 1.1<br>(349) 1.1<br>(350) 1.1  |
| 91) 0.07<br>92) 0.07<br>93) 0.07<br>95) 0.07<br>95) 0.07<br>95) 0.07<br>96) 0.07<br>98) 0.07   | (109) 0.07<br>(110) 0.07<br>(111) 0.07<br>(112) 0.07<br>(113) 0.34<br>(114) 0.34<br>(115) 0.34<br>(116) 0.34   | (127) 0.34 (128) 0.34 (129) 0.34 (130) 0.34 (131) 0.34 (132) 0.34 (132) 0.34 (133) 0.34 (134) 0.34   | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(148) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.32<br>(152) 0.32  | (163) 0.32<br>(164) 0.32<br>(165) 0.32<br>(155) 0.32<br>(155) 0.32<br>(153) 0.32   | $\begin{array}{c} (271) & 0.07 \\ (272) & 0.07 \\ (273) & 0.07 \\ (273) & 0.07 \\ (274) & 0.07 \\ (275) & 0.07 \\ (276) & 0.07 \\ (277) & 0.07 \end{array}$   | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(293) 0.05<br>(294) 0.05<br>(295) 0.05<br>(296) 0.05<br>(297) 0.05   | $\begin{array}{c} (307) & 0.05 \\ (308) & 0.05 \\ (309) & 0.16 \\ (310) & 0.16 \\ (311) & 0.16 \\ (312) & 0.16 \\ (312) & 0.16 \\ (314) & 0.16 \\ (315) & 0.16 \end{array}$   | (325) 0.16<br>(326) 0.16<br>(327) 0.16<br>(329) 0.16<br>(329) 0.16<br>(330) 0.16<br>(331) 0.16<br>(332) 0.16<br>(332) 0.16  | (343) 1.1<br>(344) 1.1<br>(343) 1.1<br>(346) 1.1<br>(346) 1.1<br>(348) 1.1<br>(348) 1.1<br>(350) 1.1<br>(350) 1.1  |
| 91) 0.07<br>92) 0.07<br>93) 0.07<br>93) 0.07<br>95) 0.07<br>95) 0.07<br>95) 0.07<br>98) 0.07<br>98) 0.07   | (109) 0.07<br>(110) 0.07<br>(111) 0.07<br>(112) 0.07<br>(113) 0.34<br>(114) 0.34<br>(115) 0.34<br>(115) 0.34<br>(116) 0.34<br>(117) 0.34   | (127) 0.34<br>(128) 0.34<br>(129) 0.34<br>(130) 0.34<br>(131) 0.34<br>(132) 0.34<br>(132) 0.34<br>(133) 0.34<br>(134) 0.34<br>(135) 0.34   | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(149) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.32<br>(151) 0.32<br>(152) 0.32<br>(153) 0.32  | (163) 0.32 (164) 0.32 (165) 0.32 (155) 0.32 (156) 0.32 (156) 0.32 (156) 0.32 (169) 0.32 (170) 0.32 (170) 0.32 (170) 0.32 (170) 0.32 (170) 0.32 (170) 0.32 (170) 0.32 (170) 0.32 (170) 0.32 (170) 0.32 (170) 0.32 (170) 0.32 (170) 0.32 (170) 0.32 (170) 0.32 (170) 0.32 (163) 0.32 (170 | (271) 0.07<br>(272) 0.07<br>(273) 0.07<br>(273) 0.07<br>(274) 0.07<br>(275) 0.07<br>(276) 0.07<br>(278) 0.07  | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(293) 0.05<br>(294) 0.05<br>(295) 0.05<br>(296) 0.05<br>(297) 0.05<br>(298) 0.05   | $\begin{array}{c} (307) & 0.05 \\ (308) & 0.05 \\ (309) & 0.16 \\ (310) & 0.16 \\ (311) & 0.16 \\ (312) & 0.16 \\ (312) & 0.16 \\ (314) & 0.16 \\ (315) & 0.16 \\ (316) & 0.16 \end{array}$   | $\begin{array}{c} (325) & 0.16 \\ (326) & 0.16 \\ (527) & 0.16 \\ (328) & 0.16 \\ (329) & 0.16 \\ (330) & 0.16 \\ (331) & 0.16 \\ (331) & 0.16 \\ (333) & 0.14 \\ (334) & 0.16 \end{array}$   | (343) 1.1<br>(344) 1.1<br>(345) 1.1<br>(346) 1.1<br>(346) 1.1<br>(348) 1.1<br>(349) 1.1<br>(350) 1.1<br>(351) 1.1<br>(352) 1.1   |
| 71) 0.07<br>72) 0.07<br>73) 0.07<br>74) 0.07<br>75) 0.07<br>75) 0.07<br>97) 0.07<br>98) 0.07<br>99) 0.07   | (109) 0.07(110) 0.07(111) 0.07(112) 0.07(113) 0.34(114) 0.34(115) 0.34(115) 0.34(116) 0.34(117) 0.34   | (127) 0.34<br>(128) 0.34<br>(129) 0.34<br>(130) 0.34<br>(131) 0.34<br>(132) 0.34<br>(132) 0.34<br>(133) 0.34<br>(134) 0.34<br>(135) 0.34<br>(136) 0.34   | (145) 0.32<br>(144) 0.32<br>(147) 0.32<br>(149) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.32<br>(152) 0.32<br>(153) 0.32<br>(154) 0.32  | (163) 0.32<br>(164) 0.32<br>(165) 0.32<br>(155) 0.32<br>(155) 0.32<br>(167) 0.32<br>(153) 0.32<br>(169) 0.32<br>(170) 0.32<br>(171) 0.32   | (271) 0.07<br>(271) 0.07<br>(273) 0.07<br>(273) 0.07<br>(274) 0.07<br>(276) 0.07<br>(276) 0.07<br>(277) 0.07<br>(278) 0.07<br>(279) 0.08  | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(293) 0.05<br>(294) 0.05<br>(295) 0.05<br>(295) 0.05<br>(297) 0.05<br>(298) 0.05<br>(299) 0.05   | $\begin{array}{c} (307) & 0.05 \\ (308) & 0.05 \\ (309) & 0.16 \\ (310) & 0.16 \\ (311) & 0.16 \\ (312) & 0.16 \\ (312) & 0.16 \\ (314) & 0.16 \\ (315) & 0.16 \\ (316) & 0.16 \\ (317) & 0.15 \end{array}$   | $\begin{array}{c} (325) & 0.16 \\ (326) & 0.16 \\ (527) & 0.16 \\ (529) & 0.16 \\ (329) & 0.16 \\ (330) & 0.16 \\ (331) & 0.16 \\ (332) & 0.16 \\ (333) & 0.16 \\ (333) & 0.16 \\ (335) & 0.15 \end{array}$   | (343) 1.1<br>(344) 1.1<br>(345) 1.1<br>(346) 1.1<br>(346) 1.1<br>(349) 1.1<br>(349) 1.1<br>(350) 1.1<br>(351) 1.1<br>(352) 1.1<br>(353) 1.1  |
| 71)       0.07         72)       0.07         73)       0.07         74)       0.07         75)       0.07         75)       0.07         76)       0.07         77)       0.07         78)       0.07         90)       0.07         00)       0.07         00)       0.07  | (109) 0.07(110) 0.07(111) 0.07(112) 0.07(113) 0.34(114) 0.34(115) 0.34(115) 0.34(116) 0.34(117) 0.34(119) 0.34   | (127) 0.34(128) 0.34(129) 0.34(130) 0.34(131) 0.34(132) 0.34(132) 0.34(133) 0.34(134) 0.34(135) 0.34(136) 0.34(137) 0.34   | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(147) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.32<br>(151) 0.32<br>(152) 0.32<br>(153) 0.32<br>(155) 0.32  | $ \begin{array}{c} (167) & 0.32 \\ (164) & 0.32 \\ (165) & 0.32 \\ (155) & 0.32 \\ (155) & 0.32 \\ (157) & 0.32 \\ (157) & 0.32 \\ (159) & 0.32 \\ (170) & 0.32 \\ (171) & 0.32 \\ (171) & 0.32 \\ (173) & 0.05 \end{array} $  | (271) 0.07<br>(272) 0.07<br>(273) 0.07<br>(273) 0.07<br>(274) 0.07<br>(275) 0.07<br>(276) 0.07<br>(277) 0.07<br>(279) 0.08<br>(280) 0.08  | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(293) 0.05<br>(294) 0.05<br>(295) 0.05<br>(296) 0.05<br>(297) 0.05<br>(298) 0.05   | $\begin{array}{c} (307) & 0.05 \\ (308) & 0.05 \\ (309) & 0.16 \\ (310) & 0.16 \\ (311) & 0.16 \\ (312) & 0.16 \\ (312) & 0.16 \\ (313) & 0.16 \\ (314) & 0.16 \\ (316) & 0.16 \\ (316) & 0.16 \\ (318) & 0.16 \end{array}$   | (325) 0.16<br>(326) 0.16<br>(327) 0.16<br>(329) 0.16<br>(329) 0.16<br>(330) 0.16<br>(331) 0.16<br>(331) 0.16<br>(332) 0.16<br>(333) 0.16<br>(333) 0.16<br>(334) 0.16<br>(336) 0.16  | (343) 1.1<br>(344) 1.1<br>(343) 1.1<br>(346) 1.1<br>(346) 1.1<br>(349) 1.1<br>(359) 1.1<br>(351) 1.1<br>(351) 1.1<br>(352) 1.1<br>(353) 1.1<br>(354) 1.1   |
| 71)       0.07         72)       0.07         73)       0.07         74)       0.07         75)       0.07         76)       0.07         77)       0.07         78)       0.07         79)       0.07         79)       0.07         79)       0.07         700)       0.07         711)       0.07         721)       0.07   | (109) 0.07(110) 0.07(111) 0.07(112) 0.07(113) 0.34(114) 0.34(115) 0.34(116) 0.34(116) 0.34(117) 0.34(119) 0.34(119) 0.34   |  | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(147) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.32<br>(151) 0.32<br>(152) 0.32<br>(153) 0.32<br>(154) 0.32<br>(156) 0.32  | $ \begin{array}{c} (167) & 0.32 \\ (164) & 0.32 \\ (165) & 0.32 \\ (155) & 0.32 \\ (155) & 0.32 \\ (157) & 0.32 \\ (153) & 0.32 \\ (159) & 0.32 \\ (170) & 0.32 \\ (171) & 0.32 \\ (171) & 0.32 \\ (172) & 0.05 \\ (174) & 0.05 \end{array} $  | (271) 0.07<br>(272) 0.07<br>(273) 0.07<br>(273) 0.07<br>(274) 0.07<br>(275) 0.07<br>(276) 0.07<br>(277) 0.07<br>(277) 0.08<br>(280) 0.08<br>(281) 0.08  | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(293) 0.05<br>(294) 0.05<br>(295) 0.05<br>(295) 0.05<br>(297) 0.05<br>(298) 0.05<br>(299) 0.05   | $\begin{array}{c} (307) & 0.05 \\ (309) & 0.16 \\ (310) & 0.16 \\ (311) & 0.16 \\ (312) & 0.16 \\ (312) & 0.16 \\ (313) & 0.16 \\ (314) & 0.16 \\ (315) & 0.16 \\ (316) & 0.16 \\ (316) & 0.16 \\ (319) & 0.16 \\ (319) & 0.16 \\ \end{array}$                              | (325) 0.16<br>(326) 0.16<br>(327) 0.16<br>(329) 0.16<br>(329) 0.16<br>(330) 0.16<br>(331) 0.16<br>(331) 0.16<br>(332) 0.16<br>(334) 0.16<br>(334) 0.16<br>(336) 0.16<br>(337) 1.156   | (343) 1.1<br>(344) 1.1<br>(343) 1.1<br>(346) 1.1<br>(346) 1.1<br>(349) 1.1<br>(350) 1.1<br>(351) 1.1<br>(353) 1.1<br>(353) 1.1<br>(355) 1.1  |
| 91)       0.07         92)       0.07         93)       0.07         95)       0.07         95)       0.07         97)       0.07         98)       0.07         99)       0.07         90)       0.07         91)       0.07         92)       0.07         93)       0.07         93)       0.07         93)       0.07         93)       0.07         93)       0.07         93)       0.07 | (109) 0.07(110) 0.07(111) 0.07(112) 0.07(113) 0.34(114) 0.34(115) 0.34(116) 0.34(116) 0.34(117) 0.34(119) 0.34(119) 0.34(120) 0.34   | $      \begin{array}{c} (127) & 0.34 \\ (128) & 0.34 \\ (129) & 0.34 \\ (130) & 0.34 \\ (131) & 0.34 \\ (131) & 0.34 \\ (132) & 0.34 \\ (134) & 0.34 \\ (135) & 0.34 \\ (135) & 0.34 \\ (136) & 0.34 \\ (138) & 0.34 \\ (139) & 0.34 \end{array} $ | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(149) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.32<br>(152) 0.32<br>(153) 0.32<br>(155) 0.32<br>(155) 0.32<br>(156) 0.32<br>(157) 0.232                             | (163) 0.32<br>(164) 0.32<br>(165) 0.32<br>(155) 0.32<br>(155) 0.32<br>(156) 0.32<br>(156) 0.32<br>(156) 0.32<br>(156) 0.32<br>(176) 0.32<br>(171) 0.32<br>(172) 0.32<br>(173) 0.05<br>(174) 0.05<br>(175) 0.05   | $\begin{array}{c} (271) & 0.07 \\ (272) & 0.07 \\ (273) & 0.07 \\ (273) & 0.07 \\ (273) & 0.07 \\ (275) & 0.07 \\ (276) & 0.07 \\ (277) & 0.07 \\ (279) & 0.08 \\ (280) & 0.08 \\ (281) & 0.08 \\ (282) & 0.08 \end{array}$ | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(293) 0.05<br>(294) 0.05<br>(295) 0.05<br>(295) 0.05<br>(297) 0.05<br>(297) 0.05<br>(298) 0.05<br>(299) 0.05   | $\begin{array}{c} (307) & 0.05 \\ (308) & 0.05 \\ (309) & 0.16 \\ (310) & 0.16 \\ (311) & 0.16 \\ (312) & 0.16 \\ (312) & 0.16 \\ (313) & 0.16 \\ (314) & 0.16 \\ (315) & 0.16 \\ (316) & 0.16 \\ (317) & 0.16 \\ (319) & 0.16 \\ (320) & 0.16 \\ \end{array}$              | (325) 0.16<br>(326) 0.16<br>(527) 0.16<br>(329) 0.16<br>(329) 0.16<br>(330) 0.16<br>(331) 0.16<br>(332) 0.16<br>(332) 0.16<br>(333) 0.16<br>(334) 0.16<br>(334) 0.16<br>(336) 0.16<br>(336) 1.156<br>(338) 1.156  | (343) 1.1<br>(344) 1.1<br>(345) 1.1<br>(346) 1.1<br>(346) 1.1<br>(349) 1.1<br>(350) 1.1<br>(351) 1.1<br>(353) 1.1<br>(354) 1.1<br>(354) 1.1<br>(354) 1.1   |
| 91)       0.07         72)       0.07         93)       0.07         95)       0.07         95)       0.07         95)       0.07         97)       0.07         98)       0.07         99)       0.07         00)       0.07         01)       0.07         02)       0.07         03)       0.07         04)       0.07  | (109) 0.07(110) 0.07(111) 0.07(112) 0.07(113) 0.34(114) 0.34(115) 0.34(115) 0.34(115) 0.34(116) 0.34(117) 0.34(119) 0.34(120) 0.34(121) 0.34   |  | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(149) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.32<br>(151) 0.32<br>(153) 0.32<br>(154) 0.32<br>(155) 0.32<br>(156) 0.32<br>(156) 0.32<br>(156) 0.32<br>(158) 0.232 | (163) 0.32<br>(164) 0.32<br>(165) 0.32<br>(155) 0.32<br>(155) 0.32<br>(156) 0.32<br>(156) 0.32<br>(156) 0.32<br>(170) 0.32<br>(171) 0.32<br>(171) 0.32<br>(172) 0.32<br>(173) 0.05<br>(174) 0.05<br>(176) 0.05   | (271) 0.07<br>(271) 0.07<br>(275) 0.07<br>(273) 0.07<br>(274) 0.07<br>(276) 0.07<br>(276) 0.07<br>(277) 0.07<br>(279) 0.08<br>(280) 0.08<br>(281) 0.08<br>(282) 0.08  | (287) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(293) 0.05<br>(294) 0.05<br>(294) 0.05<br>(294) 0.05<br>(297) 0.05<br>(298) 0.05<br>(299) 0.05<br>(300) 0.05<br>(301) 0.05                             | $\begin{array}{c} (307) & 0.05 \\ (308) & 0.05 \\ (309) & 0.16 \\ (310) & 0.16 \\ (311) & 0.16 \\ (312) & 0.16 \\ (312) & 0.16 \\ (314) & 0.16 \\ (315) & 0.16 \\ (316) & 0.16 \\ (317) & 0.16 \\ (319) & 0.16 \\ (319) & 0.16 \\ (320) & 0.16 \\ (321) & 0.16 \end{array}$ | $\begin{array}{c} (325) & 0.16 \\ (326) & 0.16 \\ (527) & 0.16 \\ (529) & 0.16 \\ (329) & 0.16 \\ (331) & 0.16 \\ (331) & 0.16 \\ (332) & 0.16 \\ (333) & 0.16 \\ (334) & 0.16 \\ (335) & 0.15 \\ (336) & 0.15 \\ (336) & 1.156 \\ (339) & 1.156 \\ (339) & 1.156 \\ \end{array}$ | (343) 1.13<br>(344) 1.1<br>(343) 1.13<br>(346) 1.1<br>(346) 1.1<br>(349) 1.13<br>(349) 1.13<br>(350) 1.1<br>(351) 1.11<br>(353) 1.11<br>(354) 1.11<br>(356) 1.11<br>(357) 1.13                               |
| 71)       0.07         72)       0.07         73)       0.07         74)       0.07         75)       0.07         75)       0.07         76)       0.07         77)       0.07         78)       0.07         79)       0.07         00)       0.07         01)       0.07         02)       0.07         03)       0.07         04)       0.07         05)       0.07                        | (109) 0.07<br>(110) 0.07<br>(111) 0.07<br>(112) 0.07<br>(113) 0.34<br>(114) 0.34<br>(115) 0.34<br>(115) 0.34<br>(116) 0.34<br>(117) 0.34<br>(119) 0.34<br>(120) 0.34<br>(121) 0.34<br>(122) 0.34 |  | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(147) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.32<br>(151) 0.32<br>(155) 0.32<br>(155) 0.32<br>(155) 0.32<br>(156) 0.32<br>(156) 0.232<br>(157) 0.232              |  | (271) 0.07<br>(272) 0.07<br>(272) 0.07<br>(273) 0.07<br>(275) 0.07<br>(275) 0.07<br>(276) 0.07<br>(277) 0.07<br>(279) 0.08<br>(290) 0.08<br>(291) 0.08<br>(292) 0.08<br>(293) 0.08<br>(293) 0.08<br>(294) 0.08              | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(293) 0.05<br>(294) 0.05<br>(295) 0.05<br>(296) 0.05<br>(297) 0.05<br>(298) 0.05<br>(299) 0.05<br>(300) 0.05<br>(301) 0.05<br>(302) 0.05               | $\begin{array}{c} (307) & 0.05 \\ (308) & 0.05 \\ (309) & 0.16 \\ (310) & 0.16 \\ (312) & 0.16 \\ (312) & 0.16 \\ (312) & 0.16 \\ (313) & 0.16 \\ (314) & 0.16 \\ (315) & 0.16 \\ (316) & 0.16 \\ (317) & 0.16 \\ (319) & 0.16 \\ (320) & 0.16 \\ \end{array}$              | (325) 0.16<br>(326) 0.16<br>(327) 0.16<br>(329) 0.16<br>(329) 0.16<br>(330) 0.16<br>(331) 0.16<br>(331) 0.16<br>(332) 0.16<br>(333) 0.16<br>(333) 0.16<br>(335) 0.15<br>(336) 0.16<br>(337) 1.156<br>(339) 1.156  | (343) 1.1<br>(344) 1.1<br>(345) 1.1<br>(346) 1.1<br>(346) 1.1<br>(349) 1.1<br>(350) 1.1<br>(351) 1.1<br>(351) 1.1<br>(353) 1.1<br>(353) 1.1<br>(354) 1.1<br>(355) 1.1<br>(354) 1.1<br>(355) 1.1<br>(354) 1.1 |
| 91)       0.07         92)       0.07         93)       0.07         95)       0.07         95)       0.07         97)       0.07         98)       0.07         99)       0.07         90)       0.07         91)       0.07         92)       0.07         93)       0.07         93)       0.07         93)       0.07         93)       0.07         93)       0.07         93)       0.07 | (109) 0.07<br>(110) 0.07<br>(111) 0.07<br>(112) 0.07<br>(113) 0.34<br>(114) 0.34<br>(115) 0.34<br>(115) 0.34<br>(115) 0.34<br>(117) 0.34<br>(118) 0.34<br>(119) 0.34<br>(120) 0.34<br>(121) 0.34 |  | (145) 0.32<br>(146) 0.32<br>(147) 0.32<br>(149) 0.32<br>(149) 0.32<br>(150) 0.32<br>(151) 0.32<br>(151) 0.32<br>(153) 0.32<br>(154) 0.32<br>(155) 0.32<br>(156) 0.32<br>(156) 0.32<br>(156) 0.32<br>(158) 0.232 | (163) 0.32<br>(164) 0.32<br>(165) 0.32<br>(155) 0.32<br>(155) 0.32<br>(156) 0.32<br>(156) 0.32<br>(156) 0.32<br>(170) 0.32<br>(171) 0.32<br>(171) 0.32<br>(172) 0.32<br>(173) 0.05<br>(174) 0.05<br>(176) 0.05   | (271) 0.07<br>(272) 0.07<br>(272) 0.07<br>(273) 0.07<br>(273) 0.07<br>(275) 0.07<br>(276) 0.07<br>(277) 0.07<br>(279) 0.07<br>(279) 0.08<br>(280) 0.08<br>(281) 0.08<br>(282) 0.08<br>(283) 0.08<br>(285) 0.08              | (289) 0.05<br>(290) 0.05<br>(291) 0.05<br>(292) 0.05<br>(292) 0.05<br>(293) 0.05<br>(294) 0.05<br>(295) 0.05<br>(297) 0.05<br>(297) 0.05<br>(298) 0.05<br>(299) 0.05<br>(300) 0.05<br>(301) 0.05<br>(302) 0.05 | $\begin{array}{c} (307) & 0.05 \\ (308) & 0.05 \\ (309) & 0.16 \\ (310) & 0.16 \\ (311) & 0.16 \\ (312) & 0.16 \\ (312) & 0.16 \\ (314) & 0.16 \\ (315) & 0.16 \\ (316) & 0.16 \\ (317) & 0.16 \\ (319) & 0.16 \\ (319) & 0.16 \\ (320) & 0.16 \\ (321) & 0.16 \end{array}$ | $\begin{array}{c} (325) & 0.16 \\ (326) & 0.16 \\ (527) & 0.16 \\ (529) & 0.16 \\ (329) & 0.16 \\ (331) & 0.16 \\ (331) & 0.16 \\ (332) & 0.16 \\ (333) & 0.16 \\ (334) & 0.16 \\ (335) & 0.15 \\ (336) & 0.15 \\ (336) & 1.156 \\ (339) & 1.156 \\ (339) & 1.156 \\ \end{array}$ | (343) 1.13<br>(344) 1.1<br>(343) 1.13<br>(346) 1.1<br>(346) 1.1<br>(349) 1.13<br>(349) 1.13<br>(350) 1.1<br>(351) 1.11<br>(353) 1.11<br>(354) 1.11<br>(356) 1.11<br>(357) 1.13                               |

.

1

| riable: VOELVL2.v  |  |  |  |  |  |  |   |  |   |   |  |   |  |  |  |
|--|--|--|--|--|--|--|---|--|---|---|--|---|--|--|--|
|  |  |  | ( 55) 0.   | 9 (73)   |  | (181)  | 0.9   | (1-7)  | 0.9   | .(217)  | 9.3  | (205)   | 4  |  | 4  |
| 1) 0.9 (19)  |  | 0.22   | •  |  |  | (182)  | 0.9   | (200)  | 0.9   | (218)   | 9.7  |   | 4  |  |  |
| 2) 0.9 (20)  |  |  | · · - /  |  | 0.9  |  | 0.9   | (201)  | 0.9   | (219)   | 5  | · · · · ·   | 4  | (  | 4  |
| 5) 0.7 (21)  |  |  | (57) 0.  |  |  | (184)  | 0.9   | (202)  | 0.9   | (220)   | 5  | · /   | 4  | (  | 4  |
| ) 0.9 (22  |  |  | (58) 0.  |  |  |  | 0.9   | (200)  | 0.9   | (221)   | ά  |   | 4  | • = •  | 4.   |
| j 0.9 (23)   | 0.9 (41  |  | ( 59) 0.   |  |  | (136)  | 0.9   | (204)  |   | (222)   | ò  | (240)   | 4  |  | 4  |
| ) 0.9 ( <u>2</u> 4   | 0.9 (42  | ) Ŭ.9  | (60) 0.  |  |  |  | 0.7   |  | 0.9   | (227)   | 5  | (241)   | 4  | (259)  | 4  |
| 7) 0.9 (25)  | 0.7 (43  | ) 0.9  | (61) 0.  |  |  | •  | 0.9   | <b>v</b> = · = <i>v</i>  | 0.9   | (224)   | 5  | (242)   | 4  | (250)  | 4  |
| a) 0.9 (26   |  | ) 0.9  | (62) 0.  |  |  | (188)<br>(169)   | 0.9   |  | 0.9   | (225)   | 4  | (245)   | 4  | (261)  | 4  |
|  |  | ) 0.9  | (63) Q.  |  |  | •  |   |  | 0.9   | (225)   | 4  | (244)   | 4  | (252)  | 4  |
|  |  | ) 0.9  | (54) V.  |  |  |  | 0.9   | (209)  |   | (227)   | 4  | (245)   | 4  | (265)  | 4  |
|  |  |  | (65) 0.  | .9 (33)  |  | (191)  |   |  |   | (228)   | 4  | (245)   | 4  | (264)  | 4  |
| •  |  |  | (66) 0.  | .9 (84)  | 0.9  | (192)  | 0.9   | • - • •  | 1.5   | (229)   | -  | (247)   | Å  | (245)  |  |
|  |  | •  | ( 67) 0.   | .9 (85)  | 0.9  | (193)  |   | (211)  | 2   |   | ~  |   | 4  |  | 4  |
| 3) 0.9 (31   |  |  | ( 68) 0  | ,9 (86)  | 0.9  | (194)  | 0.9   | • - • - •  | 2   | (230)   | د.<br>د  |   | 4  | (267)  |  |
| 4) 0.9 (32   |  |  | ( 69) 0.   |  | 0.9  | (195)  | 0.9   | (217) -  |   | (231)   | 4  | (249)   |  | (268)  |  |
| 5) 0.9 (33   |  | *  | (70) 0   |  |  | (196)  | ú.9   | (214)  |   | (232)   | 4  |   | 4  | (260)  |  |
| 16) 0.9 (34  |  |  | (71) 0.  |  |  | (197)  | 0.9   | (215)  |   | (223)   |  | (251)   | 4  | (270)  |  |
| 17) 0.9 (35  |  |  | (72) 0   |  | 0.9  | .(198)   | 0.9   | (215)  |   | (234)   |  | (252)   | +  | (270)  | 4  |
| 18) 0.9 (36  | ) 0.9 (54  | ) 0.9  |  |  |  |  |   |  |   |   |  |   |  |  |  |
|  |  |  |  |  |  |  | -   |  |   |   |  |   |  |  |  |
|  |  | 0.09   |  |  |  | (271)  | 3.6   | (289)  | 3   | (197)   | Ŭ.7  | (325)   | 0.6  | (343)<br>(344)   |  |
| 1) 0,9 (10)  | ) 0.9 (12)   |  | (145) 0  | .9 (163)   | 0.9  |  |   | (287)<br>(290)   | 3<br>3  | (307)<br>(308)  | 0.7<br>0.7   | (325)<br>(326)  | 0.6<br>0.6   | (344)  | 0.5  |
| 1) 0.9 (107<br>2) 0.9 (110   | ) 0.9 (12)   | 0.9  | (145) Ο<br>(146) Ο   | .9 (163)<br>1.9 (164   | 0.9<br>0.4   | (271)  | 3.6   | (287)<br>(290)<br>(291)  | 3<br>3<br>32  | (307)<br>(308)<br>(309)   | 0.7<br>0.7<br>0.7  | (325)<br>(326)<br>(327)   | 0.6<br>0.6<br>0.6  | (344)<br>(345)   | 0.5<br>0.5   |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | ) 0.9 (12)<br>) 0.9 (12)<br>) 0.9 (12)   | 9) 0.9<br>9) 0.7   | (145) O<br>(146) O<br>(147) O  | .9 (163)<br>1.9 (164<br>1.9 (165)  | 0.9<br>0.4<br>0.9  | (271)<br>(272)   | 3.6<br>3.6  | (289)<br>(290)<br>(291)<br>(292)   | 3<br>3<br>32<br>32  | (307)<br>(308)<br>(309)<br>(310)  | 0.7<br>0.7<br>0.7<br>0.7   | (325)<br>(326)<br>(327)<br>(328)  | 0.6<br>0.6<br>0.8<br>0.8   | (344)<br>(345)<br>(346)  | $0.5 \\ 0.5 $ |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | ) 0.9 (12)<br>) 0.9 (12)<br>) 0.9 (12)<br>) 0.9 (13)   | 9) 0.9<br>9) 0.7<br>9) 0.9   | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0   | 1.9 (163)<br>1.9 (164<br>1.9 (165)<br>1.9 (165)  | 0.9<br>0.4<br>0.9<br>0.9   | (271)<br>(272)<br>(273)  | 3.6<br>3.6<br>3.6   | (289)<br>(290)<br>(291)<br>(292)<br>(293)  | 3<br>3<br>32<br>32<br>32<br>2   | (307)<br>(308)<br>(309)<br>(310)<br>(311)   | 0.7<br>0.7<br>0.7<br>0.7<br>0.7                                    | (325)<br>(326)<br>(327)<br>(328)<br>(328)   | 0.6<br>0.6<br>0.8<br>0.8<br>0.8  | (344)<br>(345)<br>(346)<br>(347)   | 0.5<br>0.5<br>0.5<br>0.2   |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{c} 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (12) \\ 0.7 & (13) \\ 0.9 & (13) \end{array}$  | 9) 0.9<br>9) 0.9<br>9) 0.9<br>1) 0.9   | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(148) 0  | .9 (163)<br>9.9 (164<br>9.9 (165)<br>9.9 (165)<br>9.9 (165)  | 0.9<br>0.4<br>0.9<br>0.9   | (271)<br>(270)<br>(273)<br>(274)<br>(275)  | 3.6<br>3.6<br>3.6<br>3.5  | (299)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)  | 3<br>3<br>32<br>32<br>32<br>32<br>2<br>2  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)  | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7                             | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(330)   | 0.6<br>0.6<br>0.8<br>0.8<br>0.8<br>0.8   | (344)<br>(345)<br>(344)<br>(344)<br>(347)<br>(349)   | 0.5<br>0.5<br>0.5<br>0.5   |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{c} 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \end{array}$  | 0.9<br>0.7<br>0.7<br>0.9<br>0.9<br>0.9<br>0.9  | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(149) 0<br>(149) 0<br>(150) 0  | .9 (163)<br>.9 (164<br>.9 (165)<br>.9 (165)<br>.9 (165)<br>.9 (167)<br>.9 (168)  | 0.9<br>0.4<br>0.9<br>0.9<br>0.9<br>0.9   | (271)<br>(270)<br>(273)<br>(274)<br>(275)  | 3.6<br>3.6<br>3.6<br>3.6<br>3.6   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)   | 3<br>3<br>3<br>2<br>2<br>2<br>2<br>2<br>2<br>2  | $\begin{array}{c} (307) \\ (308) \\ (309) \\ (310) \\ (311) \\ (312) \\ (313) \end{array}$  | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7                      | (325)<br>(326)<br>(327)<br>(328)<br>(328)<br>(329)<br>(330)<br>(331)  | 0.6<br>0.6<br>0.8<br>0.8<br>0.8<br>0.6<br>0.6  | (344)<br>(345)<br>(346)<br>(347)<br>(349)<br>(349)   | 0.9<br>0.9<br>0.9<br>0.9<br>0.9  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{c} 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (12) \\ 0.7 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \end{array}$  | $\begin{array}{c} 0.9 \\ 0.7 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \end{array}$   | (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(149) 0<br>(149) 0<br>(150) 0<br>(151) 0   | .9 (143)<br>.9 (154<br>.9 (155)<br>.9 (155)<br>.9 (155)<br>.9 (157)<br>.9 (157)<br>.9 (159)  | 0.9<br>0.4<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9                             | (271)<br>(272)<br>(273)<br>(274)<br>(274)<br>(276)<br>(276)<br>(277)   | 3.6<br>3.6<br>3.6<br>3.6<br>3.6<br>3.6<br>3.6   | (299)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)  | 3<br>3<br>3<br>2<br>2<br>2<br>2<br>2<br>2<br>2  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)  | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7               | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)  | 0.6<br>0.6<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5   | (344)<br>(345)<br>(346)<br>(344)<br>(342)<br>(349)<br>(349)<br>(350)   | 0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5   |
| 91)       0.9       (107)         92)       0.9       (110)         93)       0.7       (111)         94)       0.9       (112)         95)       0.9       (112)         96)       0.9       (113)         97)       0.9       (114)         98)       0.9       (114)  | $\begin{array}{c} 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \end{array}$  | $\begin{array}{c} 0.9 \\ 0.7 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \end{array}$  | $\begin{array}{c} (145) & 0 \\ (146) & 0 \\ (147) & 0 \\ (148) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (152) & 0 \end{array}$  | .9 (143)<br>.9 (144<br>.9 (144<br>.9 (145)<br>.9 (146<br>.9 (147)<br>.9 (148<br>.9 (149)<br>.9 (149)<br>.9 (170)   | 0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9               | (271)<br>(270)<br>(270)<br>(274)<br>(275)<br>(275)<br>(276)<br>(277)<br>(278)  | 3.6<br>3.6<br>3.6<br>3.6<br>3.6<br>3.6<br>3.6   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)   | 33222<br>32222<br>22222   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(313)<br>(314)<br>(315)  | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7        | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(320)<br>(331)<br>(332)<br>(333)  | 0.6<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.6<br>0.6<br>0.6  | (344)<br>(345)<br>(346)<br>(344)<br>(342)<br>(342)<br>(349)<br>(350)<br>(351)  |  |
| 91)       0,9       (107)         92)       0.9       (110)         93)       0.7       (111)         94)       0.7       (111)         95)       0.9       (111)         96)       0.9       (111)         97)       0.9       (111)         97)       0.9       (112)         98)       0.9       (114)  | $ \begin{array}{c} 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \end{array} $  | $\begin{array}{c} 0.9 \\ 0.7 \\ 0.7 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \end{array}$  | $\begin{array}{c} (145) & 0\\ (146) & 0\\ (147) & 0\\ (148) & 0\\ (149) & 0\\ (150) & 0\\ (151) & 6\\ (152) & 0\\ (153) & 0\\ \end{array}$   | .9 (143)<br>.9 (154<br>.9 (155)<br>.9 (165)<br>.9 (165)<br>.9 (167)<br>.9 (159)<br>.9 (170)<br>.9 (171)  | 0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9               | (271)<br>(270)<br>(270)<br>(274)<br>(276)<br>(276)<br>(277)<br>(278)<br>(278)<br>(279)   | 3.6<br>3.6<br>3.6<br>3.6<br>3.6<br>3.6<br>3.6<br>3.6<br>3.6<br>3.6  | (287)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)<br>(296)  | 33222224<br>35222224  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)  | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7        | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(331)<br>(331)<br>(332)<br>(333)<br>(334)   | 0.6<br>0.6<br>0.8<br>0.8<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6   | (344)<br>(345)<br>(346)<br>(344)<br>(349)<br>(349)<br>(350)<br>(351)<br>(352)  | 0.8<br>0.8<br>0.8<br>0.8<br>0.8<br>0.8<br>0.8<br>0.8<br>0.8  |
| 91)       0.9       (107)         92)       0.9       (110)         93)       0.7       (111)         94)       0.9       (112)         95)       0.9       (112)         96)       0.9       (112)         97)       0.9       (112)         98)       0.9       (114)         991       0.9       (114)  | $ \begin{array}{c} 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \end{array} $  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{c} (145) & 0 \\ (146) & 0 \\ (147) & 0 \\ (148) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (152) & 0 \\ (153) & 0 \\ (154) & 0 \end{array}$   | .9 (143)<br>9 (154)<br>9 (155)<br>9 (165)<br>9 (165)<br>9 (167)<br>9 (168)<br>9 (169)<br>9 (170)<br>9 (172)  | 0.9<br>0.4<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9 | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(276)<br>(277)<br>(278)<br>(290)   | 3.6<br>3.6<br>3.6<br>3.6<br>3.6<br>5.6<br>5.6<br>5.6<br>5.6<br>3.5<br>3.5<br>3.5<br>3.5<br>3.5<br>3.5<br>3.5<br>3.5<br>3.5<br>3.5 | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(295)<br>(296)<br>(298)   | 3<br>32<br>32<br>22<br>22<br>22<br>21<br>1  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(313)<br>(314)<br>(315)  | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7 | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(320)<br>(331)<br>(332)<br>(333)  | 0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6   | (344)<br>(345)<br>(344)<br>(344)<br>(349)<br>(359)<br>(359)<br>(351)<br>(352)<br>(353)   | 0.6<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5   |
| 1)       0.9       (107)         12)       0.9       (110)         13)       0.7       (111)         14)       0.9       (112)         15)       0.9       (112)         16)       0.9       (112)         17)       0.9       (113)         18)       0.9       (114)         198)       0.9       (114)         199)       0.9       (114)         190)       0.9       (114)  | $ \begin{array}{c} 0.9 \\ 0.9 \\ 0.9 \\ 0.9 \\ 0.7 \\ 0.7 \\ 120 \\ 0.9 \\ 130 \\ 0.9 \\ 130 \\ 0.9 \\ 130 \\ 0.9 \\ 130 \\ 0.9 \\ 130 \\ 0.9 \\ 130 \\ 0.9 \\ 130 \\ 0.9 \\ 130 \\ 0.9 \\ 130 \\ 0.9 \\ 130 \\ 0.9 \\ 130 \\ 0.9 \\ 130 \\ 0.9 \\ 130 \\ 0.9 \\ 130 \\ 0.9 \\ 100 $                        | $\begin{array}{c} 0.9 \\ 0.7 \\ 0.7 \\ 0.9 \\$ | $\begin{array}{c} (145) & 0 \\ (146) & 0 \\ (147) & 0 \\ (149) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (152) & 0 \\ (153) & 0 \\ (154) & 0 \\ (155) & 0 \end{array}$  | $\begin{array}{cccc} .9 & (163) \\ .9 & (154) \\ .9 & (155) \\ .9 & (165) \\ .9 & (167) \\ .9 & (167) \\ .9 & (167) \\ .9 & (169) \\ .9 & (169) \\ .9 & (170) \\ .9 & (171) \\ .9 & (173) \\ .9 & (17$ | 0.9<br>0.4<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9 | (271)<br>(272)<br>(274)<br>(274)<br>(274)<br>(275)<br>(276)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)<br>(281)                            | 3.6<br>3.6<br>3.6<br>5.6<br>5.6<br>5.6<br>5.6<br>5.6<br>5.5<br>3.3<br>3.3<br>3.3<br>3.3<br>3.3<br>3.3<br>3.3<br>3.3<br>3.3        | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(295)<br>(295)<br>(298)<br>(298)<br>(299)   | 3<br>32<br>32<br>22<br>22<br>22<br>21<br>1  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(316)  | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7 | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(320)<br>(331)<br>(332)<br>(333)<br>(334)<br>(335)<br>(336)  | 0.6<br>0.6<br>0.8<br>0.8<br>0.8<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.5<br>0.5                             | (344)<br>(345)<br>(344)<br>(344)<br>(347)<br>(349)<br>(350)<br>(351)<br>(352)<br>(352)<br>(354)  | 0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5   |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $ \begin{array}{c} 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \end{array} $  | $\begin{array}{c} 0.9 \\ 0.7 \\$ | $\begin{array}{c} (145) & 0 \\ (146) & 0 \\ (147) & 0 \\ (149) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (152) & 0 \\ (153) & 0 \\ (155) & 0 \\ (155) & 0 \\ (156) & 0 \end{array}$   | $\begin{array}{rrrr} .9 & (143) \\ .9 & (154) \\ .9 & (155) \\ .9 & (166) \\ .9 & (167) \\ .9 & (167) \\ .9 & (157) \\ .9 & (157) \\ .9 & (170) \\ .9 & (170) \\ .9 & (173) \\ .9 & (173) \\ .9 & (174) \\ .9 & (17$ | 0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9               | (271)<br>(272)<br>(273)<br>(274)<br>(274)<br>(276)<br>(276)<br>(276)<br>(276)<br>(279)<br>(280)<br>(281)<br>(282)                            | 3.6<br>3.6<br>3.5<br>3.5<br>3.5<br>3.5<br>3.5<br>3.5<br>3.5<br>3.5<br>3.5<br>3.5  | (289)<br>(290)<br>(291)<br>(292)<br>(292)<br>(294)<br>(294)<br>(294)<br>(294)<br>(297)<br>(298)<br>(299)<br>(299)<br>(300)                                     | 3<br>32<br>32<br>2<br>2<br>2<br>2<br>2<br>1<br>0.73<br>0.73                                       | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(316)<br>(316)   | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7 | (525)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(321)<br>(331)<br>(332)<br>(333)<br>(334)<br>(335)  | 0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6   | (344)<br>(345)<br>(344)<br>(344)<br>(349)<br>(359)<br>(359)<br>(351)<br>(352)<br>(353)   | 0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5   |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $ \begin{array}{c} 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \end{array} $  | $\begin{array}{c} 0.9 \\ 0.7 \\$ | $\begin{array}{c} (145) & 0 \\ (146) & 0 \\ (147) & 0 \\ (147) & 0 \\ (150) & 0 \\ (151) & 0 \\ (152) & 0 \\ (152) & 0 \\ (153) & 0 \\ (153) & 0 \\ (154) & 0 \\ (155) & 0 \\ (155) & 0 \\ (157) & 0 \end{array}$                              | $\begin{array}{cccc} .9 & (163) \\ .9 & (164) \\ .9 & (165) \\ .9 & (166) \\ .9 & (167) \\ .9 & (167) \\ .9 & (167) \\ .9 & (170) \\ .9 & (170) \\ .9 & (171) \\ .9 & (172) \\ .9 & (172) \\ .9 & (173) \\ .9 & (174) \\ .9 & (175) \\ .9 & (17$ | 0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9               | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(276)<br>(276)<br>(279)<br>(280)<br>(284)<br>(282)<br>(283)                            | 3333333333333333  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(294)<br>(294)<br>(298)<br>(299)<br>(299)<br>(300)<br>(301)  | 3<br>3<br>3<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>1<br>1<br>0<br>0,73<br>0,73 | (207)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(316)<br>(317)<br>(318)<br>(319)                                     | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7 | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(320)<br>(331)<br>(332)<br>(333)<br>(334)<br>(335)<br>(336)  | 0.6<br>0.6<br>0.8<br>0.8<br>0.8<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.5<br>0.5                             | (344)<br>(345)<br>(344)<br>(347)<br>(349)<br>(350)<br>(351)<br>(352)<br>(352)<br>(355)<br>(355)<br>(355)                                     |  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $ \begin{array}{c} 0.9 \\ 0.9 \\ 0.9 \\ 12 \\ 0.9 \\ 13 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9 \\ 10 \\ 0.9$ | $\begin{array}{c} 0.9 \\ 0.7 \\$ | $\begin{array}{c} (145) & 0 \\ (146) & 0 \\ (147) & 0 \\ (148) & 0 \\ (150) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (153) & 0 \\ (153) & 0 \\ (154) & 0 \\ (155) & 0 \\ (156) & 0 \\ (157) & 0 \\ (158) & 0 \end{array}$                 | $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$   | 0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9               | (271)<br>(272)<br>(273)<br>(274)<br>(274)<br>(276)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)<br>(281)<br>(282)<br>(283)<br>(284)          | 3.666666666   | (289)<br>(291)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(294)<br>(297)<br>(298)<br>(299)<br>(299)<br>(299)<br>(299)<br>(290)<br>(291)<br>(301)<br>(302) | 3<br>322<br>32<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2         | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(316)<br>(317)<br>(318)<br>(319)<br>(320)                            | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7 | (325)<br>(326)<br>(326)<br>(329)<br>(329)<br>(329)<br>(331)<br>(332)<br>(333)<br>(333)<br>(334)<br>(335)<br>(336)<br>(336)<br>(337)<br>(338)                            | 0.6<br>0.6<br>0.8<br>0.8<br>0.8<br>0.6<br>0.6<br>0.6<br>0.6<br>0.5<br>0.5<br>0.5<br>0.5                      | (344)<br>(345)<br>(344)<br>(344)<br>(349)<br>(350)<br>(351)<br>(352)<br>(353)<br>(355)   |  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $ \begin{array}{c} 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (14) \\ 0.9 & (15) \\ 0.9 & (14) \\ 0.9 & (15)$   | $\begin{array}{c} 0.9 \\ 0.7 \\$ | $\begin{array}{cccc} (145) & 0 \\ (146) & 0 \\ (147) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (152) & 0 \\ (152) & 0 \\ (153) & 0 \\ (153) & 0 \\ (154) & 0 \\ (155) & 0 \\ (156) & 0 \\ (158) & 0 \\ (158) & 0 \\ (159) & 0 \end{array}$ | $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$   | 0.9<br>0.4<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9 | (271)<br>(272)<br>(274)<br>(274)<br>(274)<br>(276)<br>(276)<br>(277)<br>(279)<br>(280)<br>(281)<br>(283)<br>(283)<br>(284)<br>(285)          | 333333333333333333  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(294)<br>(296)<br>(298)<br>(299)<br>(300)<br>(301)<br>(302)<br>(303)                            | 3<br>322<br>222<br>1<br>1,73<br>30<br>0,7<br>7<br>0,7   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(316)<br>(318)<br>(317)<br>(318)<br>(319)<br>(320)<br>(321)          | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7 | (325)<br>(326)<br>(328)<br>(329)<br>(329)<br>(329)<br>(321)<br>(323)<br>(334)<br>(335)<br>(334)<br>(335)<br>(336)<br>(337)<br>(339)                                     | 0.6<br>0.6<br>0.8<br>0.8<br>0.8<br>0.6<br>0.6<br>0.6<br>0.6<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5               | (344)<br>(345)<br>(344)<br>(347)<br>(349)<br>(350)<br>(351)<br>(352)<br>(352)<br>(355)<br>(355)<br>(355)                                     |  |
| $\begin{array}{c} 91) & 0.9 & (107) \\ 92) & 0.9 & (110) \\ 93) & 0.9 & (111) \\ 94) & 0.9 & (112) \\ 95) & 0.9 & (112) \\ 97) & 0.9 & (112) \\ 97) & 0.9 & (112) \\ 98) & 0.9 & (112) \\ 98) & 0.9 & (112) \\ 00) & 0.9 & (112) \\ 01) & 0.9 & (112) \\ 01) & 0.9 & (112) \\ 02) & 0.9 & (122) \\ 03) & 0.9 & (122) \\ 04) & 0.9 & (122) \\ 05) & 0.9 & (122) \\$ | $ \begin{array}{c} 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (14) \\ 0.9 & (15)$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{c} (145) & 0 \\ (146) & 0 \\ (147) & 0 \\ (148) & 0 \\ (150) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (153) & 0 \\ (153) & 0 \\ (154) & 0 \\ (155) & 0 \\ (156) & 0 \\ (157) & 0 \\ (158) & 0 \end{array}$                 | $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$   | 0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9                             | (271)<br>(272)<br>(273)<br>(274)<br>(274)<br>(276)<br>(276)<br>(276)<br>(277)<br>(278)<br>(280)<br>(284)<br>(281)<br>(283)<br>(284)<br>(285) | 3.6<br>3.3:::::::::::::::::::::::::::::::::   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(294)<br>(294)<br>(294)<br>(298)<br>(299)<br>(300)<br>(301)<br>(302)<br>(302)<br>(304)          | 3<br>32<br>32<br>2<br>2<br>2<br>2<br>1<br>0,73<br>0,7<br>0,7<br>0,7                               | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(314)<br>(315)<br>(314)<br>(317)<br>(318)<br>(319)<br>(320)<br>(322)<br>(322) | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7 | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(321)<br>(331)<br>(332)<br>(333)<br>(334)<br>(335)<br>(336)<br>(336)<br>(337)<br>(336)<br>(337)<br>(339)<br>(340)          | 0.6<br>0.6<br>0.8<br>0.8<br>0.8<br>0.8<br>0.8<br>0.8<br>0.8<br>0.8<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5 | (244)<br>(345)<br>(244)<br>(244)<br>(249)<br>(259)<br>(351)<br>(352)<br>(355)<br>(355)<br>(355)<br>(355)                                     |  |
| 91)       0.9       (107)         92)       0.9       (110)         93)       0.9       (111)         94)       0.9       (111)         94)       0.9       (111)         94)       0.9       (111)         95)       0.9       (111)         96)       0.9       (112)         98)       0.9       (114)         99)       0.9       (114)         90)       0.9       (114)         100)       0.9       (114)         101)       0.9       (112)         102)       0.9       (122)         103)       0.9       (122)         104)       0.9       (122)         105)       0.9       (122)  | $ \begin{array}{c} 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (12) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (13) \\ 0.9 & (14) \\ 0.9 & (15) \\ 0.9 & (14) \\ 0.9 & (15)$   | $\begin{array}{c} 0.9\\ 0.7\\ 0.7\\ 0.7\\ 0.7\\ 0.7\\ 0.7\\ 0.7\\ 0.7$   | $\begin{array}{cccc} (145) & 0 \\ (146) & 0 \\ (147) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (152) & 0 \\ (152) & 0 \\ (153) & 0 \\ (153) & 0 \\ (154) & 0 \\ (155) & 0 \\ (156) & 0 \\ (158) & 0 \\ (158) & 0 \\ (159) & 0 \end{array}$ | $\begin{array}{ccccc} .9 & (163) \\ .9 & (164) \\ .9 & (165) \\ .9 & (166) \\ .9 & (167) \\ .9 & (169) \\ .9 & (170) \\ .9 & (170) \\ .9 & (170) \\ .9 & (177) \\ .9 & (1$ | 0.9<br>0.4<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9 | (271)<br>(272)<br>(274)<br>(274)<br>(274)<br>(276)<br>(276)<br>(277)<br>(279)<br>(280)<br>(281)<br>(283)<br>(283)<br>(284)<br>(285)          | 3.6.6.6.6.6.6.6.6.6.6.6.6.6.6.6.6.6.6.6   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(294)<br>(296)<br>(298)<br>(298)<br>(299)<br>(300)<br>(301)<br>(302)<br>(303)                   | 3<br>32<br>32<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2     | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(316)<br>(318)<br>(317)<br>(318)<br>(319)<br>(320)<br>(321)          | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7 | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(331)<br>(332)<br>(333)<br>(333)<br>(334)<br>(336)<br>(336)<br>(337)<br>(338)<br>(338)<br>(339)<br>(340)<br>(341) | 0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5        | (344)<br>(345)<br>(344)<br>(347)<br>(349)<br>(350)<br>(351)<br>(352)<br>(353)<br>(355)<br>(354)<br>(355)<br>(354)<br>(354)<br>(357)<br>(358) | 0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5   |

| $ \begin{array}{c} 2 \\ ( 2) \\ ( 2) \\ ( 3) \\ ( 4) \\ ( 4) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 64) \\ ( 22) \\ ( 64) \\ ( 64) \\ ( 22) \\ ( 64) \\$                                  | $\begin{array}{c} 4 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$   |
|---|--|
| $ \begin{pmatrix} 2 \\ 3 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$  | $\begin{array}{c} 5 \\ 0 \\ $ |
| $ \begin{pmatrix} 3 & 3 & 6.44 \\ 4 & 1 & 6.44 \\ 4 & 1 & 21 & 0.64 \\ 4 & 1 & 21 & 0.64 \\ 4 & 1 & 20 & 64 \\ 4 & 1 & 20 & 64 \\ 4 & 1 & 20 & 64 \\ 4 & 1 & 20 & 64 \\ 4 & 1 & 1 & 0.4 \\ 4 & 1$   | 7) 0.07<br>8) 0.07<br>4) 0.07<br>0) 0.07<br>1) 0.07<br>2) 0.07<br>3) 0.07<br>4) 0.07<br>5) 0.07  |
| $ \begin{pmatrix} 4 \\ 9 \\ 0.64 \\ (23) \\ 0.64 \\ (24) \\ 0.64 \\ (24) \\ 0.64 \\ (24) \\ 0.64 \\ (24) \\ 0.64 \\ (24) \\ 0.64 \\ (24) \\ 0.64 \\ (24) \\ 0.64 \\ (24) \\ 0.64 \\ (25) \\ 0.64 \\ (42) \\ 0.65 \\ (221) \\ 0.64 \\ (42) \\ 0.65 \\ (221) \\ 0.65 \\ (223) \\ 0.64 \\ (223) \\ 0.64 \\ (223) \\ 0.64 \\ (224) \\ 0.65 \\ (223) \\ 0.64 \\ (223) \\ 0.64 \\ (223) \\ 0.64 \\ (223) \\ 0.64 \\ (224) \\ 0.65 \\ (223) \\ 0.64 \\ (223) \\ 0.64 \\ (223) \\ 0.64 \\ (224) \\ 0.65 \\ (223) \\ 0.64 \\ (223) \\ 0.64 \\ (224) \\ 0.65 \\ (223) \\ 0.64 \\ (223) \\ 0.65 \\ (224) \\ 0.65 \\ (224) \\ 0.65 \\ (223) \\ 0.65 \\ (224) \\ 0.65 \\ (224) \\ 0.65 \\ (223) \\ 0.65 \\ (224) \\ 0.65 \\ (224) \\ 0.65 \\ (224) \\ 0.65 \\ (223) \\ 0.65 \\ (224) \\ 0.65 \\ (224) \\ 0.65 \\ (223) $ | <ul> <li>8) 0.07</li> <li>4) 0.07</li> <li>6) 0.07</li> <li>1) 0.07</li> <li>2) 0.07</li> <li>3) 0.07</li> <li>4) 0.07</li> <li>5) 0.07</li> </ul>   |
|   | 4) 0.07<br>0) 0.07<br>1) 0.07<br>2) 0.07<br>3) 0.07<br>3) 0.07<br>4) 0.07<br>5) 0.07   |
| $ \left( \begin{array}{c} 6 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$  | 0) 0.07<br>1) 0.07<br>2) 0.07<br>3) 0.07<br>4) 0.07<br>5) 0.07   |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | 0) 0.07<br>1) 0.07<br>2) 0.07<br>3) 0.07<br>4) 0.07<br>5) 0.07   |
| $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$   | 1) 0.07<br>2) 0.07<br>3) 0.07<br>4) 0.07<br>5) 0.07  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | 2)_0.07<br>3)_0.07<br>4)_0.07<br>5)_0.07   |
| $ \begin{array}{c} 100 \ 0.64 & ( \ 20 \ 0.64 & ( \ 20 \ 0.64 & ( \ 40 \ 0.4 & ( \ 61 \ 0.16 & ( \ 82 \ 0.07 & ( \ 14 \ 0.05 & ( \ 20 \ 0.07 & ( \ 22 \ 0$  | 3) 0.07<br>4) 0.07<br>5) 0.07  |
| $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$   | 4) 0.07<br>5) 0.07   |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $   | 5) 0.07  |
| $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$   |  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   |  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | 6) 0.07  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | 7) 0.07  |
| $ \begin{array}{c} (14) \ 0.54 \\ (13) \ 0.45 \\ (19) \ 0.67 \\ (19) \ 0.67 \\ (19) \ 0.67 \\ (110) \ 0.67 \\ (112) \ 0.67 \\ (112) \ 0.67 \\ (112) \ 0.67 \\ (112) \ 0.67 \\ (112) \ 0.67 \\ (112) \ 0.67 \\ (112) \ 0.67 \\ (112) \ 0.67 \\ (112) \ 0.67 \\ (112) \ 0.67 \\ (112) \ 0.67 \\ (112) \ 0.67 \\ (113) \ 0.34 \\ (144) \ 0.32 \\ (144) \ 0.32 \\ (145) \ 0.32 \\ (156) \ 0.32 \\ (156) \ 0.32 \\ (171) \ 0.43 \\ (1271) \ 0.45 \\ (192) \ 0.67 \\ (110) \ 0.67 \\ (112) \ 0.67 \\ (112) \ 0.67 \\ (112) \ 0.67 \\ (113) \ 0.34 \\ (149) \ 0.32 \\ (146) \ 0.32 \\ (156) \ 0.32 \\ (156) \ 0.32 \\ (171) \ 0.34 \\ (149) \ 0.32 \\ (166) \ 0.32 \\ (171) \ 0.34 \\ (171) \ 0.34 \\ (149) \ 0.32 \\ (166) \ 0.32 \\ (171) \ 0.34 \\ (171) \ 0.34 \\ (151) \ 0.34 \\ (151) \ 0.32 \\ (167) \ 0.32 \\ (167) \ 0.32 \\ (171) \ 0.34 \\ (127) \ 0.67 \\ (127) \ 0.67 \\ (129) \ 0.65 \\ (310) \ 0.16 \\ (320) \ 0.16 \\ (320) \ 0.16 \\ (321) \ 0.16 \\ (321) \ 0.16 \\ (321) \ 0.16 \\ (321) \ 0.16 \\ (321) \ 0.16 \\ (321) \ 0.16 \\ (322) \ 0.16 \\ (101) \ 0.67 \\ (116) \ 0.34 \\ (153) \ 0.32 \\ (171) \ 0.32 \\ (171) \ 0.32 \\ (171) \ 0.32 \\ (171) \ 0.32 \\ (171) \ 0.32 \\ (171) \ 0.32 \\ (271) \ 0.68 \\ (297) \ 0.65 \\ (315) \ 0.16 \\ (331) \ 0.16 \\ (334) \ 0.16 \\ (102) \ 0.67 \\ (116) \ 0.34 \\ (135) \ 0.34 \\ (135) \ 0.32 \\ (171) \ 0.35 \\ (171) \ 0.35 \\ (171) \ 0.35 \\ (1261) \ 0.68 \\ (297) \ 0.68 \\ (360) \ 0.68 \\ (360) \ 0.65 \\ (316) \ 0.16 \\ (334) \ 0.16 \\ (101) \ 0.67 \\ (116) \ 0.34 \\ (135) \ 0.34 \\ (135) \ 0.32 \\ (171) \ 0.35 \\ (171) \ 0.55 \\ (281) \ 0.68 \\ (297) \ 0.68 \\ (360) \ 0.65 \\ (316) \ 0.16 \\ (334) \ 0.16 \\ (102) \ 0.67 \\ (116) \ 0.34 \\ (135) \ 0.34 \\ (135) \ 0.34 \\ (135) \ 0.35 \\ (171) \ 0.55 \\ (126) \ 0.68 \\ (297) \ 0.68 \\ (300) \ 0.65 \\ (316) \ 0.16 \\ (334) \ 0.16 \\ (334) \ 0.16 \\ (102) \ 0.67 \\ (120) \ 0.67 \\ (120) \ 0.67 \\ (120) \ 0.67 \\ (120) \ 0.67 \\ (120)$   | B) 0.07  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | 9) J.07  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | 0) 0.07  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   |  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | 3) 1.136   |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | 4) 1.156   |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   |  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | 5) 1.155   |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | 5) 1.155<br>(6) 1.155  |
| $ \begin{pmatrix} 96 \\ 0.07 \\ (114) \\ 0.34 \\ (132) \\ 0.34 \\ (132) \\ 0.34 \\ (133) \\ 0.34 \\ (133) \\ 0.34 \\ (151) \\ 0.32 \\ (167) \\ 0.32 \\ (167) \\ 0.32 \\ (170) \\ 0.32 \\ (170) \\ 0.32 \\ (170) \\ 0.32 \\ (170) \\ 0.32 \\ (170) \\ 0.32 \\ (170) \\ 0.32 \\ (170) \\ 0.32 \\ (170) \\ 0.32 \\ (171) \\ 0.32 \\ (171) \\ 0.32 \\ (171) \\ 0.32 \\ (172) \\ 0.08 \\ (297) \\ 0.08 \\ (297) \\ 0.05 \\ (314) \\ 0.16 \\ (323) \\ 0.16 \\ (323) \\ 0.16 \\ (323) \\ 0.16 \\ (333) \\ 0.16 \\ (100) \\ 0.07 \\ (118) \\ 0.34 \\ (136) \\ 0.34 \\ (153) \\ 0.34 \\ (155) \\ 0.32 \\ (172) \\ 0.32 \\ (172) \\ 0.32 \\ (173) \\ 0.05 \\ (281) \\ 0.08 \\ (299) \\ 0.05 \\ (301) \\ 0.05 \\ (311) \\ 0.16 \\ (334) \\ 0.16 \\ (336) \\ 0.16 \\ (337) \\ 1.156 \\ (101) \\ 0.07 \\ (120) \\ 0.07 \\ (120) \\ 0.34 \\ (138) \\ 0.34 \\ (158) \\ 0.34 \\ (156) \\ 0.32 \\ (174) \\ 0.05 \\ (282) \\ 0.08 \\ (301) \\ 0.05 \\ (282) \\ 0.08 \\ (301) \\ 0.05 \\ (312) \\ 0.05 \\ (312) \\ 0.16 \\ (337) \\ 1.156 \\ (337) \\ 1.156 \\ (337) \\ 1.156 \\ (337) \\ 1.156 \\ (337) \\ 1.156 \\ (337) \\ 1.156 \\ (337) \\ 1.156 \\ (337) \\ 1.156 \\ (337) \\ 1.156 \\ (341) \\ 0.05 \\ (312) \\ 0.08 \\ (301) \\ 0.05 \\ (312) \\ 0$                 |  |
| $ \begin{pmatrix} 97 \\ 0.07 \\ (115) \\ 0.34 \\ (15) \\ 0.34 \\ (134) \\ 0.34 \\ (151) \\ 0.32 \\ (170) \\ 0.52 \\ (170) \\ 0.52 \\ (170) \\ 0.52 \\ (275) \\ 0.07 \\ (275) \\ 0.07 \\ (297) \\ 0.08 \\ (297) \\ 0.05 \\ (314) \\ 0.16 \\ (323) \\ 0.16 \\ (323) \\ 0.16 \\ (102) \\ 0.07 \\ (119) \\ 0.34 \\ (135) \\ 0.34 \\ (155) \\ 0.32 \\ (172) \\ 0.32 \\ (172) \\ 0.32 \\ (172) \\ 0.32 \\ (172) \\ 0.32 \\ (172) \\ 0.32 \\ (172) \\ 0.32 \\ (280) \\ 0.08 \\ (298) \\ 0.08 \\ (298) \\ 0.05 \\ (314) \\ 0.16 \\ (323) \\ 0.16 \\ (334) \\ 0.16 \\ (335) \\ 0.16 \\ (101) \\ 0.07 \\ (119) \\ 0.34 \\ (137) \\ 0.34 \\ (155) \\ 0.32 \\ (173) \\ 0.05 \\ (171) \\ 0.05 \\ (281) \\ 0.08 \\ (299) \\ 0.05 \\ (310) \\ 0.05 \\ (314) \\ 0.16 \\ (335) \\ 0.16 \\ (336) \\ 0.16 \\ (102) \\ 0.07 \\ (120) \\ 0.34 \\ (158) \\ 0.34 \\ (156) \\ 0.32 \\ (174) \\ 0.05 \\ (174) \\ 0.05 \\ (281) \\ 0.08 \\ (301) \\ 0.05 \\ (310) \\ 0.05 \\ (319) \\ 0.16 \\ (337) \\ 1.156 \\ (101) \\ 0.05 \\ (101) \\ 0.05 \\ (101) \\ 0.05 \\ (101) \\ 0.05 \\ (101) \\ 0.05 \\ (101) \\ 0.05 \\ (110$                | 6) 1.156<br>7) 1.155   |
| $ \begin{pmatrix} 98 \\ 0.07 \\ (116) \\ 0.34 \\ (135) \\ 0.34 \\ (135) \\ 0.34 \\ (155) \\ 0.32 \\ (171) \\ 0.32 \\ (171) \\ 0.32 \\ (171) \\ 0.32 \\ (171) \\ 0.32 \\ (171) \\ 0.32 \\ (171) \\ 0.32 \\ (171) \\ 0.32 \\ (171) \\ 0.32 \\ (171) \\ 0.32 \\ (171) \\ 0.32 \\ (171) \\ 0.32 \\ (171) \\ 0.32 \\ (171) \\ 0.32 \\ (171) \\ 0.32 \\ (171) \\ 0.32 \\ (172) \\ 0.32 \\ (172) \\ 0.32 \\ (173) \\ 0.05 \\ (281) \\ 0.08 \\ (297) \\ 0.05 \\ (315) \\ 0.15 \\ (316) \\ 0.16 \\ (334) \\ 0.16 \\ (334) \\ 0.16 \\ (334) \\ 0.16 \\ (334) \\ 0.16 \\ (335) \\ 0.16 \\ (101) \\ 0.07 \\ (119) \\ 0.34 \\ (138) \\ 0.34 \\ (155) \\ 0.32 \\ (173) \\ 0.05 \\ (281) \\ 0.08 \\ (301) \\ 0.05 \\ (301) \\ 0.05 \\ (311) \\ 0.16 \\ (334) \\ 0.16 \\ (336) \\ 0.16 \\ (336) \\ 0.15 \\ (101) \\ 0.05 \\ (281) \\ 0.08 \\ (301) \\ 0.05 \\ (311) \\ 0.05 \\ (312) \\ 0.05 \\ (312) \\ 0.16 \\ (337) \\ 1.156 \\ (321) \\ 0.16 \\ (337) \\ 1.156 \\ (321) \\ 0.05 \\ (311) \\ 0.05 \\ (321) \\ 0.05 \\ (321) \\ 0.05 \\ (321) \\ 0.05 \\ (312) \\ 0.05 \\ (312) \\ 0.05 \\ (312) \\ 0.16 \\ (337) \\ 1.156 \\ (321) \\ 0.05 \\ (312) \\ 0.05 \\ (312) \\ 0.05 \\ (312) \\ 0.05 \\ (312) \\ 0.16 \\ (337) \\ 0.16 \\ (331) \\ 0.16 \\ ($                | 6) 1.156<br>7) 1.156<br>18) 1.156  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | 6) 1.155<br>7) 1.155<br>8) 1.155<br>8) 1.155<br>9) 1.155   |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | 95) 1.155<br>97) 1.155<br>98) 1.155<br>99) 1.155<br>99) 1.155  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | 06) 1.156<br>(7) 1.155<br>(8) 1.156<br>(9) 1.156<br>(0) 1.156<br>(1) 1.156   |
| (102) 0.07 $(120) 0.34$ $(138) 0.34$ $(156) 0.32$ $(174) 0.05$ $(282) 0.08$ $(300) 0.05$ $(318) 0.18$ $(333) 0.16$ $(102) 0.07$ $(120) 0.34$ $(138) 0.34$ $(155) 0.272$ $(125) 0.05$ $(283) 0.08$ $(301) 0.05$ $(319) 0.16$ $(337) 1.156$ $(110) 0.05$ $(317) 0.16$ $(337) 1.156$ $(110) 0.05$ $(319) 0.16$ $(337) 0.16$ $(310) 0.05$ $(310) 0.05$ $(310) 0.16$   | 05) 1.155<br>7) 1.155<br>18) 1.155<br>9) 1.155<br>9) 1.155<br>60) 1.155<br>61) 1.155   |
| (102) $(102)$ $(102$  | 65) 1.155<br>7) 1.155<br>88) 1.155<br>99) 1.155<br>90) 1.155<br>11 1.156<br>92) 1.156<br>93) 1.156   |
|   | <ul> <li>(a) 1.155</li> <li>(b) 1.155</li> <li>(c) 1.155</li> <li>(c) 1.155</li> <li>(c) 1.156</li> <li>(c) 1.156</li> <li>(c) 1.156</li> <li>(c) 1.156</li> <li>(c) 1.156</li> </ul>  |
| (103) 0.07 (177) 0.34 (140) 0.34 (158) 0.232 (176) 0.05 (284) 0.08 (302) 0.05 (320) 0.18 (338) 1.138  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| (107) 0.07 (127) 0.74 (141) 0.32 (159) 0.32 (177) 0.05 (285) 0.08 (303) 0.05 (321) 0.18 (339) 1.136 (   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| (104) 0.07 $(124) 0.34$ $(142) 0.32$ $(160) 0.32$ $(178) 0.05$ $(286) 0.08$ $(304) 0.05$ $(322) 0.16$ $(340) 1.156$ $($   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| (108) $(.07)$ $(.175)$ $(.74)$ $(.72)$ $(.7$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| (107) $(143)$ $(143)$ $(143)$ $(167)$ $(167)$ $(170$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| (108) 0.07 (126) 0.34 (144) 0.32 (162) 0.32 (100) 0.03 (266) 0.08 (000) 0.05 (100) 0.0  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |

\_\_\_\_\_

( 55) 0.4

(70) 0.16

-----

(181) 0.05

(199) 0.34

"River discharge data at 12-hourly intervals for Station: 21D Period : 3

Phosphorus transport Berg River

Variable: VOELVL3.var1 (length = 360)

\_\_\_\_\_

.

A3.65

(253) 0.073

(235) 0.19

(217) 0.43

| riable: VO  | ELVL4.vari (   |  |   |  |  |   | (217) 0.9  | (235) 0.8   | (253) 2.5  |
|---|--|--|---|--|--|---|--|---|------------|
|   |  | ( 37) 3.4  | ( 55) 3.4   | ( 23) 5  | (181) 4.8  | (199) 0.9   | (217) 0.9  | (256) 0.8   | (254) 2.5  |
| 1) 3,404  | (17) 3.4   | ( 32) 3.4  | ( 56) 3.4   | (74) 5   | (182) 4.3  | (200) 9.9   |  | (237) 0.8   | (255) 2.74 |
| 2) 3.404  | ( 20) 3.4  |  | (57) 3.4  | (75) 5   | (1ម") 4.ម  | (201) 0.7   | (217) 0.8  |   | (256) 2.74 |
| 3) 3.4  | (21) 3.4   | ( 39) 3.4  |   | (76) 5   | (184) 4.3  | (202) 0.9   | (220) 0.8  | (238) 0.3   |            |
| 4) 3.4  | ( 22) 5.4  | (40) 3.4   | ( 58) 3.4   |  | (185) 4.8  | (203) 0.9   | (221) 0.8  | (239) 0.8   | (257) 2.74 |
| 5) 3.4  | ( 23) 3.4  | ( 4L) 3.4  | ( 59) 3.4   | (77) 5   | (186) 4.8  | (204) 0.9   | (222) 0.8  | (240) 0.8   | (258) 2.24 |
| 6) 3.4  | ( 24) 3,4  | (42) 3.4   | ( 60) 3.4   | (78) 5   | (187) 4.8  | (205) 0.4   | (223) 0,8  | (241) Ó.B   | (259) 2.74 |
| 7) 3.4  | (25) 3.4   | (43) 3.4   | (61) 3.4  | (79) 5   | (188) 4.8  | (205) 0.9   | (224) 0.8  | (242) 0.8   | (260) 2.74 |
| H) 3.4  | (26) 3.4   | (44) 3.4   | ( 62) 3.4   | ( 60) .5   |  | (207) 0.9   | (225) 0.8  | (247) 2.74  | (261) 2.5  |
|   | (27) 3.4   | (45) 3.4   | ( 65) 3.4   | (91)5  | (189) 4.8  |   | (225) 0.8  | (244) 2.74  | (242) 2.5  |
| 9) 3.4  |  | (46) 3.4   | (64) 3.4  | (82) 5   | (190) 4 ä  | (208) 0.9   | (227) 0.8  | (245) 2.74  | (263) 2.5  |
| 10) 3.4   | (28) 3.4   | (47) 3.4   | ( 65) 3.4   | (83) 5   | (141) Ú.Y  | (209) 0.9   |  | (246) 2.74  | (264) 2.5  |
| 1) 3.4  | (29) 3.4   |  | (66) 3.4  | (84) 5   | (192) 0.9  | (210) 0.9   | (228) 0.8  |   | (265) 2.74 |
| 12) 3.4   | (30)3.4  | (48) 3.4   |   | (85) 5   | (195) 0.9  | (211) 0.9   | (229) 0.8  | (247) 2.74  |            |
| 13) 3.4   | ( 31) 3.4  | ( 49) 3.4  | ( 67) 3.4   | •  | (194) 0.9  | (212) 0.9   | (200) 0.8  | (248) 2.74  | (266) 2.74 |
| (4) 3.4   | ( 32) 3.4  | ( 50) 3.4  | ( 68) 3.4   | (86)5  | (195) 0.9  | (213) 0.9   | (231) 0.8  | (249) 2.74  | (267) 2.74 |
| 5) 3.4  | ( 33) 3.4  | ( 51) 3.4  | ( 69) 3.4   | ( 87) 5  | (196) 0.9  | (214) 0.9   | (232) 0.8  | (250) 2.74  | (268) 2.74 |
| (6) 3.4   | (34) 3.4   | ( 52) 3.4  | ( 70) 3.4   | ( 88) 5  |  | (215) 0.9   | (237) 0.8  | (251) 2.74  | (269) 2.74 |
| 17} 3.4   | (35) 3.4   | ( 53) 3.4  | (71) 5  | (89) 5   | (100) 0 0  | 17161 11 9  | (234) 0.8  | (292) 2.74  | (270) 2.74 |
|   |  | (54) 3.4   | (72) 5  | (90)5  | (148) 014  | (210/ 0.7   |  |   |            |
| 18) 3.4   |  |  |   |  | -  |   |  |   |            |
|   |  |  |   |  | -  |   |  |   |            |
|   |  |  |   |  | (271) 2.74   | (287) 2.6   | (307) 0.9  | (325) 0.9   | (343) 0.4. |
|   | (109) 5  | (127) 5  | (145) 3.1   | (143) 4.8  | (271) 2.74<br>(272) 2.74   | (287) 2.6<br>(290) 2.5  | (307) 0.9<br>(308) 0.9   | (325) 0.9<br>(325) 0.9  | (343) 0.4. |
|   | (109) 5<br>(110) 5   | (127) 5<br>(128) 5   | (145) 3.1<br>(146) 3.1  | (163) 4.0<br>(164) 4.8   | (271) 2.74   | (287) 2.6   | (307) 0.9<br>(308) 0.9<br>(309) 0.9  | (325) 0.9<br>(326) 0.9<br>(327) 0.9   | (343) 0.4. |
| P1) 5<br>72) 5  | (109) 5<br>(110) 5<br>(111) 5  | (127) 5<br>(128) 5<br>(129) 5  | (145) 3.1<br>(146) 3.1<br>(147) 3.1   | (143) 4.8<br>(154) 4.8<br>(155) 4.8  | (271) 2.74<br>(272) 2.74   | (287) 2.6<br>(290) 2.5  | (307) 0.9<br>(308) 0.9<br>(309) 0.9<br>(310) 0.9   | (325) 0.9<br>(325) 0.9<br>(327) 0.9<br>(323) 0.9  | (343) 0.4. |
| 71) 5<br>72) 5<br>73) 5   | (109) 5<br>(110) 5   | (127) 5<br>(128) 5<br>(129) 5<br>(120) 5   | (145) 3.1<br>(146) 3.1<br>(147) 3.1<br>(146) 3.1  | (163) 4.8<br>(164) 4.8<br>(165) 4.8<br>(165) 4.8   | (271) 2.74<br>(272) 2.74<br>(273) 2.74<br>(274) 2.74   | (287) 2.4<br>(290) 2.5<br>(291) 2.6   | (307) 0.9<br>(308) 0.9<br>(309) 0.9  | (325) 0.9<br>(328) 0.9<br>(327) 0.9<br>(328) 0.9<br>(328) 0.9<br>(329) 0.43   | (343) 0.4. |
| <br>  | (109) 5<br>(110) 5<br>(111) 5  | (127) 5<br>(128) 5<br>(129) 5<br>(120) 5<br>(130) 5<br>(131) 5   | (145) 3.1<br>(146) 3.1<br>(147) 3.1<br>(146) 3.1<br>(149) 3.1   | (163) 4.0<br>(164) 4.8<br>(165) 4.8<br>(166) 4.8<br>(166) 4.8<br>(167) 4.8   | (271) 2.74<br>(272) 2.74<br>(273) 2.74<br>(273) 2.74<br>(274) 2.74<br>(275) 2.74   | (287) 2.4<br>(290) 2.5<br>(291) 2.6<br>(292) 2.5<br>(293) 2.5   | (307) 0.9<br>(308) 0.9<br>(309) 0.9<br>(310) 0.9   | (325) 0.9<br>(326) 0.9<br>(327) 0.9<br>(328) 0.9<br>(329) 0.43<br>(330) 0.43  | (343) 0.4. |
| 71) 5<br>72) 5<br>73) 5<br>73) 5<br>74) 5<br>75) 5  | (109) 5<br>(110) 5<br>(111) 5<br>(111) 5<br>(112) 5  | (127) 5<br>(128) 5<br>(129) 5<br>(129) 5<br>(120) 5<br>(121) 5<br>(122) 5  | (145) 3.1<br>(146) 3.1<br>(147) 3.1<br>(146) 3.1<br>(146) 3.1<br>(149) 3.1<br>(150) 3.1   | (163) 4.8<br>(164) 4.8<br>(165) 4.8<br>(156) 4.9<br>(157) 4.8<br>(157) 4.8<br>(158) 4.8  | (271) 2.74<br>(272) 2.74<br>(273) 2.74<br>(274) 2.74<br>(274) 2.74<br>(275) 2.74<br>(276) 2.74   | (289) 2.6<br>(290) 2.5<br>(291) 2.6<br>(292) 2.5<br>(295) 2.5<br>(294) 2.5  | $\begin{array}{c} (307) & 0.9 \\ (308) & 0.9 \\ (309) & 0.9 \\ (309) & 0.9 \\ (310) & 0.9 \\ (311) & 0.9 \end{array}$  | (325) 0.9<br>(328) 0.9<br>(327) 0.9<br>(328) 0.9<br>(328) 0.9<br>(329) 0.43   | (343) 0.4. |
| P1) 5<br>72) 5<br>73) 5<br>73) 5<br>74) 5<br>75) 5<br>94) 5   | (109) 5<br>(110) 5<br>(111) 5<br>(112) 5<br>(112) 5<br>(113) 5   | (127) 5<br>(128) 5<br>(129) 5<br>(120) 5<br>(130) 5<br>(131) 5   | $\begin{array}{c} (145) & 3.1 \\ (146) & 3.1 \\ (147) & 3.1 \\ (147) & 3.1 \\ (146) & 3.1 \\ (149) & 3.1 \\ (150) & 3.1 \\ (151) & 3.4 \end{array}$   | (143) 4.8<br>(164) 4.8<br>(165) 4.8<br>(166) 4.8<br>(166) 4.8<br>(164) 4.8<br>(164) 4.8<br>(169) 4.8   | (271) 2.74<br>(272) 2.74<br>(273) 2.74<br>(273) 2.74<br>(274) 2.74<br>(275) 2.74<br>(276) 2.74<br>(277) 2.5  | (287) 2.6<br>(290) 2.5<br>(291) 2.5<br>(292) 2.5<br>(293) 2.5<br>(294) 2.5<br>(295) 2.6   | $\begin{array}{cccc} (307) & 0.9 \\ (308) & 0.9 \\ (509) & 0.9 \\ (509) & 0.9 \\ (510) & 0.9 \\ (511) & 0.9 \\ (312) & 0.9 \end{array}$  | (325) 0.9<br>(326) 0.9<br>(327) 0.9<br>(328) 0.9<br>(329) 0.43<br>(330) 0.43  | (343) 0.4. |
| 91) 5<br>92) 5<br>93) 5<br>94) 5<br>95) 5<br>95) 5<br>94) 5<br>94) 5  | (109) 5<br>(110) 5<br>(111) 5<br>(112) 5<br>(112) 5<br>(113) 5<br>(114) 5<br>(115) 5   | (127) 5<br>(128) 5<br>(129) 5<br>(129) 5<br>(120) 5<br>(121) 5<br>(121) 5  | (145) 3.1<br>(146) 3.1<br>(147) 3.1<br>(143) 3.1<br>(143) 3.1<br>(150) 3.1<br>(151) 3.1<br>(152) 3.1  | (143) 4.8<br>(154) 4.8<br>(155) 4.8<br>(155) 4.8<br>(156) 4.8<br>(157) 4.8<br>(159) 4.8<br>(169) 4.8<br>(170) 4.8  | (1271) 2.74<br>(1272) 2.74<br>(1273) 1.74<br>(1274) 2.74<br>(1275) 1.74<br>(1275) 1.74<br>(1276) 1.74<br>(1277) 1.5<br>(1278) 2.5  | (287) 2.6<br>(290) 2.5<br>(291) 2.6<br>(292) 2.5<br>(295) 2.5<br>(294) 2.6<br>(295) 2.6<br>(295) 2.6  | $\begin{array}{c} (307) & 0.9 \\ (308) & 0.9 \\ (309) & 0.9 \\ (10) & 0.9 \\ (314) & 0.9 \\ (312) & 0.9 \\ (312) & 0.9 \\ (314) & 0.9 \end{array}$   | (325) 0.9<br>(325) 0.9<br>(327) 0.9<br>(323) 0.9<br>(329) 0.43<br>(330) 0.43<br>(331) 0.43  | (343) 0.4. |
| 91) 5<br>92) 5<br>93) 5<br>93) 5<br>94) 5<br>95) 5<br>96) 5<br>98) 5  | (109) 5<br>(110) 5<br>(111) 5<br>(112) 5<br>(112) 5<br>(112) 5<br>(114) 5<br>(114) 5<br>(115) 5<br>(116) 5   | (127) 5<br>(128) 5<br>(129) 5<br>(120) 5<br>(131) 5<br>(131) 5<br>(132) 5<br>(133) 5<br>(133) 5  | $\begin{array}{c} (145) & 3.1 \\ (146) & 3.1 \\ (147) & 3.1 \\ (147) & 3.1 \\ (146) & 3.1 \\ (149) & 3.1 \\ (150) & 3.1 \\ (151) & 3.4 \end{array}$   | (163) 4.9<br>(164) 4.8<br>(165) 4.9<br>(156) 4.8<br>(156) 4.8<br>(166) 4.8<br>(156) 4.8<br>(156) 4.8<br>(159) 4.8<br>(170) 4.8<br>(171) 4.8  | (271) 2.74<br>(272) 2.74<br>(273) 2.74<br>(274) 2.74<br>(274) 2.74<br>(275) 2.74<br>(276) 2.74<br>(277) 2.5<br>(279) 2.5   | (287) 2.4<br>(290) 2.5<br>(291) 2.6<br>(292) 2.5<br>(292) 2.5<br>(293) 2.6<br>(294) 2.6<br>(295) 2.6<br>(296) 2.6<br>(297) 2.6  | $\begin{array}{c} (307) & 0.9 \\ (309) & 0.9 \\ (509) & 0.9 \\ (510) & 0.9 \\ (511) & 0.9 \\ (512) & 0.9 \\ (512) & 0.9 \\ (512) & 0.9 \\ (514) & 0.9 \\ (315) & 0.9 \end{array}$  | (325) 0.9<br>(325) 0.9<br>(327) 0.9<br>(329) 0.40<br>(329) 0.40<br>(331) 0.43<br>(331) 0.43<br>(333) 0.43<br>(333) 0.43   | (343) 0.4. |
| 71) 5<br>72) 5<br>73) 5<br>74) 5<br>75) 5<br>94) 5<br>94) 5<br>98) 5<br>99) 5   | (109) 5<br>(110) 5<br>(111) 5<br>(112) 5<br>(112) 5<br>(113) 5<br>(114) 5<br>(114) 5<br>(116) 5<br>(116) 5<br>(117) 5  | (127) 5<br>(128) 5<br>(129) 5<br>(130) 5<br>(131) 5<br>(132) 5<br>(133) 5<br>(134) 5<br>(135) 5  | (145) 3.1<br>(146) 3.1<br>(147) 3.1<br>(143) 3.1<br>(143) 3.1<br>(150) 3.1<br>(151) 3.1<br>(152) 3.1  | (143) 4.8<br>(154) 4.8<br>(155) 4.8<br>(155) 4.8<br>(156) 4.8<br>(157) 4.8<br>(159) 4.8<br>(169) 4.8<br>(170) 4.8  | (271) 2.74<br>(272) 2.74<br>(273) 2.74<br>(273) 2.74<br>(274) 2.74<br>(275) 2.74<br>(276) 2.74<br>(277) 2.5<br>(278) 2.5<br>(279) 2.5<br>(280) 2.5   | (287) 2.4<br>(290) 2.5<br>(291) 2.5<br>(292) 2.5<br>(292) 2.5<br>(293) 2.5<br>(294) 2.5<br>(294) 2.5<br>(295) 2.6<br>(297) 2.6<br>(298) 2.6   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (325) 0.9<br>(328) 0.9<br>(328) 0.9<br>(329) 0.9<br>(329) 0.40<br>(730) 0.45<br>(331) 0.43<br>(335) 0.43<br>(335) 0.43<br>(335) 0.43  | (343) 0.4. |
| P1) 5<br>72) 5<br>73) 5<br>74) 5<br>74) 5<br>74) 5<br>74) 5<br>78) 5<br>79) 5<br>99) 5  | (109) 5<br>(110) 5<br>(111) 5<br>(112) 5<br>(112) 5<br>(113) 5<br>(114) 5<br>(114) 5<br>(115) 5<br>(116) 5<br>(117) 5<br>(118) 5   | (127) 5<br>(128) 5<br>(129) 5<br>(120) 5<br>(120) 5<br>(121) 5<br>(122) 5<br>(123) 5<br>(133) 5<br>(135) 5<br>(135) 5  | $\begin{array}{c} (145) & 3.1 \\ (146) & 3.1 \\ (147) & 3.1 \\ (147) & 3.1 \\ (149) & 3.1 \\ (150) & 3.1 \\ (151) & 3.1 \\ (152) & 3.1 \\ (152) & 3.1 \\ (154) & 3.1 \end{array}$   | (163) 4.9<br>(164) 4.8<br>(165) 4.9<br>(156) 4.8<br>(156) 4.8<br>(166) 4.8<br>(156) 4.8<br>(156) 4.8<br>(159) 4.8<br>(170) 4.8<br>(171) 4.8  | (271) 2.74<br>(272) 2.74<br>(273) 2.74<br>(274) 2.74<br>(274) 2.74<br>(276) 2.74<br>(276) 2.74<br>(277) 2.5<br>(278) 2.5<br>(280) 2.5<br>(281) 2.6   | (287) 2.6<br>(290) 2.5<br>(291) 2.6<br>(292) 2.5<br>(295) 2.6<br>(295) 2.6<br>(295) 2.6<br>(297) 2.6<br>(297) 2.6<br>(297) 2.6<br>(297) 0.9   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (343) 0.4. |
| 71)     5       72)     5       73)     5       74)     5       75)     5       94)     5       97)     5       98)     5       99)     5       90)     5       901)     5  | (109) 5<br>(110) 5<br>(111) 5<br>(112) 5<br>(112) 5<br>(114) 5<br>(114) 5<br>(114) 5<br>(115) 5<br>(116) 5<br>(116) 5<br>(116) 5<br>(119) 5  | (127) 5<br>(128) 5<br>(129) 5<br>(130) 5<br>(150) 5<br>(151) 5<br>(152) 5<br>(153) 5<br>(134) 5<br>(135) 5<br>(136) 5<br>(136) 5<br>(137) 3.1                                  | (145) 3.1<br>(146) 3.1<br>(147) 3.1<br>(147) 3.1<br>(146) 3.1<br>(150) 3.1<br>(151) 3.1<br>(152) 3.1<br>(153) 3.1<br>(154) 3.1<br>(155) 3.1   | $ \begin{array}{c} (163) & 4.8 \\ (164) & 4.8 \\ (165) & 4.8 \\ (156) & 4.8 \\ (157) & 4.8 \\ (157) & 4.8 \\ (169) & 4.8 \\ (169) & 4.8 \\ (170) & 4.8 \\ (171) & 4.8 \\ (172) & 4.8 \end{array} $                                     | (1271) 2.74<br>(272) 2.74<br>(273) 2.74<br>(274) 2.74<br>(274) 2.74<br>(276) 2.74<br>(277) 2.5<br>(279) 2.5<br>(279) 2.5<br>(290) 2.5<br>(291) 2.6<br>(281) 2.6  | (289) 2.6<br>(290) 2.5<br>(291) 2.5<br>(291) 2.5<br>(295) 2.5<br>(294) 2.6<br>(294) 2.6<br>(296) 2.6<br>(296) 2.6<br>(297) 2.6<br>(299) 0.9<br>(300) 0.9  | $\begin{array}{c} (307) & 0.9 \\ (308) & 0.9 \\ (509) & 0.9 \\ (510) & 0.9 \\ (511) & 0.9 \\ (512) & 0.9 \\ (512) & 0.9 \\ (512) & 0.9 \\ (514) & 0.9 \\ (514) & 0.9 \\ (515) & 0.9 \\ (516) & 0.9 \\ (518) & 0.9 \end{array}$   | (325) 0.9<br>(326) 0.9<br>(327) 0.9<br>(329) 0.40<br>(329) 0.40<br>(329) 0.43<br>(331) 0.43<br>(332) 0.43<br>(333) 0.43<br>(335) 0.43<br>(335) 0.43<br>(336) 0.43                             | (343) 0.4. |
| 91)     5       92)     5       93)     5       94)     5       95)     5       98)     5       99)     5       90)     5       901)     5       92)     5  | (109) 5<br>(110) 5<br>(111) 5<br>(112) 5<br>(112) 5<br>(114) 5<br>(114) 5<br>(114) 5<br>(115) 5<br>(116) 5<br>(116) 5<br>(117) 5<br>(119) 5<br>(120) 5   | $\begin{array}{c} (127) 5 \\ (128) 5 \\ (129) 5 \\ (150) 5 \\ (151) 5 \\ (152) 5 \\ (153) 5 \\ (134) 5 \\ (135) 5 \\ (135) 5 \\ (136) 5 \\ (137) 3.1 \\ (138) 3.1 \end{array}$ | $\begin{array}{c} (145) & 3.1 \\ (146) & 3.1 \\ (147) & 3.1 \\ (147) & 3.1 \\ (149) & 3.1 \\ (150) & 3.1 \\ (151) & 3.1 \\ (152) & 3.1 \\ (152) & 3.1 \\ (153) & 3.1 \\ (155) & 3.1 \\ (156) & 3.1 \end{array}$   | (143) 4.8<br>(164) 4.8<br>(165) 4.8<br>(166) 4.8<br>(166) 4.8<br>(166) 4.8<br>(169) 4.8<br>(169) 4.8<br>(170) 4.8<br>(171) 4.8<br>(171) 4.8<br>(172) 4.8<br>(173) 4.8<br>(173) 4.8   | (271) 2.74<br>(272) 2.74<br>(273) 2.74<br>(273) 2.74<br>(274) 2.74<br>(275) 2.74<br>(276) 2.74<br>(277) 2.5<br>(279) 2.5<br>(279) 2.5<br>(290) 2.5<br>(291) 2.6<br>(263) 2.6   | (287) 2.6<br>(290) 2.5<br>(291) 2.6<br>(291) 2.5<br>(291) 2.5<br>(291) 2.5<br>(291) 2.5<br>(291) 2.6<br>(294) 2.6<br>(296) 2.6<br>(296) 2.6<br>(296) 2.6<br>(299) 0.9<br>(300) 0.9<br>(301) 0.9                           | $\begin{array}{c} (307) & 0.9 \\ (309) & 0.9 \\ (509) & 0.9 \\ (510) & 0.9 \\ (511) & 0.9 \\ (512) & 0.9 \\ (512) & 0.9 \\ (512) & 0.9 \\ (314) & 0.9 \\ (315) & 0.9 \\ (515) & 0.9 \\ (516) & 0.9 \\ (517) & 0.9 \\ (519) & 0.9 \end{array}$  | (325) 0.9<br>(326) 0.9<br>(327) 0.9<br>(329) 0.43<br>(329) 0.43<br>(330) 0.43<br>(331) 0.43<br>(333) 0.43<br>(333) 0.43<br>(333) 0.43<br>(334) 0.43<br>(335) 0.43<br>(336) 0.43<br>(337) 0.45 | (343) 0.4. |
| 71)     5       72)     5       73)     5       74)     5       75)     5       94)     5       94)     5       98)     5       99)     5       00)     5       01)     5       02)     5       03)     5   | (109) 5<br>(110) 5<br>(111) 5<br>(112) 5<br>(112) 5<br>(113) 5<br>(114) 5<br>(114) 5<br>(115) 5<br>(116) 5<br>(117) 5<br>(116) 5<br>(117) 5<br>(119) 5<br>(120) 5<br>(121) 5                       | (127) 5<br>(128) 5<br>(129) 5<br>(130) 5<br>(131) 5<br>(132) 5<br>(133) 5<br>(134) 5<br>(135) 5<br>(135) 5<br>(135) 5<br>(136) 5<br>(137) 3.1<br>(139) 3.1                     | (145) 3.1<br>(146) 3.1<br>(147) 3.1<br>(143) 3.1<br>(143) 3.1<br>(150) 3.1<br>(151) 3.1<br>(152) 3.1<br>(152) 3.1<br>(154) 3.1<br>(156) 3.1<br>(157) 3.1  | (143) 4.8<br>(164) 4.8<br>(165) 4.8<br>(156) 4.8<br>(156) 4.8<br>(157) 4.8<br>(159) 4.8<br>(159) 4.8<br>(170) 4.8<br>(171) 4.8<br>(172) 4.8<br>(173) 4.8<br>(173) 4.8<br>(175) 4.8   | (1271) 2.74<br>(272) 2.74<br>(273) 2.74<br>(274) 2.74<br>(274) 2.74<br>(276) 2.74<br>(277) 2.5<br>(279) 2.5<br>(279) 2.5<br>(290) 2.5<br>(291) 2.6<br>(281) 2.6  | (289) 2.6<br>(290) 2.5<br>(291) 2.5<br>(291) 2.5<br>(295) 2.5<br>(294) 2.6<br>(294) 2.6<br>(296) 2.6<br>(296) 2.6<br>(297) 2.6<br>(299) 0.9<br>(300) 0.9  | (307) 0.9<br>(309) 0.9<br>(509) 0.9<br>(514) 0.9<br>(512) 0.9<br>(312) 0.9<br>(313) 0.9<br>(315) 0.9<br>(315) 0.9<br>(315) 0.9<br>(516) 0.9<br>(518) 0.9<br>(319) 0.9<br>(319) 0.9<br>(320) 0.9  | (325) 0.9<br>(325) 0.9<br>(325) 0.9<br>(327) 0.9<br>(327) 0.9<br>(329) 0.40<br>(730) 0.43<br>(331) 0.43<br>(333) 0.43<br>(333) 0.43<br>(334) 0.43<br>(335) 0.43<br>(335) 0.43<br>(337) 0.45   | (343) 0.4. |
| 91)       5         92)       5         93)       5         94)       5         95)       5         94)       5         97)       5         98)       5         99)       5         90)       5         90)       5         91)       5         92)       5         93)       5         93)       5 | (109) 5<br>(110) 5<br>(111) 5<br>(112) 5<br>(112) 5<br>(113) 5<br>(114) 5<br>(114) 5<br>(115) 5<br>(116) 5<br>(117) 5<br>(118) 5<br>(117) 5<br>(120) 5<br>(121) 5<br>(122) 5                       | (127) 5(128) 5(129) 5(120) 5(120) 5(121) 5(122) 5(123) 5(135) 5(135) 5(135) 5(136) 5(137) 3.1(139) 3.1(140) 3.1  | $      \begin{array}{c} (145) & 3.1 \\ (146) & 3.1 \\ (147) & 3.1 \\ (147) & 3.1 \\ (150) & 3.1 \\ (150) & 3.1 \\ (151) & 3.1 \\ (152) & 3.1 \\ (153) & 3.1 \\ (154) & 3.1 \\ (156) & 3.1 \\ (157) & 3.1 \\ (158) & 3.1 \end{array} $   | (163) 4.8<br>(164) 4.8<br>(165) 4.9<br>(156) 4.9<br>(157) 4.8<br>(156) 4.8<br>(156) 4.8<br>(159) 4.8<br>(170) 4.8<br>(171) 4.8<br>(171) 4.8<br>(172) 4.8<br>(173) 4.8<br>(175) 4.8<br>(175) 4.8<br>(175) 4.8                           | (271) 2.74<br>(272) 2.74<br>(273) 2.74<br>(273) 2.74<br>(274) 2.74<br>(275) 2.74<br>(276) 2.74<br>(277) 2.5<br>(279) 2.5<br>(279) 2.5<br>(290) 2.5<br>(291) 2.6<br>(263) 2.6   | (287) 2.6<br>(290) 2.5<br>(291) 2.6<br>(291) 2.5<br>(291) 2.5<br>(291) 2.5<br>(291) 2.5<br>(291) 2.6<br>(294) 2.6<br>(296) 2.6<br>(296) 2.6<br>(296) 2.6<br>(299) 0.9<br>(300) 0.9<br>(301) 0.9                           | $\begin{array}{c} (307) & 0.9 \\ (308) & 0.9 \\ (309) & 0.9 \\ (310) & 0.9 \\ (311) & 0.9 \\ (312) & 0.9 \\ (312) & 0.9 \\ (312) & 0.9 \\ (313) & 0.9 \\ (314) & 0.9 \\ (315) & 0.9 \\ (315) & 0.9 \\ (317) & 0.9 \\ (318) & 0.9 \\ (319) & 0.9 \\ (320) & 0.9 \\ (321) & 0.9 \end{array}$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (343) 0.4. |
| 91)     5       92)     5       93)     5       94)     5       95)     5       94)     5       97)     5       98)     5       99)     5       00)     5       01)     5       03)     5       04)     5   | (109) 5<br>(110) 5<br>(111) 5<br>(112) 5<br>(112) 5<br>(113) 5<br>(114) 5<br>(114) 5<br>(114) 5<br>(116) 5<br>(117) 5<br>(118) 5<br>(117) 5<br>(119) 5<br>(120) 5<br>(121) 5<br>(122) 5<br>(123) 5 | (127) 5(128) 5(129) 5(129) 5(130) 5(131) 5(133) 5(133) 5(135) 5(135) 5(136) 5(137) 3.1(139) 3.1(140) 3.1(141) 3.1  | (145) 3.1<br>(146) 3.1<br>(147) 3.1<br>(147) 3.1<br>(149) 3.1<br>(150) 3.1<br>(151) 3.1<br>(152) 3.1<br>(153) 3.1<br>(154) 3.1<br>(156) 3.1<br>(157) 3.1<br>(158) 3.1<br>(158) 3.1  | (163) 4.0<br>(164) 4.8<br>(165) 4.0<br>(156) 4.9<br>(156) 4.8<br>(157) 4.8<br>(154) 4.8<br>(154) 4.8<br>(170) 4.8<br>(171) 4.8<br>(172) 4.8<br>(173) 4.8<br>(175) 4.8<br>(175) 4.8<br>(175) 4.8<br>(177) 4.8                           | (271) 2.74<br>(272) 2.74<br>(273) 2.74<br>(273) 2.74<br>(274) 2.74<br>(276) 2.74<br>(277) 2.5<br>(279) 2.5<br>(279) 2.5<br>(280) 2.5<br>(281) 2.6<br>(283) 2.6<br>(285) 2.6  | (287) 2.4<br>(290) 2.5<br>(291) 2.6<br>(292) 2.5<br>(292) 2.5<br>(295) 2.6<br>(294) 2.5<br>(295) 2.6<br>(295) 2.6<br>(296) 2.6<br>(297) 2.6<br>(298) 2.6<br>(299) 0.9<br>(300) 0.9<br>(301) 0.9<br>(302) 0.9              | (307) 0.9<br>(309) 0.9<br>(509) 0.9<br>(514) 0.9<br>(512) 0.9<br>(312) 0.9<br>(313) 0.9<br>(315) 0.9<br>(315) 0.9<br>(315) 0.9<br>(516) 0.9<br>(518) 0.9<br>(319) 0.9<br>(319) 0.9<br>(320) 0.9  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (343) 0.43 |
| 91) 5<br>92) 5<br>93) 5<br>94) 5<br>95) 5<br>95) 5<br>97) 5<br>98) 5<br>97) 5<br>98) 5<br>97) 5<br>01) 5<br>01) 5<br>02) 5<br>03] 5<br>03] 5  | (109) 5<br>(110) 5<br>(111) 5<br>(112) 5<br>(112) 5<br>(113) 5<br>(114) 5<br>(114) 5<br>(115) 5<br>(116) 5<br>(117) 5<br>(118) 5<br>(117) 5<br>(120) 5<br>(121) 5<br>(122) 5                       | (127) 5(128) 5(129) 5(130) 5(131) 5(132) 5(133) 5(134) 5(135) 5(135) 5(136) 5(137) 3.1(138) 3.1(139) 3.1(140) 3.1(141) 3.1   | $      \begin{array}{c} (145) & 3.1 \\ (146) & 3.1 \\ (147) & 3.1 \\ (147) & 3.1 \\ (149) & 3.1 \\ (150) & 3.1 \\ (151) & 3.1 \\ (152) & 3.1 \\ (152) & 3.1 \\ (155) & 3.1 \\ (155) & 3.1 \\ (156) & 3.1 \\ (157) & 3.1 \\ (159) & 3.1 \\ (159) & 3.1 \\ (160) & 3.1 \\ \end{array} $ | (143) 4.0<br>(164) 4.8<br>(165) 4.9<br>(166) 4.8<br>(166) 4.8<br>(166) 4.8<br>(169) 4.8<br>(169) 4.8<br>(170) 4.8<br>(171) 4.8<br>(172) 4.8<br>(173) 4.8<br>(173) 4.8<br>(175) 4.8<br>(175) 4.8<br>(177) 4.8<br>(177) 4.8<br>(177) 4.8 | (1271) 2.74<br>(272) 2.74<br>(273) 2.74<br>(274) 2.74<br>(274) 2.74<br>(276) 2.74<br>(277) 2.5<br>(279) 2.5<br>(279) 2.5<br>(290) 2.5<br>(291) 2.4<br>(282) 2.4<br>(283) 2.4<br>(284) 2.6  | (289) 2.4<br>(290) 2.5<br>(291) 2.5<br>(291) 2.5<br>(295) 2.5<br>(295) 2.6<br>(296) 2.6<br>(296) 2.6<br>(297) 2.6<br>(297) 2.6<br>(299) 0.9<br>(300) 0.9<br>(300) 0.9<br>(301) 0.9<br>(302) 0.9<br>(303) 0.9<br>(304) 0.9 | $\begin{array}{c} (307) & 0.9 \\ (308) & 0.9 \\ (309) & 0.9 \\ (310) & 0.9 \\ (311) & 0.9 \\ (312) & 0.9 \\ (312) & 0.9 \\ (312) & 0.9 \\ (313) & 0.9 \\ (314) & 0.9 \\ (315) & 0.9 \\ (315) & 0.9 \\ (317) & 0.9 \\ (318) & 0.9 \\ (319) & 0.9 \\ (320) & 0.9 \\ (321) & 0.9 \end{array}$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |            |
|   | (109) 5<br>(110) 5<br>(111) 5<br>(112) 5<br>(112) 5<br>(113) 5<br>(114) 5<br>(114) 5<br>(114) 5<br>(116) 5<br>(117) 5<br>(118) 5<br>(117) 5<br>(119) 5<br>(120) 5<br>(121) 5<br>(122) 5<br>(123) 5 | (127) 5(128) 5(129) 5(129) 5(130) 5(131) 5(133) 5(133) 5(135) 5(135) 5(136) 5(137) 3.1(139) 3.1(140) 3.1(141) 3.1  | (145) 3.1<br>(146) 3.1<br>(147) 3.1<br>(147) 3.1<br>(149) 3.1<br>(150) 3.1<br>(151) 3.1<br>(152) 3.1<br>(153) 3.1<br>(154) 3.1<br>(156) 3.1<br>(157) 3.1<br>(158) 3.1<br>(158) 3.1  | (163) 4.0<br>(164) 4.8<br>(165) 4.0<br>(156) 4.9<br>(156) 4.8<br>(157) 4.8<br>(154) 4.8<br>(154) 4.8<br>(170) 4.8<br>(171) 4.8<br>(172) 4.8<br>(173) 4.8<br>(175) 4.8<br>(175) 4.8<br>(175) 4.8<br>(177) 4.8                           | $\begin{array}{c} (271) & 2.74 \\ (272) & 2.74 \\ (273) & 2.74 \\ (273) & 2.74 \\ (274) & 2.74 \\ (274) & 2.74 \\ (276) & 2.5 \\ (279) & 2.5 \\ (279) & 2.5 \\ (280) & 2.5 \\ (281) & 2.6 \\ (282) & 2.6 \\ (285) & 2.6 \\ (284) & 2.6 \\ (284) & 2.6 \\ (286) & 2.6 \\ (287) & 2.6 \\ (287) & 2.6 \\ \end{array}$ | (287) 2.6<br>(290) 2.5<br>(291) 2.6<br>(292) 2.5<br>(295) 2.6<br>(295) 2.6<br>(295) 2.6<br>(297) 2.6<br>(297) 2.6<br>(297) 2.6<br>(297) 2.6<br>(297) 0.9<br>(300) 0.9<br>(301) 0.9<br>(302) 0.9                           | (307) 0.9<br>(308) 0.9<br>(509) 0.9<br>(510) 0.9<br>(312) 0.9<br>(312) 0.9<br>(312) 0.9<br>(315) 0.9<br>(315) 0.9<br>(315) 0.9<br>(317) 0.9<br>(318) 0.9<br>(319) 0.9<br>(320) 0.9<br>(321) 0.9<br>(321) 0.9<br>(322) 0.9  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (343) 0.43 |

- -

Phosphorus transport Berg River

- - - -

|  | LVLS.varl (le   | engtn = 2007  |   |  | *   |  |   |  | (255) 0.96   |
|--|---|---|---|--|---|--|---|--|--|
|  |   | ( 37) 0.4   | ( 55) 0.29  | (73)0.6  | (181) 0.95  | (199) 0.96   | (217) 0.96  | (235) 0.96   | (253) 0.75<br>(254) 0.75   |
| 0.403  | ( 17) 0.4   |   | ( 56) 0.28  | (74) 0.6   | (192) 0.96  | (200) 0.96   | (218) 0.96  | (236) 0.96   | (255) 0.76   |
| 0,403  | (20) 0.4  | ( 38) 0.4   | ( 57) 0.28  | (75) 0.6   | (193) 0.95  | (201) 0.96   | (219) 0.96  | (237) 0.96   |  |
| 0.403  | ( 21) 0.4   | ( 39) 0.4   |   | (76) 0.6   | (184) 0.96  | (202) 0.96   | (220) 0.96  | (238) 0.96   | (256) 0.96   |
| 0.403  | (22) 0.4  | (40)0.4   | ( 58) 0.28  | (77) 0.6   | (135) 0.96  | (203) 0.96   | (221) 0.95  | (239) 0.96   | (257) 0.96   |
| 0,406  | ( 23) Ŭ.41  | (41) 0.4  | ( 59) 0.28  |  | (186) 0.95  | (204) 0.96   | (222) 0.96  | (240) 0.96   | (258) 0.95   |
| 0.406  | (24) 0.41   | (42)0.4   | ( 60) 0.28  | (78) 0.6   | (187) 0.96  | (205) 0.96   | (223) 0.96  | (241) 0.95   | (259) 0.96   |
| 0.4  | (25) 0.4  | (43)0.28  | ( 61) 0.28  | (79) 0.6   | (188) 0.96  | (206) 0.96   | (224) 0.96  | (242) 0.96   | (260) 0.96   |
| 0.4  | (26) 0.4  | (44)0.28  | ( a2) 0.28  | (80)0.4  | (134) 0.96  | (207) 0.96   | (225) 0.96  | (243) 0.96   | (261) 0.96   |
| ) ().4   | (27) 0.4  | (45)0.28  | ( 63) 0.28  | (81)0.6  |   | (208) 0.96   | (226) 0.96  | (244) 0.96   | (252) 0.95   |
| ) 0.4  | (28) 0.4  | (46) 0.28   | ( 64) 0.28  | (82)0.6  | (190) 0.96  | (209) 0,96   | _(227)_0.96   |  |  |
| 0.4  | (29) 0.4  | (47) 0.28   | ( 55) Q.28  | (83)0.5  | (191) 0.96  |  | (228) 0.96  | (246) 0.96   | (264) 0.96   |
|  | ( 30)_0.4   | _(_48)_0.28   |   | (-84)-0-6  | (192) 0.96  | (210) 0.96   | (229) 0.96  | (247) 0.96   | (265) 0.96   |
| 0.4  | ( 31) 0.4   | ( 49) 0.28  | ( 67) 0.28  | (85)0.4  | (193) 0.95  | (211) 0.96   | (229) 0.96<br>(230) 0.96  | (248) 0.96   | (266) 0.96   |
| 0.4  | (32) 0.4  | ( 50) 0.28  | ( 68) 0.29  | (86)0.6  | (194) V.96  | (212) 0.96   |   | (247) 0.96   | (257) 0.96   |
| 0.4  |   | (51) 0.28   | ( 69) 0.28  | (87) 0.6   | (195) 0.96  | (213) 0.96   | (231) 0.96  | (250) 0.96   | (268) 0.96   |
| 0.4  | (33)0.4   | (52) 0.28   | (70) 0.28   | ( 88) 0.6  | (196) 0.96  | (214) 0.96   | (232) 0.96  |  | (269) 0.96   |
| 0.4  | (34) 0.4  |   | (71) 0.28   | ( 87) 0.6  |   | (215) 0.96   | (233) 0.96  | (251) 0.96   | (287) 0.70<br>(270) 0.96   |
| ) 0.4<br>1 0.4   | (35)0.4<br>(36)0.4  | (53)0.28<br>(54)0.28  | (72) 0.28   | ( 90) 0.6  | (198) 0.96  | (216) 0.96   | (234) 0.96  | (252) 0.96   | (270) 0.76   |
|  |   |   |   |  |   |  |   |  |  |
|  |   |   |   |  |   |  |   |  |  |
|  |   |   |   |  | -   |  |   |  |  |
|  |   |   |   |  | (2/1) 0.96  | (289) 0.43   | (307) 0.126   | (325) 0.126  | (343) 0.27   |
| 1 0.5  | (109) 0.6   | (127) 0.7   | (145) 0.7   | (163) 0.78   |   | (289) 0.43<br>(290) 0.43   | (307) 0.126<br>(308) 0.126  | (325) 0.126<br>(326) 0.126   | (343) 0.27<br>(344) 0.27   |
| ) 0.5<br>) 0.6   | (109) 0.6<br>(110) 0.6  | (127) 0.7<br>(128) 0.7  | (145) 0.7<br>(146) 0.7  | (163) 0.78<br>(164) 0.78   | (271) 0.96<br>(272) 0.96  | (289) 0.43   | (307) 0.126<br>(308) 0.126<br>(309) 0.126   | (325) 0.126<br>(326) 0.126<br>(327) 0.128  | (343) 0.27<br>(344) 0.27<br>(345) 0.27   |
| ) 0.5<br>) 0.6   | (109) 0.6<br>(110) 0.6<br>(111) 0.7   | (127) 0.7<br>(128) 0.7<br>(129) 0.7   | (145) 0.7<br>(146) 0.7<br>(147) 0.7   | (163) 0.78<br>(164) 0.79<br>(165) 0.78   | (271) 0.96<br>(272) 0.96<br>(273) 0.96  | (289) 0.43<br>(290) 0.43   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (325) 0.126<br>(326) 0.126<br>(327) 0.128<br>(328) 0.125   | (343) 0.27<br>(344) 0.27<br>(345) 0.27<br>(345) 0.27   |
| ) 0.5<br>) 0.6<br>) 0.5  | (109) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7  | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(130) 0.7  | (145) 0.7<br>(146) 0.7<br>(147) 0.7<br>(144) 0.7  | (163) 0.78<br>(164) 0.78<br>(165) 0.78<br>(166) 0.78<br>(166) 0.78   | (271) 0.96<br>(272) 0.96<br>(273) 0.96<br>(273) 0.96<br>(274) 0.96  | (289) 0.43<br>(290) 0.43<br>(291) 0.43   | $\begin{array}{cccc} (307) & 0.126 \\ (308) & 0.126 \\ (309) & 0.126 \\ (310) & 0.125 \\ (311) & 0.1257 \end{array}$  | (325) 0.126<br>(326) 0.126<br>(327) 0.126<br>(328) 0.126<br>(328) 0.126<br>(329) 0.27                            | (343) 0.27<br>(344) 0.27<br>(345) 0.27<br>(345) 0.27<br>(345) 0.27<br>(347) 0.27   |
| ) 0.5<br>) 0.6<br>) 0.6<br>) 0.5   | (109) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(112) 0.7   | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(120) 0.7<br>(130) 0.7<br>(131) 0.7  | (145) 0.7<br>(144) 0.7<br>(147) 0.7<br>(148) 0.7<br>(149) 0.7<br>(149) 0.7  | (143) 0.78<br>(164) 0.78<br>(165) 0.78<br>(166) 0.78<br>(167) 0.78   | (271) 0.96<br>(272) 0.96<br>(273) 0.96<br>(274) 0.96<br>(275) 0.96  | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(292) 0.43<br>(293) 0.43   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (325) 0.126<br>(326) 0.126<br>(307) 0.126<br>(328) 0.125<br>(329) 0.27<br>(330) 0.27                             | (343) 0.27<br>(344) 0.27<br>(345) 0.27<br>(345) 0.27<br>(345) 0.27<br>(347) 0.27<br>(348) 0.27   |
| ) 0.5<br>) 0.6<br>) 0.5<br>) 0.5<br>J 0.6  | (109) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7  | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(130) 0.7<br>(131) 0.7<br>(131) 0.7<br>(132) 0.7   | (145) 0.7<br>(146) 0.7<br>(147) 0.7<br>(148) 0.7<br>(148) 0.7<br>(150) 0.7  | (143) 0.78<br>(164) 0.78<br>(165) 0.78<br>(165) 0.78<br>(167) 0.78<br>(167) 0.78<br>(153) 0.78   | (271) 0.94<br>(272) 0.95<br>(273) 0.96<br>(274) 0.96<br>(274) 0.96<br>(275) 0.96<br>(275) 0.96  | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(293) 0.43<br>(293) 0.43<br>(294) 0.43   | $\begin{array}{cccc} (307) & 0.126 \\ (308) & 0.126 \\ (309) & 0.126 \\ (310) & 0.125 \\ (311) & 0.1257 \end{array}$  | (325) 0.126<br>(326) 0.126<br>(307) 0.126<br>(328) 0.125<br>(329) 0.27<br>(330) 0.27<br>(330) 0.27<br>(531) 0.27 | (343) 0.27<br>(344) 0.27<br>(345) 0.27<br>(345) 0.27<br>(347) 0.27<br>(348) 0.27<br>(349) 0.27   |
| 0.5<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6   | (109) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(112) 0.7   | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(130) 0.7<br>(131) 0.7<br>(131) 0.7<br>(132) 0.7<br>(133) 0.7  | (145) 0.7<br>(146) 0.7<br>(147) 0.7<br>(148) 0.7<br>(148) 0.7<br>(149) 0.7<br>(150) 0.7<br>(151) 0.7  | (163) 0.78<br>(164) 0.79<br>(165) 0.78<br>(165) 0.78<br>(167) 0.78<br>(158) 0.78<br>(159) 0.78   | $\begin{array}{cccc} (271) & 0.96 \\ (272) & 0.96 \\ (273) & 0.96 \\ (274) & 0.96 \\ (274) & 0.96 \\ (275) & 0.96 \\ (275) & 0.96 \\ (277) & 0.96 \end{array}$                  | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(295) 0.43<br>(295) 0.43<br>(295) 0.43<br>(295) 0.43   | $\begin{array}{c} (307) & 0.126 \\ (308) & 0.126 \\ (309) & 0.126 \\ (310) & 0.125 \\ (311) & 0.1257 \\ (312) & 0.1267 \end{array}$   | (325) 0.126<br>(326) 0.126<br>(307) 0.126<br>(328) 0.125<br>(329) 0.27<br>(330) 0.27                             | (343) 4127<br>(344) 0.27<br>(345) 0.27<br>(345) 0.27<br>(348) 0.27<br>(348) 0.27<br>(349) 0.27<br>(350) 0.27   |
| ) 0.5<br>) 0.6<br>) 0.6<br>) 0.6<br>J 0.6<br>J 0.6<br>) 0.6  | (109) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(113) 0.7<br>(113) 0.7  | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(130) 0.7<br>(131) 0.7<br>(131) 0.7<br>(132) 0.7   | (145) 0.7<br>(144) 0.7<br>(147) 0.7<br>(148) 0.7<br>(149) 0.7<br>(150) 0.7<br>(151) 0.7<br>(151) 0.7<br>(152) 0.7   | (163) 0.78<br>(164) 0.78<br>(155) 0.78<br>(156) 0.78<br>(156) 0.78<br>(157) 0.78<br>(158) 0.78<br>(159) 0.78<br>(159) 0.78   | $\begin{array}{ccccc} (2/1) & 0.96 \\ (2/2) & 0.96 \\ (273) & 0.96 \\ (274) & 0.96 \\ (275) & 0.96 \\ (275) & 0.96 \\ (274) & 0.96 \\ (274) & 0.96 \\ (278) & 0.96 \end{array}$ | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(295) 0.43<br>(295) 0.43<br>(295) 0.43<br>(295) 0.43<br>(295) 0.43   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (325) 0.126<br>(326) 0.126<br>(307) 0.126<br>(328) 0.125<br>(329) 0.27<br>(330) 0.27<br>(330) 0.27<br>(531) 0.27 | (343) 0.27<br>(344) 0.27<br>(345) 0.27<br>(345) 0.27<br>(346) 0.27<br>(348) 0.27<br>(348) 0.27<br>(350) 0.27<br>(350) 0.27   |
| 0.5<br>0.6<br>0.5<br>0.5<br>0.6<br>0.5<br>0.5<br>0.5   | $\begin{array}{c} (109) & 0.6 \\ (110) & 0.6 \\ (111) & 0.7 \\ (112) & 0.7 \\ (113) & 0.7 \\ (113) & 0.7 \\ (114) & 0.7 \\ (115) & 0.7 \end{array}$   | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(130) 0.7<br>(131) 0.7<br>(131) 0.7<br>(132) 0.7<br>(133) 0.7  | (145) 0.7<br>(144) 0.7<br>(147) 0.7<br>(149) 0.7<br>(149) 0.7<br>(150) 0.7<br>(151) 0.7<br>(152) 0.7<br>(153) 0.78  | (163) 0.78<br>(164) 0.78<br>(165) 0.78<br>(165) 0.78<br>(167) 0.78<br>(158) 0.79<br>(169) 0.78<br>(169) 0.78<br>(170) 0.78<br>(171) 0.78   | (271) 0.94<br>(272) 0.95<br>(273) 0.96<br>(273) 0.96<br>(275) 0.96<br>(275) 0.96<br>(274) 0.96<br>(274) 0.96<br>(278) 0.96<br>(279) 0.96  | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(292) 0.43<br>(295) 0.43<br>(295) 0.43<br>(295) 0.43<br>(295) 0.43<br>(295) 0.43   | $\begin{array}{c} (307) & 0.126 \\ (308) & 0.126 \\ (309) & 0.126 \\ (310) & 0.125 \\ (311) & 0.126 \\ (212) & 0.126 \\ (312) & 0.126 \\ (314) & 0.126 \\ (315) & 0.126 \end{array}$  |  | (343) 4127<br>(344) 0.27<br>(345) 0.27<br>(345) 0.27<br>(348) 0.27<br>(348) 0.27<br>(349) 0.27<br>(350) 0.27   |
| ) 0.5<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6  |   | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(130) 0.7<br>(131) 0.7<br>(132) 0.7<br>(133) 0.7<br>(133) 0.7<br>(134) 0.7   | (145) 0,7<br>(144) 0,7<br>(144) 0,7<br>(149) 0,7<br>(149) 0,7<br>(150) 0,7<br>(151) 0,7<br>(151) 0,7<br>(153) 0,78<br>(154) 0,76  | (143) 0.78<br>(164) 0.79<br>(165) 0.78<br>(156) 0.78<br>(167) 0.78<br>(158) 0.78<br>(169) 0.78<br>(169) 0.78<br>(170) 0.78<br>(171) 0.78<br>(171) 0.78   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(292) 0.43<br>(295) 0.43<br>(295) 0.43<br>(295) 0.43<br>(295) 0.43<br>(295) 0.43<br>(299) 0.43   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |  | (343) 0.27<br>(344) 0.27<br>(345) 0.27<br>(345) 0.27<br>(346) 0.27<br>(348) 0.27<br>(348) 0.27<br>(350) 0.27<br>(350) 0.27   |
| ) 0.4<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6  | (109) 0.6<br>(110) 0.6<br>(111) 0.7<br>(112) 0.7<br>(113) 0.7<br>(114) 0.7<br>(115) 0.7<br>(115) 0.7<br>(116) 0.7<br>(118) 0.7  | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(130) 0.7<br>(131) 0.7<br>(132) 0.7<br>(133) 0.7<br>(134) 0.7<br>(135) 0.7   | (145) 0.7<br>(146) 0.7<br>(147) 0.7<br>(149) 0.7<br>(149) 0.7<br>(150) 0.7<br>(151) 0.7<br>(151) 0.7<br>(152) 0.7<br>(153) 0.78<br>(155) 0.78   | (163) 0.78<br>(164) 0.79<br>(165) 0.78<br>(165) 0.78<br>(167) 0.78<br>(167) 0.78<br>(169) 0.78<br>(169) 0.78<br>(170) 0.78<br>(171) 0.78<br>(171) 0.78<br>(172) 0.78   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(292) 0.43<br>(295) 0.43<br>(294) 0.43<br>(295) 0.43<br>(297) 0.43<br>(298) 0.43<br>(299) 0.43   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | (343) $0.27(344)$ $0.27(345)$ $0.27(346)$ $0.27(348)$ $0.27(348)$ $0.27(349)$ $0.27(350)$ $0.27(351)$ $0.27(352)$ $0.27$   |
| ) 0.5<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6  |   | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(130) 0.7<br>(131) 0.7<br>(132) 0.7<br>(133) 0.7<br>(134) 0.7<br>(135) 0.7<br>(136) 0.7  | (145) 0,7<br>(144) 0,7<br>(144) 0,7<br>(149) 0,7<br>(149) 0,7<br>(150) 0,7<br>(151) 0,7<br>(151) 0,7<br>(153) 0,78<br>(154) 0,76  | (143) 0.78<br>(164) 0.79<br>(165) 0.78<br>(156) 0.78<br>(167) 0.78<br>(158) 0.78<br>(169) 0.78<br>(169) 0.78<br>(170) 0.78<br>(171) 0.78<br>(171) 0.78   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(295) 0.43<br>(295) 0.43<br>(295) 0.43<br>(295) 0.43<br>(297) 0.43<br>(299) 0.43<br>(299) 0.43<br>(300) 0.43   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |  | (343) $(342)(344)$ $(0.27)(345)$ $(0.27)(345)$ $(0.27)(348)$ $(0.27)(349)$ $(0.27)(350)$ $(0.27)(351)$ $(0.27)(353)$ $(0.27)(353)$ $(0.27)$  |
| ) 0.5<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>) 0.6  | $      \begin{array}{l} (109) & 0.6 \\ (110) & 0.6 \\ (111) & 0.7 \\ (112) & 0.7 \\ (112) & 0.7 \\ (113) & 0.7 \\ (114) & 0.7 \\ (115) & 0.7 \\ (116) & 0.7 \\ (117) & 0.7 \\ (118) & 0.7 \\ (119) & 0.7 \\ (120) & 0.7 \end{array} $   | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(130) 0.7<br>(131) 0.7<br>(133) 0.7<br>(133) 0.7<br>(134) 0.7<br>(135) 0.7<br>(135) 0.7<br>(136) 0.7<br>(138) 0.7  | (145) 0.7<br>(146) 0.7<br>(147) 0.7<br>(149) 0.7<br>(149) 0.7<br>(150) 0.7<br>(151) 0.7<br>(151) 0.7<br>(152) 0.7<br>(153) 0.78<br>(155) 0.78   | (163) 0.78<br>(164) 0.78<br>(165) 0.78<br>(156) 0.78<br>(156) 0.78<br>(156) 0.78<br>(156) 0.78<br>(159) 0.78<br>(170) 0.78<br>(171) 0.78<br>(171) 0.78<br>(172) 0.78<br>(173) 0.78<br>(175) 0.78   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(292) 0.43<br>(295) 0.43<br>(294) 0.43<br>(295) 0.43<br>(295) 0.43<br>(297) 0.43<br>(299) 0.43<br>(399) 0.43<br>(300) 0.43   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |  | $\begin{array}{c} (345) & 0.27 \\ (344) & 0.27 \\ (345) & 0.27 \\ (345) & 0.27 \\ (348) & 0.27 \\ (348) & 0.27 \\ (349) & 0.27 \\ (350) & 0.27 \\ (351) & 0.27 \\ (351) & 0.27 \\ (353) & 0.27 \\ (355) & 0.27 \\ (355) & 0.27 \end{array}$  |
| ) 0.4<br>) 0.6<br>) 0.6<br>J 0.6<br>J 0.6<br>J 0.6<br>J 0.6<br>) 0.6<br>) 0.6<br>) 0.6<br>J 0.6<br>J 0.6   | (109) 0.6(110) 0.6(111) 0.7(112) 0.7(113) 0.7(114) 0.7(115) 0.7(116) 0.7(116) 0.7(117) 0.7(118) 0.7(119) 0.7(120) 0.7(121) 0.7  | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(130) 0.7<br>(131) 0.7<br>(132) 0.7<br>(133) 0.7<br>(134) 0.7<br>(135) 0.7<br>(135) 0.7<br>(136) 0.7<br>(138) 0.7<br>(139) 0.7                           | (145) 0.7<br>(144) 0.7<br>(147) 0.7<br>(149) 0.7<br>(150) 0.7<br>(151) 0.7<br>(151) 0.7<br>(152) 0.7<br>(153) 0.78<br>(154) 0.78<br>(155) 0.78<br>(156) 0.78  | (163) 0.78<br>(164) 0.79<br>(165) 0.78<br>(156) 0.78<br>(156) 0.78<br>(157) 0.78<br>(157) 0.78<br>(159) 0.78<br>(170) 0.78<br>(171) 0.78<br>(171) 0.78<br>(172) 0.78<br>(173) 0.78   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(292) 0.43<br>(292) 0.43<br>(294) 0.43<br>(295) 0.43<br>(295) 0.43<br>(297) 0.43<br>(297) 0.43<br>(397) 0.43<br>(300) 0.43<br>(301) 0.43<br>(302) 0.43   | $\begin{array}{c} (307) & 0.126 \\ (308) & 0.126 \\ (309) & 0.126 \\ (310) & 0.125 \\ (311) & 0.126 \\ (312) & 0.126 \\ (312) & 0.126 \\ (313) & 0.126 \\ (315) & 0.126 \\ (316) & 0.126 \\ (316) & 0.122 \\ (318) & 0.122 \\ (319) & 0.126 \\ (320) & 0.126 \\ \end{array}$  |  | (343) $0.27(344)$ $0.27(345)$ $0.27(346)$ $0.27(348)$ $0.27(349)$ $0.27(350)$ $0.27(351)$ $0.27(351)$ $0.27(355)$ $0.27(354)$ $0.27(356)$ $0.27$   |
| ) 0.4<br>) 0.6<br>) 0.6  | (109) 0.6(110) 0.6(111) 0.7(112) 0.7(113) 0.7(113) 0.7(114) 0.7(115) 0.7(116) 0.7(117) 0.7(118) 0.7(119) 0.7(120) 0.7(121) 0.7(122) 0.7   | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(130) 0.7<br>(131) 0.7<br>(131) 0.7<br>(132) 0.7<br>(133) 0.7<br>(135) 0.7<br>(135) 0.7<br>(136) 0.7<br>(138) 0.7<br>(139) 0.7<br>(140) 0.7              | (145) 0.7<br>(144) 0.7<br>(147) 0.7<br>(149) 0.7<br>(149) 0.7<br>(150) 0.7<br>(151) 0.7<br>(152) 0.7<br>(153) 0.78<br>(154) 0.78<br>(155) 0.78<br>(157) 0.78<br>(159) 0.78  | (163) 0.78<br>(164) 0.79<br>(165) 0.78<br>(165) 0.78<br>(166) 0.78<br>(167) 0.78<br>(169) 0.78<br>(169) 0.78<br>(170) 0.78<br>(171) 0.78<br>(172) 0.78<br>(173) 0.78<br>(174) 0.78<br>(176) 0.78   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (289) 0.43<br>(290) 0.43<br>(291) 0.43<br>(292) 0.43<br>(292) 0.43<br>(292) 0.43<br>(294) 0.43<br>(295) 0.43<br>(295) 0.43<br>(299) 0.43<br>(299) 0.43<br>(300) 0.43<br>(301) 0.43<br>(302) 0.43<br>(303) 0.43   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |  | (343) $0.27(344)$ $0.27(345)$ $0.27(348)$ $0.27(348)$ $0.27(349)$ $0.27(350)$ $0.27(351)$ $0.27(351)$ $0.27(353)$ $0.27(354)$ $0.27(354)$ $0.27(356)$ $0.27(356)$ $0.27(356)$ $0.27$   |
| ) 0.4<br>) 0.6<br>) 0.6   | $      \begin{array}{l} (109) & 0.6 \\ (110) & 0.6 \\ (111) & 0.7 \\ (112) & 0.7 \\ (112) & 0.7 \\ (113) & 0.7 \\ (115) & 0.7 \\ (115) & 0.7 \\ (116) & 0.7 \\ (117) & 0.7 \\ (118) & 0.7 \\ (119) & 0.7 \\ (120) & 0.7 \\ (121) & 0.7 \\ (122) & 0.7 \\ (123) & 0.7 \\ \end{array} $ | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(130) 0.7<br>(131) 0.7<br>(133) 0.7<br>(133) 0.7<br>(134) 0.7<br>(135) 0.7<br>(135) 0.7<br>(137) 0.7<br>(138) 0.7<br>(139) 0.7<br>(140) 0.7<br>(144) 0.7 | (145) 0.7<br>(146) 0.7<br>(147) 0.7<br>(149) 0.7<br>(149) 0.7<br>(150) 0.7<br>(151) 0.7<br>(151) 0.7<br>(152) 0.7<br>(153) 0.78<br>(155) 0.78<br>(156) 0.78<br>(156) 0.78<br>(159) 0.78   | (163) 0.78<br>(164) 0.79<br>(165) 0.78<br>(165) 0.78<br>(167) 0.78<br>(169) 0.78<br>(169) 0.78<br>(170) 0.78<br>(171) 0.78<br>(172) 0.78<br>(172) 0.78<br>(173) 0.78<br>(175) 0.78<br>(176) 0.78<br>(177) 0.78   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{c} (289) & 0.43 \\ (290) & 0.43 \\ (291) & 0.43 \\ (292) & 0.43 \\ (292) & 0.43 \\ (295) & 0.43 \\ (294) & 0.43 \\ (295) & 0.43 \\ (297) & 0.43 \\ (297) & 0.43 \\ (298) & 0.43 \\ (300) & 0.43 \\ (301) & 0.43 \\ (301) & 0.43 \\ (302) & 0.43 \\ (304) & 0.43 \end{array}$                  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |  | $\begin{array}{c} (345) & 6(27) \\ (344) & 0.27 \\ (345) & 0.27 \\ (345) & 0.27 \\ (348) & 0.27 \\ (349) & 0.27 \\ (350) & 0.27 \\ (350) & 0.27 \\ (351) & 0.27 \\ (352) & 0.27 \\ (354) & 0.27 \\ (355) & 0.27 \\ (355) & 0.27 \\ (356) & 0.27 \\ (357) & 0.27 \\ (358) & 0.27 \end{array}$                 |
| L) 0.6<br>2) 0.6<br>3) 0.6<br>4) 0.6<br>5) 0.6<br>5) 0.6<br>5) 0.6<br>7) 0.6<br>7) 0.6<br>7) 0.6<br>7) 0.6<br>3) 0.6<br>1) 0.6<br>2) 0.6<br>3) 0.6<br>5) 0.6<br>5) 0.6   | (109) 0.6(110) 0.6(111) 0.7(112) 0.7(112) 0.7(113) 0.7(114) 0.7(115) 0.7(116) 0.7(117) 0.7(118) 0.7(118) 0.7(120) 0.7(121) 0.7(122) 0.7(122) 0.7(123) 0.7(124) 0.7  | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(130) 0.7<br>(131) 0.7<br>(132) 0.7<br>(133) 0.7<br>(134) 0.7<br>(135) 0.7<br>(135) 0.7<br>(136) 0.7<br>(139) 0.7<br>(139) 0.7<br>(140) 0.7<br>(141) 0.7 | (145) 0.7<br>(144) 0.7<br>(147) 0.7<br>(149) 0.7<br>(149) 0.7<br>(150) 0.7<br>(151) 0.7<br>(151) 0.7<br>(152) 0.7<br>(153) 0.78<br>(155) 0.78<br>(156) 0.78<br>(159) 0.78<br>(159) 0.78<br>(159) 0.78<br>(159) 0.78<br>(159) 0.78 | (163) 0.78<br>(164) 0.79<br>(165) 0.78<br>(156) 0.78<br>(156) 0.78<br>(157) 0.78<br>(157) 0.78<br>(159) 0.78<br>(170) 0.78<br>(171) 0.78<br>(171) 0.78<br>(173) 0.78<br>(173) 0.78<br>(175) 0.78<br>(176) 0.78<br>(177) 0.78<br>(177) 0.78<br>(177) 0.78 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{c} (289) & 0.43 \\ (290) & 0.43 \\ (291) & 0.43 \\ (292) & 0.43 \\ (292) & 0.43 \\ (292) & 0.43 \\ (294) & 0.43 \\ (295) & 0.43 \\ (295) & 0.43 \\ (297) & 0.43 \\ (297) & 0.43 \\ (300) & 0.43 \\ (301) & 0.43 \\ (302) & 0.43 \\ (303) & 0.43 \\ (304) & 0.43 \\ (305) & 0.126 \end{array}$ | $\begin{array}{c} (307) & 0.126 \\ (308) & 0.126 \\ (309) & 0.126 \\ (310) & 0.125 \\ (311) & 0.126 \\ (312) & 0.126 \\ (312) & 0.126 \\ (313) & 0.126 \\ (314) & 0.126 \\ (316) & 0.126 \\ (316) & 0.122 \\ (318) & 0.122 \\ (319) & 0.126 \\ (320) & 0.126 \\ (321) & 0.126 \\ (323) & 0.126 \\ (323) & 0.126 \\ \end{array}$ |  | $\begin{array}{c} (345) & 6(27) \\ (344) & 0.27 \\ (345) & 0.27 \\ (345) & 0.27 \\ (348) & 0.27 \\ (349) & 0.27 \\ (350) & 0.27 \\ (350) & 0.27 \\ (351) & 0.27 \\ (352) & 0.27 \\ (355) & 0.27 \\ (355) & 0.27 \\ (356) & 0.27 \\ (356) & 0.27 \\ (358) & 0.27 \\ (358) & 0.27 \\ (359) & 0.27 \end{array}$ |
| 11 0.5<br>2) 0.6<br>3) 0.6<br>5) 0.6<br>5) 0.6<br>5) 0.6<br>7) 0.6<br>8) 0.6<br>7) 0.6<br>1) 0.6<br>1) 0.6<br>1) 0.6<br>1) 0.6<br>5) 0.6<br>5) 0.6<br>6) 0.6<br>8) 0.6<br>6) 0.6<br>8) 0.6 | $      \begin{array}{l} (109) & 0.6 \\ (110) & 0.6 \\ (111) & 0.7 \\ (112) & 0.7 \\ (112) & 0.7 \\ (113) & 0.7 \\ (115) & 0.7 \\ (115) & 0.7 \\ (116) & 0.7 \\ (117) & 0.7 \\ (118) & 0.7 \\ (119) & 0.7 \\ (120) & 0.7 \\ (121) & 0.7 \\ (122) & 0.7 \\ (123) & 0.7 \\ \end{array} $ | (127) 0.7<br>(128) 0.7<br>(129) 0.7<br>(130) 0.7<br>(131) 0.7<br>(133) 0.7<br>(133) 0.7<br>(134) 0.7<br>(135) 0.7<br>(135) 0.7<br>(137) 0.7<br>(138) 0.7<br>(139) 0.7<br>(140) 0.7<br>(144) 0.7 | (145) 0.7<br>(146) 0.7<br>(147) 0.7<br>(149) 0.7<br>(149) 0.7<br>(150) 0.7<br>(151) 0.7<br>(151) 0.7<br>(152) 0.7<br>(153) 0.78<br>(155) 0.78<br>(156) 0.78<br>(156) 0.78<br>(159) 0.78   | (163) 0.78<br>(164) 0.79<br>(165) 0.78<br>(165) 0.78<br>(167) 0.78<br>(169) 0.78<br>(169) 0.78<br>(170) 0.78<br>(171) 0.78<br>(172) 0.78<br>(172) 0.78<br>(173) 0.78<br>(175) 0.78<br>(176) 0.78<br>(177) 0.78   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{c} (289) & 0.43 \\ (290) & 0.43 \\ (291) & 0.43 \\ (292) & 0.43 \\ (292) & 0.43 \\ (295) & 0.43 \\ (294) & 0.43 \\ (295) & 0.43 \\ (297) & 0.43 \\ (297) & 0.43 \\ (298) & 0.43 \\ (300) & 0.43 \\ (301) & 0.43 \\ (301) & 0.43 \\ (302) & 0.43 \\ (304) & 0.43 \end{array}$                  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |  | $\begin{array}{c} (345) & 6(27) \\ (344) & 0.27 \\ (345) & 0.27 \\ (345) & 0.27 \\ (348) & 0.27 \\ (349) & 0.27 \\ (350) & 0.27 \\ (350) & 0.27 \\ (351) & 0.27 \\ (352) & 0.27 \\ (354) & 0.27 \\ (355) & 0.27 \\ (355) & 0.27 \\ (356) & 0.27 \\ (357) & 0.27 \\ (358) & 0.27 \end{array}$                 |

. .

### River discharge data at 12-hourly intervals for Station: 21D Period : 5

•

1

Phosphorus transport Berg River

| (181) 0.098<br>(182) 0.098<br>(183) 0.098<br>(184) 0.098<br>(184) 0.098<br>(185) 0.098<br>(186) 0.098<br>(187) 0.098 | (199) 2.469<br>(200) 2.469<br>(201) 2.469<br>(202) 2.469<br>(203) 2.469<br>(203) 2.469<br>(204) 2.469 | (217) 4.447<br>(218) 4.447<br>(219) 4.447<br>(220) 4.447<br>(221) 4.447<br>(221) 4.447<br>(222) 4.447  | (205) 4,573<br>(234) 6,573<br>(237) 4,573<br>(238) 4,573<br>(239) 5,324<br>(240) 5,324  | (253) 4.78<br>(254) 4.78<br>(255) 4.78<br>(255) 4.78<br>(254) 4.78<br>(257) 4.78   |
|--|---|--|---|--|
| (182) 0.078<br>(183) 0.098<br>(183) 0.078<br>(184) 0.078<br>(185) 0.078<br>(186) 0.098<br>(187) 0.099                | (200) 2,469<br>(201) 2,469<br>(202) 2,469<br>(203) 2,469<br>(203) 2,469<br>(204) 2,469<br>(205) 2,469 | (218) 4.447<br>(219) 4.447<br>(220) 4.447<br>(221) 4.447<br>(222) 4.447  | (237) 6.573<br>(238) 6.573<br>(239) 5.324   | (255) 4.78<br>(256) 4.78<br>(257) 4.78   |
| (183) 0.098<br>(184) 0.078<br>(185) 0.078<br>(185) 0.098<br>(186) 0.098<br>(187) 0.099                               | (201) 2.469<br>(202) 2.469<br>(203) 2.469<br>(204) 2.469<br>(205) 2.469                               | (219) 4.447<br>(220) 4.447<br>(221) 4.447<br>(222) 4.447   | (238) 6.573<br>(239) 5.324  | (256) 4.78<br>(257) 4.78   |
| (184) 0.078<br>(185) 0.078<br>(186) 0.078<br>(186) 0.098<br>(187) 0.099  | (202) 2.449<br>(203) 2.469<br>(204) 2.469<br>(204) 2.469  | (220) 4.447<br>(221) 4.447<br>(222) 4.447  | (239) 5.324   | (257) 4.78   |
| (185) 0.098<br>(186) 0.098<br>(187) 0.098<br>(187) 0.098   | (203) 2,469<br>(204) 2,469<br>(205) 2,469   | (221) 4.447<br>(222) 4.447   |   |  |
| (186) 0.098<br>(187) 0.098<br>(193) 0.099  | (204) 2.469   | (222) 4,447  | (740) 5.324   |  |
| (187) 0.098  | 12051 7 4-4   |  |   | (258) 4.78   |
| (120) 0 099  | 12001 2.707   | (223) 4.447  | (041) 6.234   | (259) 4.78   |
|  | (206) 2.469   | (224) 4.447  | (242) 6.204   | (260) 4.78   |
| (189) 0.098  | (207) 2.469   | (225) 6.573  | (243) 6.234   | (251) 4.78   |
| (190) 0.098  | (208) 2.469   | (226) 6.573  | (244) 6.234   | (252) 4-78   |
| (191) 0 098  | (209) 2.469   | (227) 6.573  | (245) 6.234   | (253) 4.78   |
| (197) 0 098  | (210) 2.469   | (228) 6.573  | (246) 6,234   | (264) 4.78   |
| (193) 7 449  | (211) 4.447   | (229) 6.573  | (247) 6.234   | (265) 4.78   |
| 11011 7 149  | (212) 4.447   | (230) 6.573  | (248) 6.234   | (266) 4.78   |
| (195) 0 469  | (217) 4 447   | (231) 6.573  |   | (267) 4.78   |
| (194) ~ 440  | (714) 4.447   | (232) 6.573  |   | (268) 4.78   |
| (198) 2.487  | (715) A 117   | (233) 6-573  | (251) 6.234   | (269) 1.652  |
| (197) 2.407  | (212) 4,447   | (234) 6.573  | (252) 6.234   | (270) 1,652  |
| (198) 2.464  | (210) 4.447   | (134) 0.0/3  |   |  |
|  |   |  |   | (343) 0.223  |
|  |   |  |   | (344) 0.223  |
|  |   |  |   | (345) 0.223  |
|  |   |  |   | (345) 0.223  |
|  |   |  |   | (347) 0,223  |
|  |   |  | (300) 0.223   | (343) 0,223  |
|  |   |  | (331) 0.223   | (349) 0.223  |
|  |   |  | (332) 0.223   | (350) 0.223  |
|  |   |  | (333) 0.223   | (351) 0.26   |
|  |   |  | (334) 0.223   | (352) 0.26   |
|  |   |  | (335) 0.223   | (353) 0.26   |
|  |   | (318) 2.128  | (336) 0.223   | (354) 0.26   |
|  |   |  | (337) 0.223   | (355) 0.26   |
|  |   |  | (338) 0.223   | (356) 0.26   |
| (285) 2,128  | (303) 2.21  | (321) 2.128  | (339) 0.223   | (357) 0.26   |
|  |   |  |   |  |
|  |   |  | (340) 0.223   | (358) 0.26   |
| (286) 2,120  | (304) 2.21  | (322) 2.128  | (340) 0.223<br>(341) 0.223  | (358) 0.26<br>(359) 0.26   |
|  |   |  |   |  |
|  | -   | (271)         1.852         (299)         2.128           (272)         1.652         (290)         2.128           (273)         1.652         (291)         2.128           (273)         1.652         (292)         2.128           (274)         1.652         (292)         2.128           (275)         1.652         (294)         2.128           (275)         1.652         (294)         2.128           (275)         1.652         (295)         2.21           (279)         1.652         (295)         2.21           (279)         1.652         (297)         2.21           (280)         1.652         (296)         2.21           (281)         2.128         (299)         2.21           (281)         2.128         (300)         2.21           (283)         2.128         (300)         2.21 | (191) 0.098 (209) 2.469 (227) 6.575 (192) 0.098 (210) 2.469 (229) 6.575 (193) 2.469 (211) 4.447 (229) 6.575 (193) 2.469 (212) 4.447 (229) 6.575 (195) 2.469 (213) 4.447 (230) 6.575 (195) 2.469 (213) 4.447 (231) 6.575 (196) 2.469 (215) 4.447 (232) 6.575 (197) 2.469 (215) 4.447 (233) 6.575 (197) 2.469 (215) 4.447 (233) 6.575 (197) 2.469 (215) 4.447 (233) 6.575 (197) 2.469 (215) 4.447 (233) 6.575 (197) 2.469 (215) 4.447 (233) 6.575 (197) 2.469 (215) 4.447 (233) 6.575 (197) 2.469 (215) 4.447 (233) 6.575 (197) 2.469 (215) 4.447 (234) 6.575 (197) 2.469 (215) 4.447 (234) 6.575 (197) 2.469 (215) 4.447 (234) 6.575 (197) 1.652 (290) 2.128 (308) 2.21 (275) 1.652 (291) 2.128 (311) 2.128 (275) 1.652 (291) 2.128 (311) 2.128 (275) 1.652 (296) 2.21 (315) 2.128 (277) 1.652 (296) 2.21 (315) 2.128 (279) 1.652 (296) 2.21 (315) 2.128 (280) 1.652 (296) 2.21 (315) 2.128 (280) 1.652 (297) 2.21 (315) 2.128 (280) 1.652 (297) 2.21 (317) 2.128 (281) 2.128 (300) 2.21 (318) 2.128 (282) 2.128 (300) 2.21 (319) 2.128 (283) 2.128 (300) 2.21 (319) 2.128 (284) 2.128 (300) 2.21 (319) 2.128 (284) 2.128 (300) 2.21 (320) 2.128 (284) 2.128 (300) 2.21 (320) 2.128 (284) 2.128 (300) 2.21 (320) 2.128 (284) 2.128 (300) 2.21 (320) 2.128 (284) 2.128 (300) 2.21 (320) 2.128 (284) 2.128 (300) 2.21 (320) 2.128 (284) 2.128 (300) 2.21 (320) 2.128 (284) 2.128 (300) 2.21 (320) 2.128 (284) 2.128 (300) 2.21 (320) 2.128 (284) 2.128 (300) 2.21 (320) 2.128 (284) 2.128 (300) 2.21 (320) 2.128 (300) 2.21 (320) 2.128 (320) 2.21 (320) | $ \begin{array}{c} (271) 1.852 & (299) 2.128 & (307) 2.21 & (325) 0.223 \\ (272) 1.652 & (290) 2.129 & (306) 2.21 & (324) 0.223 \\ (273) 1.652 & (290) 2.128 & (309) 2.128 & (324) 0.223 \\ (273) 1.652 & (292) 2.128 & (310) 2.128 & (326) 0.223 \\ (274) 1.652 & (292) 2.128 & (311) 2.126 & (326) 0.223 \\ (275) 1.652 & (294) 2.128 & (311) 2.126 & (320) 0.223 \\ (275) 1.652 & (294) 2.128 & (312) 2.128 & (331) 0.223 \\ (277) 1.652 & (295) 2.21 & (313) 2.128 & (331) 0.223 \\ (279) 1.652 & (296) 2.21 & (315) 2.128 & (333) 0.223 \\ (279) 1.652 & (296) 2.21 & (314) 2.128 & (333) 0.223 \\ (280) 1.652 & (296) 2.21 & (316) 2.128 & (333) 0.223 \\ (281) 2.128 & (300) 2.21 & (317) 2.128 & (335) 0.223 \\ (283) 2.128 & (300) 2.21 & (319) 2.128 & (337) 0.223 \\ (283) 2.128 & (300) 2.21 & (319) 2.128 & (337) 0.223 \\ (284) 2.128 & (302) 2.21 & (320) 2.129 & (338) 0.223 \\ \end{array}$ |

1

Phosphorus transport Berg River

TR 143 March 1989

|  | e: KLEINI   |   |  |   |   |   |  | (145)  | 2.56-5   | (163)   | 0.01/3  | (131)   | 0   | (179)   | 2.SE-   |
|--|---|---|--|---|---|---|--|--|--|---|---|---|---|---|---|
| 1)   | 0,522   | ( 19)   | 0.108  | ( 37)   | 0.108   | ( 55)   | 0.108  | (146)  | 0  | (164)   | 8E~3  | (192)   | 0   | (200)   | 0.023   |
| 2)   | 0.607   | ( 20)   | 0,095  | (38)  | 0.054   | (56)  | 0,085  | (147)  | ŏ ·  | (165)   | ö   | (183)   | 0   | (201)   | 0.05  |
| 3)   | 0.385   | (21)  | 0.108  | ( 39)   | 0.085   | ( 57)   | 0.12   | (148)  |  | (166)   | ō.  | (194)   | 88~3  | (202)   | 0.04  |
| 4)   | 0.319   | ( 22)   | 0.096  | ( 40)   | 0.006   | (58)  | 0.076  |  | 0  | (167)   | õ   | (185)   | 0   | (203)   | -0.03   |
| 5)   | 0.607   | (27)  | 0.096  | (41)  | 0.0742  | ( 59)   | 0.108  | (149)  | 0  | (168)   | ŏ   | (126)   | 8E-3  | (204)   | 0.02  |
| 6)   | 0.255   | ( 24)   | 0.036  | (42)  | 0.0449  | ( 60)   | 0.074  | (150)  | 0<br>A   |   | ŏ.  | (187)   | 0   | (205)   | 0.020   |
|  | 0.607   | (25)  | 0,0742   | ( 43)   | 0.085   | (61)  | Ú.1445   | (151)  | 0  | (169)   |   | (188)   | BE-3  | (206)   | 0   |
| 7)   |   | (26)  | 0.028  | (44)  | 0.064   | (62)  | 0.1445   | (152)  | ¢.   | (170)   | Ω.  | (189)   | 0   | (207)   | ō   |
| 8)   | 0.225   | (20)  | 0.0742   | (45)  | 0.108   | ( 65)   | 0.1573   | (153)  | Ů  | (171)   | 0   |   | N<br>BE−S   | (208)   | õ   |
| 9)   | 0.197   |   | 0.036  | (46)  | 0.1704  | (64)  | 0.1445   | (154)  | Q.   | (172)   | 8E-1  | (150)   |   | (209)   | ŏ   |
| to)  | 0.1704  | ( 28)   |  | (40)  | 0.906   | ( 65)   | 0.1573   | (155)  | U U  | (173)   | 0   | (191)   | 0   | (210)   | 2E-3  |
| 11)  | 0.1836  | (29)  | 0.085  | (4B)  | 0.2401  | ( 66)   | 0.076  | (156)  | 7E~3   | (174)   | 0.021   | (192)   | 0   |   | 0.04  |
| 12)  | 0.1321  | ( 30)   | 0.054  |   | 0.3365  | (67)  | 0.12   | (197)  | 0  | (175)   | Ŭ.  | (195)   | 0<br>   | (211)   |   |
| 13)  | 0.132   | ( 31)   | 0.085  | (49)  | 0.225   | ( 68)   | 0.054  | (158)  | 2E~3   | (176)   | 0.021   | (194)   | 2E-3  | (212)   | 2E~3  |
| 14)  | 0.109   | ( 32)   | 0.036  | ( 50)   |   | ( 60)   | 0.074  | (159)  | 0  | (177)   | Q   | (195)   | 2.5E-3  | (213)   | Ú.  |
| 15)  | 0.12  | (33)  | 0.108  | (51)  | 0.197   |   | 0.045  | (160)  | 26-0   | (178)   | ο.  | (196)   | 2E~3  | (214)   | 0   |
| 16)  | 0.074   | ( 34)   | 0.074  | ( 52)   | 0,1836  | (70)  | 0.0454   | (161)  | 2,5E-3   | (179)   | 0   | (197)   | 0   | (215)   | 0.03  |
| 17)  | 0.108   | (35)  | 0.12   | ( 53)   | 0.1704  | (71)  |  | (152)  | 0.028  | (180)   | Ō.  | (1981)  | 8E-3  | (214)   | 0,09  |
| 18)  | 0.096   | ( 36)   | 0.12   | (54)  | 0,1321  | (72)  | 0.054  |  |  | •   |   |   |   |   |   |
|  |   |   |  |   |   |   |  |  | -  |   |   |   |   |   |   |
|  |   |   |  |   |   |   |  |  |  |   |   |   |   | (271)   | 0.10  |
|  |   |   |  |   |   |   |  | . (217)  | 0.197  | (235)   | 0.12  | (253)   | 0.2102  | (271)   |   |
| 73)  | 0.085   | ( 91)   | 0.085  | (107)   | 0.0138  | (127)   |  | (217)<br>(216)   | -<br>0,197<br>4,531  | (235)<br>(256)  | $0.12 \\ 0.108$   | (253)<br>(254)  | 0.2102<br>0.197   | (271)<br>(272)  | 0.12  |
| 73)<br>74)   | 0.085<br>0.045  | ( 91)<br>( 92)  | 0,085<br>0,085   | (107)<br>(110)  | 0.0138<br>8E-3  | (127)<br>(128)  | 0.0138   | (217)<br>(216)<br>(219)  | -<br>0,197<br>4,531<br>0,7   | (235)<br>(236)<br>(237)   | $0.12 \\ 0.108 \\ 0.108 \\ 0.108$   | (253)<br>(254)<br>(255)   | 0.2102<br>0.197<br>0.1573   | (271)<br>(272)<br>(273)   | 0.12  |
| 73)<br>74)<br>75)  | 0.085<br>0.045<br>0.085   | ( 91)<br>( 92)<br>( 93)   | 0.085<br>0.085<br>0.085  | (107)<br>(110)<br>(111)   | 0.0138<br>86-3<br>7.86-3  | (127)<br>(128)<br>(129)   | 0.0138<br>0.014<br>0.0136  | (217)<br>(216)<br>(219)<br>(220)   | -<br>0,197<br>4,531<br>0,7<br>0,445  | (235)<br>(236)<br>(237)<br>(238)  | $0.12 \\ 0.108 \\ 0.108 \\ 0.054$   | (253)<br>(254)<br>(255)<br>(256)  | $0.2102 \\ 0.197 \\ 0.1573 \\ 0.1445 $  | (271)<br>(272)<br>(273)<br>(274)  | 0.12<br>0.14<br>0.15  |
| 73)<br>74)<br>75)<br>76)   | 0.085<br>0.045<br>0.085<br>0.096  | ( 91)<br>( 92)<br>( 93)<br>( 94)  | 0.085<br>0.085<br>0.085<br>0.085   | (109)<br>(110)<br>(111)<br>(112)  | 0.0108<br>88-3<br>7.88-3<br>86-3  | (127)<br>(123)<br>(129)<br>(130)  | 0.0138<br>0.014<br>0.0136<br>0.014   | (217)<br>(216)<br>(219)  | -<br>0,197<br>4,531<br>0,7<br>0,445<br>0,522   | (235)<br>(206)<br>(207)<br>(238)<br>(239)   | $0.12 \\ 0.108 \\ 0.108 \\ 0.054 \\ 0.12$   | (253)<br>(254)<br>(255)<br>(256)<br>(257)   | 0.2102<br>0.197<br>0.1573<br>0.1445<br>0.1445   | (271)<br>(272)<br>(273)<br>(274)<br>(275)   | 0.12<br>0.14<br>0.15<br>0.14  |
| 73)<br>74)<br>75)<br>76)<br>77)  | 0.085<br>0.045<br>0.085<br>0.096<br>0.1321  | ( 91)<br>( 92)<br>( 93)<br>( 94)<br>( 95)   | 0.085<br>0.085<br>0.085<br>0.036<br>0.036  | (107)<br>(110)<br>(111)<br>(112)<br>(113)   | 0.0108<br>86-0<br>7.86-0<br>86-0<br>7.86-0  | (127)<br>(123)<br>(129)<br>(130)<br>(131)   | 0.0138<br>0.014<br>0.0156<br>0.014<br>0.0138   | (217)<br>(216)<br>(219)<br>(220)   | -<br>0,197<br>4,531<br>0,7<br>0,445  | (235)<br>(236)<br>(237)<br>(238)<br>(239)<br>(240)  | 0.12<br>0.108<br>0.108<br>0.054<br>0.12<br>0.074  | (253)<br>(254)<br>(255)<br>(256)<br>(257)<br>(258)  | 0.2102<br>0.197<br>0.1573<br>0.1445<br>0.1445<br>0.1445   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)  | 0.12<br>0.14<br>0.15<br>0.14<br>0.14  |
| 73)<br>74)<br>75)<br>76)<br>77)<br>78)   | 0.085<br>0.045<br>0.085<br>0.096<br>0.1321<br>0.1445  | ( 91)<br>( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 95)<br>( 95)   | 0.085<br>0.085<br>0.085<br>0.076<br>0.054<br>0.036   | (107)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)  | 0.0108<br>88-3<br>7.88-3<br>88-7<br>7.88-3<br>88-3  | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)  | 0.0138<br>0.014<br>0.0136<br>0.014<br>0.0138<br>0.014<br>0.0138  | (217)<br>(218)<br>(219)<br>(220)<br>(220)<br>(221)   | -<br>0,197<br>4,531<br>0,7<br>0,445<br>0,522   | (235)<br>(236)<br>(237)<br>(238)<br>(239)<br>(240)<br>(241)   | 0.12<br>0.108<br>0.108<br>0.054<br>0.12<br>0.074<br>0.108   | (253)<br>(254)<br>(255)<br>(255)<br>(256)<br>(257)<br>(258)<br>(258)  | 0.2102<br>0.197<br>0.1573<br>0.1445<br>0.1445<br>0.1445<br>0.1445<br>0.1321   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)   | 0.12<br>0.14<br>0.15<br>0.14<br>0.09<br>0.13  |
| 73)<br>74)<br>75)<br>76)<br>77)<br>78)<br>78)<br>79)   | 0.085<br>0.045<br>0.085<br>0.096<br>0.1321<br>0.1445<br>0.12  | ( 91)<br>( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 95)<br>( 97)   | 0.085<br>0.035<br>0.085<br>0.036<br>0.054<br>0.054<br>0.036<br>0.0281  | (109) (110) (111) (112) (113) (114) (115)   | 0.0108<br>8E-0<br>7.8E-0<br>8E-0<br>7.8E-0<br>8E-3<br>7.8E-3<br>7.8E-3  | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)   | 0.0138<br>0.014<br>0.0136<br>0.014<br>0.0138<br>0.014<br>0.0638  | (217)<br>(216)<br>(219)<br>(220)<br>(221)<br>(222)   | -<br>0.197<br>4.531<br>0.7<br>0.445<br>0.522<br>0.32   | (235)<br>(236)<br>(237)<br>(238)<br>(239)<br>(240)  | 0.12<br>0.108<br>0.108<br>0.054<br>0.12<br>0.074  | (253)<br>(254)<br>(255)<br>(256)<br>(256)<br>(258)<br>(258)<br>(259)<br>(260)   | 0.2102<br>0.197<br>0.1573<br>0.1445<br>0.1445<br>0.1445<br>0.1445<br>0.1321<br>0.132  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)  | $\begin{array}{c} 0.12 \\ 0.14 \\ 0.15 \\ 0.14 \\ 0.09 \\ 0.13 \\ 0.10 \end{array}$   |
| 73)<br>74)<br>75)<br>76)<br>77)<br>78)<br>77)<br>80)   | 0.085<br>0.045<br>0.085<br>0.096<br>0.1321<br>0.1445<br>0.12<br>0.085   | ( 91)<br>( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 95)<br>( 97)<br>( 90)  | 0.085<br>0.035<br>0.085<br>0.036<br>0.054<br>0.054<br>0.036<br>0.0281  | (107)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)  | 0.0138<br>8E-3<br>8E-3<br>8E-3<br>8E-3<br>8E-3<br>8E-3<br>8E-3  | (127)<br>(123)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)  | 0.0138<br>0.014<br>0.0158<br>0.014<br>0.0138<br>0.014<br>0.0638<br>0.054   | (217)<br>(216)<br>(219)<br>(220)<br>(221)<br>(222)<br>(223)<br>(223)<br>(224)  | -<br>0,197<br>4,531<br>0,7<br>0,445<br>0,522<br>0,32<br>0,2712   | (235)<br>(236)<br>(237)<br>(238)<br>(239)<br>(240)<br>(241)   | 0.12<br>0.108<br>0.108<br>0.054<br>0.12<br>0.074<br>0.108<br>0.085<br>0.108   | (253)<br>(254)<br>(255)<br>(256)<br>(256)<br>(258)<br>(258)<br>(259)<br>(260)<br>(261)  | $\begin{array}{c} 0.2102 \\ 0.197 \\ 0.1573 \\ 0.1445 \\ 0.1445 \\ 0.1445 \\ 0.1321 \\ 0.132 \\ 0.12 \end{array}$   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(276)<br>(277)<br>(278)<br>(279)  | 0.12<br>0.14<br>0.15<br>0.14<br>0.09<br>0.13<br>0.10<br>0.09  |
| 73)<br>74)<br>75)<br>76)<br>77)<br>78)<br>77)<br>80)<br>81)  | 0.085<br>0.045<br>0.085<br>0.096<br>0.1321<br>0.1445<br>0.12<br>0.085<br>0.085  | ( 91)<br>( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 95)<br>( 95)<br>( 97)<br>( 90)<br>( 99)  | 0.085<br>0.005<br>0.085<br>0.036<br>0.054<br>0.054<br>0.036<br>0.0281<br>0.0281<br>0.108   | $(107) \\ (110) \\ (111) \\ (112) \\ (113) \\ (113) \\ (114) \\ (115) \\ (116) \\ (117) \end{cases}$  | 0.0108<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>7.8E-3<br>7.8E-3  | (127)<br>(123)<br>(129)<br>(130)<br>(131)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)  | 0.0138<br>0.014<br>0.0136<br>0.014<br>0.0138<br>0.014<br>0.0138<br>0.014<br>0.0638<br>0.054  | (217)<br>(218)<br>(219)<br>(220)<br>(221)<br>(222)<br>(223)<br>(224)<br>(225)  | -<br>0.197<br>4.531<br>0.7<br>0.445<br>0.522<br>0.32<br>0.2712<br>0.225  | (235)<br>(236)<br>(237)<br>(238)<br>(239)<br>(240)<br>(241)<br>(242)  | 0.12<br>0.108<br>0.108<br>0.054<br>0.12<br>0.074<br>0.108<br>0.085  | (253)<br>(254)<br>(255)<br>(256)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(252)                   | 0.2102<br>0.197<br>0.1573<br>0.1445<br>0.1445<br>0.1445<br>0.1445<br>0.1321<br>0.132<br>0.12<br>0.12  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)  | $\begin{array}{c} 0.12\\ 0.14\\ 0.15\\ 0.14\\ 0.09\\ 0.13\\ 0.10\\ 0.09\\ 0.09\\ 0.09\end{array}$   |
| 73)<br>74)<br>75)<br>76)<br>77)<br>78)<br>77)<br>80)<br>81)  | 0.085<br>0.045<br>0.085<br>0.096<br>0.1321<br>0.1445<br>0.12<br>0.085   | ( 91)<br>( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 95)<br>( 95)<br>( 96)<br>( 97)<br>( 90)<br>( 100)  | 0.085<br>0.035<br>0.045<br>0.054<br>0.054<br>0.054<br>0.0281<br>0.0281<br>0.108<br>0.054   | $(109) \\ (110) \\ (111) \\ (112) \\ (113) \\ (113) \\ (114) \\ (115) \\ (116) \\ (116) \\ (117) \\ (118) \end{cases}$                                | 0.0108<br>8E-3<br>7.8E-3<br>8E-3<br>8E-3<br>9E-3<br>8E-3<br>8E-3<br>8E-3<br>8E-3  | (127)<br>(123)<br>(129)<br>(130)<br>(131)<br>(131)<br>(131)<br>(133)<br>(133)<br>(135)<br>(136)   | 0.0138<br>0.014<br>0.0136<br>0.014<br>0.0138<br>0.014<br>0.0138<br>0.014<br>0.0638<br>0.054<br>0.054<br>0.054  | (217)<br>(218)<br>(219)<br>(220)<br>(221)<br>(222)<br>(223)<br>(223)<br>(224)<br>(225)<br>(226)  | -<br>0.197<br>4.531<br>0.7<br>0.445<br>0.522<br>0.32<br>0.2712<br>0.225<br>0.2102<br>0.197                                       | (235)<br>(236)<br>(237)<br>(238)<br>(239)<br>(240)<br>(240)<br>(241)<br>(242)<br>(243)  | 0.12<br>0.108<br>0.108<br>0.054<br>0.12<br>0.074<br>0.108<br>0.085<br>0.108   | (253)<br>(254)<br>(255)<br>(256)<br>(256)<br>(258)<br>(258)<br>(259)<br>(260)<br>(261)  | $\begin{array}{c} 0.2102 \\ 0.197 \\ 0.1573 \\ 0.1445 \\ 0.1445 \\ 0.1445 \\ 0.1321 \\ 0.132 \\ 0.12 \end{array}$   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)<br>(281)   | $\begin{array}{c} 0.12\\ 0.14\\ 0.15\\ 0.14\\ 0.09\\ 0.13\\ 0.10\\ 0.09\\ 0.09\\ 0.09\\ 0.07\\ 0.13\end{array}$   |
| 73)<br>74)<br>75)<br>75)<br>76)<br>77)<br>78)<br>79)<br>80)<br>81)<br>82)                                    | 0.085<br>0.045<br>0.085<br>0.096<br>0.1321<br>0.1445<br>0.12<br>0.085<br>0.085  | ( 91)<br>( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 95)<br>( 97)<br>( 98)<br>( 99)<br>( 100)<br>( 101)   | 0.085<br>0.085<br>0.085<br>0.026<br>0.036<br>0.036<br>0.0281<br>0.0281<br>0.108<br>0.054<br>0.054  | (107)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(119)  | 0.0108<br>88-3<br>7.88-3<br>88-3<br>88-3<br>7.88-3<br>88-3<br>7.88-3<br>88-3<br>7.88-3<br>7.88-3  | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(135)<br>(135)<br>(137)  | 0.0138<br>0.014<br>0.0136<br>0.014<br>0.0138<br>0.014<br>0.0138<br>0.014<br>0.0638<br>0.054<br>0.054<br>0.054<br>0.036<br>7.8E-3                                     | (217)<br>(216)<br>(219)<br>(220)<br>(221)<br>(222)<br>(223)'<br>(224)<br>(225)<br>(226)<br>(227)   | -<br>0.197<br>4.531<br>0.7<br>0.445<br>0.522<br>0.32<br>0.2712<br>0.225<br>0.2102<br>0.197<br>0.1704                             | (235)<br>(226)<br>(237)<br>(238)<br>(239)<br>(240)<br>(241)<br>(242)<br>(243)<br>(244)<br>(244)<br>(245)  | 0.12<br>0.108<br>0.108<br>0.054<br>0.12<br>0.074<br>0.108<br>0.085<br>0.108<br>0.132  | (253)<br>(254)<br>(255)<br>(256)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(252)                   | 0.2102<br>0.197<br>0.1573<br>0.1445<br>0.1445<br>0.1445<br>0.1445<br>0.1321<br>0.132<br>0.12<br>0.12  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)  | $\begin{array}{c} 0.12\\ 0.14\\ 0.15\\ 0.14\\ 0.09\\ 0.13\\ 0.10\\ 0.09\\ 0.09\\ 0.09\\ 0.13\\ 0.10\\ 0.10\end{array}$  |
| 73)<br>74)<br>75)<br>75)<br>77)<br>80)<br>81)<br>82)<br>82)<br>83)   | 0.085<br>0.045<br>0.085<br>0.096<br>0.1321<br>0.1445<br>0.12<br>0.085<br>0.085<br>0.085   | ( 91)<br>( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 95)<br>( 95)<br>( 96)<br>( 97)<br>( 90)<br>( 100)  | 0.085<br>0.085<br>0.085<br>0.074<br>0.054<br>0.0281<br>0.0281<br>0.108<br>0.054<br>0.054<br>0.054  | $(109) \\ (110) \\ (111) \\ (112) \\ (113) \\ (113) \\ (114) \\ (115) \\ (116) \\ (116) \\ (117) \\ (118) \\ (119) \\ (120) \end{cases}$              | 0.0138<br>8E-3<br>8E-3<br>8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>0.0742                          | (127)<br>(123)<br>(129)<br>(130)<br>(131)<br>(133)<br>(134)<br>(135)<br>(134)<br>(137)<br>(138)   | 0.0138<br>0.014<br>0.0156<br>0.014<br>0.0158<br>0.014<br>0.0638<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>2.8E-3<br>2E-3                                       | (217)<br>(218)<br>(220)<br>(221)<br>(222)<br>(223)'<br>(224)<br>(225)<br>(224)<br>(226)<br>(226)   | -<br>0,197<br>4,531<br>0,7<br>0,445<br>0,522<br>0,225<br>0,2712<br>0,225<br>0,2102<br>0,197<br>0,1704<br>0,157                   | (235)<br>(226)<br>(227)<br>(238)<br>(239)<br>(240)<br>(241)<br>(241)<br>(242)<br>(243)<br>(244)<br>(245)<br>(246)                                     | 0.12<br>0.108<br>0.108<br>0.054<br>0.12<br>0.074<br>0.108<br>0.085<br>0.108<br>0.132<br>0.12  | (253)<br>(254)<br>(255)<br>(256)<br>(257)<br>(258)<br>(258)<br>(259)<br>(259)<br>(259)<br>(261)<br>(261)<br>(262)<br>(263)                            | $\begin{array}{c} 0.2102\\ 0.197\\ 0.1573\\ 0.1445\\ 0.1445\\ 0.1445\\ 0.1445\\ 0.1321\\ 0.132\\ 0.132\\ 0.12\\ 0.064\\ 0.0964 \end{array}$                                     | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)<br>(281)   | 0.12<br>0.14<br>0.15<br>0.14<br>0.09<br>0.13<br>0.10<br>0.09<br>0.09<br>0.09<br>0.13<br>0.10<br>0.10  |
| 73)<br>74)<br>75)<br>75)<br>77)<br>80)<br>81)<br>82)<br>82)<br>83)<br>84)                                    | 0.085<br>0.045<br>0.085<br>0.1321<br>0.1445<br>0.12<br>0.085<br>0.085<br>0.045<br>0.045   | ( 91)<br>( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 95)<br>( 97)<br>( 98)<br>( 99)<br>( 100)<br>( 101)   | 0.085<br>0.085<br>0.085<br>0.026<br>0.036<br>0.036<br>0.0281<br>0.0281<br>0.108<br>0.054<br>0.054  | $(109) \\ (110) \\ (111) \\ (112) \\ (113) \\ (114) \\ (115) \\ (114) \\ (115) \\ (116) \\ (117) \\ (118) \\ (119) \\ (120) \\ (121) \end{cases}$     | 0.0108<br>8E-0<br>7.8E-0<br>8E-0<br>7.8E-0<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>0.0742<br>0.0742                    | (127)<br>(123)<br>(129)<br>(130)<br>(131)<br>(133)<br>(134)<br>(135)<br>(134)<br>(135)<br>(136)<br>(137)<br>(138)<br>(139)                            | 0.0138<br>0.014<br>0.0138<br>0.014<br>0.0138<br>0.014<br>0.0138<br>0.014<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.036<br>7.8E-3<br>2E-3<br>2.5E-3  | (217)<br>(218)<br>(219)<br>(220)<br>(221)<br>(222)<br>(223)<br>(224)<br>(225)<br>(224)<br>(225)<br>(226)<br>(228)<br>(229)                                     | -<br>0.197<br>4.531<br>0.7<br>0.445<br>0.522<br>0.32<br>0.2712<br>0.225<br>0.2102<br>0.197<br>0.1704                             | (235)<br>(276)<br>(277)<br>(237)<br>(239)<br>(240)<br>(241)<br>(241)<br>(242)<br>(243)<br>(244)<br>(245)<br>(246)<br>(247)                            | 0.12<br>0.109<br>0.109<br>0.054<br>0.12<br>0.074<br>0.109<br>0.085<br>0.108<br>0.132<br>0.132<br>0.12<br>0.12<br>0.197<br>1.822                     | (253)<br>(254)<br>(255)<br>(256)<br>(257)<br>(257)<br>(257)<br>(261)<br>(261)<br>(262)<br>(263)<br>(264)<br>(264)                                     | $\begin{array}{c} 0.2102\\ 0.197\\ 0.1573\\ 0.1445\\ 0.1445\\ 0.1445\\ 0.1321\\ 0.132\\ 0.132\\ 0.12\\ 0.064\\ 0.0964\\ 0.085 \end{array}$                                      | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)<br>(281)<br>(281)<br>(282)                                     | 0.12<br>0.14<br>0.15<br>0.14<br>0.09<br>0.13<br>0.10<br>0.09<br>0.09<br>0.09<br>0.13<br>0.10<br>0.10  |
| 73)<br>74)<br>75)<br>76)<br>77)<br>80)<br>81)<br>82)<br>82)<br>82)<br>83)<br>84)<br>85)                      | 0.085<br>0.045<br>0.095<br>0.096<br>0.1321<br>0.1445<br>0.085<br>0.085<br>0.085<br>0.045<br>0.064<br>0.036<br>0.085                   | ( 91)<br>( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 95)<br>( 95)<br>( 95)<br>( 96)<br>( 97)<br>( 97)<br>( 100)<br>( 101)<br>( 102)   | 0.085<br>0.085<br>0.085<br>0.074<br>0.054<br>0.0281<br>0.0281<br>0.108<br>0.054<br>0.054<br>0.054  | $(109) \\ (110) \\ (111) \\ (112) \\ (113) \\ (113) \\ (114) \\ (115) \\ (116) \\ (116) \\ (117) \\ (118) \\ (119) \\ (120) \end{cases}$              | 0.0108<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>0.0742<br>0.036                     | (127)<br>(123)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(135)<br>(136)<br>(137)<br>(137)<br>(139)<br>(140)                   | 0.0138<br>0.014<br>0.0136<br>0.014<br>0.0138<br>0.014<br>0.0438<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>2E-3<br>2E-3<br>2E-3                        | (217)<br>(218)<br>(219)<br>(220)<br>(221)<br>(222)<br>(223)<br>(223)<br>(224)<br>(225)<br>(226)<br>(226)<br>(227)<br>(228)<br>(229)<br>(230)                   | -<br>0.197<br>4.531<br>0.7<br>0.445<br>0.522<br>0.32<br>0.2712<br>0.225<br>0.2102<br>0.197<br>0.1704<br>0.157                    | (235)<br>(206)<br>(237)<br>(238)<br>(239)<br>(240)<br>(241)<br>(242)<br>(243)<br>(243)<br>(244)<br>(245)<br>(246)<br>(247)<br>(248)                   | 0.12<br>0.108<br>0.109<br>0.054<br>0.12<br>0.074<br>0.108<br>0.005<br>0.108<br>0.132<br>0.12<br>0.12<br>0.12<br>0.12<br>1.822                       | (253)<br>(254)<br>(255)<br>(256)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(257)<br>(260)<br>(261)<br>(262)<br>(263)<br>(264)<br>(265) | $\begin{array}{c} 0.2102\\ 0.197\\ 0.1573\\ 0.1445\\ 0.1445\\ 0.1445\\ 0.1321\\ 0.132\\ 0.132\\ 0.12\\ 0.064\\ 0.0964\\ 0.0964\\ 0.074\\ \end{array}$                           | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)<br>(281)<br>(282)<br>(283)                                     | $\begin{array}{c} 0.12\\ 0.14\\ 0.15\\ 0.14\\ 0.09\\ 0.13\\ 0.10\\ 0.09\\ 0.09\\ 0.09\\ 0.013\\ 0.10\\ 0.14\\ 0.12\end{array}$  |
| 73)<br>74)<br>75)<br>77)<br>80)<br>81)<br>82)<br>83)<br>84)<br>83)<br>84)<br>85)<br>84)                      | 0.085<br>0.045<br>0.085<br>0.096<br>0.1321<br>0.1445<br>0.12<br>0.085<br>0.085<br>0.045<br>0.045<br>0.045<br>0.036<br>0.054           | ( 91)<br>( 92)<br>( 92)<br>( 94)<br>( 95)<br>( 95)<br>( 95)<br>( 95)<br>( 95)<br>( 95)<br>( 95)<br>( 95)<br>( 96)<br>( 97)<br>( 97)<br>( 100)<br>( 101)<br>( 102)<br>( 103) | 0.085<br>0.085<br>0.025<br>0.034<br>0.034<br>0.034<br>0.0281<br>0.108<br>0.054<br>0.054<br>0.054   | $(109) \\ (110) \\ (111) \\ (112) \\ (113) \\ (114) \\ (115) \\ (114) \\ (115) \\ (116) \\ (117) \\ (118) \\ (119) \\ (120) \\ (121) \end{cases}$     | 0.0108<br>8E-0<br>7.8E-0<br>8E-0<br>7.8E-0<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>0.0742<br>0.0742                    | (127)<br>(123)<br>(129)<br>(130)<br>(131)<br>(133)<br>(134)<br>(135)<br>(134)<br>(135)<br>(136)<br>(137)<br>(138)<br>(139)                            | 0.0138<br>0.014<br>0.0138<br>0.014<br>0.0138<br>0.014<br>0.0138<br>0.014<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.036<br>7.8E-3<br>2E-3<br>2.5E-3  | (217)<br>(216)<br>(219)<br>(220)<br>(221)<br>(223)<br>(223)<br>(224)<br>(225)<br>(224)<br>(227)<br>(228)<br>(229)<br>(228)<br>(229)<br>(230)<br>(231)          | -<br>0.197<br>4.531<br>0.7<br>0.445<br>0.522<br>0.32<br>0.2712<br>0.225<br>0.2102<br>0.197<br>0.1704<br>0.157<br>0.157<br>0.1445 | (235)<br>(206)<br>(237)<br>(239)<br>(240)<br>(241)<br>(242)<br>(244)<br>(244)<br>(244)<br>(244)<br>(244)<br>(246)<br>(248)<br>(249)                   | 0.12<br>0.108<br>0.108<br>0.054<br>0.12<br>0.074<br>0.108<br>0.085<br>0.108<br>0.132<br>0.12<br>0.12<br>0.197<br>1.822<br>1.822<br>0.904            | (253)<br>(254)<br>(255)<br>(255)<br>(257)<br>(257)<br>(257)<br>(260)<br>(260)<br>(262)<br>(263)<br>(264)<br>(264)<br>(265)<br>(265)<br>(265)          | $\begin{array}{c} 0.2102\\ 0.197\\ 0.1573\\ 0.1445\\ 0.1445\\ 0.1445\\ 0.1321\\ 0.132\\ 0.12\\ 0.064\\ 0.0964\\ 0.085\\ 0.0964\\ 0.074\\ 0.0964\\ 0.0964\\ \end{array}$         | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(276)<br>(277)<br>(280)<br>(281)<br>(280)<br>(281)<br>(283)<br>(284)<br>(285)                   | 0.12<br>0.14<br>0.15<br>0.14<br>0.09<br>0.13<br>0.10<br>0.09<br>0.09<br>0.13<br>0.10<br>0.14<br>0.12<br>0.14  |
| 73)<br>74)<br>75)<br>76)<br>77)<br>80)<br>81)<br>82)<br>83)<br>84)<br>85)<br>84)<br>85)<br>84)<br>85)        | 0.085<br>0.045<br>0.085<br>0.096<br>0.1321<br>0.1445<br>0.12<br>0.085<br>0.085<br>0.045<br>0.085<br>0.064<br>0.036<br>0.054<br>0.0638 | ( 91)<br>( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 95)<br>( 95)<br>( 96)<br>( 97)<br>( 97)<br>( 97)<br>( 97)<br>( 100)<br>( 101)<br>( 102)<br>( 103)<br>( 104)<br>( 105)        | 0.085<br>0.085<br>0.025<br>0.036<br>0.034<br>0.034<br>0.034<br>0.038<br>0.0281<br>0.108<br>0.054<br>0.054<br>0.054<br>0.054                    | $(109) \\ (110) \\ (111) \\ (112) \\ (113) \\ (113) \\ (114) \\ (115) \\ (116) \\ (117) \\ (118) \\ (119) \\ (120) \\ (121) \\ (122) \end{cases}$     | 0.0108<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>0.0742<br>0.036                     | (127)<br>(123)<br>(129)<br>(130)<br>(131)<br>(133)<br>(134)<br>(135)<br>(134)<br>(137)<br>(136)<br>(137)<br>(139)<br>(139)<br>(140)<br>(141)<br>(142) | 0.0138<br>0.014<br>0.0156<br>0.014<br>0.0158<br>0.014<br>0.0638<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>2E-3<br>2E-3<br>2E-3<br>2.5E-3<br>2.5E-3<br>0        | (217)<br>(218)<br>(219)<br>(220)<br>(221)<br>(222)<br>(223)<br>(224)<br>(225)<br>(224)<br>(226)<br>(226)<br>(229)<br>(228)<br>(229)<br>(230)<br>(231)<br>(232) | -<br>0.197<br>4.531<br>0.7<br>0.445<br>0.522<br>0.32<br>0.2712<br>0.225<br>0.2102<br>0.197<br>0.1704<br>0.157<br>0.157<br>0.1445 | (235)<br>(226)<br>(227)<br>(238)<br>(239)<br>(240)<br>(241)<br>(242)<br>(243)<br>(244)<br>(245)<br>(244)<br>(245)<br>(248)<br>(248)<br>(249)<br>(250) | 0.12<br>0.108<br>0.108<br>0.054<br>0.12<br>0.074<br>0.108<br>0.085<br>0.108<br>0.132<br>0.132<br>0.132<br>0.197<br>1.822<br>1.822<br>0.906<br>0.445 | (253)<br>(254)<br>(255)<br>(256)<br>(257)<br>(258)<br>(257)<br>(240)<br>(240)<br>(240)<br>(240)<br>(243)<br>(244)<br>(245)<br>(244)<br>(245)<br>(246) | $\begin{array}{c} 0.2102\\ 0.197\\ 0.1973\\ 0.1445\\ 0.1445\\ 0.1445\\ 0.1445\\ 0.1321\\ 0.132\\ 0.12\\ 0.064\\ 0.0964\\ 0.085\\ 0.0964\\ 0.074\\ 0.0964\\ 0.085\\ \end{array}$ | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)<br>(281)<br>(282)<br>(283)<br>(284)<br>(284)<br>(285)<br>(285) | $\begin{array}{c} 0.12\\ 0.14\\ 0.15\\ 0.14\\ 0.09\\ 0.13\\ 0.10\\ 0.09\\ 0.09\\ 0.13\\ 0.10\\ 0.14\\ 0.12\\ 0.14\\ 0.15\\ \end{array}$   |
| 73)<br>74)<br>75)<br>75)<br>77)<br>80)<br>81)<br>82)<br>83)<br>84)<br>85)<br>84)<br>85)<br>84)<br>86]<br>86] | 0.085<br>0.045<br>0.085<br>0.096<br>0.1321<br>0.1445<br>0.12<br>0.085<br>0.085<br>0.045<br>0.045<br>0.045<br>0.036<br>0.054           | ( 91)<br>( 92)<br>( 93)<br>( 94)<br>( 95)<br>( 95)<br>( 95)<br>( 96)<br>( 97)<br>( 98)<br>( 100)<br>( 101)<br>( 102)<br>( 103)<br>( 104)                                    | 0.085<br>0.005<br>0.005<br>0.074<br>0.074<br>0.074<br>0.074<br>0.0781<br>0.0281<br>0.108<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054 | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(119)<br>(120)<br>(121)<br>(122)<br>(123) | 0.0108<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>8E-3<br>7.8E-3<br>0.0742<br>0.0742<br>0.036<br>0.0208 | (127)<br>(123)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(135)<br>(135)<br>(136)<br>(137)<br>(139)<br>(140)<br>(141)                            | 0.0138<br>0.014<br>0.0136<br>0.014<br>0.0138<br>0.014<br>0.0038<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.054<br>0.036<br>7.8E-3<br>2E-3<br>2.5E-3<br>2.5E-3 | (217)<br>(216)<br>(219)<br>(220)<br>(221)<br>(223)<br>(223)<br>(224)<br>(225)<br>(224)<br>(227)<br>(228)<br>(229)<br>(228)<br>(229)<br>(230)<br>(231)          | -<br>0.197<br>4.531<br>0.7<br>0.445<br>0.522<br>0.32<br>0.2712<br>0.225<br>0.2102<br>0.197<br>0.1704<br>0.157<br>0.157<br>0.1445 | (235)<br>(206)<br>(237)<br>(239)<br>(240)<br>(241)<br>(242)<br>(244)<br>(244)<br>(244)<br>(244)<br>(244)<br>(246)<br>(248)<br>(249)                   | 0.12<br>0.108<br>0.108<br>0.1054<br>0.12<br>0.074<br>0.108<br>0.085<br>0.108<br>0.132<br>0.12<br>0.12<br>0.197<br>1.822<br>1.822<br>0.904           | (253)<br>(254)<br>(255)<br>(255)<br>(257)<br>(257)<br>(257)<br>(260)<br>(260)<br>(262)<br>(263)<br>(264)<br>(264)<br>(265)<br>(265)<br>(265)          | $\begin{array}{c} 0.2102\\ 0.197\\ 0.1573\\ 0.1445\\ 0.1445\\ 0.1445\\ 0.1321\\ 0.132\\ 0.12\\ 0.064\\ 0.0964\\ 0.085\\ 0.0964\\ 0.074\\ 0.0964\\ 0.0964\\ \end{array}$         | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(276)<br>(277)<br>(280)<br>(281)<br>(280)<br>(281)<br>(283)<br>(284)<br>(285)                   | $\begin{array}{c} 0.100\\ 0.12\\ 0.14\\ 0.15\\ 0.14\\ 0.09\\ 0.13\\ 0.10\\ 0.09\\ 0.13\\ 0.10\\ 0.13\\ 0.10\\ 0.14\\ 0.15\\ 0.14\\ 0.15\\ 0.17\\ 0.18\\ 0.18$ |

| <br>(287) | 0.1836 | (307) | 0.1573 | (325) | 0.2555     | (343) | 31.52  |
|-----------|--------|-------|--------|-------|------------|-------|--------|
| (290)     | 0.132  | (308) | 4.018  | (326) | ú.799      | (344) | 60     |
| (290)     | 0.1704 | (309) | 0.445  | (327) | 1.534      | (345) | 34.4   |
| (271)     | 0.157  | (310) | 0.7    | (328) | 11.9       | (746) | 13.58  |
| (293)     | 0.1830 | (311) | 1.396  | (329) | 5.077      | (247) | 109.2  |
| (294)     | 0.184  | (312) | 0.445  | (330) | 2.281      | (348) | 6Ŭ     |
| (295)     | 0.1636 | (313) | 0.607  | (531) | 1.822      | (349) | 48     |
| (296)     | 0.1445 | (314) | 0.785  | (332) | 1.264      | (350) | 43     |
| (297)     | 0.1704 | (315) | 0.445  | (333) | 0.91       | (351) | 24.4   |
| (278)     | 0.12   | (316) | 0.197  | (334) | 0.904      | (352) | 27.5   |
| (299)     | 0.12   | (317) | 0.2871 | (335) | 0.799      | (353) | 17.4 . |
| (300)     | 0.12   | (318) | 0.1321 | (336) | <b>0.7</b> | (354) | 20.4   |
| (301)     | 0.1704 | (319) | 0,1704 | (337) | 0.607      | (355) | 14.32  |
| (302)     | 0.1704 | (320) | 0.074  | (338) | 0.607      | (356) | 18,02  |
| (303)     | 0.1573 | (321) | 0.0964 | (339) | 1.822      | (357) | 9.55   |
| (304)     | 0.157  | (322) | 0.074  | (340) | 3.773      | (358) | 15.74  |
| (305)     | 0.1573 | (323) | 0.0742 | (341) | 2.94       | (359) | 4.83   |
| (306)     | 0.1704 | (324) | 0.2102 | (342) | 2.94       | (360) | 6.84   |

.

.

.

TR 143 March 1989

| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | $      \begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$ |
|---|---|
|---|---|

|  |  |  |  |   | ~_~~~~~~~~   |  |  |  |   |     |
|--|--|--|--|---|--|--|--|--|---|-----|
| ( 92) 3.11 (<br>( 93) 2.94 (<br>( 94) 2.771 (<br>( 95) 2.771 (<br>( 95) 2.771 (<br>( 96) 2.605 (<br>( 97) 2.442 (<br>( 97) 2.442 (<br>( 98) 2.442 (<br>( 99) 2.442 (<br>( 100) 2.281 (<br>( 101) 2.124 (<br>( 102) 5.38 (<br>( 103) 4.531 (<br>( 104) 3.54 ( | $\begin{array}{c} (109) & 5.953 \\ (110) & 5.077 \\ (111) & 4.531 \\ (112) & 4.62 \\ (113) & 4.618 \\ (114) & 5.677 \\ (115) & 4.901 \\ (114) & 4.901 \\ (115) & 4.901 \\ (116) & 4.92 \\ (117) & 3.773 \\ (118) & 3.54 \\ (117) & 3.773 \\ (119) & 3.773 \\ (120) & 3.11 \\ (121) & 3.114 \\ (122) & 2.94 \\ (127) & 2.771 \end{array}$ | (127) 2.442<br>(128) 2.44<br>(129) 2.442<br>(130) 2.442<br>(131) 2.442<br>(132) 2.28<br>(133) 2.28<br>(133) 2.281<br>(154) 2.124<br>(135) 2.124<br>(135) 2.124<br>(137) 1.972<br>(138) 1.822<br>(139) 1.822<br>(140) 1.972 | $\begin{array}{c} (145) & 1.972 \\ (146) & 8.22 \\ (147) & 6.89 \\ (148) & 5.65 \\ (149) & 16.64 \\ (150) & 9.26 \\ (151) & 6.572 \\ (152) & 5.65 \\ (153) & 4.531 \\ (154) & 4.27 \\ (155) & 3.773 \\ (156) & 3.54 \\ (157) & 3.314 \\ (159) & 3.114 \end{array}$ | $\begin{array}{c} (163) & 2,771 \\ (164) & 2,61 \\ (165) & 2,605 \\ (166) & 2,440 \\ (167) & 2,281 \\ (168) & 2,281 \\ (168) & 2,281 \\ (169) & 2,124 \\ (170) & 2,124 \\ (171) & 2,124 \\ (171) & 2,124 \\ (172) & 1,972 \\ (173) & 1,972 \\ (173) & 1,972 \\ (175) & 1,972 \\ (176) & 1,972 \\ (177) & 1,622 \end{array}$ | (271) 11.15<br>(272) 11.15<br>(273) 34.97<br>(274) 21.87<br>(275) 11.94<br>(275) 11.94<br>(276) 8.56<br>(277) 6.89<br>(277) 6.89<br>(277) 5.95<br>(277) 5.301<br>(280) 4.53<br>(281) 4.531<br>(281) 4.531<br>(282) 5.08<br>(283) 4.27<br>(284) 4.02<br>(285) 4.018 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $      \begin{array}{lllllllllllllllllllllllllllllll$ | 4 . |
| (102) 5.38<br>(103) 4.531<br>(104) 3.54<br>(105) 40.42<br>(106) 15.3<br>(107) 8.91   | (120) 3.11<br>(121) 3.114  | (138) 1.822<br>(139) 1.822   | (157) 3.314  | (175) 1.972<br>(176) 1.972  | (283) 4.27<br>(284) 4.02   | (301) 2.124<br>(302) 1.972                           | (319) 1.476<br>(320) 1.534                           | (337) 0.522<br>(338) 0.445                           | (355) 0.385<br>(356) 0.32                             | •   |

•

-

|       |           |         | •         |           |     | ·        |     |
|-------|-----------|---------|-----------|-----------|-----|----------|-----|
| River | discharge | data at | 12-hourly | intervals | for | Station: | 23A |
|       |           |         |           |           |     | Period : | 2   |

.

Phosphorus transport Berg River

.

-----

|   |              |                 |                |                | - 7(0)         |                |                |                  |                |                |       |                |                |        |                |               |                |                |                |                | <b>_</b> . |
|---|--------------|-----------------|----------------|----------------|----------------|----------------|----------------|------------------|----------------|----------------|-------|----------------|----------------|--------|----------------|---------------|----------------|----------------|----------------|----------------|------------|
|   |              | e: MLEIN        |                | (length        |                |                |                |                  |                |                | (181) | 0.1021         | (199)          | 0,12   | (217)          | 0.7           | (235)          |                | (253)          | 1.138          | •          |
|   | (1)          | 0.3198          | (19)           | 0.157          |                | 0.799          | (55)           |                  | (73)           |                | (192) | 0.12           | (200)          | 0.064  | (219)          | 0.445         | (236)          | 5.381          | (254)          | 1.019          |            |
|   |              | 0.32            | ( 20)          | 0.132          | ( 18)          | 0.607          | (56)           | 0.21             | (74)           |                | (163) | 0.1321         | (201)          | 0.12   | (219)          | 0.522         | (207)          | 4.53           | (255)          | 0.904          |            |
|   | (3)          | 0.3198          | ( 21)          | 0.1573         | ( 39)          | 0.407          | ( 57)          | 0.225            | ( /5)          | 0,607<br>0.445 | (184) | 0.108          | (202)          | 0.054  | (220)          | 0.353         | (239)          | 2.771          | (256)          | 0.906          |            |
|   | (4)          | 0.21            | ( 22)          | 0.12           | (40)           | 0.522          | (58)           | 0.145            |                | 0.445          | (165) | 0.0964         | (203)          | 0.12   | (221)          | 0.350         | (239)          | 2.281          | (257)          | 0.906          |            |
|   | (5)          | 0.3198          | (23)           | 0.1445         | (41)           | 0.445          | (59)           | 0.1704           | ( 77)<br>( 78) | 0.287          | (196) | 0.074          | (204)          | 0.074  | (222)          | 0.255         | (240)          | 2.124          | (258)          | 0.905          |            |
|   | (6)          | 0.27            | (24)           | 0,12           | ( 42)          | 0.445          | ( 60)          | 3.77             |                | 0.2871         | (187) | 0.085          | (205)          | 0.1573 | (223)          | 0.2871        |                | 1.972          | (259)          | 1.018          |            |
|   | (7)          | 0.3198          | (25)           | 0.1445         | (43)           | 0.445          | ( 51)          | 2.124            | (80)           | 0.255          | (199) | 0.074          | (206)          | 0.21   | (224)          | 0.197         | (242)          | 1.575          | (260)          | 0.905          |            |
|   | (8)          | 0.225           | (26)           | 0.17           | ( 44)          | 0.353          | (62)           | 1.264            | (80)           | 0.2871         | (187) | 0.090          | (207)          | 1.676  | (225)          | 0.197         | (243)          | 1.574          | (261)          | 0.906          |            |
|   | ( 9)         | 0.2971          | (27)           | 0.225          | (45)           | 0.445          | (63)           | 1.019<br>2.124   | (82)           | 0.255          | (190) | 0.045          | (208)          | 8.50   | (226)          | 0.108         | • • •          | 1.574          | (262)          | 0.799<br>0.906 |            |
|   | (10)         | 0.225           | (28)           | 0.287          | (46)           | 0.255          | (64)<br>(65)   | 2,771            | (83)           | 0,2871         | (191) | 0.1321         | (209)          | 4,018  | (227)          | 0.108         |                | 1.534          | (263)          | 0.906          |            |
|   | (11)         | 0.353           | (29)           | 0.255          | (47)           | 0.2712         |                | 1,534            | (84)           | 0.287          | (192) | 0.074          | (210)          | 7.541  | (228)          | 0.12          | (246)          | 1.5.4          | (264)<br>(265) | 0.906          |            |
|   | (12)         | 0.24            | ( 30)          | 0.21           | (48)           | 0.184          | ( 67)          | 1.138            | (85)           | 0.2712         | (193) | 0.1573         | (211)          | 3.538  | (229)          | 0.12          | (247)          | 1.676          | (266)          | 0.799          | 7          |
|   | (13)         | 0,255           | (31)           | 0.3365         | (49)           |                | (68)           | 0.799            | (86)           | 0.184          | (194) | 0.145          | (212)          | 1.9    | (230)          | 0.085         | (248)          | 1.534<br>1.396 | (267)          | 0.799          |            |
|   |              | 0.256           | ( 32)          | 2.442          | (50)           | 0.17<br>0.1573 | ( 49)          | 0.799            | ( 87)          | 0.225          | (195) | 0.1704         |                | 1.504  | (201)          | 0.108         | (249)<br>(250) | 1.264          | (269)          | 0.799          |            |
|   |              | 0.2401          |                | 1.675          | (51)<br>(52)   | 0.108          | (70)           | 0.607            | ( 88)          | 0.24           | (196) |                | (214)          | 1.138  | (232)          | 1.019         |                | 1.254          | (269)          | 0.799          |            |
|   | (16)         |                 | • • •          | 1.178          |                |                |                | 0.607            | (89)           | 0.1704         |       | 0.1573         |                | 1.019  | (233)<br>(234) | 0,12<br>8,22  |                | 1.138          |                | 0./99          |            |
|   | (17)<br>(19) | 0.1704<br>0.145 | ( 35)<br>( 36) |                | (54)           |                | (72)           | 0,607            | ( 90)          | 0.172          | (198) | 0.096          | (215)          | 0.799  |                |               |                |                |                |                |            |
|   |              |                 |                |                |                |                |                |                  |                |                | -     |                |                |        |                |               |                |                |                |                |            |
|   |              |                 |                |                |                |                |                |                  |                |                |       | -              |                |        |                |               |                |                |                |                |            |
|   |              |                 |                |                |                |                |                |                  |                |                |       | 0.799          | <br>(289)      |        | (307)          | 0.607         | (325)          | 1.138          | (.4.)          | 0.607          |            |
|   | (91)         | 0,1321          |                | 0.197          | (127)          |                | (145)          | 0.2712           | -              | 0.445<br>0.385 | (272) | 0.7            | (290)          | 0.799  | (308)          | 0.522         | (326)          | 1.02           | (344)          | 0.607          |            |
|   | ( 92)        | 0.17            | (110)          | 0.157          | (120)          | 0.7            |                | 0.24             | (164)<br>(165) | 0.3765         |       | 0.799          | (291)          | 0.799  | (209)          |               | (327)          | 0.906          | ( 45)          |                |            |
|   | (93)         | 0.1704          | (111)          |                | (129)          | 0.607          | (147)          | $0.2401 \\ 0.21$ | (166)          | 0.32           | (274) |                | (292)          | 0.799  | ([10]          | 1.02          | (328)          | 0.906          | (46)           | 0.445          |            |
|   | (94)         | 0.132           | (112)          |                | (130)          | 0.607          | (148)<br>(149) | 0.197            | (157)          | 0.3030         | (275) | 0.7            | (197)          | Ú.799  | (311)          | 2.94          | (329)          | 0.906          |                | 0.607<br>0.607 | 2          |
|   | ( 75)        | 0.2102          |                | 0.445          | (131)          | 0.522<br>0.445 | • - • • •      | 0.197            | (168)          | 0.271          | (276) | 0.799          | (294)          | 0.799  | (11)           |               | (330)          | 0.905          | (348)          |                | Ψ          |
|   | (96)         | 0.197           |                | 5.381          | (132)<br>(133) | 0.445          | (151)          | 0.255            | (169)          | 0,255          | (277) | 10.19          | (295)          |        | (713)          |               | (331)          | 0.799<br>0.799 | (349)<br>(350) | 0.607          | <b>.</b>   |
|   | (97)         | 0.225           | (115)          |                | (133)          | 0.385          | (152)          | 0.24             | (179)          | 0.24           |       | 4.018          | (294)          |        | (314)          | -             | (332)<br>(333) | 0.799          | (351)          | 0.7            | N          |
|   | (98)         | 0.225           |                | 2.442<br>1.676 | (135)          | 0.385          |                | 0.2401           | (171)          | 0.225          |       | 5.077          | (297)          | 0.799  | (015)          |               | (334)          | 0.799          | (352)          | 0.607          |            |
|   | (99)         | 0.228           |                | 1.138          | (136)          | 0.337          | (154)          | 0.24             | (172)          | 0.197          |       | 2.771          | (298)          | 0.7    |                | 1.534         | (334)          | 0.799          | (353)          | Ů.7            |            |
|   | (100)        | 0.607           |                |                | (137)          | 0.385          | (155)          | 0.2102           | (173)          | 0.197          |       | 2.771          | (299)          | 0.7    | (717)          |               | (336)          | 0.799          | (354)          |                |            |
|   | (101)        | 0.353           | (117)          |                | ,              | 0.353          | (156)          | 0.197            | (174)          | 0.17           |       |                | (300)          | 0.7    | (318)<br>(319) | 1.14<br>1.017 | (337)          | 0.799          | (355)          | 0.7            |            |
|   | (102)        | 0.235           | (121)          |                |                | 0.353          | (157)          | 0.197            | (175)          | 0.1836         |       | 1.534          | (301)          |        | (320)          | 0.906         | (338)          | 0.7            | (356)          | 0.7            |            |
|   | (104)        | 0.225           | (122)          |                |                | 0.353          | (158)          | 0.145            | (176)          | 0.145          |       | 1.396          | (302)          |        | (320)          |               | (339)          | 0.7            | (357)          |                |            |
| 2 | (105)        | 0.2102          | (123)          | 1.676          | (141)          |                | (159)          | 0.1445           | (177)          |                |       | 1.264          | (303)          | -      | (322)          |               | (340)          | 0.7            | (358)          |                |            |
|   | (106)        | 0.17            |                | 1.264          | (142)          | 0.271          | (160)          | 0.17             | (178)          | 0.096          |       | 1,019          | (304)<br>(305) |        | (323)          |               | (341)          | 0.7            | (359)          |                |            |
|   | (107)        | 0.1573          | (125)          |                | (143)          | 0.2555         |                | 0.2712           | (179)          | 0.1321         |       | 1.019<br>0.906 | (305)          |        |                | 1.14          | (342)          |                | (360)          | 0.607          |            |
|   | (100)        | 0 132           | (126)          | 0.906          | (144)          | 0.24           | (162)          | 0.7              | (180)          |                | (288) | 0.908          |                |        |                |               |                |                |                |                |            |
| • |              |                 |                |                |                |                |                |                  |                |                |       |                |                |        |                |               |                |                |                |                |            |

. . .

-

. . .

| ariable: ELEIN4.var1   | (length = 344)  | (101) 5.95 (199) 4.5% (217) 2.771 (238) 10 (253) 2.442   |
|--|---|--|
| 1) $0.607$ (19)         2) $0.607$ (20)         3) $0.607$ (21)         4) $0.7$ (22)         5) $0.7$ (23)         6) $0.7$ (24)         7) $0.52$ (25)         8) $0.799$ (26)         9) $10.766$ (27)         10) $10.38$ (28)         11) $5.65$ (29)         12) $3.114$ (30)         13) $2.442$ (31)         14) $1.676$ (32)         15) $1.534$ (34)         17) $1.39$ (35) | 1.26 $(37)$ $1.4$ $(55)$ $11.94$ $(73)$ $5.95$ $1.264$ $(38)$ $1.396$ $(56)$ $9.63$ $(74)$ $5.38$ $7.2$ $(37)$ $1.4$ $(57)$ $7.87$ $(75)$ $4.801$ $4.27$ $(40)$ $1.396$ $(58)$ $13.58$ $(76)$ $4.53$ $3.1$ $(41)$ $1.4$ $(59)$ $14.01$ $(77)$ $4.53$ $2.442$ $(42)$ $1.396$ $(60)$ $9.26$ $(78)$ $4.27$ $2.28$ $(43)$ $1.4$ $(61)$ $7.54$ $(79)$ $4.27$ $1.972$ $(44)$ $1.396$ $(52)$ $6.572$ $(80)$ $4.018$ $1.82$ $(45)$ $1.26$ $(53)$ $5.65$ $(81)$ $5.77$ $1.676$ $(47)$ $1.14$ $(55)$ $8.22$ $(83)$ $5.114$ $1.534$ $(48)$ $1.264$ $(66)$ $6.89$ $(44)$ $5.114$ $1.534$ $(50)$ $45$ $(68)$ $5.077$ $(86)$ $2.94$ $1.376$ $(51)$ $14.87$ $(69)$ $4.53$ $(87)$ $2.771$ $1.676$ $(52)$ $100$ $(70)$ $5.077$ $(89)$ $2.771$ $1.676$ $(52)$ $100$ $(70)$ $5.077$ $(89)$ $2.771$ $1.676$ $(52)$ $100$ $(70)$ $5.077$ $(89)$ $2.771$ $1.676$ $(52)$ $100$ $(70)$ $5.077$ $(89)$ $2.771$ $1.676$ $(52)$ $100$ $(70)$ $5.077$ < | $ \begin{array}{c} (131) & 5.75 & (200) & 4.27 & (218) & 2.94 & (236) & 7.87 & (254) & 2.442 \\ (182) & 5.65 & (201) & 4.02 & (219) & 2.771 & (237) & 6.259 & (255) & 2.281 \\ (184) & 5.08 & (202) & 4.02 & (220) & 2.605 & (239) & 4.801 & (256) & 2.124 \\ (185) & 5.077 & (203) & 3.77 & (221) & 2.442 & (239) & 4.27 & (257) & 2.124 \\ (186) & 5.08 & (204) & 3.77 & (222) & 2.605 & (240) & 3.773 & (258) & 2.442 \\ (187) & 5.077 & (205) & 3.54 & (222) & 2.605 & (240) & 3.773 & (258) & 2.442 \\ (188) & 4.801 & (206) & 3.54 & (224) & 2.281 & (241) & 3.54 & (259) & 3.114 \\ (188) & 4.801 & (206) & 3.54 & (224) & 2.28 & (242) & 3.114 & (260) & 6.89 \\ (139) & 4.27 & (207) & 3.31 & (225) & 2.74 & (243) & 3.114 & (261) & 4.801 \\ (190) & 4.27 & (205) & 7.114 & (226) & 2.28 & (244) & 2.94 & (262) & 4.013 \\ (191) & 4.018 & (209) & 3.114 & (222) & 2.281 & (244) & 2.94 & (263) & 3.538 \\ (192) & 4.02 & (210) & 3.114 & (229) & 2.281 & (247) & 2.605 & (264) & 2.94 \\ (193) & 4.27 & (211) & 3.114 & (229) & 2.281 & (247) & 2.605 & (263) & 2.94 \\ (194) & 11.15 & (212) & 2.94 & (270) & 2.124 & (249) & 2.605 & (266) & 2.771 \\ (195) & 7.54 & (213) & 2.94 & (251) & 2.124 & (249) & 2.605 & (266) & 2.771 \\ (195) & 7.54 & (214) & 2.771 & (233) & 2.281 & (247) & 2.605 & (266) & 2.771 \\ (196) & 5.08 & (216) & 2.771 & (233) & 2.281 & (251) & 3.114 & (269) & 2.442 \\ (197) & 5.08 & (216) & 2.771 & (233) & 2.281 & (251) & 3.114 & (269) & 2.442 \\ (198) & 5.08 & (216) & 2.771 & (234) & 10.38 & (252) & 2.605 & (270) & 2.442 \\ (198) & 5.08 & (216) & 2.771 & (234) & 10.38 & (252) & 2.605 & (270) & 2.442 \\ \end{array}$ |
|  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |

(178)

(179)

(180)

\_\_\_\_

6.89

6.57

\_\_\_\_\_

6.259

- (286)

(297)

(288)

----

1.822

1.822

1.676

(304)

(305)

(306)

1.133

1.02

River discharge data at 12-hourly intervals for Station: 23A Period : 4

(160)

----

.

4.8

(161) 23.41

(162) 150

3.54

3.31

\_\_\_\_

(142)

\_\_\_\_\_

(144)

(143) 3.54

.

4

(106) 11.15

(107) 9.26

----------

(108) 60

(124)

(125)

(126)

-----

5.95

5.65

5.38

\_\_\_\_

0.445

0.353

(341)

(342)

(323)

(324)

\_\_\_\_

0.522

River discharge data

| 91) 0,12    | (109) 0.225 | (127) 0.085 | (145) 0.12  | (165) 0.12  |
|-------------|-------------|-------------|-------------|-------------|
| 92) 0.12    | (110) 0.157 | (128) 0.036 | (146) 0.054 | (164) 0.198 |
| 95) 0,126   | (111) 0.17  | (129) 0.05  | (147) 0.12  | (165) 0.096 |
| (94) 0.132  | (112) 0.132 | (130) 0.028 | (148) 0.12  | (16v) 0.132 |
| 95) 0.125   | (113) 0.157 | (131) 0.05  | (147) 0.132 | (157) 0.074 |
| ( 76) 0.064 | (114) 0.145 | (132) 0.021 | (150) 0.12  | (168) 0.054 |
| ( 97) 0.054 | (115) 0.13  | (133) 0.045 | (151) 0.108 | (169) 0.085 |
| ( 98) 0.074 | (116) 0.096 | (134) 0.074 | (152) 0.074 | (170) 0.054 |
| ( 99) 0.108 | (117) 0.13  | (135) 0.12  | (153) 0.132 | (171) 0.085 |
| (100) 0.108 | (118) 0.036 | (136) 0.145 | (154) 0.036 | (172) 0.074 |
| (101) 0,108 | (119) 0.096 | (137) 0.108 | (155) 0.074 | (173) 0.085 |
| (102) 0.054 | (120) 0.085 | (138) 0.028 | (156) 0.054 | (174) 0.045 |
| (103) 0.085 | (121) 0.12  | (139) 0.036 | (157) 0.074 | (175) 0.096 |
| (104) 0.054 | (122) 0.132 | (140) 0.045 | (158) 0.054 | (176) 0.085 |
| (105) 0.064 | (123) 0.108 | (141) 0.255 | (159) 0.085 | (177) Q.108 |
| (104) 0.045 | (124) 0,045 | (142) 0.197 | (160) 0.045 | (178) 0.12  |
| (102) 0.045 | (125) 0.074 | (143) 0.21  | (161) 0.085 | (179) 0.132 |
| (108) 0.17  | (126) 0.045 | (144) 0.132 | (152) 0.074 | (180) 0.085 |

1 ... >

v intervals for Station: 23A Period: 5

| (271) 0.108  | (287) 0.2401 | (307) 0.197  | (325) 1.019         | (343) 0.385    |            |
|--------------|--------------|--------------|---------------------|----------------|------------|
| (272) 0.108  | (290) 1,972  | (308) 0.21   | (026) 0.908         | (344) 0.353    |            |
| (277) 0.1321 | (291) 1.019  | (309) 0.255  | (327) 0.799         | (345) 0.353    |            |
| (274) 0.184  | (272) 9.7    | (310) 0.307  | (328) \$.95         | (346) 0.007    | -          |
| (2/5) 0.2555 | (272) 0.522  | (011) 0.607  | (227) 2.94          | (347) 0.3198   | A3         |
| (276) 0.7    | (294) 0.385  | (312) 0.822  | (330) 1.97          | (348) 0.319    |            |
| (277) 0.607  | (295) 0.0000 | (313) 0.445  | (331) 1.396         | . (049) 0.3198 | ~          |
| (278) 0.337  | (296) 0.271  | (514) 0.35   | (332) 1.02          | (350) 0.300    | -          |
| (279) 0.2712 | (297) 0.2401 | (315) 0.3365 | (333) 0.906         | (351) 0.445    |            |
| (280) 0.24   | (298) 0.24   | (316) 0.319  | (334) 0.799         | (352) 0.607    |            |
| (281) 0.225  | (299) 0.225  | (317) 0.2871 | (335) 0.65          | (353) 0.607    |            |
|              | (300) 0,225  | (318) 0.287  | (336) 0.607         | (354) 0.522    |            |
| (282) 0.21   | (301) 0.225  | (319) 0.2871 | (337) 0.522         | (355) 0.445    |            |
| (283) 0.197  |              | (320) 0.385  | (338) 0.445         | (356) 0.445    |            |
| (284) 0.184  | (302) 0.21   | (321) 7.213  | (339) 0.445         | (357) 0.385    |            |
| (285) 0.1704 | (303) 0.2102 | (322) 2.94   | (340) 0.445         | (358) 0.337    |            |
| (286) Ú.197  | (304) 0.197  |              | (341) 0.445         | (359) 0.3198   |            |
| (287) 0,1836 | (305) 0.197  | (323) 1.972  | (342) 0.385         | (360) 0,303    |            |
| (288) 0.17   | (306) 0.184  | (324) 1.39   | (342) <b>0.38</b> 3 | (330) 01300    | ~ <b>-</b> |
|              |              |              |                     |                |            |

| 1) 0.375  | (19) 0.17                | (37) 0.157                 | ( 55) 0.353                 | (73) 0.157  |
|-----------|--------------------------|----------------------------|-----------------------------|-------------|
| 2) 0.385  | ( 20) 0.145              | (38) 0.17                  | ( 56) 0.307                 | ( 74) 0.096 |
| 3) 0.445  | (21) 0.21                | ( 39) 0.184                | ( 57) 0.255                 | ( 75) 0.13  |
| 4) 0.385  | (22) 0.17                | (40) 0.095                 | ( 58) 0.21                  | ( 76) 0.064 |
| 5) 0,385  | ( 23) 0.255              | (41) 0.12                  | ( 59) 0.C1                  | ( 77) 0.13  |
|           | (24) 0.21                | (42) 0.045                 | ( 60) 0.21                  | (78) 0.096  |
| 6) 0.319  | (25) 0.17                | (43) 0.085                 | ( 61) 0.197                 | ( 79) 0.157 |
| 7) 0.353  | (25) 0.17                | ( 44) 0.064                | ( 62) 0.157                 | ( 80) 0.157 |
| 8) 0.353  | (23) 0.17<br>(27) 0.1573 | (45) 0.14                  | ( 63) 0.182                 | (81) 0.1445 |
| 9) 0.353  |                          | (46) 0.074                 | ( 64) 0.17                  | (82) 0.045  |
| 10) 0.353 | (28) 0.108               | (47) 0,109                 | ( 55) 0.197                 | ( 83) 0.13  |
| 11) 0.32  | ( 29) 0.17               | (48) 0.054                 | (66)0.21                    | ( 84) 0.045 |
| 12) 0.256 | (30) 0.132               | (48) 0.034                 | ( 67) 0.197                 | ( 85) 0.096 |
| 13) 0.28% | (31) 0.1573              | • • • •                    | ( 68) 0.145                 | (86) 0.036  |
| 14) 0,157 | ( 32) 0.108              | ( 50) 0.132                | ( 69) 0.17                  | ( 87) 0.085 |
| 15) 0.287 | ( 33) 0.1573             | ( 51) 0.183                | ( 34) 0.132                 | ( 88) 0.064 |
| 16) 0.197 | (34) 0.132               | ( 52) 0.799                |                             | (89) 0.085  |
| 17) 0.197 | ( 35) 0.184              | ( 53) 0.799<br>( 54) 0.337 | ( 71) 0.183a<br>( 72) 0.096 | ( 90) 0.085 |

| 181 0.085   | (199) 0.021  | (217) 0,184  | (205) 0.132  | (253) 0.085  |
|-------------|--------------|--------------|--------------|--------------|
| 132) 0.035  | (200) 0.023  | (219) 0.194  | (206) 0.085  | (254) 0.045  |
| 183) 0.064  | (201) 0.04   | (219) 0.17   | (237) 0.108  | (255) 0.132  |
| 184) 0.036  | (202) 0.000  | (220) 0.184  | (258) 0.108  | (256) 0.095  |
| 185) 0.085  | (203) 0.096  | (221) 0.184  | (239) 0.1445 | (257) 0.12   |
| 186) 0.045  | (204) 0.074  | (222) 0.145  | (240) 0.074  | (258) 0.054  |
| 187) 0.074  | (205) 0.085  | (223) 0.184  | (241)  0.12  | (259) 0.1445 |
| 188) 0.054  | (205) 0.095  | (224) 0.12   | (242) 0.074  | (260) 0.157  |
| (189) 0.132 | (207) 0.096  | (225) 0.132  | (240) 0.085  | (261) 0.197  |
| (190) 0.132 | (208) 0.036  | (225) 0.096  | (244) 0.045  | (252) 0.184  |
| (191) 0.132 | (209) 0.054  | (227) 0.12   | (245) 0.074  | · (263) 0.17 |
| (192) 0.145 | (210) 0.045  | (228) 0.085  | (246) 0.108  | (264) 0.17   |
| (193) 0.12  | (211) 0.064  | (229) 0.12   | (247) 0.12   | (265) 0.157  |
| (194) 0.045 | (212) 0.045  | (230) 0.085  | (248) 0.108  | (146) 0.137  |
| (195) 0.074 | (213) 0,1445 | (231) 0.1445 | (249) 0.108  | (267) 0.1445 |
| (196) 0.045 | (214) 0.157  | (232) 0.132  | (280) 0.036  | (268) 0.108  |
| (197) 0.085 | (215) 0.184  | (233) 0.132  | (251) 0.064  | (769) Ó 108  |
| (198) 0.028 | (216) 0.157  | (254) 0.132  | (252) 0.036  | (270) 0.12   |

ariable: MLEINS.var1 (length = 360)

| 1) 0.271  | (17)  |  |  | 0.607  | ( 55)   |   | ( 73)  |  | (131)  |  | (179)  |  | (217)   |  | (2.05)  |   | (250)  |   |
|---|---|--|--|--|---|---|--|--|--|--|--|--|---|--|---|---|--|---|
| 2) 0.271  | ( 20)   | 4.02   | (33)   | 0.607  | ( 56)   | 0.7   | (74)   | 0.906  | (182)  |  |  | 5.38   | (218)   |  | (236)   |   | (254)  |   |
| 3) 0.271  |   | 2.771  | ( 39)  | 0.607  | ( 57)   | 0.8   | ( 75)  | 1.396  | (183) (  | 11.94  | (201)  | 5.077  | (217)   |  | (237)   |   | (255)  |   |
| 4) 0.271  |   | 3.314  | ( 40)  |  | ( 58)   | 4.801   | (75)   | 1.254  | (184)  | 78   |  | 5.08   | (220)   |  |   |   | (256)  |   |
| 53 0.271  |   | 2.442  | ( 41)  |  | ( 59)   |   | (77)   | 1.14   | (135) :  | 51   | (203)  | 1a.02  | (221)   |  | (227)   |   | (257)  |   |
| 6) 0.271  |   | 1.972  | ( 12)  |  |   | 3.114   | ( 781  | 1.019  | (196) (  | 49   | (204)  | 58   | (222)   | 4.53   | (240)   |   | (258)  |   |
| 7) 0.287  |   | 1.576  | (43)   |  |   | 2.124   |  | 4.02   | (137) -  | 40.4   | (205)  | 19.44  | (223)   | 4.55   | (241)   | 2.94  | (259)  |   |
| 8) 0.287  |   | 1.376  | (44)   |  |   | 1.575   |  | 2.442  | (188) (  | 23.4   | (206)  | 13.6   | (224)   | 4.27   | (242)   |   | (260)  |   |
| 9) 0.35   |   | 1.264  | (45)   |  | ( 5 )   |   | • - •  | 1.97   | (187) 1  | 17.5   | (207)  | 11.15  | (225)   | 4.02   | (243)   |   | (251)  |   |
| 10) 6.572   | (28)  |  | (46)   |  |   | 1.5.34  |  | 1.5.54   | (190) 0  | 14.43  | (208)  | 12.3   | (226)   | 4.02   | (244)   | <u> </u>  | (262)  |   |
|   |   | 1.02   | (47)   |  |   | 1.264   | (83)   |  | (191) 1  |  | (1269)   | 10   | (227)   | 3.77   | (245)   | 2.77  | (153)  | 5.  |
| (11) 5.65<br>(12) 5.381   |   | 0.906  | (48)   |  |   | 1.133   | (84)   |  | (192)  |  |  | 8.55   | 12280   |  | (246)   | 2.51  | (264)  | 4.  |
| 12) 5.95  | (31)  |  | (48)   |  | ( 67 }  |   | (85)   |  | (193)  |  |  | 7.54   | (229)   | 3.77   | (247)   | 2.442   | (265)  | 4.  |
| 14) 3.54  |   | 0.799  | ( 50)  |  | ( 59)   |   | (85)   | 1.02   | (194)  | 0.71   | (212)  | 7.21   | (250)   | 3,54   | (248)   | 2.442   | (266)  |   |
|   | (32)  |  | ( 51)  |  |   | 0.905   | (87)   | 3.114  | (195)  | 8.56   | (213)  | 6.89   | (231)   | 3.31   | (249)   | 2.94  | (267)  |   |
| 15) 4.53  | (34)  | ~ <b>7</b>   |  | 1 704  | 6 705   | A 700   | 1 991  | - Z 21 S   | 11701  | //   |  | 6.57   | (232)   | 3.11   | (250)   | 2.74  | (268)  | 5.  |
| 16) 4.02<br>(17) 2.605  |   | 0.7  | 1 573  | 107 3  |   | 0.8   | ( 89)  | 4.53   | (197)  | 7.54   |  | 6.25   |   | 3,114  | (251)   | 2.77  | (259)  | 6.  |
| 18) 1.97  |   |  | 1 945  | 0.004  | ( 77)   | A 749   | 1 900  | 3 114  | (198)  | 6.57   | (216)  |  | (274)   |  | (252)   |   | (270)  | 5.  |
|   |   |  |  |  |   |   |  |  |  |  |  |  |   |  |   |   |  | _   |
|   |   |  |  |  |   |   |  |  |  |  |  |  |   |  |   |   |  | •   |
|   | (109)   | 1.676  | (127)  | 1.97   | (145)   | 7.54  | (163)  | <b></b>  | (2/1)  | <br>4.5%   | (287)  | 2.442  | (307)   | 1.822  | (325)   | 1.396   | (343)  | 0.1   |
| 91) 2.442   | (109)<br>(110)  | 1.676<br>1.575   |  | 1.97   | (145)<br>(145)  | 7.54<br>6.57  | (163)<br>(164)   | 3.53<br>4.53   | (2/1)<br>(272)   | 4.53<br>4.018  | (287)<br>(290)   | 2.442  | (207)<br>(208)  | 1.822  | (325)<br>(325)  | 1.396   | (343)<br>(344)   | o.<br>o.  |
| 91) 2.442<br>92) 2.124  | (109)<br>(110)<br>(111)   | 1.676<br>1.575<br>2.442  | (127)<br>(128)<br>(129)  | 1.97<br>1.97<br>1.97   | (145)<br>(146)<br>(147)   | 7.54<br>6.57<br>7.54  | (163)<br>(164)<br>(165)  | 5.53<br>4.53<br>4.02   | (2/1)<br>(2/2)<br>(273)  | 4.53<br>4.018<br>3.773   | (287)<br>(290)<br>(291)  | 2.442<br>2.442<br>2.442<br>2.442   | (207)<br>(208)<br>(309)   | 1.822<br>2.281<br>3.114  | (325)<br>(326)<br>(327)   | 1.376<br>1.264<br>1.264   | (340)<br>(044)<br>(045)  | 0.<br>0.<br>0.  |
| (91) 2.442<br>92) 2.124<br>93) 2.124<br>93) 2.124<br>94) 14.43  | (109)<br>(110)<br>(111)<br>(112)  | 1.676<br>1.675<br>2.442<br>2.771   | (127)<br>(128)<br>(129)<br>(129)<br>(130)  | 1.97<br>1.97<br>1.97<br>2.124  | (145)<br>(146)<br>(147)<br>(147)<br>(148)   | 7,54<br>6,37<br>7,54<br>6,89  | (163)<br>(164)<br>(165)<br>(166)   | 3.53<br>4.53<br>4.02<br>3.54   | (2/1)<br>(272)<br>(273)<br>(273)   | 4.53<br>4.018<br>3.773<br>3.538  | (287)<br>(290)<br>(291)<br>(292)   | 2,442<br>2,442<br>2,442<br>2,442<br>2,281  | (207)<br>(208)<br>(309)<br>(310)  | 1.822<br>2.281<br>3.114<br>2.442   | (325)<br>(326)<br>(327)<br>(328)  | 1.376<br>1.264<br>1.264<br>1.019  | (343)<br>(344)<br>(345)<br>(346)   | 0.<br>0.<br>0.  |
| 91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.43  | (109)<br>(110)<br>(111)<br>(112)<br>(112)<br>(113)  | 1.676<br>1.675<br>2.442<br>2.771<br>2.77   | (127)<br>(128)<br>(129)<br>(130)<br>(131)  | 1.97<br>1.97<br>1.97<br>2.124<br>2.124   | (145)<br>(145)<br>(147)<br>(147)<br>(147)<br>(147)  | 7,54<br>6,57<br>7,54<br>6,89<br>8,91  | (163)<br>(164)<br>(165)<br>(166)<br>(167)  | 5.53<br>4.53<br>4.02<br>3.54<br>3.31   | (2/1)<br>(272)<br>(273)<br>(274)<br>(275)  | 4.53<br>4.018<br>3.773<br>3.538<br>3.314   | (287)<br>(290)<br>(291)<br>(292)<br>(293)  | 2,442<br>2,442<br>2,442<br>2,281<br>2,281<br>2,281   | (207)<br>(208)<br>(309)<br>(311)  | 1.822<br>2.281<br>3.114<br>2.442<br>1.972  | (325)<br>(326)<br>(327)<br>(329)<br>(329)   | 1.396<br>1.264<br>1.264<br>1.254<br>1.019<br>1.019  | (343)<br>(344)<br>(345)<br>(345)<br>(345)<br>(347)   | 0.<br>0.<br>0.<br>0.  |
| 91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.43<br>95) 7.541   | (109)<br>(110)<br>(111)<br>(112)<br>(112)<br>(113)  | 1.676<br>1.675<br>2.442<br>2.771   | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(131)<br>(172)  | 1.97<br>1.97<br>1.97<br>2.124<br>2.124<br>1.97   | (145)<br>(145)<br>(147)<br>(147)<br>(147)<br>(147)<br>(150)   | 7.54<br>6.57<br>7.54<br>6.89<br>8.91<br>6.25  | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(163)   | 5.53<br>4.53<br>4.02<br>3.54<br>3.11<br>3.11   | (2/1)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)   | 4.53<br>4.018<br>3.773<br>3.538<br>3.314<br>5.114  | (287)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)   | 2,442<br>2,442<br>2,442<br>2,281<br>2,281<br>2,281<br>2,281  | (207)<br>(308)<br>(309)<br>(310)<br>(311)<br>(311)  | 1.822<br>2.281<br>3.114<br>2.442<br>1.972<br>1.822   | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(320)   | 1.376<br>1.264<br>1.264<br>1.619<br>1.019<br>1.019<br>1.019   | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(347)<br>(348)  | 0.<br>0.<br>0.<br>0.<br>0.  |
| (91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.43<br>95) 7.541<br>95) 4.901   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)  | 1.676<br>1.675<br>2.442<br>2.771<br>2.77   | (127)<br>(128)<br>(129)<br>(130)<br>(131)  | 1.97<br>1.97<br>1.97<br>2.124<br>2.124<br>1.97   | (145)<br>(146)<br>(147)<br>(144)<br>(147)<br>(150)<br>(151)   | 7.54<br>6.37<br>7.54<br>6.89<br>8.91<br>6.25<br>5.38  | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(163)<br>(159)  | 5.53<br>4.63<br>4.02<br>3.54<br>3.51<br>3.11<br>2.94   | (2/1)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(277)  | 4.53<br>4.018<br>3.773<br>3.538<br>3.314<br>3.114<br>5.114   | (287)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)   | 2,442<br>2,442<br>2,442<br>2,281<br>2,281<br>2,291<br>2,281  | (207)<br>(208)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)   | 1.822<br>2.281<br>3.114<br>2.442<br>1.972<br>1.822<br>1.822<br>1.322   | (325)<br>(326)<br>(327)<br>(329)<br>(329)<br>(330)<br>(331)   | 1.376<br>1.264<br>1.264<br>1.019<br>1.019<br>1.019<br>1.019   | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(348)<br>(348)<br>(349)   | 0.<br>0.<br>0.<br>0.<br>0.  |
| 91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.43<br>95) 7.541<br>95) 4.901<br>95) 3.77  | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)  | 1.676<br>1.675<br>2.447<br>2.771<br>2.77<br>2.442<br>2.605   | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(131)<br>(172)  | 1.97<br>1.97<br>1.97<br>2.124<br>2.124<br>1.97<br>1.802  | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(152)  | 7.54<br>6.37<br>7.54<br>6.89<br>8.41<br>6.25<br>5.38<br>4.801   | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(163)<br>(163)<br>(159)<br>(170)  | 3.53<br>4.53<br>4.02<br>3.54<br>3.31<br>3.11<br>2.94<br>2./7   | (2/1)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(277)<br>(278)   | 4.53<br>4.018<br>5.775<br>3.538<br>3.514<br>5.114<br>5.114<br>2.94   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(295)<br>(295)  | 2,442<br>2,442<br>2,442<br>2,281<br>2,281<br>2,281<br>2,281<br>2,281<br>2,284<br>2,124   | (207)<br>(208)<br>(309)<br>(310)<br>(311)<br>(212)<br>(213)<br>(314)  | 1.822<br>2.281<br>3.114<br>2.442<br>1.972<br>1.822<br>1.322<br>1.375   | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(329)<br>(331)<br>(331)<br>(332)  | 1.376<br>1.264<br>1.264<br>1.619<br>1.019<br>1.019<br>1.019<br>0.908  | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(348)<br>(349)<br>(350)   | 0.<br>0.<br>0.<br>0.<br>0.<br>0.  |
| (91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.43<br>(95) 7.541<br>95) 7.541<br>95) 4.901<br>(97) 3.77<br>98) 3.114   | (109)<br>(110)<br>(111)<br>(112)<br>(112)<br>(114)<br>(115)<br>(115)  | 1.676<br>1.675<br>2.447<br>2.771<br>2.77<br>2.442<br>2.605   | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(135)  | 1.97<br>1.97<br>1.97<br>2.124<br>2.124<br>1.97<br>1.97<br>1.97<br>10.8   | (145)<br>(146)<br>(144)<br>(147)<br>(147)<br>(147)<br>(147)<br>(147)<br>(150)<br>(151)<br>(152)<br>(153)                            | 7,54<br>6,37<br>7,54<br>6,99<br>8,91<br>6,25<br>5,38<br>4,80,1<br>4,63  | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(163)<br>(169)<br>(169)<br>(171)  | 5.53<br>4.53<br>4.02<br>3.54<br>3.11<br>3.11<br>2.94<br>2.77<br>2.44   | (2/1)<br>(272)<br>(273)<br>(273)<br>(273)<br>(273)<br>(275)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)   | 4.53<br>4.018<br>3.578<br>3.514<br>3.114<br>5.114<br>2.94<br>2.94  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(293)<br>(293)<br>(297)  | 2,442<br>2,442<br>2,242<br>2,281<br>2,281<br>2,281<br>2,281<br>2,124<br>1,972  | (507)<br>(508)<br>(509)<br>(510)<br>(511)<br>(512)<br>(513)<br>(514)<br>(314)<br>(515)  | 1.822<br>2.281<br>3.114<br>2.442<br>1.972<br>1.822<br>1.822<br>1.676   | (325)<br>(324)<br>(324)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329)<br>(321)<br>(322)<br>(331)   | $1.376 \\ 1.264 \\ 1.264 \\ 1.019 \\ 1.019 \\ 1.019 \\ 1.019 \\ 0.906 \\ 0.705 $  | (343)<br>(344)<br>(345)<br>(346)<br>(347)<br>(348)<br>(349)<br>(350)<br>(351)  | 0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.  |
| (91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.43<br>95) 7.541<br>95) 4.901<br>(97) 3.77<br>98) 3.114<br>99) 2.77   | (109)<br>(110)<br>(111)<br>(112)<br>(112)<br>(114)<br>(115)<br>(115)  | 1.676<br>1.675<br>2.442<br>2.771<br>2.77<br>2.442<br>2.605<br>6.89<br>5.08   | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(131)<br>(125)<br>(134)   | 1.97<br>1.97<br>1.97<br>2.124<br>2.124<br>1.97<br>1.97<br>1.97<br>10.8   | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(152)  | 7,54<br>6,37<br>7,54<br>6,99<br>8,91<br>6,25<br>5,38<br>4,80,1<br>4,63  | (163)<br>(164)<br>(166)<br>(166)<br>(167)<br>(163)<br>(163)<br>(170)<br>(171)<br>(172)   | 5.53<br>4.53<br>4.02<br>3.54<br>3.11<br>3.11<br>2.94<br>2.77<br>2.44<br>2.28   | (2/1)<br>(272)<br>(273)<br>(273)<br>(275)<br>(275)<br>(275)<br>(279)<br>(279)<br>(289)   | 4.53<br>4.018<br>3.5314<br>3.114<br>3.114<br>2.94<br>2.771   | (287)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(293)<br>(295)<br>(295)<br>(297)<br>(298)  | 2,442<br>2,442<br>2,442<br>2,281<br>2,281<br>2,281<br>2,281<br>2,281<br>2,124<br>1,972<br>1,822  | (207)<br>(208)<br>(309)<br>(310)<br>(311)<br>(212)<br>(213)<br>(314)<br>(315)<br>(316)  | 1.022<br>2.201<br>3.114<br>2.442<br>1.972<br>1.022<br>1.022<br>1.022<br>1.075<br>1.676<br>1.534                            | (325)<br>(326)<br>(327)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329)<br>(325)<br>(325)<br>(325)   | $1.376 \\ 1.264 \\ 1.264 \\ 1.019 \\ 1.019 \\ 1.019 \\ 1.019 \\ 0.906 \\ 0.705 \\ 0.906 \\ 0.90$ | (340)<br>(044)<br>(045)<br>(346)<br>(347)<br>(048)<br>(349)<br>(349)<br>(350)<br>(351)<br>(352)  | 0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.                                    |
| 91)       2.442         92)       2.124         93)       2.124         94)       14.43         95)       7.541         95)       7.541         95)       7.541         95)       7.541         95)       7.541         95)       7.541         95)       3.114         99)       3.114         99)       2.77         100)       2.605 | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(115)<br>(114)<br>(117)   | 1.676<br>1.675<br>2.442<br>2.771<br>2.77<br>2.442<br>2.605<br>6.89<br>5.08   | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(134)<br>(135)   | 1.97<br>1.97<br>2.124<br>2.124<br>1.97<br>1.802<br>1.97<br>1.802<br>1.97<br>1.908  | (145)<br>(146)<br>(147)<br>(147)<br>(150)<br>(151)<br>(151)<br>(152)<br>(153)<br>(154)<br>(155)                                     | 7,54<br>6,57<br>7,54<br>6,29<br>8,91<br>6,25<br>5,38<br>4,89<br>4,83<br>4,63<br>4,63<br>3,77                          | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(163)<br>(159)<br>(159)<br>(170)<br>(171)<br>(172)<br>(173)                                     | 5.53<br>4.53<br>4.02<br>3.54<br>3.11<br>2.94<br>2.77<br>2.44<br>2.28<br>2.28   | (2/1)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(277)<br>(278)<br>(279)<br>(280)<br>(280)<br>(281)   | 4.53<br>4.018<br>3.775<br>3.538<br>3.114<br>5.114<br>2.94<br>2.771<br>3.538  | (287)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(293)<br>(293)<br>(297)<br>(298)<br>(299)  | 2.442<br>2.442<br>2.442<br>2.281<br>2.281<br>2.281<br>2.281<br>2.124<br>1.972<br>1.822<br>1.522  | (207)<br>(208)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(316)<br>(316)<br>(317)   | 1.822<br>2.281<br>3.114<br>2.442<br>1.972<br>1.822<br>1.822<br>1.676<br>1.676<br>1.534<br>1.396                            | (325)<br>(324)<br>(327)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329)<br>(321)<br>(325)   | $1.376 \\ 1.264 \\ 1.254 \\ 1.019 \\ 1.019 \\ 1.019 \\ 1.019 \\ 0.906 \\ 0.705 \\ 0.906 \\ 0.906 $  | (340)<br>(044)<br>(044)<br>(044)<br>(044)<br>(044)<br>(044)<br>(050)<br>(051)<br>(052)<br>(052)  | 0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.                              |
| (91) 2.442<br>92) 2.124<br>93) 2.124<br>93) 2.124<br>94) 14.43<br>95) 7.541<br>95) 4.901<br>(97) 3.77<br>98) 3.114<br>99) 2.77<br>100) 2.605<br>101) 2.442  | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(115)<br>(114)<br>(117)   | 1.676<br>1.675<br>2.442<br>2.771<br>2.442<br>2.605<br>6.89<br>5.08<br>4.02<br>3.314                                    | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(134)<br>(135)<br>(134)<br>(135)<br>(136)<br>(137)                   | 1.97<br>1.97<br>1.97<br>2.124<br>2.124<br>2.124<br>1.97<br>1.802<br>1.97<br>10.6<br>5.08<br>3.77<br>3.114                                | (145)<br>(146)<br>(147)<br>(144)<br>(150)<br>(151)<br>(152)<br>(155)<br>(155)<br>(155)<br>(156)                                     | 7.54<br>6.37<br>7.54<br>6.89<br>8.91<br>5.25<br>5.38<br>4.801<br>4.801<br>4.63<br>3.77<br>3.77                        | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(163)<br>(170)<br>(170)<br>(171)<br>(172)<br>(173)<br>(174)                                     | 3.53<br>4.63<br>4.02<br>3.54<br>3.31<br>3.11<br>2.94<br>2.77<br>2.44<br>2.28<br>2.28<br>2.28<br>2.124                            | (2/1)<br>(272)<br>(273)<br>(273)<br>(274)<br>(275)<br>(277)<br>(278)<br>(279)<br>(280)<br>(281)<br>(281)   | 4.53<br>4.018<br>3.773<br>3.508<br>3.314<br>0.114<br>2.94<br>2.94<br>2.94<br>2.771<br>3.538<br>3.114   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(293)<br>(293)<br>(293)<br>(298)<br>(299)<br>(299)<br>(300)  | 2,442<br>2,442<br>2,442<br>2,281<br>2,281<br>2,281<br>2,281<br>2,281<br>2,124<br>1,970<br>1,822<br>1,822<br>1,822  | (207)<br>(208)<br>(208)<br>(210)<br>(212)<br>(212)<br>(212)<br>(213)<br>(214)<br>(314)<br>(314)<br>(314)<br>(316)<br>(318)  | 1.822<br>2.281<br>3.114<br>2.442<br>1.972<br>1.822<br>1.822<br>1.674<br>1.675<br>1.675<br>1.534<br>1.396                   | (325)<br>(324)<br>(327)<br>(329)<br>(329)<br>(329)<br>(321)<br>(321)<br>(331)<br>(335)<br>(335)<br>(335)  | $1.376 \\ 1.264 \\ 1.264 \\ 1.019 \\ 1.019 \\ 1.019 \\ 1.019 \\ 0.906 \\ 0.90$ | (343)<br>(344)<br>(344)<br>(346)<br>(346)<br>(346)<br>(347)<br>(349)<br>(350)<br>(351)<br>(352)<br>(353)<br>(353)                                      | 0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.      |
| 91)       2.442         92)       2.124         93)       2.124         93)       2.124         93)       7.341         94)       4.301         97)       3.77         98)       3.114         99)       2.77         100)       2.605         101)       2.422         102)       2.281  | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(115)<br>(115)<br>(115)<br>(119)<br>(120)   | 1.676<br>1.675<br>2.442<br>2.771<br>2.442<br>2.605<br>6.89<br>5.08<br>4.02<br>3.314                                    | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(134)<br>(135)<br>(134)<br>(135)<br>(136)<br>(137)<br>(139)          | 1.97<br>1.97<br>1.97<br>2.124<br>2.124<br>1.87<br>1.872<br>1.97<br>10.8<br>5.08<br>3.77<br>3.114<br>2.77                                 | (145)<br>(146)<br>(147)<br>(148)<br>(150)<br>(155)<br>(155)<br>(155)<br>(155)<br>(156)<br>(157)                                     | 7,54<br>6,87<br>7,54<br>6,89<br>8,91<br>6,25<br>5,8<br>4,80,1<br>4,63<br>4,63<br>4,63<br>4,63<br>3,77<br>3,11         | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(167)<br>(169)<br>(170)<br>(171)<br>(171)<br>(173)<br>(174)<br>(175)                            | 3.53<br>4.63<br>4.02<br>3.54<br>3.11<br>2.94<br>2.77<br>2.44<br>2.28<br>2.124<br>2.124   | (2/1)<br>(272)<br>(273)<br>(274)<br>(275)<br>(274)<br>(276)<br>(277)<br>(278)<br>(279)<br>(280)<br>(280)<br>(281)<br>(282)<br>(293)                            | 4.53<br>4.018<br>3.538<br>3.514<br>5.114<br>5.94<br>2.94<br>2.771<br>3.538<br>3.114<br>2.94<br>2.771<br>3.114<br>2.94  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(293)<br>(297)<br>(298)<br>(299)<br>(299)<br>(300)<br>(301)  | 2,442<br>2,442<br>2,281<br>2,281<br>2,281<br>2,281<br>2,124<br>1,970<br>1,802<br>1,922<br>1,922<br>1,922   | (207)<br>(508)<br>(509)<br>(510)<br>(511)<br>(512)<br>(513)<br>(214)<br>(215)<br>(514)<br>(315)<br>(318)<br>(319)   | 1.822<br>2.281<br>3.114<br>2.442<br>1.972<br>1.822<br>1.822<br>1.676<br>1.534<br>1.534<br>1.534<br>1.396<br>1.395          | (325)<br>(324)<br>(327)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329)<br>(321)<br>(325)<br>(334)<br>(336)<br>(336)<br>(337)                            | $1.376 \\ 1.264 \\ 1.264 \\ 1.019 \\ 1.019 \\ 1.019 \\ 1.019 \\ 0.906 \\ 0.90$ | (343)<br>(344)<br>(344)<br>(344)<br>(344)<br>(344)<br>(354)<br>(351)<br>(352)<br>(355)<br>(355)  | 0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0 |
| (91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.43<br>95) 7.541<br>95) 7.541<br>95) 3.77<br>98) 3.114<br>99) 2.77<br>100) 2.605<br>101) 2.442<br>102) 2.281<br>103) 2.281  | (109)<br>(110)<br>(111)<br>(112)<br>(112)<br>(114)<br>(115)<br>(115)<br>(115)<br>(115)<br>(117)<br>(118)<br>(119)<br>(120)<br>(121)                                     | 1.676<br>1.675<br>2.442<br>2.771<br>2.77<br>2.442<br>2.605<br>6.89<br>5.08<br>4.02<br>3.314<br>2.94                    | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(134)<br>(135)<br>(135)<br>(136)<br>(137)<br>(139)<br>(139)<br>(140) | 1.97<br>1.97<br>1.97<br>2.124<br>2.124<br>1.800<br>1.97<br>1.800<br>1.97<br>10.6<br>5.08<br>3.77<br>3.114<br>2.77<br>2.605               | (145)<br>(144)<br>(147)<br>(147)<br>(150)<br>(151)<br>(153)<br>(153)<br>(155)<br>(155)<br>(155)<br>(157)<br>(159)                   | 7,54<br>6,57<br>7,54<br>6,99<br>8,91<br>6,25<br>5,38<br>4,60<br>3,77<br>3,77<br>3,77<br>3,11<br>5,45                  | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(163)<br>(167)<br>(170)<br>(171)<br>(172)<br>(173)<br>(175)<br>(175)                            | 5.53<br>4.53<br>4.02<br>3.54<br>3.11<br>2.94<br>2.77<br>2.44<br>2.28<br>2.28<br>2.124<br>2.124<br>1.97                           | (2/1)<br>(272)<br>(273)<br>(273)<br>(275)<br>(275)<br>(276)<br>(279)<br>(279)<br>(279)<br>(280)<br>(281)<br>(282)<br>(281)<br>(282)<br>(284)                   | 4.53<br>4.018<br>3.53<br>3.53<br>4.07<br>7.8<br>3.53<br>4.07<br>5.114<br>2.778<br>2.771<br>3.53<br>4.22<br>771<br>2.771  | (287)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(293)<br>(293)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(298)<br>(301)<br>(302)                   | 2,442<br>2,442<br>2,242<br>2,281<br>2,281<br>2,281<br>2,281<br>2,281<br>1,922<br>1,822<br>1,822<br>1,822<br>1,822<br>1,822                                     | (507)<br>(508)<br>(509)<br>(510)<br>(511)<br>(512)<br>(513)<br>(514)<br>(514)<br>(514)<br>(514)<br>(518)<br>(518)<br>(518)<br>(519)<br>(520)                            | 1.822<br>2.281<br>3.114<br>2.442<br>1.972<br>1.822<br>1.674<br>1.674<br>1.674<br>1.534<br>1.396<br>1.396<br>1.395<br>1.264 | (325)<br>(324)<br>(327)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329)<br>(325)<br>(324)<br>(335)<br>(336)<br>(337)<br>(338)                   | $\begin{array}{c} 1.376\\ 1.264\\ 1.264\\ 1.619\\ 1.019\\ 1.019\\ 1.019\\ 0.906\\ 0.705\\ 0.906\\ 0.906\\ 0.906\\ 0.906\\ 0.906\\ 0.799\end{array}$   | (343)<br>(344)<br>(344)<br>(344)<br>(342)<br>(344)<br>(354)<br>(351)<br>(352)<br>(353)<br>(355)<br>(355)<br>(355)                                      | 0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0 |
| (91) 2.442<br>92) 2.124<br>93) 2.124<br>94) 14.43<br>95) 7.541<br>95) 7.541<br>95) 7.541<br>95) 2.77<br>98) 3.114<br>99) 2.77<br>100) 2.605<br>101) 2.442<br>102) 2.281<br>103) 2.281<br>103) 2.281<br>104) 2.124   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(115)<br>(117)<br>(118)<br>(119)<br>(120)<br>(121)<br>(122)                                     | 1.676<br>1.675<br>2.442<br>2.771<br>2.77<br>2.442<br>2.605<br>6.69<br>5.08<br>4.02<br>3.314<br>2.94<br>3.114           | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(134)<br>(135)<br>(134)<br>(135)<br>(136)<br>(137)<br>(139)          | 1.97<br>1.97<br>1.97<br>2.124<br>2.124<br>1.800<br>1.97<br>1.800<br>1.97<br>10.6<br>5.08<br>3.77<br>3.114<br>2.77<br>2.605               | (145)<br>(146)<br>(147)<br>(147)<br>(150)<br>(151)<br>(153)<br>(155)<br>(155)<br>(156)<br>(156)<br>(157)<br>(159)                   | 7,54<br>6,57<br>7,54<br>6,99<br>8,91<br>6,25<br>5,58<br>4,801<br>4,02<br>3,77<br>3,77<br>3,77<br>3,11<br>5,65<br>5,95 | (163)<br>(164)<br>(165)<br>(166)<br>(163)<br>(159)<br>(170)<br>(171)<br>(172)<br>(173)<br>(174)<br>(175)<br>(176)                            | 5.53<br>4.02<br>3.54<br>3.31<br>3.11<br>2.94<br>2.77<br>2.44<br>2.28<br>2.28<br>2.124<br>2.124<br>1.97<br>1.97                   | (2/1)<br>(272)<br>(273)<br>(273)<br>(273)<br>(275)<br>(275)<br>(277)<br>(278)<br>(279)<br>(280)<br>(280)<br>(281)<br>(281)<br>(281)<br>(282)<br>(284)<br>(285) | 4.53<br>4.018<br>3.773<br>3.5314<br>3.114<br>2.94<br>2.771<br>3.538<br>3.114<br>2.94<br>2.771<br>3.538<br>3.114<br>2.94<br>2.771   | (287)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(293)<br>(293)<br>(298)<br>(297)<br>(298)<br>(299)<br>(300)<br>(301)<br>(302)<br>(303)                   | 2,442<br>2,442<br>2,242<br>2,281<br>2,281<br>2,281<br>2,281<br>2,281<br>2,281<br>1,922<br>1,822<br>1,822<br>1,822<br>1,822<br>1,822<br>1,822                   | (207)<br>(208)<br>(309)<br>(310)<br>(311)<br>(312)<br>(314)<br>(314)<br>(314)<br>(317)<br>(318)<br>(319)<br>(320)<br>(321)  | 1.822<br>2.281<br>3.114<br>2.442<br>1.972<br>1.822<br>1.322<br>1.675<br>1.534<br>1.396<br>1.396<br>1.395<br>1.264<br>1.264 | (325)<br>(326)<br>(327)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329)<br>(327)<br>(327)<br>(328)<br>(337)<br>(338)<br>(338)<br>(338)                   | $1.376 \\ 1.264 \\ 1.264 \\ 1.019 \\ 1.019 \\ 1.019 \\ 1.019 \\ 0.906 \\ 0.906 \\ 0.906 \\ 0.906 \\ 0.906 \\ 0.906 \\ 0.906 \\ 0.799 \\ 0.79$ | (340)<br>(044)<br>(044)<br>(044)<br>(044)<br>(044)<br>(0548)<br>(0548)<br>(0551)<br>(0551)<br>(0552)<br>(0552)<br>(0555)<br>(0555)<br>(0555)<br>(0356) | 0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0 |
| (91) 2.442<br>(92) 2.124<br>(93) 2.124<br>(93) 2.124<br>(94) 14.43<br>(95) 7.541<br>(95) 3.77<br>(98) 3.114<br>(99) 2.77<br>(100) 2.605<br>(101) 2.465<br>(102) 2.281<br>(103) 2.28<br>(103) 2.28<br>(104) 2.124<br>(105) 1.97<br>(106) 1.822   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(115)<br>(117)<br>(118)<br>(119)<br>(120)<br>(121)<br>(122)                                     | 1.676<br>1.675<br>2.442<br>2.771<br>2.442<br>2.605<br>6.89<br>5.08<br>4.02<br>3.314<br>2.94<br>3.114<br>2.605<br>2.442 | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(134)<br>(135)<br>(135)<br>(136)<br>(137)<br>(139)<br>(139)<br>(140) | 1.97<br>1.97<br>1.97<br>2.124<br>2.124<br>1.97<br>1.97<br>1.97<br>1.97<br>5.08<br>5.08<br>5.08<br>5.77<br>3.114<br>2.77<br>2.605<br>2.77 | (145)<br>(146)<br>(147)<br>(144)<br>(150)<br>(151)<br>(152)<br>(155)<br>(155)<br>(155)<br>(155)<br>(156)<br>(157)<br>(159)<br>(159) | 7.54<br>6.37<br>7.54<br>6.99<br>8.91<br>4.93<br>5.58<br>4.90<br>1<br>4.93<br>3.77<br>3.11<br>5.45<br>5.95<br>4.53     | (163)<br>(164)<br>(165)<br>(165)<br>(166)<br>(167)<br>(163)<br>(170)<br>(171)<br>(172)<br>(173)<br>(174)<br>(175)<br>(176)<br>(177)<br>(178) | 3.53<br>4.63<br>4.02<br>3.54<br>3.31<br>3.11<br>2.94<br>2.77<br>2.44<br>2.28<br>2.28<br>2.124<br>2.124<br>2.124<br>1.97<br>1.822 | (2/1)<br>(272)<br>(273)<br>(274)<br>(275)<br>(274)<br>(278)<br>(279)<br>(280)<br>(281)<br>(281)<br>(281)<br>(283)<br>(284)<br>(285)<br>(285)                   | 4.53<br>4.018<br>3.773<br>3.538<br>3.314<br>5.114<br>5.114<br>2.94<br>2.94<br>2.94<br>2.94<br>2.94<br>2.94<br>2.771<br>2.771<br>2.771  | (289)<br>(290)<br>(291)<br>(292)<br>(295)<br>(295)<br>(295)<br>(295)<br>(295)<br>(295)<br>(297)<br>(298)<br>(299)<br>(300)<br>(301)<br>(301)<br>(303)<br>(304) | 2,442<br>2,442<br>2,442<br>2,281<br>2,281<br>2,281<br>2,281<br>2,124<br>1,970<br>1,822<br>1,822<br>1,822<br>1,822<br>1,822<br>1,822<br>1,822<br>1,822<br>1,822 | (207)<br>(508)<br>(508)<br>(510)<br>(510)<br>(512)<br>(512)<br>(513)<br>(514)<br>(314)<br>(314)<br>(314)<br>(317)<br>(518)<br>(319)<br>(321)<br>(322)                   | 1.822<br>2.281<br>3.114<br>2.442<br>1.972<br>1.822<br>1.374<br>1.675<br>1.534<br>1.396<br>1.396<br>1.395<br>1.264<br>1.264 | (325)<br>(324)<br>(324)<br>(329)<br>(329)<br>(329)<br>(329)<br>(331)<br>(335)<br>(335)<br>(335)<br>(336)<br>(337)<br>(338)<br>(338)<br>(339)<br>(340) | $1.376\\1.264\\1.264\\1.019\\1.019\\1.019\\1.019\\0.906\\0.906\\0.906\\0.906\\0.906\\0.906\\0.906\\0.906\\0.906\\0.799\\0.7$  | (342)<br>(343)<br>(344)<br>(344)<br>(344)<br>(344)<br>(351)<br>(352)<br>(352)<br>(355)<br>(355)<br>(355)<br>(355)<br>(356)<br>(358)                    | 0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0 |
| (91) 2.442<br>(92) 2.124<br>(93) 2.124<br>(94) 14.43<br>(95) 7.541<br>(95) 4.901<br>(97) 3.77<br>(98) 3.114<br>(97) 2.605<br>(101) 2.442<br>(102) 2.281<br>(103) 2.28<br>(104) 2.124<br>(105) 1.97  | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(115)<br>(115)<br>(115)<br>(115)<br>(117)<br>(118)<br>(120)<br>(121)<br>(122)<br>(123)<br>(124) | 1.676<br>1.675<br>2.442<br>2.771<br>2.442<br>2.605<br>6.89<br>5.08<br>4.02<br>3.314<br>2.94<br>3.114<br>2.605<br>2.442 | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(135)<br>(135)<br>(136)<br>(137)<br>(139)<br>(139)<br>(140)<br>(141) | 1.97<br>1.97<br>1.97<br>1.97<br>2.124<br>2.124<br>2.124<br>1.800<br>1.97<br>10.6<br>5.08<br>3.77<br>3.114<br>2.77<br>2.605<br>2.77<br>58 | (145)<br>(146)<br>(147)<br>(147)<br>(150)<br>(151)<br>(153)<br>(155)<br>(155)<br>(156)<br>(156)<br>(157)<br>(159)                   | 7.54<br>6.37<br>7.54<br>6.99<br>8.91<br>4.93<br>5.58<br>4.90<br>1<br>4.93<br>3.77<br>3.11<br>5.45<br>5.95<br>4.53     | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(167)<br>(169)<br>(170)<br>(171)<br>(173)<br>(174)<br>(175)<br>(176)<br>(177)<br>(178)<br>(179) | 5.53<br>4.02<br>3.54<br>3.31<br>3.11<br>2.94<br>2.77<br>2.44<br>2.28<br>2.28<br>2.124<br>2.124<br>4.97<br>1.97                   | (2/1)<br>(272)<br>(273)<br>(273)<br>(273)<br>(275)<br>(275)<br>(277)<br>(278)<br>(279)<br>(280)<br>(280)<br>(281)<br>(281)<br>(281)<br>(282)<br>(284)<br>(285) | 4.53<br>4.018<br>3.53<br>3.53<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.018<br>3.53<br>4.017<br>3.53<br>5.34<br>2.77<br>3.53<br>8.31<br>4.027<br>3.53<br>8.31<br>4.027<br>3.53<br>8.31<br>4.027<br>3.53<br>8.31<br>4.027<br>2.77<br>3.53<br>8.31<br>4.027<br>2.77<br>1.03<br>3.53<br>4.027<br>2.77<br>1.03<br>2.771<br>2.771<br>2.771<br>2.771<br>2.771<br>2.771<br>2.771<br>2.771<br>2.771<br>2.771<br>2.771<br>2.771<br>2.771<br>2.771<br>2.771 | (287)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(293)<br>(297)<br>(298)<br>(297)<br>(299)<br>(300)<br>(301)<br>(302)<br>(303)<br>(304)<br>(305)          | 2,442<br>2,442<br>2,242<br>2,281<br>2,281<br>2,281<br>2,281<br>2,281<br>2,281<br>1,922<br>1,822<br>1,822<br>1,822<br>1,822<br>1,822<br>1,822                   | (207)<br>(508)<br>(509)<br>(510)<br>(511)<br>(513)<br>(514)<br>(515)<br>(514)<br>(515)<br>(514)<br>(515)<br>(516)<br>(517)<br>(518)<br>(319)<br>(521)<br>(522)<br>(522) | 1.822<br>2.281<br>3.114<br>2.442<br>1.972<br>1.822<br>1.374<br>1.675<br>1.534<br>1.396<br>1.396<br>1.395<br>1.264<br>1.264 | (325)<br>(324)<br>(324)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329)<br>(324)<br>(335)<br>(336)<br>(337)<br>(338)<br>(339)<br>(339)<br>(340)<br>(341) | $1.376\\1.264\\1.264\\1.019\\1.019\\1.019\\1.019\\0.906\\0.906\\0.906\\0.906\\0.906\\0.906\\0.906\\0.906\\0.906\\0.799\\0.7$  | (340)<br>(044)<br>(044)<br>(044)<br>(044)<br>(044)<br>(0548)<br>(0548)<br>(0551)<br>(0551)<br>(0552)<br>(0552)<br>(0555)<br>(0555)<br>(0555)<br>(0356) | 0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0 |

÷

|  |  |  |   | (73) 0   | (181) 0  | (199) 0   | (217) 0  | (235) (  | 0   | (253)   | Q.   |
|--|--|--|---|--|--|---|--|--|---|---|--|
| 1) 0   | (19) 🗘   | (37)0  | (55)0<br>(55)0  | (74) 0   | (132) 0  | (200) 0   | (218) 0  | (235) 0  |   | (254)   |  |
| 2) 0   | (20) 0   | (38) (   |   | (75) 0   | (182) 0  | (201) 0   | (219) Ý  | (237) = 0  |   | (255)   |  |
| 3) 0   | (21)0  | ( 29) 0  |   | (76) 0   | (134) 0  | (202) 0   | (220) 0.117  | (238) 0  |   | (255)   |  |
| 4) O   | ( 22) 0  | (40) 0   | (58) 0  | · ( 77) 0  | (185) 0  | (203) 0   | (221) 0.029  | (209) 🤇  | Q.  | (257)   |  |
| 5) Ó   | (25) 0   | (41) 0   | (59) 0  | (77) 0   | (186) 0  | (204) 0-  | (222) 9E-3   | (240) ¢  |   | (258)   |  |
| 6) U   | (24) O   | (42) 0   | (60) 0  | (79) 0   | (187) Q  | (205) 0   | (223) <u>5</u> e~3   | (241) 🤇  |   | (259)   |  |
| 7) ()  | (25) 0   | (43) 0   | (61) 0  | (80) 0   | (138) 0  | (205) 0   | (224) 2E~3   | (242) (  |   | /250)   |  |
| B) U   | i 25) V  | (44) 0   | 1、42) 0   | (81) 0   | (169) 0  | (207) O   | (225) CE-3   | (245) 0  | 0   | (251)   |  |
| 9) 0   | (27) 0   | (45) 0   | (63) 0  | (82) 0   | (170) 9  | (203) 0   | (226) 16-3   | (244) 🤇  | 0   | (252)   |  |
| 10) 0  | (28) V   | (46) 0   | (64) 0  | (83)0  | (191) 0  | (209) 0   | (227) 1E-3   | (245) (  | Q   | (243)   |  |
| (1) Ú  | (29) 0   | (47) 0   | (65)0   | (84) 0   | (192) 0  | (210) 0   | (228) 16-3   | (246) (  | Ů   | (244)   |  |
| 12) 0  | ( 30) O  | (48) 0   | (66) 0<br>(7) 0   | (85) 0   | (193) 0  | (211) 0   | (229) 1E-3   | (247) (  |   | (265)   |  |
| 13) 0  | (31)0  | (49) Q   | (67) 0  | (65) 0   | (174) 0  | (212) 0   | L(230) 0   | (248) 0  |   | (256)   |  |
| 14) 0  | (32) 0   | (50) 0   | (68) 0  | (87) 0   | (175) 0  | (213) 0   | (231) 0  | (249) (  |   | (267)   |  |
| 15) 0  | (22) 0   | (51) 0   | ( 69) O   | (86)Ú  | (196) Ŭ  | (214) 0   | (232) 0  | (250) 🤇  |   | (268)   |  |
| 16) (  | (34) 0   | (52) 0   | (70) U<br>(71) O  | (89)0  | (197) 0  | (215) 0   | (237) Q  | (251) (  |   | (269)   |  |
| 17) 0  | (35)0<br>(35)0   | (53) ()<br>(54) ()   | (71)0<br>(72)0  | (90) 0   | 1041 0   | (216) 0   | (234) 0  | (252) (  |   | (270)   |  |
|  |  |  |   |  | -  |   |  |  |   |   |  |
|  |  |  |   |  |  |   |  |  |   |   |  |
|  |  |  |   |  | (271) Q  | (289) 0   | (307) 0  | (325)  | 0   | (343)   | 0.7  |
| 91) 0  | (109) Q  | (127) ))   | (145) ý   |  |  | (289) 0<br>(290) 0  | (307) 0<br>(308) 0   | (325)<br>(325) (   | 0<br>0  | (343)<br>(344)  | 11.74  |
| 91) 0<br>92) 0   | (109) O<br>(110) O   | (127) 0<br>(128) 0   | (145) 9<br>(145) 0  | (163) 0  | (271) 0<br>(272) 0<br>(270) 0  | (289) = 0<br>(290) = 0<br>(291) = 0   | (307) 0<br>(308) 0<br>(309) 0  | (325)<br>(325)<br>(327)  | 0<br>0<br>0   | (343)<br>(344)<br>(345)   | 0.78<br>11.74<br>0.85  |
| 91) 0<br>92) 0<br>93) 0  | (109) 0<br>(110) 0<br>(111) 0  | (127) 0<br>(128) 0<br>(129) 0  | (145) 0<br>(145) 0<br>(147) 0   | (163) 0<br>(164) 0   | (1271) 0<br>(1272) 0<br>(1270) 0<br>(1274) 0   | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0  | (307) 0<br>(309) 0<br>(309) 0<br>(310) 0   | (325)<br>(325)<br>(327)<br>(323)<br>(323)  | 0<br>0<br>0<br>0  | (343)<br>(344)<br>(345)<br>(345)  | 0.78<br>11.74<br>0.85<br>0.45  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0   | $\begin{array}{ccc} (109) & 0 \\ (110) & 0 \\ (111) & 0 \\ (112) & 0 \end{array}$  | (127) 0<br>(128) 0<br>(129) 0<br>(129) 0<br>(130) 0  | (145) 9<br>(145) 0  | (163) 0<br>(164) 0<br>(164) 0<br>(165) 0   | (271) 0<br>(272) 0<br>(273) 0<br>(273) 0<br>(274) 0<br>(275) 0   | $\begin{array}{ccc} (289) & 0 \\ (290) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \end{array}$  | (207) 0<br>(209) 0<br>(209) 0<br>(310) 0<br>(311) 0  | (325)<br>(325)<br>(327)<br>(328)<br>(328)<br>(229)   | 0<br>0<br>0<br>0  | (343)<br>(344)<br>(345)<br>(345)<br>(345)   | 0.78<br>11.74<br>0.83<br>0.43<br>47  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0  | $\begin{array}{c} (109) & 0 \\ (110) & 0 \\ (111) & 0 \\ (112) & 0 \\ (113) & 0 \end{array}$   | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0  | (145) 0<br>(145) 0<br>(147) 0<br>(149) 0  | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0   | $\begin{array}{ccc} (271) & 0 \\ (272) & 0 \\ (270) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \end{array}$  | $\begin{array}{ccc} (289) & 0 \\ (290) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \\ (294) & 0 \end{array}$   | (207) 0<br>(308) 0<br>(209) 0<br>(310) 0<br>(311) 0<br>(312) 0   | (325)<br>(325)<br>(327)<br>(328)<br>(328)<br>(329)<br>(329)<br>(329)   | 0<br>0<br>0<br>0<br>0   | (343)<br>(344)<br>(345)<br>(345)<br>(346)<br>(347)<br>(348)   | 0.78<br>11.7-<br>0.83<br>0.45<br>47<br>5.83  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>96) 0   | $\begin{array}{c} (109) & 0 \\ (110) & 0 \\ (111) & 0 \\ (112) & 0 \\ (113) & 0 \\ (114) & 0 \end{array}$  | (127) 0(128) 0(129) 0(130) 0(131) 0(131) 0(132) 0  | (145) 0<br>(145) 0<br>(147) 0<br>(149) 0<br>(149) 0   | (163) 0<br>(164) 0<br>(165) 0<br>(166) 0<br>(167) 0  | $\begin{array}{ccc} (171) & 0 \\ (172) & 0 \\ (172) & 0 \\ (172) & 0 \\ (175) & 0 \\ (175) & 0 \\ (175) & 0 \\ (175) & 0 \\ (177) & 0 \end{array}$   | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(294) 0<br>(294) 0<br>(294) 0  | $\begin{array}{cccc} (307) & 0 \\ (308) & 0 \\ (309) & 0 \\ (310) & 0 \\ (311) & 0 \\ (312) & 0 \\ (312) & 0 \\ (315) & 0 \end{array}$   | (325)<br>(325)<br>(325)<br>(329)<br>(329)<br>(329)<br>(329)<br>(320)<br>(331)  | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0.039  | (343)<br>(344)<br>(345)<br>(345)<br>(346)<br>(347)<br>(348)<br>(349)  | 0.78<br>11.7-<br>0.83<br>0.41<br>47<br>5.83<br>3.00  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>96) 0<br>97) 0  | $\begin{array}{ccc} (109) & 0 \\ (110) & 0 \\ (111) & 0 \\ (112) & 0 \\ (113) & 0 \\ (114) & 0 \\ (114) & 0 \\ (115) & 0 \end{array}$                            | $(127) 0 \\ (128) 0 \\ (129) 0 \\ (130) 0 \\ (131) 0 \\ (152) 0 \\ (133$ | (145) 0<br>(145) 0<br>(147) 0<br>(143) 0<br>(149) 0<br>(150) 0  | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(169) 0  | $\begin{array}{cccc} (171) & 0 \\ (272) & 0 \\ (272) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \\ (277) & 0 \\ (273) & 0 \end{array}$  | (289) 0<br>(290) 0<br>(291) 0<br>(292) 0<br>(293) 0<br>(294) 0<br>(294) 0<br>(295) 0<br>(296) 0   | $\begin{array}{cccc} (307) & 0 \\ (309) & 0 \\ (309) & 0 \\ (310) & 0 \\ (311) & 0 \\ (312) & 0 \\ (312) & 0 \\ (315) & 0 \\ (314) & 0 \end{array}$  | (325)<br>(324)<br>(324)<br>(329)<br>(329)<br>(329)<br>(329)<br>(331)<br>(332)  | 0<br>0<br>0<br>0<br>0<br>0.039<br>0.021   | (343)<br>(344)<br>(345)<br>(345)<br>(347)<br>(347)<br>(349)<br>(350)  | 0.78<br>0.80<br>0.41<br>47<br>0.90<br>4.01   |
| 91)     0       92)     0       93)     0       94)     0       95)     0       96)     0       97)     0       98)     0  | $\begin{array}{ccc} (109) & 0 \\ (110) & 0 \\ (111) & 0 \\ (112) & 0 \\ (113) & 0 \\ (113) & 0 \\ (114) & 0 \\ (115) & 0 \\ (116) & 0 \end{array}$               | $(127) 0 \\ (128) 0 \\ (127) 0 \\ (130) 0 \\ (131) 0 \\ (152) 0 \\ (133) 0 \\ (133) 0 \\ (124$ | (145) 0(145) 0(147) 0(147) 0(149) 0(150) 0(151) 0   | (163) 0<br>(164) 0<br>(165) 0<br>(165) 0<br>(165) 0<br>(167) 0<br>(169) 0<br>(169) 0<br>(170) 0<br>(171) 0   | $\begin{array}{cccc} (171) & 0 \\ (272) & 0 \\ (272) & 0 \\ (273) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \\ (273) & 0 \\ (273) & 6 \\ (279) & 0 \end{array}$   | $\begin{array}{c} (289) & 0 \\ (29\alpha) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \\ (293) & 0 \\ (294) & 0 \\ (295) & 0 \\ (296) & 0 \\ (297) & 0 \end{array}$  | $\begin{array}{cccc} (307) & 0 \\ (309) & 0 \\ (309) & 0 \\ (310) & 0 \\ (311) & 0 \\ (312) & 0 \\ (315) & 0 \\ (315) & 0 \\ (315) & 0 \end{array}$  | (325) (<br>(325) (<br>(329) (<br>(329) (<br>(329) (<br>(325) (<br>(331) (<br>(333) (<br>(333) (  | 0<br>0<br>0<br>0<br>0<br>0.039<br>0.039<br>0.021<br>9E~0                                    | (343)<br>(344)<br>(345)<br>(345)<br>(345)<br>(342)<br>(348)<br>(348)<br>(350)<br>(351)  | 0.78<br>0.80<br>0.45<br>47<br>5.85<br>3.00<br>4.05<br>3.00   |
| 91)     0       92)     0       93)     0       94)     0       95)     0       96)     0       97)     0       98)     0       99)     0  | $\begin{array}{cccc} (109) & 0 \\ (110) & 0 \\ (111) & 0 \\ (112) & 0 \\ (113) & 0 \\ (113) & 0 \\ (114) & 0 \\ (115) & 0 \\ (116) & 0 \\ (117) & 0 \end{array}$ | $(127) 0 \\ (128) 0 \\ (129) 0 \\ (130) 0 \\ (131) 0 \\ (131) 0 \\ (133) 0 \\ (133) 0 \\ (134) 0 \\ (135$ | (145) 0 (145) 0 (147) 0 (149) 0 (149) 0 (150) 0 (151) 0 (151) 0 (152) 0   | $ \begin{array}{c} (163) & 0 \\ (164) & 0 \\ (165) & 0 \\ (165) & 0 \\ (165) & 0 \\ (167) & 0 \\ (169) & 0 \\ (169) & 0 \\ (170) & 0 \end{array} $   | (271) 0<br>(272) 0<br>(272) 0<br>(274) 0<br>(275) 0<br>(275) 0<br>(275) 0<br>(277) 0<br>(277) 0<br>(279) 0<br>(279) 0<br>(280) 0   | $\begin{array}{c} (289) & 0 \\ (290) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \\ (293) & 0 \\ (294) & 0 \\ (295) & 0 \\ (296) & 0 \\ (297) & 0 \\ (297) & 0 \\ (298) & 0 \end{array}$   | $\begin{array}{cccc} (307) & 0 \\ (309) & 0 \\ (309) & 0 \\ (311) & 0 \\ (311) & 0 \\ (312) & 0 \\ (313) & 0 \\ (313) & 0 \\ (314) & 0 \\ (315) & 0 \\ (316) & 0 \end{array}$  | (325) (<br>(325) (<br>(322) (<br>(329) (<br>(329) (<br>(329) (<br>(331) (<br>(330) (<br>(330) (<br>(334)   | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>3<br>9<br>5<br>5<br>5<br>2<br>3           | (343)<br>(344)<br>(345)<br>(345)<br>(346)<br>(347)<br>(348)<br>(348)<br>(349)<br>(350)<br>(351)<br>(352)  | 0.78<br>11.74<br>0.83<br>0.49<br>47<br>5.97<br>5.97<br>5.97<br>5.90<br>4.05<br>5.00<br>4.95  |
| 91) 0<br>92) 0<br>93) 0<br>94) 0<br>95) 0<br>95) 0<br>95) 0<br>97) 0<br>98) 0<br>98) 0<br>99) 0  |  | $(127) 0 \\ (128) 0 \\ (127) 0 \\ (130) 0 \\ (131) 0 \\ (152) 0 \\ (133) 0 \\ (133) 0 \\ (124$ | $\begin{array}{c}(145) & 0\\(145) & 0\\(147) & 0\\(149) & 0\\(149) & 0\\(150) & 0\\(151) & 0\\(151) & 0\\(152) & 0\\(153) & 0\end{array}$   | $ \begin{array}{c} (163) & 0 \\ (164) & 0 \\ (165) & 0 \\ (165) & 0 \\ (165) & 0 \\ (167) & 0 \\ (169) & 0 \\ (169) & 0 \\ (170) & 0 \\ (171) & 0 \\ (172) & 0 \\ (173) & 0 \end{array} $  | $\begin{array}{cccc} (271) & 0 \\ (272) & 0 \\ (272) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \\ (277) & 0 \\ (279) & 0 \\ (279) & 0 \\ (280) & 0 \\ (281) & 0 \end{array}$   | $\begin{array}{cccc} (289) & 0 & .\\ (290) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \\ (293) & 0 \\ (295) & 0 \\ (296) & 0 \\ (297) & 0 \\ (298) & 0 \\ (298) & 0 \\ (299) & 0 \end{array}$   | (207) 0<br>(309) 0<br>(309) 0<br>(310) 0<br>(311) 0<br>(312) 0<br>(313) 0<br>(313) 0<br>(314) 0<br>(315) 0<br>(315) 0<br>(316) 0<br>(317) 0  | (325) (<br>(325) (<br>(327) (<br>(328) (<br>(329) (<br>(320) (<br>(331) (<br>(333) (<br>(334) (<br>(335) (   | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | (343)<br>(344)<br>(345)<br>(345)<br>(347)<br>(347)<br>(347)<br>(347)<br>(350)<br>(351)<br>(352)<br>(351)  | 0.78<br>11.74<br>0.83<br>0.49<br>47<br>5.97<br>5.97<br>5.97<br>5.97<br>5.90<br>4.05<br>5.90<br>1.89<br>1.19  |
| 91)     0       92)     0       93)     0       94)     0       95)     0       96)     0       97)     0       98)     0       99)     0       90)     0       00)     0  |  | $(127) 0 \\ (128) 0 \\ (129) 0 \\ (130) 0 \\ (131) 0 \\ (132) 0 \\ (133) 0 \\ (133) 0 \\ (134) 0 \\ (135) 0 \\ (136) 0 \\ (136) 0 \\ (137$ | $\begin{array}{cccc} (145) & 0 \\ (145) & 0 \\ (147) & 0 \\ (149) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (152) & 0 \\ (153) & 0 \\ (154) & 0 \end{array}$   | $ \begin{array}{c} (163) & 0 \\ (164) & 0 \\ (165) & 0 \\ (165) & 0 \\ (165) & 0 \\ (167) & 0 \\ (167) & 0 \\ (167) & 0 \\ (170) & 0 \\ (171) & 0 \\ (172) & 0 \\ (173) & 0 \\ (174) & 0 \end{array} $   | (271)       0         (272)       0         (272)       0         (275)       0         (275)       0         (273)       0         (279)       0         (280)       0         (281)       0         (282)       0  | $\begin{array}{c} (289) & 0 \\ (291) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \\ (293) & 0 \\ (293) & 0 \\ (294) & 0 \\ (296) & 0 \\ (297) & 0 \\ (298) & 0 \\ (298) & 0 \\ (298) & 0 \\ (299) & 0 \\ (300) & 0 \end{array}$  | $\begin{array}{ccccc} (307) & 0 \\ (309) & 0 \\ (309) & 0 \\ (310) & 0 \\ (311) & 0 \\ (312) & 0 \\ (312) & 0 \\ (313) & 0 \\ (314) & 0 \\ (314) & 0 \\ (315) & 0 \\ (316) & 0 \\ (317) & 0 \\ (318) & 0 \end{array}$  | (325) (<br>(325) (<br>(329) (<br>(329) (<br>(329) (<br>(321) (<br>(331) (<br>(323) (<br>(334) (<br>(335) (<br>(325) (<br>(326) (   | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | (343)<br>(344)<br>(345)<br>(345)<br>(347)<br>(347)<br>(347)<br>(347)<br>(350)<br>(351)<br>(352)<br>(351)<br>(352)<br>(354)  | 0.78<br>11.7-<br>0.89<br>0.49<br>47<br>5.85<br>5.95<br>5.95<br>5.95<br>1.95<br>1.10<br>0.99  |
| 91)     0       92)     0       93)     0       94)     0       95)     0       97)     0       97)     0       97)     0       97)     0       97)     0       97)     0       97)     0       97)     0       97)     0       97)     0       97)     0       97)     0       97)     0       97)     0       97)     0       97)     0       92)     0                              |  | $(127) 0 \\ (128) 0 \\ (129) 0 \\ (130) 0 \\ (131) 0 \\ (131) 0 \\ (132) 0 \\ (133) 0 \\ (133) 0 \\ (134) 0 \\ (135) 0 \\ (136$ | $\begin{array}{c} (145) & 0 \\ (145) & 0 \\ (147) & 0 \\ (147) & 0 \\ (150) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (152) & 0 \\ (153) & 0 \\ (154) & 0 \\ (155) & 0 \end{array}$   | $ \begin{array}{c} (163) & 0 \\ (164) & 0 \\ (165) & 0 \\ (165) & 0 \\ (165) & 0 \\ (167) & 0 \\ (169) & 0 \\ (169) & 0 \\ (170) & 0 \\ (171) & 0 \\ (172) & 0 \\ (173) & 0 \end{array} $  | $ \begin{array}{cccc} (171) & 0 \\ (172) & 0 \\ (172) & 0 \\ (172) & 0 \\ (173) & 0 \\ (175) & 0 \\ (175) & 0 \\ (175) & 0 \\ (173) & 0 \\ (173) & 0 \\ (173) & 0 \\ (173) & 0 \\ (173) & 0 \\ (181) & 0 \\ (181) & 0 \\ (182) & 0 \\ (183) & 0 \\ \end{array} $ | $\begin{array}{c} (289) & 0 \\ (290) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \\ (293) & 0 \\ (294) & 0 \\ (294) & 0 \\ (296) & 0 \\ (297) & 0 \\ (298) & 0 \\ (299) & 0 \\ (300) & 0 \\ (301) & 0 \end{array}$   |  | (325) (<br>(324) (<br>(329) (<br>(329) (<br>(329) (<br>(329) (<br>(320) (<br>(331) (<br>(320) (<br>(320) (<br>(323) (<br>(325) (<br>(325) (<br>(326) (<br>(327) (  | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | (343)<br>(344)<br>(344)<br>(345)<br>(345)<br>(347)<br>(349)<br>(349)<br>(351)<br>(351)<br>(352)<br>(355)<br>(354)<br>(355)  | 0.78<br>11.74<br>0.85<br>0.45<br>47<br>5.85<br>5.85<br>5.85<br>5.85<br>5.85<br>5.85<br>5.85<br>5.8   |
| 91)       0         92)       0         93)       0         94)       0         95)       0         96)       0         97)       0         98)       0         97)       0         98)       0         99)       0         000)       0         001)       0         002)       0         003)       0  |  | $(127) 0 \\ (128) 0 \\ (129) 0 \\ (130) 0 \\ (131) 0 \\ (152) 0 \\ (153) 0 \\ (153) 0 \\ (154) 0 \\ (135) 0 \\ (136) 0 \\ (137) 0 \\ (138$ | $\begin{array}{c} (145) & 0 \\ (145) & 0 \\ (147) & 0 \\ (147) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (155) & 0 \\ (155) & 0 \\ (155) & 0 \\ (155) & 0 \\ (156) & 0 \end{array}$  | $ \begin{array}{c} (163) & 0 \\ (164) & 0 \\ (165) & 0 \\ (165) & 0 \\ (165) & 0 \\ (167) & 0 \\ (167) & 0 \\ (167) & 0 \\ (170) & 0 \\ (171) & 0 \\ (172) & 0 \\ (173) & 0 \\ (174) & 0 \end{array} $   | $\begin{array}{cccc} (271) & 0 \\ (272) & 0 \\ (272) & 0 \\ (273) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \\ (277) & 0 \\ (279) & 0 \\ (279) & 0 \\ (280) & 0 \\ (281) & 0 \\ (282) & 0 \\ (282) & 0 \\ (284) & 0 \end{array}$                                | $\begin{array}{cccc} (289) & 0 & .\\ (290) & 0 \\ (291) & 0 \\ (292) & 0 \\ (293) & 0 \\ (294) & 0 \\ (294) & 0 \\ (294) & 0 \\ (294) & 0 \\ (297) & 0 \\ (297) & 0 \\ (297) & 0 \\ (297) & 0 \\ (301) & 0 \\ (302) & 0 \end{array}$  | $\begin{array}{cccc} (307) & 0 \\ (309) & 0 \\ (309) & 0 \\ (310) & 0 \\ (311) & 0 \\ (312) & 0 \\ (312) & 0 \\ (315) & 0 \\ (314) & 0 \\ (315) & 0 \\ (316) & 0 \\ (316) & 0 \\ (317) & 0 \\ (318) & 0 \\ (519) & 0 \\ (320) & 0 \end{array}$   | (325) (<br>(324) (<br>(329) (<br>(329) (<br>(329) (<br>(327) (<br>(327) (<br>(327) (<br>(327) (<br>(328) | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | $\begin{array}{c} (343)\\ (344)\\ (344)\\ (344)\\ (344)\\ (344)\\ (347)\\ (347)\\ (348)\\ (349)\\ (351)\\ (351)\\ (352)\\ (351)\\ (352)\\ (354)\\ (354)\\ (354)\end{array}$ | 0.78<br>11.74<br>0.85<br>0.45<br>47<br>5.85<br>3.00<br>4.65<br>3.00<br>1.85<br>1.15<br>0.99<br>0.76  |
| 91)       0         92)       0         93)       0         94)       0         95)       0         96)       0         97)       0         97)       0         97)       0         97)       0         98)       0         99)       0         00)       0         00)       0         00)       0         00)       0         001)       0         003)       0         004)       0 |  | $(127) 0 \\ (128) 0 \\ (129) 0 \\ (130) 0 \\ (131) 0 \\ (131) 0 \\ (133) 0 \\ (133) 0 \\ (134) 0 \\ (134) 0 \\ (135) 0 \\ (134) 0 \\ (137) 0 \\ (138) 0 \\ (138) 0 \\ (139$ | $\begin{array}{ccccc} (145) & 0 \\ (145) & 0 \\ (147) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (152) & 0 \\ (153) & 0 \\ (154) & 0 \\ (155) & 0 \\ (156) & 0 \\ (157) & 0 \end{array}$                                    | $ \begin{array}{c} (163) & 0 \\ (164) & 0 \\ (165) & 0 \\ (165) & 0 \\ (165) & 0 \\ (167) & 0 \\ (169) & 0 \\ (169) & 0 \\ (170) & 0 \\ (171) & 0 \\ (172) & 0 \\ (173) & 0 \\ (174) & 0 \\ (175) & 0 \\ (175) & 0 \\ (177) & 0 \end{array} $  | $\begin{array}{cccc} (271) & 0 \\ (272) & 0 \\ (272) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \\ (277) & 0 \\ (277) & 0 \\ (279) & 0 \\ (280) & 0 \\ (281) & 0 \\ (281) & 0 \\ (282) & 0 \\ (283) & 0 \\ (285) & 0 \end{array}$                   | $\begin{array}{cccc} (289) & 0 & .\\ (290) & 0 & .\\ (291) & 0 & .\\ (292) & 0 & .\\ (293) & 0 & .\\ (295) & 0 & .\\ (295) & 0 & .\\ (296) & 0 & .\\ (297) & 0 & .\\ (297) & 0 & .\\ (298) & 0 & .\\ (297) & 0 & .\\ (300) & 0 & .\\ (301) & 0 & .\\ (302) & 0 & .\\ (303) & 0 & .\\ \end{array}$ | $\begin{array}{cccc} (307) & 0 \\ (308) & 0 \\ (309) & 0 \\ (311) & 0 \\ (311) & 0 \\ (312) & 0 \\ (315) & 0 \\ (315) & 0 \\ (314) & 0 \\ (315) & 0 \\ (316) & 0 \\ (316) & 0 \\ (317) & 0 \\ (318) & 0 \\ (319) & 0 \\ (321) & 0 \\ (321) & 0 \end{array}$                            | (325) (<br>(325) (<br>(325) (<br>(329) (<br>(329) (<br>(329) (<br>(320) (<br>(331) (<br>(334) (<br>(335) (<br>(335) (<br>(335) (<br>(337) (<br>(339) (   | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | (343)<br>(3445)<br>(3445)<br>(3445)<br>(3445)<br>(3445)<br>(3445)<br>(3447)<br>(3449)<br>(35449)<br>(3551)<br>(3551)<br>(3552)<br>(3554)<br>(3554)<br>(3554)                | 0.78<br>11.74<br>0.85<br>0.45<br>47<br>5.85<br>3.00<br>4.65<br>3.00<br>1.15<br>0.96<br>0.76<br>0.66  |
| 91)       0         92)       0         93)       0         94)       0         95)       0         95)       0         97)       0         97)       0         99)       0         100)       0         101)       0         102)       0         103)       0         104)       0         105)       0  |  | (127) 0<br>(128) 0<br>(129) 0<br>(130) 0<br>(131) 0<br>(131) 0<br>(133) 0<br>(133) 0<br>(134) 0<br>(135) 0<br>(135) 0<br>(136) 0<br>(137) 0<br>(138) 0<br>(139) 0<br>(140) 0   | $\begin{array}{c} (145) & 0 \\ (145) & 0 \\ (147) & 0 \\ (147) & 0 \\ (149) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (152) & 0 \\ (153) & 0 \\ (155) & 0 \\ (155) & 0 \\ (156) & 0 \\ (157) & 0 \\ (158) & 0 \end{array}$              | $ \begin{array}{c} (163) & 0 \\ (164) & 0 \\ (165) & 0 \\ (165) & 0 \\ (165) & 0 \\ (167) & 0 \\ (167) & 0 \\ (167) & 0 \\ (170) & 0 \\ (171) & 0 \\ (172) & 0 \\ (173) & 0 \\ (173) & 0 \\ (174) & 0 \\ (175) & 0 \\ (175) & 0 \\ (177) & 0 \\ (177) & 0 \\ (178) & 0 \end{array} $ | $\begin{array}{cccc} (171) & 0 \\ (172) & 0 \\ (272) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \\ (277) & 0 \\ (273) & 6 \\ (279) & 0 \\ (280) & 0 \\ (281) & 0 \\ (281) & 0 \\ (281) & 0 \\ (283) & 0 \\ (284) & 0 \\ (286) & 0 \end{array}$      | $\begin{array}{cccc} (289) & 0 & .\\ (290) & 0 & .\\ (291) & 0 & .\\ (292) & 0 & .\\ (293) & 0 & .\\ (295) & 0 & .\\ (295) & 0 & .\\ (296) & 0 & .\\ (297) & 0 & .\\ (298) & 0 & .\\ (297) & 0 & .\\ (300) & 0 & .\\ (301) & 0 & .\\ (302) & 0 & .\\ (303) & 0 & .\\ (304) & 0 & .\\ \end{array}$ | $\begin{array}{ccccc} (307) & 0 \\ (309) & 0 \\ (309) & 0 \\ (310) & 0 \\ (311) & 0 \\ (312) & 0 \\ (312) & 0 \\ (313) & 0 \\ (314) & 0 \\ (315) & 0 \\ (316) & 0 \\ (316) & 0 \\ (317) & 0 \\ (318) & 0 \\ (519) & 0 \\ (519) & 0 \\ (320) & 0 \\ (321) & 0 \\ (322) & 0 \end{array}$ | (325) (<br>(325) (<br>(329) (<br>(329) (<br>(329) (<br>(327) (<br>(331) (<br>(323) (<br>(325) (<br>(325) (<br>(326) (<br>(326) (<br>(326) (<br>(339) (<br>(340) (  | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | (343)<br>(344)<br>(344)<br>(344)<br>(344)<br>(344)<br>(347)<br>(354)<br>(351)<br>(352)<br>(3551)<br>(3551)<br>(3553)<br>(355)<br>(358)                                      | 0.76<br>11.74<br>0.87<br>47<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5.97<br>5 |
| 91)     0       92)     0       93)     0       94)     0       95)     0       96)     0       97)     0       98)     0       99)     0       100)     0   |  | $(127) 0  (128) 0  (129) 0  (120) 0  (130) 0  (131) 0  (132) 0  (133) 0  (134) 0  (134) 0  (135) 0  (136) 0  (137) 0  (138) 0  (139) 0  (141) 0 \\ (141) 0 \\ (121) 0 \\ (141) 0 \\ (141) 0 \\ (122$                               | $\begin{array}{c} (145) & 0 \\ (145) & 0 \\ (147) & 0 \\ (147) & 0 \\ (150) & 0 \\ (150) & 0 \\ (151) & 0 \\ (151) & 0 \\ (152) & 0 \\ (153) & 0 \\ (154) & 0 \\ (155) & 0 \\ (154) & 0 \\ (157) & 0 \\ (158) & 0 \\ (159) & 0 \end{array}$ | $ \begin{array}{c} (163) & 0 \\ (164) & 0 \\ (165) & 0 \\ (165) & 0 \\ (165) & 0 \\ (167) & 0 \\ (169) & 0 \\ (169) & 0 \\ (170) & 0 \\ (171) & 0 \\ (172) & 0 \\ (173) & 0 \\ (174) & 0 \\ (175) & 0 \\ (175) & 0 \\ (177) & 0 \end{array} $  | $\begin{array}{cccc} (271) & 0 \\ (272) & 0 \\ (272) & 0 \\ (274) & 0 \\ (275) & 0 \\ (275) & 0 \\ (275) & 0 \\ (277) & 0 \\ (277) & 0 \\ (279) & 0 \\ (280) & 0 \\ (281) & 0 \\ (281) & 0 \\ (282) & 0 \\ (283) & 0 \\ (285) & 0 \end{array}$                   | $\begin{array}{cccc} (289) & 0 & .\\ (290) & 0 & .\\ (291) & 0 & .\\ (292) & 0 & .\\ (293) & 0 & .\\ (295) & 0 & .\\ (295) & 0 & .\\ (296) & 0 & .\\ (297) & 0 & .\\ (297) & 0 & .\\ (298) & 0 & .\\ (297) & 0 & .\\ (300) & 0 & .\\ (301) & 0 & .\\ (302) & 0 & .\\ (303) & 0 & .\\ \end{array}$ | $\begin{array}{cccc} (307) & 0 \\ (308) & 0 \\ (309) & 0 \\ (311) & 0 \\ (311) & 0 \\ (312) & 0 \\ (315) & 0 \\ (315) & 0 \\ (314) & 0 \\ (315) & 0 \\ (316) & 0 \\ (316) & 0 \\ (317) & 0 \\ (318) & 0 \\ (319) & 0 \\ (321) & 0 \\ (321) & 0 \end{array}$                            | (325) (<br>(324) (<br>(324) (<br>(329) (<br>(329) (<br>(329) (<br>(320) (<br>(320) (<br>(320) (<br>(320) (<br>(320) (<br>(320) (<br>(327) (<br>(326) (<br>(327) (<br>(328) (<br>(327) (<br>(328) (<br>(329) (<br>(341) (<br>(341) ()))))))))))))))))))))))))))))))))))   | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | (343)<br>(3445)<br>(3445)<br>(3445)<br>(3445)<br>(3445)<br>(3445)<br>(3447)<br>(3449)<br>(35449)<br>(3551)<br>(3551)<br>(3552)<br>(3554)<br>(3554)<br>(3554)                | 0.78<br>11.74<br>0.87<br>47<br>5.97<br>47<br>5.97<br>5.00<br>4.07<br>5.00<br>1.15<br>0.99<br>0.66<br>0.66<br>0.49<br>0.49  |

| riable: SAN  |   |  |   |   |   | A CONTRACT OF A STATE   | (217) 0.285  | (235) 0.064  | (293) 0.025  |
|--|---|--|---|---|---|---|--|--|--|
|  | ( 19) 0.19  | ( 37) 0.064  | (55)0.029   |   | (191) 0.037   | (177) 0.014<br>(200) 0.014  | (217) 0.280<br>(218) 0.19  | (236) 0.064  | (254) 0.02   |
| 2) 0.341   | ( 20) 0.163   | ( 33) 0.05   | ( 56) 0.029   | ( 74) 0.029   | (182) 0.039<br>(183) 0.039  | (201) 0.014   | (219) 0.219  | (237) 0.055  | (255) 0.025  |
| 3) 0,285   | (21) 0.163  | ( 09) 0.05   | ( 57) 0.029   | ( 75) 0.039   | (13.) 0.0.5   | (201) 0.014   | (220) 0.998  | (133) 0.05   | (256) 0.02   |
| 4) 0.022   | ( 22) 0.163   | ( 40) 0.05   | (58) 0.039  | ( 76) Ú.ZSL   | (184) 0.029   |   | (221) 0.604  | (239) 0.064  | (257) 0.02   |
| 5) 0.285   | ( 23) 0.163   | (41) 0.05  | ( 59) 0.039   | ( 77) 0.19  | (185) 0.929   | (203) 0.014   | (222) 0.322  | (240) 9.05   | (258) 0.02   |
| <b>6)</b> 0.322  | (24) 0.139  | (42) 0.05  | ( 60) 0.039   | ( 74) 0.19  | (186) 0.029   | (204) 0.029   | (223) 0.25   | (241) 0.05   | (259) 0.92   |
| 7) 0.285   | ( 25) 0.117   | ( 45) 0.039  | ( 61) 0.039   | ( 79) 0,285   | (187) 0.029   | (205) 0.029   |  | (242) 0.05   | (260) 0.01   |
| e) 0.285   | ( 25) 0,117   | ( 44) 0.039  | ( 52) 0.029   | (80) 3.001  | (198) 0.029   | (206) 0.021   | (224) 0.19<br>(225) 0.19   | (242) 0.05   | (261) 0.02   |
| 9) 0.285   | ( 27) 0.17  | ( 45) 0.029  | ( 60) 0.029   | ( 81) 0.786   |   | (207) 0.029   |  | (244) 0.05   | (262) 0.01   |
|  | ( 28) 0.139   | (45) 0.029   | ( 54) 0.029   | (82) 0.361  | (190) 0.029   | (208) 0.117   | (225) 0.163  |  | (263) 0.02   |
| 10) 0.285  | (29) 0.117  | (47) 0.029   | ( 55) 0.029   | (83)0.19  | (191) 0.029   | (209) 0.549   | (227) 0.139  | (245) 0.039<br>(246) 0.029   | (264) 0.02   |
| 11) 0.285  | ( 30) 0.097   |  |   | (84)0.163   | (192) 0.029   | (210) 8.07  | (228) 0.139  | (246) 0.029  | (265) 0.02   |
| 12) 0.25   | ( 30) 070   | ( 49) 0.021  | ( 67) 0.029   | (85) 0.139  | (193) 0.021   | (211) 1.329   | (229) 0.117  | (247) 0.029  |  |
| 131 0.217  | ( 37) 0 079   | ( 50) 0.021  | ( 68) 0.029   | ( 84) 0.117   | (194) 0.021   | (212) 1.156   | (230) 0.047  | (248) 0.029  | - 1400 / V.VA<br>- 1917 - 197  |
| 14) 0.219  | ( 32) 0.077<br>( 37) 0.044  | ( 51) 0.021  | 1 691 0.034   | ( 87) 0.117   | (195) 0.021   | (213) 0.661   | (231) 0.097  | (249) 0.029  | (  |
| 15) 0.219  | ( 30) V.V04<br>( 24) O O(4  | ( 57) 0 071  | ( 70) 0.029   | (83) 0.117  | (196) 0.014   | (214) 1.329   | (232) 0.079  | (250) 0.021  | (268) V.V.   |
| 15) 0.19   | ( 34) 0.004   | / 57/ 0.021  | 1 711 0.029   | ( 89) 0.097   | (197) 0.014   | (215) 0.449   | (230) 0.079  | (251) 0.029  | (259) 0.05   |
| 17) 0.19   | 331 0.084   | ( 54) 0 021  | ( 77) 0.029   | ( 90) 0.097   | (178) 0.014   | (215) 0.522   | (134) 0.079  | (2521 0,029  | (270) 1.7.   |
| 181 0.19   | ( 36) 0.064   | ( 34) 07025  | · · · · · · · · · · · ·   |   |   |   |  |  |  |
| 18) 0.14   | (36) 0.084  |  |   | ( 84) 0.143<br>( 85) 0.139<br>( 86) 0.117<br>( 87) 0.117<br>( 88) 0.117<br>( 89) 0.097<br>( 90) 0.097   |   |   |  |  |  |
|  |   |  | ·   |   |   |   |  |  |  |
|  | (10?) 0.163   | (127) 0.064  | (145) 0.097   | (165) 0.079   | (271) 1.329   | (289) 0.05  | (007) 5E-3   |  |  |
|  | (10?) 0.163<br>(110) 0.19   | (127) 0.064<br>(123) 0.05  | (145) 0.097<br>(146) 1.921  | (165) 0.079<br>(164) 0.079  | (271) 1.329<br>(172) 9.551  | (089) 0.05<br>(090) 0.009   | (307) 5E-3<br>(308) 5E-3   | (325) 0<br>(326) 0   | (3431-0  |
| 91) 0.097<br>92) 0.097<br>93) 0.079  | (109) 0.163<br>(110) 0.19<br>(111) 0.117  | (127) 0.064<br>(123) 0.05<br>(129) 0.05  | (145) 0.097<br>(146) 1.421<br>(147) 0.449   | (165) 0.079<br>(164) 0.079  | (271) 1.329<br>(172) 9.551  | (289) 0.05<br>(290) 0.029<br>(291) 0.029  | (307) 5E-3<br>(308) 5E-3<br>(309) 2E-3   | (125) 0<br>(126) 0<br>(126) 0<br>(227) 0   | (340) 0<br>(344) 0   |
| 91) 0.097  | (109) 0.163<br>(110) 0.19<br>(111) 0.117<br>(112) 0.117   | (127) 0.064<br>(123) 0.05<br>(129) 0.05<br>(130) 0.05  | (145) 0.097<br>(145) 1.921<br>(147) 0.449<br>(148) 0.404  | (165) 0.079<br>(164) 0.079  | (271) 1.329<br>(172) 9.551  | (289) 0.05<br>(290) 0.039<br>(291) 0.039<br>(292) 0.029   | (307) 58-3<br>(308) 56-3<br>(309) 28-3<br>(310) 58-3   | (528) 0<br>(528) 0<br>(528) 0<br>(528) 0<br>(528) 0  | (340) ゆ<br>(344) ゆ<br>(345) ゆ  |
| 91) 0.097<br>72) 0.097<br>93) 0.077<br>94) 0.079<br>95) 0.079  | (109) 0.163<br>(110) 0.19<br>(111) 0.117<br>(112) 0.117<br>(112) 0.117  | (127) 0.064<br>(123) 0.05<br>(129) 0.05<br>(120) 0.05<br>(121) 0.05  | (145) 0.097<br>(145) 1.421<br>(147) 0.449<br>(148) 0.404<br>(149) 1.72  | (165) 0.079<br>(164) 0.079<br>(165) 0.079<br>(165) 0.079<br>(165) 0.04  | (271) 1.329<br>(272) 9.551<br>(273) 0.478<br>(274) 2.173<br>(275) 0.784   | (289) 0.05<br>(290) 0.059<br>(291) 0.059<br>(292) 0.029<br>(293) 0.029  | (307) 58-3<br>(308) 56-3<br>(309) 28-3<br>(310) 58-3<br>(311) 28-3   | (125) 0<br>(126) 0<br>(126) 0<br>(227) 0   | (343) (0<br>(344) (0<br>(345) (0<br>(345) (0   |
| 91) 0.097<br>72) 0.097<br>93) 0.077<br>94) 0.079<br>95) 0.079  | (10?) 0.163<br>(110) 0.19<br>(111) 0.117<br>(112) 0.117<br>(113) 0.117<br>(114) 0.117   | (127) 0.064<br>(123) 0.05<br>(129) 0.05<br>(130) 0.05<br>(131) 0.05<br>(132) 0.05  | (145) 0.097<br>(146) 1.421<br>(147) 0.449<br>(148) 0.404<br>(149) 1.72<br>(150) 0.504   | (165) 0.079<br>(164) 0.079<br>(165) 0.079<br>(165) 0.079<br>(165) 0.044<br>(169) 0.054  | $\begin{array}{c} (271) & 1.329 \\ (272) & 0.551 \\ (273) & 0.478 \\ (274) & 2.173 \\ (275) & 0.784 \\ (275) & 0.784 \\ (275) & 0.404 \end{array}$  | (289) 0.05<br>(290) 0.059<br>(291) 0.059<br>(292) 0.029<br>(292) 0.029<br>(293) 0.029<br>(294) 0.029  | (307) 58-3<br>(308) 56-3<br>(307) 28-3<br>(310) 58-3<br>(311) 28-3<br>(312) 58-3   | (305) 0<br>(325) 0<br>(327) 0<br>(328) 0<br>(328) 0<br>(329) 0<br>(330) 0  | (343) ()<br>(344) ()<br>(345) ()<br>(345) ()<br>(345) ()<br>(345) ()   |
| 91) 0.097<br>72) 0.097<br>73) 0.077<br>93) 0.079<br>94) 0.079  | (109) 0.163<br>(110) 0.19<br>(111) 0.117<br>(112) 0.117<br>(112) 0.117  | (127) 0.064<br>(123) 0.05<br>(129) 0.05<br>(130) 0.05<br>(131) 0.05<br>(132) 0.05<br>(133) 0.05  | (145) 0.097<br>(146) 1.421<br>(147) 0.449<br>(148) 0.404<br>(149) 1.72<br>(150) 0.504<br>(151) 0.361  | (165) 0.079<br>(164) 0.079<br>(165) 0.079<br>(165) 0.079<br>(165) 0.044<br>(169) 0.064  | (271) 1.329<br>(272) 0.561<br>(273) 0.478<br>(274) 2.173<br>(275) 0.786<br>(275) 0.786<br>(275) 0.404<br>(277) 0.285  | (289) 0.05<br>(290) 0.059<br>(291) 0.059<br>(292) 0.029<br>(293) 0.029<br>(293) 0.029<br>(294) 0.029<br>(295) 0.029   | (307) 5E-3<br>(308) 5E-3<br>(309) 2E-3<br>(310) 5E-3<br>(311) 3E-3<br>(312) 5E-3<br>(312) 5E-3<br>(313) 1E-3   | (528) 0<br>(528) 0<br>(527) 0<br>(328) 0<br>(329) 0<br>(330) 0<br>(330) 0<br>(331) 0   | (340) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(345) 0<br>(348) 0<br>(348) 0<br>(349) 0   |
| 91) 0.097<br>72) 0.097<br>93) 0.079<br>94) 0.079<br>95) 0.079<br>96) 0.079   | (10?) 0.163<br>(110) 0.19<br>(111) 0.117<br>(112) 0.117<br>(113) 0.117<br>(114) 0.117   | (127) 0.064<br>(123) 0.05<br>(129) 0.05<br>(130) 0.05<br>(131) 0.05<br>(132) 0.05  | (145) 0.097<br>(145) 1.921<br>(147) 0.449<br>(148) 0.404<br>(149) 1.72<br>(150) 0.504<br>(152) 0.25   | (165) 0.079<br>(164) 0.079<br>(165) 0.079<br>(165) 0.079<br>(165) 0.079<br>(167) 0.054<br>(169) 0.064<br>(169) 0.05   | (271) 1.329<br>(272) 0.501<br>(273) 0.478<br>(274) 2.173<br>(275) 0.786<br>(275) 0.786<br>(275) 0.404<br>(277) 0.285<br>(278) 0.19  | (289) 0.05<br>(290) 0.039<br>(291) 0.039<br>(291) 0.029<br>(293) 0.029<br>(293) 0.029<br>(294) 0.029<br>(295) 0.029<br>(296) 0.029  | (307) 58-3<br>(308) 58-3<br>(307) 28-3<br>(310) 58-3<br>(311) 28-3<br>(312) 58-3<br>(312) 58-3<br>(313) 18-3<br>(314) 58-3   | (525) 0<br>(525) 0<br>(527) 0<br>(527) 0<br>(529) 0<br>(539) 0<br>(531) 0<br>(532) 0   | (345) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(345) 0<br>(349) 0<br>(349) 0<br>(350) 0   |
| 91) 0.097<br>72) 0.097<br>93) 0.079<br>94) 0.079<br>95) 0.079<br>96) 0.079<br>96) 0.079  | (109) 0.163<br>(110) 0.19<br>(111) 0.117<br>(112) 0.117<br>(112) 0.117<br>(113) 0.117<br>(114) 0.117<br>(115) 0.404<br>(116) 0.219<br>(117) 0.139   | (127) 0.064<br>(123) 0.05<br>(129) 0.05<br>(130) 0.05<br>(131) 0.05<br>(132) 0.05<br>(132) 0.05<br>(133) 0.05<br>(134) 0.05<br>(135) 0.039   | (145) 0.097<br>(145) 1.421<br>(147) 0.449<br>(148) 0.404<br>(149) 1.72<br>(150) 0.504<br>(151) 0.361<br>(152) 0.25<br>(153) 0.19  | $\begin{array}{c} (155) & 0.079 \\ (154) & 0.079 \\ (155) & 0.079 \\ (155) & 0.079 \\ (155) & 0.054 \\ (159) & 0.054 \\ (159) & 0.054 \\ (167) & 0.05 \\ (171) & 0.05 \end{array}$  | (221) 1.329<br>(222) 9.551<br>(273) 0.498<br>(274) 2.173<br>(275) 0.784<br>(275) 0.784<br>(275) 0.404<br>(277) 0.295<br>(278) 0.19<br>(279) 0.139   | (289) 0.05<br>(290) 0.039<br>(291) 0.039<br>(292) 0.029<br>(293) 0.029<br>(294) 0.029<br>(294) 0.029<br>(296) 0.029<br>(297) 0.029  | (307) 58-3<br>(308) 58-3<br>(309) 28-3<br>(310) 58-3<br>(311) 28-3<br>(312) 58-3<br>(313) 18-3<br>(314) 58-3<br>(314) 58-3<br>(315) 18-3   | (525) 0<br>(524) 0<br>(524) 0<br>(527) 0<br>(529) 0<br>(539) 0<br>(531) 0<br>(531) 0<br>(532) 0<br>(533) 0   | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(348) 0<br>(348) 0<br>(349) 0<br>(350) 0<br>(351) 0  |
| 91) 0.097<br>92) 0.097<br>93) 0.079<br>94) 0.079<br>95) 0.079<br>96) 0.079<br>97) 0.055<br>98) 0.05  | $\begin{array}{c} (109) & 0.163 \\ (110) & 0.19 \\ (111) & 0.117 \\ (112) & 0.117 \\ (112) & 0.117 \\ (113) & 0.117 \\ (114) & 0.117 \\ (115) & 0.404 \\ (116) & 0.219 \end{array}$                           | (127) 0.064<br>(123) 0.05<br>(129) 0.05<br>(130) 0.05<br>(171) 0.05<br>(171) 0.05<br>(132) 0.05<br>(133) 0.05<br>(134) 0.03<br>(135) 0.039   | (145) 0.097<br>(146) 1.421<br>(147) 0.449<br>(148) 0.404<br>(149) 1.72<br>(150) 0.504<br>(151) 0.361<br>(152) 0.25<br>(153) 0.19<br>(154) 0.163   | $\begin{array}{c} (165) & 0.079 \\ (164) & 0.079 \\ (165) & 0.079 \\ (165) & 0.079 \\ (165) & 0.054 \\ (169) & 0.054 \\ (169) & 0.054 \\ (169) & 0.05 \\ (171) & 0.05 \\ (172) & 0.079 \end{array}$   | $\begin{array}{c} (271) & 1.329 \\ (272) & 0.551 \\ (273) & 0.498 \\ (274) & 2.173 \\ (275) & 0.784 \\ (275) & 0.784 \\ (275) & 0.404 \\ (277) & 0.285 \\ (278) & 0.19 \\ (279) & 0.139 \\ (280) & 0.117 \end{array}$                       | (289) 0.05<br>(290) 0.039<br>(291) 0.039<br>(292) 0.029<br>(293) 0.029<br>(294) 0.029<br>(295) 0.029<br>(296) 0.029<br>(296) 0.029<br>(296) 0.029   | (307) 58-3<br>(308) 56-3<br>(309) 28-3<br>(310) 58-3<br>(311) 28-3<br>(312) 58-3<br>(313) 18-3<br>(314) 58-3<br>(314) 18-3<br>(315) 18-3<br>(316) 28-3   | $\begin{array}{c} (123) & 0 \\ (525) & 0 \\ (527) & 0 \\ (328) & 0 \\ (329) & 0 \\ (329) & 0 \\ (331) & 0 \\ (331) & 0 \\ (332) & 0 \\ (334) & 0 \end{array}$                | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(344) 0<br>(348) 0<br>(348) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(351) 0<br>(352) 0                       |
| 91) 0.097<br>72) 0.097<br>93) 0.079<br>94) 0.079<br>95) 0.079<br>96) 0.079<br>96) 0.05<br>96) 0.05<br>99) 0.05   | (109) 0.163<br>(110) 0.19<br>(111) 0.17<br>(112) 0.117<br>(112) 0.117<br>(113) 0.117<br>(114) 0.117<br>(115) 0.404<br>(116) 0.219<br>(117) 0.139  | $\begin{array}{c} (127) & 0.064 \\ (123) & 0.05 \\ (129) & 0.05 \\ (130) & 0.05 \\ (131) & 0.05 \\ (132) & 0.05 \\ (132) & 0.05 \\ (133) & 0.05 \\ (134) & 0.039 \\ (135) & 0.039 \\ (137) & 0.029 \end{array}$  | (145) 0.097<br>(146) 1.421<br>(147) 0.449<br>(148) 0.404<br>(149) 1.72<br>(150) 0.504<br>(151) 0.361<br>(152) 0.25<br>(153) 0.19<br>(154) 0.163<br>(155) 0.143  | $\begin{array}{c} (163) & 0.079 \\ (164) & 0.079 \\ (165) & 0.079 \\ (165) & 0.079 \\ (165) & 0.044 \\ (159) & 0.054 \\ (169) & 0.054 \\ (169) & 0.05 \\ (170) & 0.05 \\ (171) & 0.05 \\ (172) & 0.079 \\ (173) & 0.079 \end{array}$  | $\begin{array}{c} (271) & 1.329 \\ (272) & 0.551 \\ (273) & 0.478 \\ (274) & 2.173 \\ (275) & 0.784 \\ (275) & 0.784 \\ (275) & 0.404 \\ (277) & 0.295 \\ (278) & 0.19 \\ (279) & 0.139 \\ (280) & 0.117 \\ (281) & 0.117 \end{array}$      | (289) 0.05<br>(290) 0.039<br>(291) 0.039<br>(292) 0.029<br>(293) 0.029<br>(295) 0.029<br>(295) 0.029<br>(296) 0.029<br>(297) 0.029<br>(297) 0.029<br>(299) 0.021  | (307) 5E-3<br>(308) 5E-3<br>(309) 2E-3<br>(310) 5E-3<br>(311) 5E-3<br>(312) 5E-3<br>(312) 5E-3<br>(314) 5E-3<br>(314) 5E-3<br>(314) 5E-3<br>(316) 2E-3<br>(317) 0  | $\begin{array}{c} (128) & 0 \\ (128) & 0 \\ (328) & 0 \\ (329) & 0 \\ (329) & 0 \\ (330) & 0 \\ (331) & 0 \\ (332) & 0 \\ (332) & 0 \\ (334) & 0 \\ (335) & 0 \end{array}$   | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(345) 0<br>(347) 0<br>(349) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(353) 0                       |
| 91) 0.097<br>72) 0.097<br>93) 0.079<br>94) 0.079<br>95) 0.079<br>96) 0.079<br>96) 0.055<br>98) 0.05<br>100) 0.05   | (109) 0.163<br>(110) 0.19<br>(111) 0.117<br>(112) 0.117<br>(112) 0.117<br>(114) 0.117<br>(114) 0.117<br>(115) 0.404<br>(116) 0.219<br>(117) 0.139<br>(118) 0.117  | $\begin{array}{c} (127) & 0.064 \\ (123) & 0.05 \\ (129) & 0.05 \\ (130) & 0.05 \\ (131) & 0.05 \\ (132) & 0.05 \\ (133) & 0.05 \\ (133) & 0.05 \\ (134) & 0.039 \\ (135) & 0.039 \\ (136) & 0.029 \\ (138) & 0.029 \end{array}$   | (145) 0.097<br>(145) 1.921<br>(147) 0.449<br>(148) 0.404<br>(149) 1.72<br>(150) 0.504<br>(151) 0.361<br>(152) 0.25<br>(153) 0.19<br>(154) 0.143<br>(156) 0.139  | $\begin{array}{c} (165) & 0.079 \\ (164) & 0.079 \\ (165) & 0.079 \\ (165) & 0.079 \\ (165) & 0.079 \\ (167) & 0.054 \\ (169) & 0.054 \\ (169) & 0.054 \\ (170) & 0.05 \\ (171) & 0.05 \\ (172) & 0.079 \\ (173) & 0.079 \\ (174) & 0.064 \end{array}$  | (271) 1.329<br>(272) 0.501<br>(273) 0.478<br>(274) 2.173<br>(275) 0.786<br>(275) 0.786<br>(275) 0.786<br>(277) 0.285<br>(278) 0.19<br>(279) 0.139<br>(280) 0.117<br>(281) 0.117<br>(282) 0.097  | (289) 0.05<br>(290) 0.039<br>(291) 0.039<br>(291) 0.039<br>(293) 0.029<br>(293) 0.029<br>(294) 0.029<br>(294) 0.029<br>(296) 0.029<br>(296) 0.029<br>(298) 0.021<br>(300) 0.014   | (307) 5E-3<br>(308) 5E-3<br>(309) 2E-3<br>(310) 5E-3<br>(311) 2E-3<br>(312) 5E-3<br>(312) 5E-3<br>(314) 5E-3<br>(314) 5E-3<br>(314) 5E-3<br>(316) 2E-3<br>(317) 0<br>(318) 2E-3  | (525) 0<br>(525) 0<br>(527) 0<br>(529) 0<br>(529) 0<br>(530) 0<br>(531) 0<br>(532) 0<br>(532) 0<br>(5334) 0<br>(334) 0<br>(335) 0<br>(336) 0                                 | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(345) 0<br>(347) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(352) 0<br>(353) 0<br>(354) 0            |
| 91) 0.097<br>72) 0.097<br>93) 0.079<br>94) 0.079<br>95) 0.079<br>96) 0.079<br>96) 0.079<br>97) 0.054<br>98) 0.05<br>99) 0.05<br>100) 0.05<br>101) 0.05<br>102] 0.079                 | (109) 0.163<br>(110) 0.19<br>(111) 0.117<br>(112) 0.117<br>(113) 0.117<br>(114) 0.117<br>(114) 0.117<br>(115) 0.404<br>(116) 0.219<br>(117) 0.139<br>(118) 0.117<br>(119) 0.117                               | $\begin{array}{c} (127) & 0.064 \\ (123) & 0.05 \\ (129) & 0.05 \\ (130) & 0.05 \\ (131) & 0.05 \\ (132) & 0.05 \\ (132) & 0.05 \\ (133) & 0.05 \\ (134) & 0.039 \\ (135) & 0.039 \\ (137) & 0.029 \end{array}$  | (145) 0.097<br>(145) 1.421<br>(147) 0.449<br>(148) 0.404<br>(149) 1.72<br>(150) 0.504<br>(151) 0.361<br>(152) 0.25<br>(153) 0.19<br>(154) 0.163<br>(156) 0.139<br>(157) 0.139   | (165) 0.079(164) 0.079(165) 0.079(165) 0.079(165) 0.054(169) 0.054(169) 0.054(169) 0.054(170) 0.05(171) 0.05(171) 0.079(173) 0.079(174) 0.064   | (271) 1.329<br>(272) 9.561<br>(275) 0.478<br>(274) 2.173<br>(275) 0.784<br>(275) 0.784<br>(275) 0.404<br>(277) 0.295<br>(278) 0.19<br>(279) 0.139<br>(290) 0.117<br>(291) 0.117<br>(292) 0.097<br>. (285) 0.079                             | (289) 0.05<br>(290) 0.039<br>(291) 0.039<br>(292) 0.029<br>(293) 0.029<br>(294) 0.029<br>(294) 0.029<br>(296) 0.029<br>(297) 0.029<br>(298) 0.029<br>(299) 0.021<br>(300) 0.014   | $ \begin{array}{c} (307) & 56-3 \\ (308) & 56-3 \\ (309) & 26-3 \\ (310) & 58-3 \\ (311) & 36-3 \\ (312) & 58-3 \\ (312) & 58-3 \\ (313) & 18-3 \\ (314) & 58-3 \\ (314) & 58-3 \\ (314) & 28-3 \\ (316) & 28-3 \\ (318) & 28-3 \\ (319) & 0 \end{array} $ | (125) 0<br>(525) 0<br>(527) 0<br>(429) 0<br>(429) 0<br>(330) 0<br>(331) 0<br>(332) 0<br>(3334) 0<br>(336) 0<br>(336) 0<br>(337) 0  | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(345) 0<br>(348) 0<br>(359) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(352) 0<br>(353) 0<br>(355) 0            |
| 91) 0.097<br>72) 0.077<br>93) 0.079<br>94) 0.079<br>95) 0.079<br>96) 0.079<br>97) 0.054<br>98) 0.05<br>99) 0.05<br>100) 0.05<br>101) 0.05<br>102) 0.079<br>103) 0.079                | (109) 0.163<br>(110) 0.19<br>(111) 0.117<br>(112) 0.117<br>(112) 0.117<br>(115) 0.117<br>(114) 0.117<br>(115) 0.404<br>(116) 0.219<br>(117) 0.139<br>(118) 0.117<br>(119) 0.117<br>(120) 0.097                | $\begin{array}{c} (127) & 0.064 \\ (123) & 0.05 \\ (129) & 0.05 \\ (130) & 0.05 \\ (131) & 0.05 \\ (132) & 0.05 \\ (133) & 0.05 \\ (133) & 0.05 \\ (134) & 0.039 \\ (135) & 0.039 \\ (136) & 0.029 \\ (138) & 0.029 \end{array}$   | (145) 0.097<br>(146) 1.421<br>(147) 0.449<br>(148) 0.404<br>(149) 1.72<br>(150) 0.504<br>(151) 0.361<br>(152) 0.25<br>(153) 0.19<br>(154) 0.163<br>(155) 0.143<br>(156) 0.139<br>(157) 0.139<br>(159) 0.117   | (165) 0.079(164) 0.079(165) 0.079(165) 0.079(165) 0.054(169) 0.054(169) 0.054(169) 0.054(170) 0.05(171) 0.05(171) 0.079(173) 0.079(174) 0.064   | (271) 1.329<br>(272) 9.561<br>(275) 0.478<br>(274) 2.173<br>(275) 0.784<br>(275) 0.784<br>(275) 0.404<br>(277) 0.295<br>(278) 0.19<br>(279) 0.139<br>(290) 0.117<br>(291) 0.117<br>(292) 0.097<br>. (285) 0.079                             | (289) 0.05<br>(290) 0.039<br>(291) 0.039<br>(292) 0.029<br>(293) 0.029<br>(293) 0.029<br>(294) 0.029<br>(295) 0.029<br>(296) 0.029<br>(297) 0.029<br>(298) 0.029<br>(298) 0.029<br>(299) 0.021<br>(300) 0.014<br>(301) 0.014  | (307) 5E-3<br>(308) 5E-3<br>(307) 2E-3<br>(310) 5E-3<br>(311) 2E-3<br>(312) 5E-3<br>(313) 1E-3<br>(314) 5E-3<br>(314) 5E-3<br>(314) 2E-3<br>(317) 0<br>(318) 2E-3<br>(317) 0<br>(320) 1E-3   | (22%) 0<br>(32%) 0<br>(32%) 0<br>(32%) 0<br>(32%) 0<br>(32%) 0<br>(33%) 0 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| 91) 0.097<br>72) 0.077<br>93) 0.079<br>94) 0.079<br>95) 0.079<br>96) 0.059<br>96) 0.05<br>100) 0.05<br>100) 0.05<br>101) 0.05<br>101) 0.05<br>102] 0.079<br>103] 0.079<br>104] 0.163 | (109) 0.163<br>(110) 0.19<br>(111) 0.117<br>(112) 0.117<br>(112) 0.117<br>(115) 0.404<br>(116) 0.219<br>(117) 0.139<br>(118) 0.117<br>(119) 0.117<br>(120) 0.097<br>(121) 0.079                               | (127) 0.064<br>(123) 0.05<br>(129) 0.05<br>(150) 0.05<br>(151) 0.05<br>(152) 0.05<br>(132) 0.05<br>(134) 0.05<br>(134) 0.05<br>(155) 0.039<br>(136) 0.029<br>(136) 0.029   | (145) 0.097<br>(146) 1.421<br>(147) 0.449<br>(148) 0.504<br>(150) 0.504<br>(151) 0.361<br>(152) 0.25<br>(153) 0.19<br>(154) 0.163<br>(155) 0.143<br>(155) 0.139<br>(157) 0.139<br>(159) 0.117   | (165) 0.079(164) 0.079(165) 0.079(165) 0.079(165) 0.054(169) 0.054(169) 0.054(169) 0.054(170) 0.05(171) 0.05(171) 0.079(173) 0.079(174) 0.064   | (271) 1.329<br>(272) 9.561<br>(275) 0.478<br>(274) 2.173<br>(275) 0.784<br>(275) 0.784<br>(275) 0.404<br>(277) 0.295<br>(278) 0.19<br>(279) 0.139<br>(290) 0.117<br>(291) 0.117<br>(292) 0.097<br>. (285) 0.079                             | (289) 0.05<br>(290) 0.039<br>(291) 0.039<br>(291) 0.039<br>(292) 0.029<br>(293) 0.029<br>(295) 0.029<br>(295) 0.029<br>(296) 0.029<br>(297) 0.029<br>(297) 0.029<br>(299) 0.021<br>(300) 0.014<br>(301) 0.014<br>(303) 9E-3   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (128) 0<br>(128) 0<br>(127) 0<br>(227) 0<br>(229) 0<br>(239) 0<br>(231) 0<br>(332) 0<br>(334) 0<br>(334) 0<br>(335) 0<br>(335) 0<br>(336) 0<br>(337) 0<br>(338) 0<br>(338) 0 | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(349) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(352) 0<br>(353) 0<br>(354) 0<br>(355) 0<br>(355) 0 |
| 91) 0.097<br>72) 0.097<br>93) 0.079<br>94) 0.079<br>95) 0.079<br>95) 0.054<br>98) 0.05<br>99) 0.05<br>100) 0.05<br>101) 0.05<br>102) 0.079<br>103) 0.079<br>103) 0.079<br>104) 0.163 | (10?) 0.163<br>(110) 0.19<br>(111) 0.117<br>(112) 0.117<br>(113) 0.117<br>(114) 0.117<br>(115) 0.404<br>(114) 0.219<br>(117) 0.139<br>(118) 0.117<br>(119) 0.117<br>(120) 0.097<br>(121) 0.079<br>(123) 0.079 | (127) 0.064<br>(123) 0.05<br>(129) 0.05<br>(130) 0.05<br>(131) 0.05<br>(132) 0.05<br>(133) 0.05<br>(133) 0.05<br>(134) 0.039<br>(136) 0.039<br>(136) 0.029<br>(139) 0.029<br>(140) 0.029   | $\begin{array}{c} (145) & 0.097 \\ (145) & 1.421 \\ (147) & 0.449 \\ (148) & 0.404 \\ (149) & 1.72 \\ (150) & 0.504 \\ (151) & 0.361 \\ (152) & 0.25 \\ (153) & 0.19 \\ (154) & 0.163 \\ (154) & 0.143 \\ (155) & 0.143 \\ (156) & 0.139 \\ (157) & 0.139 \\ (159) & 0.117 \\ (159) & 0.117 \\ (150) & 0.097 \end{array}$ | $\begin{array}{c} (165) & 0.079 \\ (164) & 0.079 \\ (165) & 0.079 \\ (165) & 0.079 \\ (165) & 0.079 \\ (167) & 0.054 \\ (169) & 0.054 \\ (169) & 0.054 \\ (170) & 0.05 \\ (171) & 0.05 \\ (172) & 0.079 \\ (173) & 0.079 \\ (174) & 0.064 \\ (175) & 0.064 \\ (175) & 0.064 \\ (177) & 0.05 \\ (177) & 0.05 \\ (177) & 0.05 \\ (177) & 0.05 \\ \end{array}$ | (271) 1.329<br>(172) 0.561<br>(275) 0.478<br>(274) 2.173<br>(275) 0.786<br>(175) 0.786<br>(175) 0.295<br>(278) 0.19<br>(277) 0.139<br>(280) 0.117<br>(281) 0.117<br>(282) 0.097<br>(283) 0.079<br>(283) 0.079<br>(284) 0.064<br>(285) 0.064 | $\begin{array}{c} (1289) & 0.05 \\ (290) & 0.039 \\ (291) & 0.039 \\ (291) & 0.029 \\ (293) & 0.029 \\ (293) & 0.029 \\ (294) & 0.029 \\ (294) & 0.029 \\ (296) & 0.029 \\ (296) & 0.029 \\ (298) & 0.029 \\ (298) & 0.021 \\ (300) & 0.014 \\ (301) & 0.014 \\ (302) & 0.014 \\ (302) & 0.014 \\ (304) & 0.014 \end{array}$  |  | (125) 0<br>(325) 0<br>(327) 0<br>(329) 0<br>(329) 0<br>(323) 0<br>(331) 0<br>(334) 0<br>(334) 0<br>(335) 0<br>(336) 0<br>(337) 0<br>(338) 0<br>(339) 0<br>(339) 0            | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| 91) 0.097<br>72) 0.077<br>93) 0.079<br>94) 0.079<br>95) 0.079<br>96) 0.059<br>96) 0.05<br>100) 0.05<br>100) 0.05<br>101) 0.05<br>101) 0.05<br>102] 0.079<br>103] 0.079<br>104] 0.163 | (109) 0.163<br>(110) 0.19<br>(111) 0.117<br>(112) 0.117<br>(112) 0.117<br>(114) 0.117<br>(115) 0.404<br>(116) 0.219<br>(117) 0.139<br>(118) 0.117<br>(119) 0.117<br>(120) 0.0979<br>(121) 0.079               | $\begin{array}{c} (127) & 0.064 \\ (123) & 0.05 \\ (129) & 0.05 \\ (130) & 0.05 \\ (131) & 0.05 \\ (132) & 0.05 \\ (132) & 0.05 \\ (133) & 0.05 \\ (134) & 0.05 \\ (134) & 0.039 \\ (135) & 0.039 \\ (136) & 0.029 \\ (138) & 0.029 \\ (148) & 0.029 \\ (141) & 0.029 \end{array}$ | (145) 0.097<br>(145) 1.421<br>(147) 0.449<br>(148) 0.404<br>(149) 1.72<br>(150) 0.504<br>(151) 0.361<br>(152) 0.25<br>(153) 0.19<br>(154) 0.163<br>(155) 0.139<br>(157) 0.139<br>(159) 0.117<br>(159) 0.117<br>(159) 0.097  | (165) 0.079(164) 0.079(165) 0.079(165) 0.079(165) 0.054(169) 0.054(169) 0.054(169) 0.054(170) 0.05(171) 0.05(171) 0.079(173) 0.079(174) 0.064   | (271) 1.329<br>(272) 9.561<br>(275) 0.478<br>(274) 2.173<br>(275) 0.784<br>(275) 0.784<br>(275) 0.404<br>(277) 0.295<br>(278) 0.19<br>(279) 0.139<br>(290) 0.117<br>(291) 0.117<br>(292) 0.097<br>. (285) 0.079                             | $\begin{array}{c} (289) & 0.05 \\ (290) & 0.029 \\ (291) & 0.029 \\ (291) & 0.029 \\ (293) & 0.029 \\ (293) & 0.029 \\ (294) & 0.029 \\ (294) & 0.029 \\ (296) & $ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (128) 0<br>(128) 0<br>(127) 0<br>(227) 0<br>(229) 0<br>(239) 0<br>(231) 0<br>(332) 0<br>(233) 0<br>(334) 0<br>(335) 0<br>(335) 0<br>(336) 0<br>(337) 0<br>(338) 0<br>(338) 0 | (343) 0<br>(344) 0<br>(345) 0<br>(345) 0<br>(349) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(352) 0<br>(353) 0<br>(354) 0<br>(356) 0<br>(356) 0 |

| Variable:  | SAND3.var  | 1 (length   | = 360)                  |  |  |  |  |
|--|--|---|-------------------------|--|--|--|--|
| <pre>( 1) 0 ( 2) 0 ( 2) 0 ( 3) 0 ( 4) 0 ( 5) 0 ( 4) 0 ( 5) 0 ( 4) 0 ( 7) 0 ( 8) 0 ( 7) 0 ( 10) 0 ( 11) 0 ( 12) 0 ( 12) 0 ( 13) 0 ( 14) 0 ( 15) 0</pre> | ( 17) 0<br>( 20) 0<br>( 21) 0<br>( 21) 0<br>( 22) 0<br>( 23) 0<br>( 24) 0<br>( 25) 0<br>( 25) 0<br>( 25) 0<br>( 28) 0<br>( 28) 0<br>( 28) 0<br>( 28) 0<br>( 30) 0<br>( 31) 0<br>( 32) 0<br>( 33) 0 | ( 37) 0<br>( 38) 0<br>( 39) 0<br>( 41) 0<br>( 42) 0<br>( 42) 0<br>( 42) 0<br>( 43) 0<br>( 45) 0<br>( 46) 0<br>( 46) 0<br>( 47) 0<br>( 49) 0<br>( 50) 0<br>( 51) 0 |                         |  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ |
| (15)0<br>(16)0<br>(17)0<br>(18)0   | (33)0<br>(34)0<br>(35)0<br>(36)0   | ( 51) 0<br>( 52) 0<br>( 53) 0<br>( 54) 0  | (70)0<br>(71)0<br>(72)0 | (88) 0 (106) 0 (124) 0 (1<br>(89) 0 (107) 0 (125) 0 (1 | .42) 0 (304) 0<br>(43) 0 (305) 0<br>(44) 0 (306) 0   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 0 (359) 0  |

| (145) 0<br>(146) 0<br>(147) 0<br>(148) 0<br>(149) 0 | (163) 0<br>(164) 0<br>(165) 0 | (182) 0 | (200) 0 |         |           |         |         |
|---|-------------------------------|---------|---------|---------|-----------|---------|---------|
| (147) 0<br>(148) 0                                  | -                             |         |         | (218) 0 | (236) 0   | (254) 0 | (272) 4 |
| (148) 0   |                               | (183) 0 | (201) 0 | (213) 0 | (237) 0   | (255) 0 | (273) 0 |
|   | (166) 0                       | (184) 0 | (202) 0 | (220) 0 | (259) 0   | (256) V | (274) 0 |
|   | (157) 0                       | (185) 0 | (200) 0 | (221) 0 | (209) 0   | (257) 0 | (275) 0 |
| (150) 0   | (158) Q                       | (186) 0 | (204) 0 | (222) 0 | (240) = 0 | (258) Ú | (276) 5 |
| (151) 0   | (169) 0                       | (187) 0 | (205) 0 | (225) 0 | (241) 0   | (259) 0 | (277) 0 |
| (152) 0   | (170) 0                       | (188) 0 | (206) 0 | (224) 0 | (242) Ú   | (260) 0 | (278) 0 |
| (153) 0   | (171) 0                       | (189) 0 | (207) 0 | (225) 0 | (243) Ŭ   | (261) Ú | (279) ( |
| (154) 0   | (172) 0                       | (190) 0 | (208) 0 | (226) 0 | (244) 0   | (262) 0 | (280) 4 |
| (155) 0   | (173) 0                       | (191) 0 | (209) 0 | (227) 0 | (245) 0   | (263) 0 | (581) 0 |
| (156) 0   | (174) 0                       | (192) 0 | (210) 0 | (228) 0 | (246) Ŭ   | (264) 0 | (282) ( |
| (157) 0   | (175) 0                       | (193) 0 | (211) 0 | (229) 9 | (247) 0   | (265) 0 | (282) ( |
| (158) 0   | (176) 0                       | (194) 0 | (212) 0 | (230) 0 | (248) 0   | (266) 0 | (284)   |
| (159) 0   | (177) 0                       | (195) 0 | (213) 0 | (231) 0 | (249) 0   | (267) 0 | (285) 4 |
| (160) 0   | (178) Ŭ                       | (196) 0 | (214) 0 | (232) 0 | (250) 0   | (268) 0 | (286) 4 |
| (161) 0   | (179) 0                       | (197) 0 | (215) 0 | (233) 0 | (251) 0   | (269) 0 | (287) ( |
| (162) 0   | (180) 0                       | (198) 0 | (216) 0 | (234) O | (252) 0   | (270) 0 | (288)   |
|   |                               |         |         |         |           |         |         |

Phosphorus transport Berg River

TR 143 March 1989

| Variable: SAND4.va  | ar1 (length = 344)   | (101) 0.285 (122) 0.25 (217) 0.098 (235) 0.139 (253) 0.064 |
|---|--|--|
| $ \begin{pmatrix} 1 \\ 0 \\ -2 \\ 0 \\ -3 \\ 0 \\ -3 \\ 0 \\ -4 \\ -3 \\ -4 \\ -4 \\ -4 \\ -4 \\ -4 \\ -4$  | 49       0       (37) $1E-3$ (55) $0.4449$ $(73)$ $0.217$ $20$ 0       (39) $1E-3$ (56) $0.322$ (74) $0.139$ $21$ 0       (39) $1E-3$ (56) $0.322$ (74) $0.139$ $21$ 0       (39) $1E-3$ (57) $0.25$ (75) $0.117$ $221$ 0       (40) $1E-3$ (59) $2.657$ (77) $0.068$ $223$ $1E-3$ (41) $1E-3$ (59) $2.657$ (77) $0.068$ $224$ $5E-3$ (42) $1E-3$ (50) $0.786$ (78) $0.079$ $25$ $1E-3$ (43) $1E-3$ (50) $0.219$ (81) $0.079$ $26$ $2E-3$ (44) $1E-3$ (63) $0.219$ (81) $0.079$ $27$ $1E-3$ (45) $1E-3$ (64) $0.219$ (81) $0.0079$ $28$ $1E-3$ (44) $1E-3$ (64) $0.219$ (81) | $      \begin{array}{lllllllllllllllllllllllllllllll$      |
| $ \begin{array}{c} (91) & 0.039 & (1) \\ (92) & 0.039 & (1) \\ (92) & 0.039 & (1) \\ (93) & 0.039 & (1) \\ (94) & 0.039 & (1) \\ (95) & 0.039 & (1) \\ (96) & 0.039 & (1) \\ (97) & 5.039 & (1) \\ (98) & 9.1 & (1) \\ (98) & 9.1 & (1) \\ (99) & 9.82 & (1) \\ (100) & 1.827 & (1) \\ (101) & 1.075 & (1) \\ \end{array} $ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$      |

(283) 0.021

(284) 0.021

(266) 0.014

(288) 0.014

(287) 0.02

· (285) 0.021

(301)

(303)

\_\_\_\_\_

(302) 2E-3

(304) 2E~3

(305) 28-3

(306) 28-3

2E-3

2E-3

`

### River discharge data at 12-hourly intervals for Station: 23B Period : 4

(157) 0.604

(158) 0.404

(159) 0.361

(160) 0.361

(161) 1,827

\_\_\_\_\_

(162) 13.37

(139) 0.163

(140) 0.163

(141) 0.163

(142) 0.219

(143) 0.163

(144) 0.165

-----

(175) 0.404

(175) 0.449

(177) 0.322

(178) 0.361

(179) 0.322

(180) 0.322

\_\_\_\_\_

Phosphorus transport Berg River

(102) 0.924

(104) 2.297

(105) 0.924

(106) 0.604

(107) 2.835

(108) 3.809

.

(103) 8.4

(120) 0.361

(121) 0.361

(125) 0.285

0.322

0.322

0.285

0.285

(122)

(123)

(124)

(125)

(319) 1E-3

(320) 0

(321) 0

(322) = 0

(323) 0

(324) 0

\_\_\_\_\_

(337) 0

(338) 0

(339) 0

(340) 0

(341) 0

(342) 0

\_\_\_\_\_

| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ |   |  |  |
|---|---|--|--|
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                            |
|   | (140) 0<br>(141) 0<br>(142) 0<br>(143) 0<br>(143) 0   | (502) 0 (320)<br>(303) 0 (321)<br>(304) 0 (322)<br>(305) 0 (323)<br>(305) 0 (323)<br>(306) 0 (324) | 0 (338) 0 (354) 0<br>0 (339) 0 (359) 0<br>0 (340) 0 (359) 0<br>0 (341) 0 (359) 0 |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | (271) 0(272) 0(273) 0(273) 0(274) 0                   | -  |  |

(259) 0

(260) 0

(251) 0

(262) 0

(263) 0

(264) 0

(265) 0

(266) 0

(267) Ú

(268) 0

(269) 0

(270) 0

(2/7) 0

(278) 0

(279) 0

(280) 0 (281) 0

(282) 0

(2**8**3) U

(284) Ŭ

(285) 0

(286) 0

(287) 0

(288) 0

| River | discharge | data | at | 12-hourly | intervals | for | Station: | 23B |
|-------|-----------|------|----|-----------|-----------|-----|----------|-----|
|       |           |      |    |           |           |     | Period : | 5   |

(220) 0

(224) 0

(225) 0 (226) 0

(227) 0

(228) 0 (229) 0

(230) 0

(231) 0

(232) 0

(233) 0

(234) 0

(204) 0

(205) 0

(206) 0

(207) 0

(208) 0

(209) 0

(211) 0

(212) 0

(213) 0

(214) 0

(215) 0

(216) 0

(210) 0

(241) 0

(242) 0

(243) 0

(244) 0

(245) 0

(246) 0

(247) 0

(248) 0

(249) 0

(250) 0

(251) 0 (252) 0

. . .

TR 143 March 1989

A3.81

Phosphorus transport Berg River - -. . . .

(150) 0

(151) 0

(152) 0

(153) 0

(154) 0

(155) 0

(156) 0

(157) 0

(158) 0

(159) 0

(160) 0

(161) 0

(1687-0

(159) 0

(170) 0

(171) 0

(173) 0

(174) 0

(175) 0 (176) 0 (177) 0

(179) 0

(179) 0

(162) 0 (180) 0

\_\_\_\_\_

(172) 0

(186) 0

(187) 0

(198) 0

(189) 0

(190) 0

(191) 0

(192) 0

(193) 0

(174) 0

(195) 0

(195) 0

(197) 0

(198) 0

| CIDDLAT SOM  | 06.varl (ler  | 10th - Jay/  |   |   |   |  |  |  |  |
|--|---|--|---|---|---|--|--|--|--|
|  |   |  |   |   | (191) 0.021   | (199) 0.139  | (217) 0.163  | (235) 0.097  | (257) 0.05   |
| 1) 0   | ( 19) 2E-3  | ( 37) IE-3   | ( 55) 2E-3  | (73) 2E-3   |   | 12001 0.139  | (218) 0.163  | (206) 0.219  | (254) 0.05   |
| $\frac{1}{2}$  | (20) 28-3   | (38) 18-3  | ( 55) 1E-J  | ( 74) 5E-3  | (101) 0.017   |  | (219) 0 139  | (237) 0.139  | (255) 0.05   |
|  | (21) 26-3   | ( 39) 1E~3   | ( 57) 5E-D  | ( 75) CE-3  | (193) 0.05  | (201) 0.17   |  | (22/4) 0 1/9   | (256) 0.05   |
| <b>u</b> , .   |   |  | ( 58) 28-3  | 1 761 2E-3  | (184) 5.039   | (202) 0.139  | (2207 0.157  |  | (257) 0.05   |
| 4) Ú   |   |  | ( 59) 2E-3  | ( 77) 18-3  | (185) 3,184   | (203) 0.304  | (221) 0.117  | (2.7) 0.077  | (258) 0.05   |
| 5) 0   | ( 23) 16-3  | ( 41) 1E-3   | 37120-3   |   | (186) 1.421   | (204) 6,772  | (222) 0.17   | (140) 0.097  | (138) 0.05   |
| 6)0  | ( 24) 2E-3  |  | ( 60) 26-3  |   | (187) 3,809   | (205) 1.241  | (223) 0.117  | (241) 0.07   | (257) 0.09   |
| 7) 0   | ( 25) 16-3  | ( 43) 1E-3   | ( 61) 2E-C  | ( /9) 2E-3  | (199) 0 755   | 12061 0.661  | (224) 0.117  | (242) 0.079  | (26)) 0.28   |
| 810  | ( 26) 2E-3  | ( 44) 1E-3   | ( 62) 26-3  | ( 80) 2E-3  |   | (207) 0 498  | (225) 0.11/  | (243) 0.064  | (251) 0.32   |
| 910  | ( 27) 1E-3  | ( 45) 12-3   | ( 63) 2E-3  | ( 81) 2E~3  | (137) 0.7.2   | (207) 0.470  | (2:6) 0 117  | (244) 0.064  | (252) 0.25   |
|  | (28) 2E-3   | (46) 1E-3  | ( 64) IE-J  | ( 82) 2E-3  | (190) 0.361   | (208) 1.100  |  | (245) 0.064  | (250) 0.16   |
| O) 2E-3  |   | ( 47) 1E-3   | ( 65) 16-7  | ( B3) 2E-3  | (191) 0.285   | (209) 0.549  |  |  | (264) 0.11   |
| 1) 2E-3  | ( 29) 1E-3  |  | ( 66) 1E-3  | 1 BA) 7E-3  | (192) 0.219   | (210) 0.404  | (228) 0.097  |  | (255) 0.09   |
| 2) 2E-3  | ( 30) 2E~3  |  |   | ( 05) 15-3  | (195) 0.19  | (211) 0.322  | (229) 0.097  | (247) 0.05   |  |
| 3) 2E-3  | ( 31) IE-3  | , == -   | ( 67) 18-3  |   | (194) 0.163   | (212) 0.285  | (230) 0.097  | (248) 0.05   | (255) 0.07   |
| 4) 5E-3  | ( 32) 1E-3  | ( 50) 5E-3   | ( 68) 16-3  | ( 04) 20-3  | (195) 0.139   | (21.5) 0.25  | (231) 0.097  | (249) 0,05   | (267) 0.07   |
| 5) 2E-3  | ( 33) 1E-3  |  | ( 69) 1E-3  | (87) 56-3   | (194) 0 219   | (214) 0.25   | (232) 0.079  | (250) 0.05   | (268) 0.07   |
| 6) 28-3  |   | (52) 2E-3  | ( 70) 1E-3  | ( 88) 2E-3  | (178) 0.217   | (214) 0.20   | (233) 0-079  | (251) 0.05   | (259) 0.06   |
|  |   | (53) 2E-3  | ( 71) 1E-3  | ( 87) CE-3  | (197) 0.219   |  | (274) 0 079  | (252) 0.05   | (270) 0.02   |
| 7) 22-3  | (36) 1E+3   | ( 54) 1E-3   | ( 72) 1F-3  | ( 90) 2E-3  | (198) 0.150   | (218) 0.14   | (204) 0.000  |  |  |
|  |   |  |   |   | -   |  |  |  |  |
|  | ×   |  |   |   | -   |  | ·  |  | _~   |
|  | · · · · · · · · · · · · · · · · · · ·   |  |   |   |   | (289) 5E-3   | (307) 1E-3   | (325) 1E-3   | (343) 0  |
|  | ·   |  | (145) 0.163   | (143) 0.117   | (271) 0.079   | (289)がE~3<br>(280)がE~3   | (307) 18~3<br>(308) 18~3   | (325) 1E-3<br>(326) 1E-3   | (343) 0<br>(344) 1E-3  |
|  | (109) 11-3  | (127) 26-3   | (145) 0.165<br>(146) 0.097  |   | (271) 0.079<br>(272) 0.08   | (287) 5E~3<br>(290) 5E~3<br>(290) 5E~3   | (307) 1E-3<br>(308) 1E-3<br>(309) 1E-3   |  | (343) 0<br>(344) 18-3<br>(345) 0   |
| 21) 28-3<br>2) 28-3  | (109) 1L-3<br>(110) 1E-3  | (127) 28-3<br>(128) 28-3   | (145) 0.163<br>(146) 0.097<br>(147) 0.219   | (143) 0.117<br>(144) 0.079<br>(145) 0.079   | (271) 0.079<br>(272) 0.08<br>(273) 0.084  | (289) 5E~3<br>(290) 5E~3<br>(291) 5E~3   | (307) 1E-3<br>(309) 1E-3<br>(369) 1E-3<br>(369) 1E-3   | (327) 18-3   | (345) 0  |
| 1) 28-3<br>2) 28-3<br>2) 28-3  | (109) 11-3<br>(110) 1E-3<br>(111) 5E-3  | (127) 28-3<br>(128) 28-3<br>(129) 28-3   | (145) 0.163<br>(146) 0.097<br>(147) 0.219<br>(148) 0.235  | (143) 0.117<br>(164) 0.079<br>(165) 0.079<br>(165) 0.139  | $\begin{array}{c} (271) & 0.079 \\ (272) & 0.08 \\ (273) & 0.064 \\ (274) & 0.05 \end{array}$   | (289) 5E~3<br>(290) 5E~3<br>(291) 5E~3<br>(291) 5E~3<br>(292) 5E~3   | (307) 4E-3<br>(308) 1E-3<br>(309) 1E-3<br>(309) 1E-3<br>(310) 1E-3   | (327) 1E-3<br>(328) 1E-3   | (345)0<br>(346)0   |
| 1) 2E-3<br>2) 2E-3<br>3) 2E-3<br>3) 2E-3<br>4) 5E-3  | (109) 1E-3<br>(110) 1E-3<br>(111) 5E-3<br>(112) 2E-3  | (127) 28-3<br>(128) 28-3<br>(129) 28-3<br>(129) 28-3<br>(130) 28-3   | (145) 0.165<br>(146) 0.097<br>(147) 0.219<br>(148) 0.235<br>(148) 0.351   | (143) 0.117<br>(164) 0.079<br>(165) 0.079<br>(165) 0.139<br>(157) 0.139   | (271) 0.079<br>(272) 0.08<br>(273) 0.064<br>(274) 0.05<br>(275) 0.05?   | (289) 55-3<br>(290) 55-3<br>(291) 55-3<br>(292) 95-3<br>(293) 55-3   | (307) 1E-3<br>(308) 1E-3<br>(309) 1E-3<br>(310) 1E-3<br>(311) 1E-3<br>(311) 1E-3   | (327) 18-3<br>(328) 18-3<br>(329) 18-3   | (345) 0<br>(346) 0<br>(347) 0  |
| 1) 2E-3<br>2) 2E-3<br>3) 2E-3<br>3) 2E-3<br>4) 5E-3<br>5) 0.029  | (109) 1E-3<br>(110) 1E-3<br>(111) 8E-3<br>(112) 8E-3<br>(112) 8E-3  | (127) 26-3<br>(128) 26-3<br>(129) 26-3<br>(129) 26-3<br>(120) 26-3<br>(121) 26-3   | (145) 0.165<br>(146) 0.097<br>(147) 0.219<br>(148) 0.235<br>(149) 0.561<br>(150) 0.785  | (143) 0.117<br>(144) 0.079<br>(145) 0.079<br>(146) 0.139<br>(1457) 0.139<br>(1464) 0.079  | (271) 0.079<br>(272) 0.08<br>(273) 0.064<br>(274) 0.05<br>(275) 0.039<br>(276) 0.039  | (289) 5E~3<br>(290) 5E~3<br>(291) 5E~3<br>(292) 5E~3<br>(293) 5E~3<br>(294) 5E~3   | (307) 1E-3<br>(308) 1E-3<br>(309) 1E-3<br>(310) 1E-3<br>(311) 1E-3<br>(312) 2E-3   | (327) 1E-3<br>(328) 1E-3<br>(329) 1E-3<br>(330) 1E-3   | (345) 0<br>(346) 0<br>(347) 0<br>(348) 0   |
| 1) 2E-3<br>2) 2E-3<br>2) 2E-3<br>4) 5E-3<br>5) 0.029<br>6) 0.014   | (109) 1E-3<br>(110) 1E-3<br>(111) 5E-3<br>(112) 2E-3<br>(112) 2E-3<br>(114) 2E-3  | (127) 28-3<br>(128) 28-3<br>(129) 28-3<br>(129) 28-3<br>(120) 28-3<br>(131) 28-3<br>(132) 28-3   | (145) 0.163<br>(146) 0.097<br>(147) 0.219<br>(148) 0.235<br>(149) 0.561<br>(150) 0.285<br>(151) 0.139   | (143) 0.117<br>(143) 0.079<br>(165) 0.079<br>(165) 0.139<br>(157) 0.139<br>(159) 0.084  | (271) 0.079<br>(272) 0.08<br>(273) 0.064<br>(274) 0.05<br>(275) 0.039<br>(276) 0.039<br>(277) 0.029   | (289) 5E~3<br>(290) 5E~3<br>(291) 5E~3<br>(293) 5E~3<br>(294) 5E~3<br>(294) 5E~3<br>(294) 5E~3<br>(295) 5E~3   | (307) 1E-3<br>(308) 1E-3<br>(309) 1E-3<br>(310) 1E-3<br>(311) 1E-3<br>(312) 2E-3<br>(313) 1E-3   | (327) 1E-3<br>(328) 1E-3<br>(329) 1E-3<br>(330) 1E-3<br>(331) 1E-3   | (345) 0<br>(346) 0<br>(347) 0<br>(348) 0<br>(349) 0  |
| 21) 2E-3<br>(2) 2E-3<br>(2) 2E-3<br>(4) 5E-3<br>(5) 0.029<br>(6) 0.014<br>(7) 0.05   | (109) 1E-3<br>(110) 1E-3<br>(111) SE-3<br>(112) 2E-3<br>(112) 2E-3<br>(113) 2E-3<br>(114) 2E-3<br>(115) SE-3  | (127) 28-3<br>(128) 28-3<br>(129) 28-3<br>(120) 28-3<br>(121) 28-3<br>(131) 28-3<br>(133) 28-3   | (145) 0.165<br>(146) 0.097<br>(147) 0.219<br>(148) 0.235<br>(149) 0.361<br>(150) 0.285<br>(151) 0.139<br>(152) 0.397  | (143) 0.117<br>(144) 0.079<br>(145) 0.079<br>(145) 0.139<br>(157) 0.139<br>(158) 0.079<br>(159) 0.064<br>(159) 0.054  | $\begin{array}{c} (271) & 0.079 \\ (272) & 0.08 \\ (273) & 0.054 \\ (274) & 0.05 \\ (275) & 0.039 \\ (276) & 0.039 \\ (277) & 0.029 \\ (278) & 0.029 \end{array}$   | (289) 5E~3<br>(290) 5E~3<br>(291) 5E~3<br>(292) 5E~3<br>(293) 5E~3<br>(294) 5E~3<br>(294) 5E~3<br>(294) 5E~3<br>(296) 5E~3   | (307) 1E-3<br>(308) 1E-3<br>(309) 1E-3<br>(310) 1E-3<br>(311) 1E-3<br>(312) 2E-3<br>(313) 1E-3<br>(314) 1E-3   | (327) 1E-3<br>(328) 1E-3<br>(329) 1E-3<br>(330) 1E-3<br>(331) 1E-3<br>(332) 2E-3   | (345) 0<br>(346) 0<br>(347) 0<br>(348) 0<br>(349) 0<br>(350) 0   |
| 21) 2E-3<br>(2) 2E-3<br>(2) 2E-3<br>(4) 5E-3<br>(5) 0.029<br>(6) 0.014<br>(7) 0.05   | (109) 1E-3<br>(110) 1E-3<br>(111) 8E-3<br>(112) 2E-3<br>(112) 2E-3<br>(114) 2E-3<br>(114) 2E-3<br>(115) 5E-3<br>(116) 5E-3  | (127) 28-3<br>(128) 28-3<br>(128) 28-3<br>(120) 28-3<br>(130) 28-3<br>(131) 28-3<br>(132) 28-3<br>(133) 28-3<br>(134) 0.021  | (145) 0.163<br>(146) 0.097<br>(147) 0.219<br>(148) 0.235<br>(149) 0.361<br>(150) 0.285<br>(151) 0.139<br>(152) 0.097  | (143) 0.117<br>(164) 0.079<br>(165) 0.079<br>(165) 0.139<br>(157) 0.139<br>(168) 0.079<br>(159) 0.064<br>(170) 0.05   | $\begin{array}{c} (271) & 0.079 \\ (272) & 0.08 \\ (273) & 0.064 \\ (274) & 0.05 \\ (275) & 0.059 \\ (275) & 0.039 \\ (276) & 0.029 \\ (278) & 0.029 \\ (279) & 0.029 \end{array}$  | (289) 5E-3<br>(290) 5E-3<br>(291) 5E-3<br>(292) 5E-3<br>(293) 5E-3<br>(294) 5E-3<br>(294) 5E-3<br>(296) 5E-3<br>(297) 5E-3   | (207) 1E-3<br>(20B) 1E-3<br>(309) 1E-3<br>(310) 1E-3<br>(311) 1E-3<br>(312) 2E-3<br>(313) 1E-3<br>(314) 1E-3<br>(315) 1E-3   | (327) 1E-3<br>(328) 1E-3<br>(329) 1E-3<br>(330) 1E-3<br>(331) 1E-3<br>(332) 2E-3<br>(333) 2E-3   | (345) = 0<br>(346) = 0<br>(347) = 0<br>(348) = 0<br>(349) = 0<br>(350) = 0<br>(351) = 0  |
| 91) 2E-3<br>92) 2E-3<br>92) 2E-3<br>94) 5E-3<br>95) 0.029<br>96) 0.019<br>97) 0.05<br>98) 5E-3   | (109) 1E-3<br>(110) 1E-3<br>(111) 8E-3<br>(112) 2E-3<br>(112) 2E-3<br>(114) 2E-3<br>(115) 5E-3<br>(116) 5E-3<br>(117) 9E-3  | (127) 28-3<br>(128) 28-3<br>(128) 28-3<br>(130) 28-3<br>(130) 28-3<br>(131) 28-3<br>(132) 28-3<br>(132) 28-3<br>(133) 28-3<br>(134) 0.021<br>(135) 0.498   | (145) 0.163<br>(146) 0.097<br>(147) 0.219<br>(148) 0.235<br>(149) 0.561<br>(150) 0.285<br>(151) 0.139<br>(152) 0.097<br>(153) 0.079   | (143) 0.117<br>(144) 0.079<br>(145) 0.079<br>(155) 0.139<br>(157) 0.139<br>(159) 0.064<br>(159) 0.064<br>(170) 0.059<br>(159) 0.039   | (271) 0.079<br>(272) 0.08<br>(273) 0.064<br>(274) 0.05<br>(275) 0.059<br>(276) 0.039<br>(277) 0.029<br>(278) 0.029<br>(278) 0.029<br>(279) 0.029  | (289) 5E~3<br>(290) 5E~3<br>(291) 5E~3<br>(293) 5E~3<br>(294) 5E~3<br>(294) 5E~3<br>(294) 5E~3<br>(294) 5E~3<br>(297) 5E~3<br>(298) 2E~3   | (307) 1E-3<br>(309) 1E-3<br>(309) 1E-3<br>(310) 1E-3<br>(311) 1E-3<br>(312) 2E-3<br>(313) 1E-3<br>(313) 1E-3<br>(314) 1E-3<br>(314) 1E-3   | (327) 1E-3<br>(328) 1E-3<br>(329) 1E-3<br>(330) 1E-3<br>(332) 1E-3<br>(332) 2E-3<br>(333) 2E-3<br>(334) 1E-3   | (345) 0<br>(346) 0<br>(347) 0<br>(348) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0   |
| 21) 2E-3<br>22) 2E-3<br>24) 2E-3<br>24) 2E-3<br>24) 0.029<br>26) 0.014<br>27) 0.05<br>28) 5E-3<br>29) 5E-3   | (109) 1E-3<br>(110) 1E-3<br>(111) 8E-3<br>(112) 2E-3<br>(112) 2E-3<br>(114) 2E-3<br>(114) 2E-3<br>(115) 5E-3<br>(116) 5E-3  | (127) 26-3<br>(128) 26-3<br>(129) 26-3<br>(130) 26-3<br>(131) 26-3<br>(132) 26-3<br>(132) 26-3<br>(132) 26-3<br>(133) 26-3<br>(134) 0.021<br>(135) 0.498<br>(136) 0.163  | (145) 0.163<br>(146) 0.097<br>(147) 0.219<br>(148) 0.235<br>(149) 0.561<br>(150) 0.285<br>(151) 0.139<br>(152) 0.097<br>(153) 0.079<br>(154) 0.064  | (143) 0.117<br>(144) 0.079<br>(165) 0.079<br>(156) 0.139<br>(157) 0.139<br>(159) 0.039<br>(159) 0.064<br>(170) 0.05<br>(171) 0.039<br>(172) 0.039   | (271) 0.079<br>(272) 0.08<br>(272) 0.08<br>(273) 0.054<br>(274) 0.05<br>(275) 0.039<br>(276) 0.039<br>(277) 0.029<br>(278) 0.029<br>(280) 0.021<br>(280) 0.021  | (289) 5E-3<br>(290) 5E-3<br>(291) 5E-3<br>(293) 5E-3<br>(293) 5E-3<br>(293) 5E-3<br>(295) 5E-3<br>(297) 5E-3<br>(297) 5E-3<br>(298) 2E-3<br>(298) 1E-3   | (307) 1E-3<br>(208) 1E-3<br>(309) 1E-3<br>(309) 1E-3<br>(310) 1E-3<br>(311) 1E-3<br>(313) 1E-3<br>(315) 1E-3<br>(315) 1E-3<br>(316) 1E-3<br>(317) 1E-3   | (327) 1E-3<br>(328) 1E-3<br>(329) 1E-3<br>(330) 1E-3<br>(331) 1E-3<br>(332) 2E-3<br>(333) 2E-3   | (345) = 0<br>(346) = 0<br>(347) = 0<br>(348) = 0<br>(349) = 0<br>(350) = 0<br>(351) = 0  |
| 21) 2E-3<br>22) 2E-3<br>22) 2E-3<br>24) 5E-3<br>25) 0.029<br>24) 0.014<br>27) 0.05<br>28) 5E-3<br>30) 2E-3<br>30) 2E-3   | (109) 1E-3<br>(110) 1E-3<br>(111) 8E-3<br>(112) 2E-3<br>(112) 2E-3<br>(114) 2E-3<br>(115) 5E-3<br>(116) 5E-3<br>(117) 9E-3  | (127) 28-3<br>(128) 28-3<br>(128) 28-3<br>(130) 28-3<br>(130) 28-3<br>(131) 28-3<br>(132) 28-3<br>(132) 28-3<br>(133) 28-3<br>(134) 0.021<br>(135) 0.498   | (145) 0.163<br>(146) 0.097<br>(147) 0.219<br>(148) 0.235<br>(149) 0.361<br>(150) 0.285<br>(151) 0.139<br>(152) 0.097<br>(153) 0.079<br>(155) 0.05   | (143) 0.117<br>(144) 0.079<br>(145) 0.079<br>(145) 0.139<br>(157) 0.139<br>(148) 0.079<br>(159) 0.064<br>(170) 0.05<br>(171) 0.039<br>(172) 0.039<br>(173) 0.039  | $ \begin{array}{c} (271) & 0.079 \\ (272) & 0.08 \\ (273) & 0.054 \\ (274) & 0.05 \\ (275) & 0.039 \\ (276) & 0.039 \\ (277) & 0.029 \\ (278) & 0.029 \\ (279) & 0.029 \\ (280) & 0.021 \\ (281) & 0.021 \\ (262) & $ | (289) 5E-3<br>(290) 5E-3<br>(291) 5E-3<br>(293) 5E-3<br>(293) 5E-3<br>(294) 5E-3<br>(294) 5E-3<br>(294) 5E-3<br>(297) 5E-3<br>(298) 2E-3<br>(299) 1E-3<br>(200) 1E-3   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (327) 18-3<br>(328) 18-3<br>(329) 18-3<br>(330) 18-3<br>(331) 18-3<br>(332) 28-3<br>(333) 18-3<br>(334) 18-3<br>(335) 18-3   | (345) 0<br>(346) 0<br>(347) 0<br>(348) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0   |
| 2E-3       2D     2E-3       2D     2E-3       3C     2E-3       3C     0.029       3C     0.05       3D     3E-3       3D     3E-3       3D     2E-3       3D     2E-3  | $      \begin{array}{c} (109) & 1100 \\ (110) & 1100 \\ (111) & 5100 \\ (111) & 5100 \\ (112) & 2100 \\ (112) & 2100 \\ (113) & 2100 \\ (114) & 2100 \\ (114) & 5100 \\ (116) & $ | (127) 2E-3<br>(128) 2E-3<br>(129) 2E-3<br>(120) 2E-3<br>(131) 2E-3<br>(132) 2E-3<br>(132) 2E-3<br>(133) 0.498<br>(134) 0.163<br>(137) 0.079  | (145) 0.163<br>(146) 0.097<br>(147) 0.219<br>(148) 0.235<br>(149) 0.361<br>(150) 0.285<br>(151) 0.139<br>(152) 0.097<br>(153) 0.079<br>(153) 0.05<br>(156) 0.05   | (143) 0.117<br>(164) 0.079<br>(165) 0.079<br>(157) 0.139<br>(157) 0.139<br>(159) 0.064<br>(170) 0.05<br>(171) 0.039<br>(172) 0.039<br>(172) 0.039<br>(174) 0.029  | (271) 0.079<br>(272) 0.08<br>(273) 0.064<br>(274) 0.05<br>(275) 0.059<br>(276) 0.039<br>(277) 0.029<br>(278) 0.029<br>(278) 0.029<br>(278) 0.021<br>(281) 0.021<br>(281) 0.021<br>(282) 0.021   | (289) 5E-3<br>(290) 5E-3<br>(291) 5E-3<br>(293) 5E-3<br>(294) 5E-3<br>(294) 5E-3<br>(294) 5E-3<br>(294) 5E-3<br>(297) 5E-3<br>(297) 5E-3<br>(297) 1E-3<br>(300) 1E-3   | (307) 1E-3<br>(309) 1E-3<br>(309) 1E-3<br>(310) 1E-3<br>(311) 1E-3<br>(312) 2E-3<br>(313) 1E-3<br>(314) 1E-3<br>(314) 1E-3<br>(314) 1E-3<br>(318) 1E-3<br>(318) 1E-3   | (327) 1E-3<br>(328) 1E-3<br>(329) 1E-3<br>(330) 1E-3<br>(331) 1E-3<br>(332) 2E-3<br>(333) 2E-3<br>(334) 1E-3<br>(335) 1E-3<br>(336) 1E-3                             | (345) 0<br>(344) 0<br>(347) 0<br>(348) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(352) 0  |
| 2E-3       2D       2E-3       3D       2E-3       4D       5E-3       9D       6E-3       9D       5E-3   | $\begin{array}{c} (109) & 11-3 \\ (110) & 12-3 \\ (111) & 52-3 \\ (112) & 22-3 \\ (112) & 22-3 \\ (113) & 22-3 \\ (114) & 52-3 \\ (114) & 52-3 \\ (116) & 52-3 \\ (117) & 92-3 \\ (119) & 52-3 \\ (119) & 52-3 \\ (120) & 52-3 \end{array}$   | (127) 28-3<br>(128) 28-3<br>(129) 28-3<br>(120) 28-3<br>(130) 28-3<br>(131) 28-3<br>(132) 28-3<br>(133) 28-3<br>(134) 0.021<br>(135) 0.478<br>(136) 0.163<br>(137) 0.079<br>(138) 0.064  | (145) 0.163<br>(144) 0.097<br>(147) 0.219<br>(148) 0.235<br>(149) 0.561<br>(150) 0.285<br>(151) 0.139<br>(152) 0.097<br>(152) 0.097<br>(153) 0.079<br>(154) 0.064<br>(155) 0.05<br>(156) 0.039  | (143) 0.117<br>(144) 0.079<br>(165) 0.079<br>(165) 0.139<br>(157) 0.139<br>(159) 0.084<br>(170) 0.084<br>(171) 0.039<br>(172) 0.039<br>(173) 0.039<br>(173) 0.029<br>(175) 0.029  | (271) 0.079<br>(272) 0.08<br>(273) 0.064<br>(274) 0.05<br>(275) 0.039<br>(276) 0.039<br>(277) 0.029<br>(278) 0.029<br>(279) 0.029<br>(280) 0.021<br>(281) 0.021<br>(282) 0.021<br>(283) 0.017   | (289) 5E-3<br>(290) 5E-3<br>(291) 5E-3<br>(292) 5E-3<br>(293) 5E-3<br>(294) 5E-3<br>(294) 5E-3<br>(297) 5E-3<br>(297) 5E-3<br>(297) 5E-3<br>(299) 1E-3<br>(300) 1E-3<br>(301) 1E-3   | $\begin{array}{c} (307) & 1E-3 \\ (308) & 1E-3 \\ (308) & 1E-3 \\ (309) & 1E-3 \\ (310) & 1E-3 \\ (311) & 1E-3 \\ (312) & 2E-3 \\ (313) & 1E-3 \\ (314) & 1E-3 \\ (316) & 1E-3 \\ (319) & 1E-3 \\$ | (327) 1E-3<br>(328) 1E-3<br>(329) 1E-3<br>(330) 1E-3<br>(331) 1E-3<br>(332) 2E-3<br>(333) 2E-3<br>(334) 1E-3<br>(336) 1E-3<br>(336) 1E-3                             | (345) 0<br>(344) 0<br>(344) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(352) 0<br>(353) 0<br>(354) 0<br>(355) 0  |
| 21)       2E-3         22)       2E-4         24)       3E-3         24)       3E-3         26)       0.014         27)       0.05         28)       5E-3         20)       2E-3         21)       2E-3         22)       2E-3         23)       2E-3  |   | (127) 28-3<br>(128) 28-3<br>(128) 28-3<br>(129) 28-3<br>(130) 28-3<br>(131) 28-3<br>(132) 28-3<br>(132) 28-3<br>(134) 0.021<br>(135) 0.498<br>(136) 0.143<br>(137) 0.079<br>(138) 0.064<br>(139) 0.039                               | (145) 0.165<br>(146) 0.097<br>(147) 0.219<br>(148) 0.235<br>(149) 0.551<br>(150) 0.285<br>(151) 0.137<br>(152) 0.097<br>(153) 0.079<br>(153) 0.079<br>(154) 0.064<br>(155) 0.05<br>(154) 0.039<br>(158) 0.0361  | (143) 0.117<br>(144) 0.079<br>(165) 0.079<br>(165) 0.139<br>(157) 0.139<br>(159) 0.039<br>(159) 0.064<br>(170) 0.05<br>(171) 0.039<br>(172) 0.039<br>(173) 0.039<br>(173) 0.029<br>(174) 0.029  | (271) 0.079<br>(272) 0.08<br>(273) 0.054<br>(274) 0.05<br>(275) 0.039<br>(276) 0.039<br>(276) 0.029<br>(278) 0.029<br>(280) 0.021<br>(281) 0.021<br>(282) 0.021<br>(283) 0.017<br>(284) 0.014   | (289) 5E-3<br>(290) 5E-3<br>(291) 5E-3<br>(292) 5E-3<br>(293) 5E-3<br>(294) 5E-3<br>(294) 5E-3<br>(297) 5E-3<br>(297) 5E-3<br>(297) 5E-3<br>(297) 2E-3<br>(299) 1E-3<br>(300) 1E-3<br>(301) 1E-3<br>(302) 1E-3                             | $\begin{array}{c} (307) & 1E-3 \\ (308) & 1E-3 \\ (309) & 1E-3 \\ (310) & 1E-3 \\ (311) & 1E-3 \\ (312) & 2E-3 \\ (312) & 1E-3 \\ (313) & 1E-3 \\ (314) & 1E-3 \\ (314) & 1E-3 \\ (318) & 1E-3 \\ (319) & 1E-3 \\ (320) & 1E-3 \\$ | (327) 1E-3<br>(328) 1E-3<br>(329) 1E-3<br>(330) 1E-3<br>(331) 1E-3<br>(332) 2E-3<br>(333) 2E-3<br>(333) 1E-3<br>(335) 1E-3<br>(336) 1E-3<br>(336) 1E-3<br>(338) 1E-3 | (345) 0<br>(344) 0<br>(347) 0<br>(347) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(353) 0<br>(353) 0<br>(355) 0<br>(355) 0<br>(356) 0  |
| 21)       2E-3         22)       2E-3         23)       2E-3         24)       5E-3         26)       0.024         26)       0.014         27)       5E-3         28)       5E-3         20)       2E-3         21)       2E-3         21)       2E-3         22)       2E-3         23)       2E-3         24)       2E-3  |   | (127) 26-3<br>(128) 26-3<br>(128) 26-3<br>(130) 26-3<br>(130) 26-3<br>(131) 26-3<br>(132) 26-3<br>(132) 26-3<br>(133) 2.6-3<br>(134) 0.021<br>(135) 0.498<br>(136) 0.163<br>(137) 0.079<br>(138) 0.064<br>(137) 0.039<br>(140) 0.029 | (145) 0.163<br>(146) 0.097<br>(147) 0.219<br>(148) 0.235<br>(149) 0.361<br>(150) 0.285<br>(151) 0.139<br>(152) 0.097<br>(153) 0.079<br>(153) 0.064<br>(156) 0.05<br>(156) 0.361<br>(159) 0.322  | (143) 0.117<br>(144) 0.079<br>(145) 0.079<br>(145) 0.139<br>(157) 0.139<br>(159) 0.064<br>(170) 0.05<br>(171) 0.039<br>(172) 0.039<br>(172) 0.039<br>(173) 0.029<br>(175) 0.029<br>(176) 0.029  | (271) 0.079<br>(272) 0.08<br>(273) 0.064<br>(274) 0.05<br>(275) 0.029<br>(276) 0.029<br>(276) 0.029<br>(278) 0.029<br>(278) 0.029<br>(279) 0.029<br>(280) 0.021<br>(281) 0.021<br>(281) 0.021<br>(283) 0.014  | (289) 5E-3<br>(290) 5E-3<br>(291) 5E-3<br>(292) 5E-3<br>(293) 5E-3<br>(294) 5E-3<br>(294) 5E-3<br>(294) 5E-3<br>(297) 5E-3<br>(297) 5E-3<br>(297) 5E-3<br>(297) 1E-3<br>(300) 1E-3<br>(302) 1E-3<br>(303) 1E-3                             | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |  | $\begin{array}{cccc} (345) & 0 \\ (344) & 0 \\ (344) & 0 \\ (342) & 0 \\ (349) & 0 \\ (350) & 0 \\ (351) & 0 \\ (352) & 0 \\ (352) & 0 \\ (353) & 0 \\ (354) & 0 \\ (355) & 0 \\ (356) & 0 \\ (356) & 0 \\ (357) & 0 \end{array}$                        |
| 21)       2E-3         22)       2E-3         22)       2E-3         24)       3E-3         25)       0.029         24)       0.05         27)       0.05         28)       3E-3         30)       2E-3         30)       2E-3         32)       2E-3         33)       2E-3         34)       2E-3         35)       2E-3   | $      \begin{array}{c} (109) & 1100 \\ (110) & 1100 \\ (110) & 1100 \\ (111) & 5100 \\ (112) & 2100 \\ (112) & 2100 \\ (113) & 2100 \\ (114) & 2100 \\ (114) & 5100 \\ (116) & $ | (127) 2E-3 (128) 2E-3 (129) 2E-3 (120) 2E-3 (131) 2E-3 (132) 2E-3 (132) 2E-3 (133) 0.498 (134) 0.021 (135) 0.498 (136) 0.163 (137) 0.079 (138) 0.064 (137) 0.029 (141) 0.029   | (145) 0.163<br>(144) 0.097<br>(147) 0.219<br>(148) 0.235<br>(149) 0.561<br>(150) 0.285<br>(151) 0.139<br>(152) 0.097<br>(152) 0.097<br>(153) 0.059<br>(154) 0.065<br>(156) 0.05<br>(157) 0.039<br>(158) 0.321<br>(159) 0.322<br>(169) 0.322               | (143) 0.117<br>(144) 0.079<br>(165) 0.079<br>(165) 0.139<br>(157) 0.139<br>(159) 0.064<br>(171) 0.039<br>(172) 0.039<br>(172) 0.039<br>(173) 0.039<br>(173) 0.029<br>(175) 0.029<br>(176) 0.029<br>(177) 0.029<br>(177) 0.029                               | (271) 0.079<br>(272) 0.08<br>(273) 0.064<br>(274) 0.05<br>(275) 0.039<br>(276) 0.039<br>(276) 0.029<br>(278) 0.029<br>(279) 0.029<br>(280) 0.021<br>(281) 0.021<br>(283) 0.017<br>(284) 0.014<br>(285) 0.014  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (307) 1E-3<br>(308) 1E-3<br>(309) 1E-3<br>(309) 1E-3<br>(310) 1E-3<br>(312) 2E-3<br>(313) 1E-3<br>(314) 1E-3<br>(315) 1E-3<br>(316) 1E-3<br>(316) 1E-3<br>(317) 1E-3<br>(319) 1E-3<br>(319) 1E-3<br>(321) 1E-3<br>(322) 1E-3   |  | (345) 0<br>(344) 0<br>(347) 0<br>(348) 0<br>(349) 0<br>(350) 0<br>(351) 0<br>(352) 0<br>(352) 0<br>(353) 0<br>(354) 0<br>(355) 0<br>(355) 0<br>(356) 0<br>(357) 0<br>(358) 0   |
| 2E-3         22) 2E-3         22) 2E-3         24) 5E-3         75) 0.029         76) 0.019         76) 0.05         77) 0.05         79) 5E-3         79) 5E-3         701 2E-3         701 2E-3         702) 2E-3         703) 2E-3         704) 2E-3         705) 2E-3         705) 2E-3         706) 2E-3         707) 0.12         708         709         709         700 2E-3         701 2E-3         702 2E-3         703 2E-3         704 2E-3 |   | (127) 2E-3<br>(128) 2E-3<br>(129) 2E-3<br>(120) 2E-3<br>(131) 2E-3<br>(132) 2E-3<br>(132) 2E-3<br>(132) 2E-3<br>(135) 0.478<br>(135) 0.163<br>(137) 0.079<br>(138) 0.064<br>(137) 0.029<br>(140) 0.029<br>(141) 0.029                | (145) 0.163<br>(146) 0.097<br>(147) 0.219<br>(148) 0.235<br>(149) 0.5a1<br>(150) 0.285<br>(151) 0.139<br>(152) 0.097<br>(153) 0.079<br>(153) 0.05<br>(154) 0.05<br>(154) 0.05<br>(157) 0.039<br>(158) 0.341<br>(159) 0.322<br>(160) 0.322                 | (143) 0.117<br>(144) 0.079<br>(145) 0.079<br>(145) 0.139<br>(157) 0.139<br>(157) 0.039<br>(157) 0.064<br>(170) 0.065<br>(171) 0.039<br>(172) 0.039<br>(172) 0.039<br>(173) 0.029<br>(174) 0.029<br>(176) 0.029<br>(177) 0.029<br>(178) 0.021                | (271) 0.079<br>(272) 0.08<br>(272) 0.08<br>(273) 0.054<br>(274) 0.05<br>(275) 0.039<br>(276) 0.039<br>(278) 0.029<br>(278) 0.029<br>(280) 0.021<br>(281) 0.021<br>(282) 0.021<br>(283) 0.017<br>(284) 0.014<br>(285) 0.014<br>(285) 0.014<br>(285) 95~3   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | (307) 1E-3<br>(308) 1E-3<br>(309) 1E-3<br>(309) 1E-3<br>(310) 1E-3<br>(311) 1E-3<br>(312) 3E-3<br>(313) 1E-3<br>(314) 1E-3<br>(316) 1E-3<br>(316) 1E-3<br>(319) 1E-3<br>(319) 1E-3<br>(320) 1E-3<br>(322) 1E-3<br>(323) 1E-3   |  | $\begin{array}{cccc} (345) & 0 \\ (344) & 0 \\ (344) & 0 \\ (349) & 0 \\ (349) & 0 \\ (350) & 0 \\ (351) & 0 \\ (352) & 0 \\ (352) & 0 \\ (353) & 0 \\ (354) & 0 \\ (355) & 0 \\ (356) & 0 \\ (358) & 0 \\ (358) & 0 \\ (359) & 0 \end{array}$           |
|  |   | (127) 2E-3 (128) 2E-3 (129) 2E-3 (120) 2E-3 (131) 2E-3 (132) 2E-3 (132) 2E-3 (133) 0.498 (134) 0.021 (135) 0.498 (136) 0.163 (137) 0.079 (138) 0.064 (137) 0.029 (141) 0.029   | (145) 0.163<br>(146) 0.097<br>(147) 0.219<br>(148) 0.235<br>(149) 0.361<br>(150) 0.285<br>(151) 0.139<br>(152) 0.097<br>(153) 0.079<br>(153) 0.064<br>(155) 0.05<br>(156) 0.05<br>(157) 0.039<br>(158) 0.341<br>(159) 0.322<br>(160) 0.322<br>(161) 0.322 | (143) 0.117<br>(144) 0.079<br>(165) 0.079<br>(165) 0.139<br>(157) 0.139<br>(159) 0.064<br>(171) 0.039<br>(172) 0.039<br>(172) 0.039<br>(173) 0.039<br>(173) 0.029<br>(174) 0.029<br>(175) 0.029<br>(177) 0.029<br>(177) 0.021<br>(178) 0.021<br>(180) 0.021 | (271) 0.079<br>(272) 0.08<br>(273) 0.064<br>(274) 0.05<br>(275) 0.059<br>(276) 0.029<br>(277) 0.029<br>(278) 0.029<br>(278) 0.024<br>(280) 0.021<br>(281) 0.021<br>(283) 0.017<br>(284) 0.014<br>(285) 0.014<br>(285) 0.014<br>(286) 9E-3<br>(286) 9E-3   | (289) 5E-3<br>(290) 5E-3<br>(291) 5E-3<br>(292) 5E-3<br>(294) 5E-3<br>(294) 5E-3<br>(294) 5E-3<br>(294) 5E-3<br>(297) 5E-3<br>(297) 5E-3<br>(297) 5E-3<br>(297) 1E-3<br>(300) 1E-3<br>(301) 1E-3<br>(303) 1E-3<br>(304) 1E-3<br>(306) 1E-3 | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  |  | $\begin{array}{c} (345) & 0 \\ (344) & 0 \\ (344) & 0 \\ (349) & 0 \\ (359) & 0 \\ (351) & 0 \\ (352) & 0 \\ (352) & 0 \\ (353) & 0 \\ (354) & 0 \\ (354) & 0 \\ (354) & 0 \\ (356) & 0 \\ (357) & 0 \\ (359) & 0 \\ (359) & 0 \\ (360) & 0 \end{array}$ |

Period : 6

| Va       | riable | I DRIEI     | .varl        | (length        | = 360)         |      |       |      |                | 1             |       | •     |       |      |       |       |        |       |       |       |
|----------|--------|-------------|--------------|----------------|----------------|------|-------|------|----------------|---------------|-------|-------|-------|------|-------|-------|--------|-------|-------|-------|
|          |        |             |              |                |                | 2.21 | ( 55) | 2,94 | ( 73)          | 1.26          | (181) | 0.242 | (199) | 1,46 | (217) | 1.66  | (235)  | Đ.9   | (222) | 2.94  |
| (        |        | 1.95        | (19)         | 0.512          | (37)<br>(38)   | 2.37 | ( 56) | 3.7  | (74)           | 1.1           | (182) | 0.35  | (200) | 1.52 | (218) | 1.73  | (226)  | 0.75  | (254) | 3     |
| (        |        | 1.97        | (20)         | 0.6            |                | 2.1  | ( 57) | 2.02 | (75)           | 0.96          | (183) | 0.427 | (201) | 1.59 | (_17) | 4.04  | (227)  | Ú.u   | (255) | 2.94  |
| <u>(</u> | -      | 1.73        | (21)         | 0.427<br>0.469 | ( 39)<br>( 40) | 2.20 | (58)  | 2.6  | (76)           | 0.96          | (184) | 0.512 | (202) | 1.55 | (220) | o.4   | (239)  | 0.36  | (25-1 | 2.94  |
| (        |        | 2.02        | (22)         |                | (40)           | 2.74 | (57)  | 1.46 | (77)           | 1.02          | (185) | 0.56  | (207) | 1.56 | (221) | ÷.4   | (209)  | 0.512 | 125/1 | 2.21  |
|          |        | 1.73        | (25)         | 0.348          | • • • •        | 2.55 | ( 60) | 1.8  | ( 78)          | 1.02          | (186) | 0.65  | (204) | 1.72 | (222) | 5.9   | (240)  | 47    | (253) | 2.06  |
| (        |        | 1.66        | (24)         | 0.427          | (42)           | 2.37 | ( 61) | 1.2  | (79)           | 0.76          | (187) | 0.75  | (205) | 1.3  | (223) | 4.38  | (241)  | 0.427 | (259) | 1.8   |
| (        |        | 2.55        | (25)         | 0.311          | (43)           | 2.74 | (62)  | 1.33 | (80)           | 0.96          | (188) | 0.8   | (206) | 2.03 | (224) | 3.42  | (242)  | 9,427 | (260) | 1,73  |
| (        |        | 2.1         | (26)         | 0.36           | (44)<br>(45)   | 1.87 | (63)  | 1.2  | (91)           | 0.85          | (189) | 0.85  | (207) | 2.02 | (225) | 2.24  | (242)  | 0.6   | (261  | 1,59  |
| (        |        | 2.55        | (27)         | 0.209          | (45)           | 2.06 | ( 64) | 1.2  | (82)           | 0.85          | (190) | 0.93  | (208) | 2.02 | (226) | 2.28  | (244)  | 0.87  | (262) | 1.55  |
| ,        |        | 2.55        | (28)         | 0.273<br>0.96  | (47)           | 1.46 | ( 65) | 1.14 | (83)           | 0.75          | (191) | 0.96  | (207) | 1.59 | (227) | 2,02  | (245)  | 1.2   | (161) | 1.52  |
| •        |        | 1.95        | (29)         | 0.78           | (47)<br>(4B)   | 1.66 | (66)  | 1.2  | (84)           | 0.85          | (192) | 1.02  | (210) | 1.57 | (228) | 1.83  | (245)  | 1.25  | (264) | 1.49  |
|          |        | 2.21        | (30)         | 1.39           | (49)           | 1.33 | (67)  | 1.14 | ( 85)          | 0.91          | (193) | 0.91  | (211) | 1.46 | (229) | 1.52  | (247)  | 1.73  | (265) | 1.03  |
|          |        | 1.46        | (31)<br>(32) | 1.33           | ( 50)          | 1.39 | ( 68) | 1.38 | ( 86)          | 0.88          | (194) | 1     | (212) | 1.46 | (230) | 1.46  | (248)  | 1.46  | (265) | 1.33  |
|          | •      | 1.73        |              | 1.59           | (51)           | 4.74 | ( 69) | 1.66 | ( 87)          | 0.75          | (195) | 1.2   | (213) | 1.33 | (221) | 1.33  | (249)  | 1.59  | (267) | 1.26  |
| -        |        | 0.96        | (33)         | 1.47           | (52)           | 1.33 | (70)  | 1.75 | (88)           | 0.85          | (196) | 1.36  | (214) | 1.35 | (202) | 1.2   | (250)  | 1.58  | (263) | 1.25  |
|          |        | 1.33        | (34)         | 2.21           | ( 53)          | 4.04 | (71)  | 1.59 | (89)           | 0,56          | (197) | 1.39  | (215) | 1.39 | (222) | 1.02  | (251)  | 1.95  | (25%) | 1.2   |
| -        |        | 0.7<br>0.85 | (35)         | 1.8            | (54)           | 4.5  | (72)  | 1.5  | (90)           | 0.56          | (198) | 1.46  | (215) | 1.47 | (234) | 1.02  | (252)  | 2.22  | (279) | 1.25  |
|          |        |             |              |                |                |      |       |      |                | ļ             |       | -     | ,<br> |      |       |       |        |       |       |       |
|          |        |             |              |                |                | 1.46 | (145) | 1.8  | (163)          | 1.08          | (271) | 1.2   | (209) | 1.08 | (207) | 1.26  | (325)  | 2.74  | (14.1 |       |
|          |        | 0.469       | (109)        | 1,93           | (127)<br>(128) | 1.42 | (146) | 1.64 | (164)          | 0.99          | (272) | 1.23  | (290) | 1.17 | (363) | 1. 19 | (226)  | 2.37  | 6344  |       |
|          |        | 0.49        | (110)        | 1.0            | •              | 1.26 | (147) | 1.87 | (155)          | 0.35          | (273) | 1.39  | (291) | 1.14 | (307) | 1.2   | (327)  | 2.55  | (245) |       |
|          |        | 0.469       | (111)        | 1.54           | (129)<br>(130) | 1,26 | (148) | 1.95 | (166)          | 0.77          | (274) | 1.45  | (292) | 1.2  | (310) | 1.2   | (328)  | 2.74  | (346  |       |
| -        |        | 0.52        | (112)        | 1.45           | (131)          | 1,2  | (149) | 1.97 | (157)          | 0.512         | (275) | 1.46  | (293) | 1.14 | (311) | 1.14  | (327)  | 5.10  | (24); |       |
| •        | -      | 0.469       | (113)        | 1,14           | (131)          | 1.49 | (150) | 1.95 | (168)          | 0.44          | (276) | 1.45  | (294) | 1.1  | (312) | 1.2   | (0.30) | 10.4  | ( 18  |       |
|          |        | 0.47        | (114)        | 1.02           | (133)          | 1.73 | (151) | 1.95 | (169)          | 0.311         | (277) | 1,66  | (295) | 1,08 | (317) | 1.52  | (201)  | 16    | (345) |       |
| -        |        | 0.512       | (115)        | 0.8            |                | 1.74 | (152) | 2.1  | (170)          | 0.311         | (278) | 1.8   | (296) | 1.2  | (314) | 1.14  | (332)  | 3.3   | (350) |       |
| -        | • •    | 0.51        | (116)        | 0.77           | (134)          |      | (153) | 2.21 | (171)          | 0.209         | (279) | 1.39  | (297) | 1,73 | (315) | 5.13  | (333)  | 16.2  | (351) |       |
|          | •      | 0.56        | (117)        | 0.65           | (135)          | 1.73 | (154) | 2.37 | (172)          | 0.311         | (280) | 1.2   | (298) | 1,85 | (316) | 5.13  | (334)  | 22.7  | (352) | 323   |
|          | •      | 0.56        | (118)        | 0.67           | (136)          | 1.87 | •     | 2,37 | (173)          | 0.242         | (201) | 0.85  | (299) | 1.8  | (317) | 4,38  | (335)  | 8.5   | (350) | 166   |
|          |        | 0.35        | (119)        | Ú.7            | (137)          | 2.02 | (155) | 2.37 | (174)          | 0.275         | (282) | 0.82  | (300) | 1.74 | (318) | 4.5   | (336)  | 11.7  | (354) | 192   |
|          |        | 0.53        | (120)        | 0.82           | (138)          | 2.15 | (156) |      | (175)          | 0.275         | (283) | 0.65  | (301) | 1.66 | (319) | 3.15  | (337)  | 6.9   | (355) | 83.9  |
| -        |        | 0.469       | (121)        | 1.08           | (139)          | 2.1  | (157) | 2.02 | •              | 0.179         | (284) | 0.5   | (302) | 1.59 | (320) | 3.7   | (338)  | 7.4 . | (356) | 120.6 |
|          |        | 0.56        | (122)        | 1.2            | (140)          | 2.21 | (158) | 1.8  | (176)          | 0.151         | (285) | 0.6   | (303) | 1.52 | (321) | 2.74  | (339)  | 6.4   | (357) | 46.6  |
|          |        | 1.39        | (123)        | 1.33           | (141)          | 2.1  | (157) | 1,45 | (177)          |               | (285) | 0.6   | (304) | 1.46 | (322) | 2.94  | (340)  | 6.4   | (758) | 60    |
| ()       |        | 2.37        | (124)        | 1.42           | (142)          | 2.1  | (160) | 1.46 | (178)          | 0.22          | (288) | 0.65  | (305) | 1.37 | (323) | 2.55  | (241)  | 6.4   | (359) |       |
| ()       | (07)   | 2.55        | (125)        | 1.52           | (143)          | 1.95 | (161) | 1,33 | (179)<br>(180) | 0.209<br>0.24 | (288) | 0.85  | (305) | 1.39 | (324) | 2.55  | (342)  | 0.25  |       |       |
|          | (08)   | 2.2         | (126)        | 1.35           | {244}          | 1.95 | (162) | 1.23 |                |               |       |       |       |      |       |       |        |       |       |       |

Phosphorus transport Berg River

TR 143 March 1989

| 91)   | 27.1 | (109) | 180   | (127)  | 25.2 | (145) | 1     | (143) | 24    |
|-------|------|-------|-------|--------|------|-------|-------|-------|-------|
| 92)   | 25.8 | (110) |       | (128)  | 24   | (146) | 13.5  | (164) | 2     |
| 93)   | 25.8 |       | 104   | (124)  | 24   | (147) | 21.5  | (165) | 22.7  |
| 94)   | 25.2 | (112) | 55.15 | (100)  | 23.3 | (143) | 25.2  | (165) | 22.1  |
| 95)   | 20.2 | (113) | 4 🤉   | (131)  | 22.7 | (149) | 24.5  | (167) | 22.4  |
| 96)   | 22.1 | (114) | 36.2  | (1.32) | 22.1 | (150) | 112   | (158) | 24    |
| 97)   | 20.4 | (115) | 4 6   | (103)  | 22.1 | (151) | 105.3 | (169) | 22.7  |
| 99)   | 19.2 | (115) | 35.9  | (134)  | 21.5 | (152) | 120   | (170) | 22.1. |
| 99)   | 18.2 | (117) | 33.9  | (135)  | 20.4 | (153) | 147   | (171) | 22.1  |
| 100)  | 15.2 | (110) | 44    | (136)  | 20.4 | (154) | 97    | (172) | 21.5  |
| (101) | 15.2 | (119) | 50.6  | (137)  | 19.2 | (155) | 62.5  | (173) | 20.4  |
| (102) | 14.3 | (120) | 44    | (138)  | 19.2 | (156) | 47.4  | (174) | 19.2  |
| (103) | 14.3 | (121) | 36.7  | (139)  | 18.2 | (157) | 38.2  | (175) | 18.2  |
| (104) | 14.3 | (122) | 32.5  | (140)  | 17.1 | (158) | 32.5  | (176) | 17.1  |
| (105) | 23.3 | (123) | 30.4  | (141)  | 17.1 | (159) | 29.1  | (177) | 17.1  |
| (106) | 31.8 | (124) | 29.1  | (142)  | 16.2 | (160) | 27.8  | (178) | 16.2  |
|       | 147  | (125) | 27.8  | (143)  | 16.2 | (161) | 25.8  | (179) | 16.2  |
| (108) |      | (126) | 27.1  | (144)  | 15.2 | (162) | 29.2  | (180) | 15.2  |

.

÷

| 14.3 | (289)   | 25.2   | (207)  | 11.1   | (325)  | 7.4  | (343)  | 3.72   |
|------|---|--|--|--|--|--|--|--|
| 52.2 | (290)   | 24.6   | (308)  | 10.4   | (325)  | 7.4  |  | 3.4  |
| 59   | (291)   | 23.2   | (309)  | 9.8  | (327)  | 7.4  | (345)  | 3.15   |
| 1.08 | (292)   | 22.7   | (-1)   | 4.1  | (328)  | 5.9  |  | 2.74   |
|      | (29.)   | 23.3   | (311)  | 4.1  | (329)  | 0.9  |  | 2.44 👡   |
|      | (294)   | 22.1   | (.1.)  | 8.5  | (330)  | 6.4  | (348)  | _ 2•74 <b>ਨੇ</b>                                     |
| +    | •   | 20.4   | (317)  | 8.5  | (331)  | 6.4  | (347)  | 2.24 🚛   |
|      | . – .   | 17.1   | (714)  | ម  | (332)  | 6.4  | (350)  | - 2.55 <b>დ</b>                                      |
|      |   | 16.2   | (315)  | 8  | (333)  | 6.4  | (351)  | 2.55 🏞   |
|      | • - •   |  | (316)  | 7.4  | (334)  | 6.4  | (352)  | 2.55   |
|      | 1   |  | (317)  | 8  | (335)  | 5.4  | (392)  | 2.55   |
|      |   |  | (218)  | 7.4  | (336)  | 5.54   | (354)  | 2.55   |
|      | • - ·   |  | (319)  | 7.4  | (337)  | 5.54   | (355)  | 2.37   |
|      | • •   |  | (320)  | 7.3  | (338)  | 5.54   | (356)  | 2.1  |
|      | 1 /   |  |  | 8  | (339)  | 5.13   | (357)  | 1.95   |
|      | • = - •   |  | •  | 8  | (340)  | 4.74   | (358)  | 1.3  |
|      |   |  | • • • • • •  | 8  | (341)  | 4.38   | (359)  | 1.73   |
| 25.8 | (306)   | 11.1   | (324)  | 8  | (342)  | 4.04   | (360)  | 1.65   |
|      | 52.2<br>59<br>108<br>235<br>181<br>155<br>147<br>112.9<br>77.1<br>57.3<br>49<br>42.7<br>41.2<br>337.8<br>26.5 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 52.2 $(290)$ $24.6$ $(308)$ $10.4$ $59$ $(291)$ $25.3$ $(409)$ $9.8$ $106$ $(292)$ $22.7$ $(310)$ $9.1$ $335$ $(293)$ $23.5$ $(511)$ $9.1$ $181$ $(294)$ $22.1$ $(313)$ $8.5$ $155$ $(295)$ $20.4$ $(313)$ $8.5$ $147$ $(294)$ $17.1$ $(314)$ $8$ $112.9$ $(297)$ $14.2$ $(215)$ $8$ $77.1$ $(299)$ $14.3$ $(316)$ $7.4$ $47$ $(300)$ $12.7$ $(518)$ $7.4$ $42.7$ $(301)$ $12.7$ $(319)$ $7.4$ $41.2$ $(302)$ $11.9$ $(320)$ $7.3$ $33.2$ $(304)$ $11.1$ $(322)$ $8$ $26.5$ $(305)$ $11.4$ $(323)$ $8$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ |

### River discharge data at 12-hourly intervals for Station: 23D Period : 2

Phosphorus transport Berg River

| ariab   |   | E3.var1   | (Teng)  |   |  |   |  |  |   | (181)   |   | (199)   |   | (217)   |   | (235)   | 24.5   | (253)  | 7.4   |
|---|---|---|---|---|--|---|--|--|---|---|---|---|---|---|---|---|--|--|---|
| 1)  |   | ( 19)   |   | ( 37) 1   | 0,4  | ( 55)   | 1.44   | 1 1 1 1 1  | 0.0   | (192)   |   | (200)   |   | (218)   | 9.8   | (236)   | 22.1   | (254)  |   |
|   | 1.52  | ( 20)   |   | (38)1   |  | ( 56)   |  | (74)   |   | (185)   |   | (201)   |   | (219)   |   | (237)   | 24.6   | (255)  | 5.4   |
| - ŝí  |   | (21)  |   | (37)  | 8.5  | ( 57)   |  | (75)   | 6,4   |   |   | (202)   |   | (220)   |   | (238)   | 26.5   | (256)  | 6.4   |
|   | 1.33  |   | 1.52  | (40)  | 6.9  | ( 5日)   |  | (76)   |   | (184)   | 1.00  | (203)   |   | (221)   |   | (209)   | 28.4   | (257)  | 5.4   |
| 5)  |   | (23)  |   | (41)  |  | ( 57)   |  |  | <b>5</b> .  | (185)   |   | (204)   |   | (222)   |   | (240)   |  | (258)  | 5.77  |
|   | 1.26  |   | 1.08  | (42)  |  | ( 60)   | 2.74   | (78)   |   | (196)   |   |   |   | (223)   |   | (241)   |  | (229)  |   |
|   |   | (25)  |   | (43)  |  | ( 61)   | 6.9  | (79)   |   | (137)   | 0.8   | (205)   |   | (224)   |   | (242)   |  | (260)  |   |
| 7)  |   |   | 0.85  | (44)  |  | ( 52)   |  | (80)   | 5.13  | (188)   | 0.7   | (204)   |   |   |   | (243)   |  | (261)  |   |
|   | 1.33  | • - • •   |   | (45)  |  | ( 50)   |  | (81)   | 4.7   | (199)   |   | (1:07)  |   | (225)   |   | (244)   |  | (262)  |   |
| . 9)  |   | • - /   | 0.85  | (46)  |  | ( 64)   |  | (82)   | 4.38  | (190)   | 0.54  | (208)   | 1.2   | (226)   |   | • •   |  | (263)  |   |
| 10)   |   |   | 1.02  | . (47)  |  | ( 65)   |  | (83)   | 4.04  | (171)   | 0.56  | (209)   | 17.1  | (227)   |   | (245)   |  | (264)  |   |
| 11}   |   | (29)  |   | (47)  |  | (60)  |  | (84)   | 3.42  | (192)   | 0.512   | (570)   | 14.2  | (228)   |   | (245)   |  | (245)  |   |
|   | 1.02  | ( 30)   |   |   |  | (67)  |  | (85)   | 3.2   | (193)   | Q.47  | (211)   | 23.3  | (229)   |   | (247)   |  |  |   |
|   | 1.08  | ( 31)   |   | (49)  |  |   |  | (85)   | 2.94  | (194)   | 0.512   | (212)   | 32.5  | (230)   |   | (248)   |  | (255)  |   |
| 14)   | 1.08  | (32)  |   | ( 50)   |  | (68)  |  | (87)   |   | (195)   | 0.512   | (213)   | 35.3  |   | 3.15  | (249)   |  | (267)  |   |
| 15)   | 1.14  | ( 33)   |   | (51)  |  | ( 59)   |  | (87)   | 7<br>7 74   | (197)<br>(197)<br>(192)<br>(197)<br>(194)<br>(195)<br>(195)<br>(197)<br>(198)   | 0.6   | (214)   | 31.1  | (232)   | 3.42  | (250)   |  | (248)  |   |
| 16)   | 1.39  | (34)  | 4.74  | ( 52)   |  | ( 70)   |  |  | 2 - 7   | (197)   | 0.625   | (215)   | 24.6  | (233)   | 4.04  | (251)   |  | (269)  |   |
|   | 1.52  | (35)  | 5.13  | ( 53)   |  | (71)  |  | ( 89)  | 2.00  | (198)   | 0.55  | (216)   | 17.1  | (234)   | 5.13  | (2\$2)  | 8  | (270)  | 3.42  |
|   | 1 50  | (36)  | R   | ( 54)   | 1.33   | ( 72)   | 9.8  | ( 90)  | 2.21  | (1/0/   |   |   |   |   |   |   |  |  |   |
|   |   |   |   |   |  |   |  |  |   |   | <b>-</b> ·  |   |   |   |   |   |  |  |   |
|   |   |   |   |   |  |   |  |  |   |   |   |   |   |   |   |   |  | ( (4'))  |   |
| _ <b>_</b>  |   |   |   |   |  |   |  |  |   |   |   | (289)   | 6.4   | (307)   | 3,72  | (225)   | 8.5  | ( 4.)  | 4.74  |
|   | 1.37  | (109)   | 1+87  | (127)   | 6.9  | (145)   |  |  |   |   |   | (289)<br>(290)  | 6.4<br>9.97   | (307)<br>(308)  | 3,72  | (325)<br>(326)  | 8.5<br>9.1   | (343)<br>(344)   | 4./4  |
| 91)<br>92)  | 1.37<br>1.59  | (10 <b>9</b> )<br>(110)   | 1.87<br>1.46  | (127)<br>(128)  | 6.9<br>5.97  | (145)<br>(145)  |  |  |   |   |   | (289)<br>(290)<br>(291)   | 6.4<br>9.97<br>5.54   | (307)<br>(308)<br>(308)   | 3,72<br>14,04<br>4,04   | (325)<br>(326)<br>(327)   | 8.5<br>9.1<br>9.1  | (343)<br>(344)<br>(345)  | 4.74<br>4.74<br>4.74  |
| 91)<br>92)<br>93)   | 1.37<br>1.59<br>1.33  | (109)<br>(110)<br>(111)   | 1.87<br>1.46<br>1.26  | (127)<br>(128)<br>(129)   | 6.9<br>5.97<br>5.13  | (145)<br>(145)<br>(147)   |  |  |   |   |   | (289)<br>(290)<br>(291)<br>(292)  | 6.4<br>5.07<br>5.54<br>5.54   | (307)<br>(308)<br>(309)<br>(309)<br>(310)   | 3,72<br>14,04<br>4,04<br>4,74   | (325)<br>(326)<br>(327)<br>(328)  | 8.5<br>9.1<br>9.1<br>8.5   | (342)<br>(344)<br>(345)<br>(345)   | 4.74<br>4.74<br>4.74<br>5.13  |
| 91)<br>92)<br>93)<br>94)  | 1.37<br>1.59<br>1.33<br>1.14  | (109)<br>(110)<br>(111)<br>(112)  | 1.87<br>1.46<br>1.26<br>1.14  | (127)<br>(128)<br>(129)<br>(130)  | 6.9<br>5.97<br>5.13<br>4.74  | (145)<br>(145)<br>(147)<br>(147)<br>(148)   |  |  |   |   |   | (289)<br>(290)<br>(291)<br>(292)<br>(293)   | 6.4<br>5.97<br>5.54<br>5.54<br>5.26   | (307)<br>(308)<br>(309)<br>(310)<br>(311)   | 3.72<br>14.04<br>4.04<br>4.74<br>6.4  | (325)<br>(326)<br>(327)<br>(328)<br>(328)   | 8.5<br>9.1<br>9.1<br>8.5<br>8  | (343)<br>(344)<br>(345)<br>(345)<br>(345)<br>(347)   | 4.74<br>4.74<br>4.74<br>5.13<br>5.13  |
| 91)<br>92)<br>93)<br>94)<br>95)   | 1.37<br>1.59<br>1.33<br>1.14<br>0.96  | (109)<br>(110)<br>(111)<br>(112)<br>(113)   | 1.87<br>1.46<br>1.26<br>1.14<br>1.25  | (127)<br>(128)<br>(129)<br>(129)<br>(130)<br>(131)  | 6.9<br>5.97<br>5.13<br>4.74<br>3.7   | (145)<br>(145)<br>(147)<br>(147)<br>(147)<br>(147)  |  |  |   |   |   | (289)<br>(290)<br>(291)<br>(292)<br>(292)<br>(293)<br>(294)                                     | 6.4<br>5.97<br>5.54<br>5.54<br>5.26<br>5.13   | (307)<br>(308)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)   | 3,72<br>4,04<br>4,04<br>4,74<br>6,4<br>8,5  | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)  | 8,5<br>9,1<br>9,1<br>8,5<br>8<br>7,4   | (343)<br>(344)<br>(345)<br>(345)<br>(345)<br>(347)<br>(343)  | 4.74<br>4.74<br>4.74<br>5.13<br>5.13<br>5.13  |
| 91)<br>92)<br>93)<br>94)<br>95)<br>96)  | 1.37<br>1.59<br>1.33<br>1.14<br>0.96<br>0.95  | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)  | 1.87<br>1.46<br>1.26<br>1.14<br>1.20<br>2.55  | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)  | 6.9<br>5.97<br>5.13<br>4.74<br>3.7<br>3.15   | (145)<br>(145)<br>(147)<br>(147)<br>(147)<br>(147)<br>(149)<br>(150)  |  |  |   |   |   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)                                     | 6.4<br>5.97<br>5.54<br>5.54<br>5.26<br>5.13   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)   | 3.72<br>4.04<br>4.04<br>4.74<br>6.4<br>8.5<br>10.4  | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(330)<br>(331)  | 8.5<br>9.1<br>9.5<br>8<br>7.4<br>7.4   | (343)<br>(344)<br>(345)<br>(345)<br>(345)<br>(347)<br>(343)<br>(343)   | 4.74<br>4.74<br>5.13<br>5.13<br>5.13<br>4.74  |
| 91)<br>92)<br>93)<br>94)<br>95)<br>96)<br>97)   | 1.37<br>1.59<br>1.33<br>1.14<br>0.95<br>0.95<br>0.91  | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)   | 1.87<br>1.46<br>1.26<br>1.14<br>1.20<br>2.55<br>2.55  | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)   | 6.9<br>5.97<br>5.13<br>4.74<br>3.7<br>3.15<br>2.55   | (145)<br>(145)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)   |  |  |   |   |   | (289)<br>(290)<br>(291)<br>(291)<br>(292)<br>(295)<br>(295)<br>(295)                            | 6.4<br>5.97<br>5.54<br>5.54<br>5.26<br>5.13<br>4.74   | (307)<br>(308)<br>(309)<br>(310)<br>(312)<br>(312)<br>(313)<br>(314)  | 3,72<br>4,04<br>4,04<br>4,74<br>6,4<br>8,5<br>10,4<br>9,1   | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(330)<br>(331)<br>(332)   | 8.5<br>9.1<br>9.1<br>8.5<br>8<br>7.4<br>7.4<br>6.9   | (342)<br>(344)<br>(345)<br>(345)<br>(344)<br>(343)<br>(349)<br>(350)   | 4.74<br>4.74<br>5.13<br>5.13<br>5.13<br>4.74<br>4.74  |
| 91)<br>92)<br>93)<br>94)<br>95)<br>95)<br>96)<br>97)<br>98)   | 1.37<br>1.59<br>1.33<br>1.14<br>0.96<br>0.91<br>1.2   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)  | 1.87<br>1.46<br>1.26<br>1.14<br>1.20<br>2.55<br>2.55<br>4.04  | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)   | 6.9<br>5.97<br>5.13<br>4.74<br>3.7<br>3.15<br>2.55<br>2.21   | (145)<br>(145)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(151)  |  |  |   |   |   | (289)<br>(290)<br>(291)<br>(292)<br>(292)<br>(292)<br>(294)<br>(295)<br>(297)                   | 6.4<br>5.97<br>5.54<br>5.26<br>5.13<br>4.74<br>4.74   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)   | 3,72<br>4,04<br>4,04<br>4,74<br>6,4<br>8,5<br>10,4<br>9,1   | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(337)<br>(331)<br>(333)   | 8.5<br>9.1<br>9.1<br>8.5<br>8<br>7.4<br>7.4<br>6.9<br>6.4  | (342)<br>(344)<br>(345)<br>(346)<br>(346)<br>(348)<br>(348)<br>(349)<br>(350)<br>(351)   | 4.74<br>4.74<br>5.13<br>5.13<br>4.74<br>4.74<br>4.74  |
| 91)<br>92)<br>93)<br>94)<br>95)<br>95)<br>96)<br>97)<br>98)   | 1.37<br>1.59<br>1.33<br>1.14<br>0.95<br>0.95<br>0.91  | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)   | 1.87<br>1.46<br>1.26<br>1.14<br>1.26<br>2.55<br>2.55<br>4.04<br>4.4   | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)   | 6.9<br>5.97<br>5.13<br>4.74<br>3.7<br>3.15<br>2.55<br>2.21<br>1.87                                 | (145)<br>(145)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(152)<br>(153)   | 1.2<br>1.33<br>1.23<br>1.2<br>1.2<br>1.06<br>0.96<br>0.85<br>0.8   | (163)<br>(164)<br>(155)<br>(166)<br>(167)<br>(168)<br>(169)<br>(169)<br>(170)<br>(171)   | 1.2<br>1.2<br>1.14<br>1.05<br>1.02<br>6.4<br>5<br>13.5<br>10.1  | (271)<br>(272)<br>(273)<br>(274)<br>(274)<br>(275)<br>(276)<br>(277)<br>(277)<br>(278)<br>(279)   | 3.42<br>5.42<br>3.15<br>2.94<br>2.74<br>2.74<br>2.94<br>3.42<br>8.5   | (289)<br>(290)<br>(291)<br>(292)<br>(294)<br>(294)<br>(294)<br>(294)<br>(294)<br>(297)<br>(298) | 6.4<br>5.97<br>5.54<br>5.54<br>5.26<br>5.13<br>4.74<br>4.74<br>4.74   | (307)<br>(308)<br>(309)<br>(310)<br>(312)<br>(312)<br>(313)<br>(314)  | 3,72<br>4,04<br>4,04<br>4,74<br>6,4<br>8,5<br>10,4<br>9,1<br>24   | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(334)   | 8.5<br>9.1<br>9.1<br>8.5<br>8<br>7.4<br>7.4<br>6.9<br>6.4<br>6.4   | (342)<br>(344)<br>(345)<br>(345)<br>(346)<br>(347)<br>(349)<br>(349)<br>(350)<br>(351)<br>(352)  | 4.74<br>4.74<br>5.13<br>5.13<br>4.74<br>4.74<br>4.74<br>4.74  |
| 91)<br>92)<br>93)<br>94)<br>95)<br>95)<br>95)<br>97)<br>98)<br>99)  | 1.37<br>1.59<br>1.33<br>1.14<br>0.96<br>0.91<br>1.2   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(116)<br>(117)<br>(118)                                     | 1.87<br>1.46<br>1.26<br>1.14<br>1.20<br>2.55<br>2.55<br>4.04<br>4.4<br>4.04   | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(133)<br>(135)<br>(136)  | 6.9<br>5.97<br>5.13<br>4.74<br>3.7<br>3.15<br>2.55<br>2.21<br>1.89                                 | (145)<br>(145)<br>(147)<br>(147)<br>(147)<br>(150)<br>(151)<br>(152)<br>(153)<br>(154)  | 1.2<br>1.30<br>1.2<br>1.2<br>1.2<br>1.2<br>0.96<br>0.96<br>0.85<br>0.8<br>0.75   | (163)<br>(164)<br>(155)<br>(167)<br>(168)<br>(168)<br>(169)<br>(169)<br>(170)<br>(172)   | 1,2<br>1,2<br>1,14<br>1,02<br>6,4<br>8<br>13,5<br>10,1<br>8,5   | (271)<br>(272)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(290)   | 3.42<br>5.42<br>3.15<br>2.74<br>2.74<br>2.74<br>3.42<br>8.5<br>9.1  | (289)<br>(290)<br>(291)<br>(292)<br>(292)<br>(294)<br>(295)<br>(295)<br>(295)<br>(299)<br>(299) | 6.4<br>5.97<br>5.54<br>5.54<br>5.26<br>5.13<br>4.74<br>4.74<br>4.74   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)   | 3,72<br>4,04<br>4,04<br>4,74<br>6,4<br>8,5<br>10,4<br>9,1<br>24<br>27,1   | (325)<br>(327)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(333)<br>(333)<br>(334)  | 8.5<br>9.1<br>9.1<br>8.5<br>8<br>7.4<br>6.9<br>6.4<br>6.4<br>5.97  | (342)<br>(344)<br>(344)<br>(345)<br>(344)<br>(343)<br>(343)<br>(343)<br>(343)<br>(343)<br>(343)<br>(351)<br>(351)<br>(352)<br>(353)                            | 4.74<br>4.74<br>5.13<br>5.13<br>5.13<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74                          |
| 91)<br>92)<br>93)<br>94)<br>95)<br>95)<br>96)<br>97)<br>98)<br>99)<br>100)  | 1.37<br>1.59<br>1.33<br>1.14<br>0.96<br>0.95<br>0.91<br>1.2<br>1.37   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)   | 1.87<br>1.46<br>1.26<br>1.14<br>1.20<br>2.55<br>2.55<br>4.04<br>4.4<br>4.04   | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(137)   | 6.9<br>5.97<br>5.13<br>4.74<br>3.7<br>3.15<br>2.55<br>2.21<br>1.87<br>1.59<br>1.46                 | (145)<br>(145)<br>(147)<br>(146)<br>(150)<br>(151)<br>(151)<br>(152)<br>(153)<br>(155)  | 1.2<br>1.30<br>1.23<br>1.2<br>1.0<br>0.96<br>0.85<br>0.8<br>0.75<br>0.45   | (167)<br>(164)<br>(165)<br>(165)<br>(167)<br>(168)<br>(169)<br>(169)<br>(169)<br>(170)<br>(172)<br>(1773)                                    | 1.2<br>1.2<br>1.14<br>1.02<br>6.4<br>8<br>13.5<br>10.1<br>8.5<br>6.9  | (271)<br>(272)<br>(272)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(290)<br>(281)   | 3.42<br>5.42<br>3.42<br>2.74<br>2.74<br>2.74<br>3.42<br>8.5<br>9.1<br>6.4   | (299)   | 6.4<br>5.97<br>5.54<br>5.54<br>5.26<br>5.13<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74   | (307)<br>(508)<br>(709)<br>(710)<br>(711)<br>(712)<br>(712)<br>(713)<br>(713)<br>(714)<br>(715)<br>(714)  | 3,72<br>4,04<br>4,74<br>6,4<br>8,5<br>10,4<br>9,1<br>24<br>27,1<br>24   | (325)<br>(327)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(333)<br>(335)<br>(335)  | 8.5<br>9.1<br>9.5<br>8.5<br>7.4<br>7.4<br>6.9<br>6.4<br>5.97<br>5.97                                       | (342)<br>(344)<br>(345)<br>(345)<br>(346)<br>(346)<br>(346)<br>(350)<br>(351)<br>(353)<br>(354)  | 4.74<br>4.74<br>5.13<br>5.13<br>5.13<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74                          |
| 91)<br>92)<br>93)<br>94)<br>95)<br>97)<br>97)<br>97)<br>99)<br>100)   | 1.37<br>1.59<br>1.33<br>1.14<br>0.94<br>0.95<br>0.91<br>1.2<br>1.37<br>2.94   | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(116)<br>(117)<br>(118)                                     | 1.87<br>1.46<br>1.26<br>1.14<br>1.26<br>2.55<br>2.55<br>4.04<br>4.4<br>4.04   | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(137)<br>(138)  | 6.9<br>5.13<br>4.74<br>3.7<br>3.15<br>2.55<br>2.21<br>1.69<br>1.46<br>1.33                         | (145)<br>(145)<br>(147)<br>(148)<br>(150)<br>(151)<br>(152)<br>(153)<br>(155)<br>(155)  | 1.2<br>1.30<br>1.20<br>1.2<br>1.2<br>1.2<br>0.96<br>0.85<br>0.8<br>0.85<br>0.8<br>0.75<br>0.45<br>0.45                           | (163)<br>(164)<br>(155)<br>(166)<br>(167)<br>(168)<br>(170)<br>(170)<br>(171)<br>(173)<br>(174)  | 1.2<br>1.2<br>1.14<br>1.05<br>1.02<br>6.4<br>8<br>13.5<br>10.1<br>8.5<br>6.9<br>5.54                                | (271)<br>(272)<br>(272)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(277)<br>(290)<br>(291)<br>(291)  | 3.42<br>5.42<br>3.15<br>2.74<br>2.74<br>2.74<br>3.42<br>8.5<br>9.1<br>6.4<br>6.4  | (277)<br>(300)  | 6.4<br>9.97<br>5.54<br>5.54<br>5.26<br>5.13<br>4.74<br>4.74<br>4.74<br>4.74<br>4.38<br>4.04                                 | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(314)<br>(315)<br>(314)<br>(312)<br>(318)   | 3,72<br>4,04<br>4,74<br>6,4<br>8,5<br>10,4<br>9,1<br>24<br>27,1<br>24   | (325)<br>(327)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(333)<br>(335)<br>(335)  | 8.5<br>9.1<br>9.1<br>8.5<br>8<br>7.4<br>6.9<br>6.4<br>6.4<br>5.97  | (344)<br>(344)<br>(345)<br>(345)<br>(346)<br>(347)<br>(349)<br>(350)<br>(351)<br>(351)<br>(353)<br>(354)<br>(354)  | 4.74<br>4.74<br>5.135<br>5.135<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.7         |
| 91)<br>92)<br>93)<br>94)<br>95)<br>94)<br>94)<br>94)<br>99)<br>100)<br>101)<br>102)                                   | 1.37<br>1.57<br>1.25<br>1.14<br>0.96<br>0.91<br>1.2<br>1.37<br>2.94<br>2.94<br>3.15                                 | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(115)<br>(116)<br>(117)<br>(118)<br>(119)                            | 1.87<br>1.46<br>1.26<br>1.14<br>1.20<br>2.55<br>2.55<br>4.04<br>4.4<br>4.04<br>4.04                                 | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(137)<br>(139)  | 6.9<br>5.97<br>5.13<br>4.74<br>3.7<br>3.15<br>2.55<br>2.21<br>1.87<br>1.59<br>1.46<br>1.33<br>1.26 | (145)<br>(145)<br>(147)<br>(148)<br>(150)<br>(151)<br>(151)<br>(152)<br>(153)<br>(154)<br>(155)<br>(155)  | 1.2<br>1.30<br>1.20<br>1.2<br>1.2<br>1.08<br>0.96<br>0.85<br>0.8<br>0.75<br>0.45<br>0.45<br>0.45                                 | (163)<br>(164)<br>(155)<br>(166)<br>(167)<br>(169)<br>(170)<br>(170)<br>(172)<br>(173)<br>(174)<br>(175)                                     | 1.2<br>1.2<br>1.14<br>1.08<br>1.02<br>6.4<br>8<br>13.5<br>10.1<br>8.5<br>6.9<br>5.54<br>4.4                         | (271)<br>(272)<br>(272)<br>(274)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(290)<br>(291)<br>(291)<br>(293)                            | 3.42<br>5.415<br>3.415<br>3.74<br>2.74<br>2.74<br>2.74<br>3.42<br>8.5<br>9.1<br>6.4<br>6.5  | (277)<br>(300)<br>(301)   | 6.4<br>5.57<br>5.54<br>5.54<br>5.26<br>5.13<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.38<br>4.04<br>4.04                 | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)<br>(315)<br>(314)<br>(312)<br>(318)<br>(319)                                     | 3.72<br>4.04<br>4.74<br>5.4<br>8.5<br>10.4<br>9.1<br>27.1<br>24<br>27.1<br>24<br>20.4                                       | (325)<br>(327)<br>(327)<br>(327)<br>(329)<br>(329)<br>(321)<br>(332)<br>(333)<br>(333)<br>(333)<br>(335)<br>(335)<br>(335)<br>(335)                   | 8.5<br>9.1<br>9.5<br>8<br>7.4<br>7.4<br>6.9<br>6.4<br>5.97<br>5.97   | (344)<br>(344)<br>(345)<br>(345)<br>(343)<br>(343)<br>(343)<br>(354)<br>(355)<br>(355)<br>(355)<br>(355)   | 4.74<br>4.74<br>5.13<br>5.13<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74                  |
| 91)<br>92)<br>93)<br>95)<br>95)<br>95)<br>94)<br>97)<br>99)<br>1001)<br>101)<br>102)<br>103}                          | 1.87<br>1.59<br>1.14<br>0.96<br>0.95<br>0.95<br>1.2<br>1.87<br>2.94<br>2.94<br>3.15                                 | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(115)<br>(115)<br>(115)<br>(116)<br>(117)<br>(118)<br>(119)<br>(120) | 1.87<br>1.46<br>1.26<br>1.14<br>1.26<br>2.55<br>2.55<br>4.04<br>4.4<br>4.04<br>4.04<br>4.04<br>3.72                 | (127)<br>(120)<br>(120)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(137)<br>(139)<br>(139)<br>(140)                            | 6.9<br>5.97<br>5.13<br>4.74<br>3.7<br>3.15<br>2.55<br>2.87<br>1.59<br>1.46<br>1.326<br>1.26        | (148)<br>(148)<br>(147)<br>(148)<br>(150)<br>(151)<br>(152)<br>(153)<br>(154)<br>(155)<br>(156)<br>(158)  | 1.2<br>1.33<br>1.33<br>1.2<br>1.2<br>1.2<br>1.08<br>0.96<br>0.8<br>0.8<br>0.8<br>0.45<br>0.45<br>0.45                            | (162)<br>(164)<br>(155)<br>(167)<br>(168)<br>(169)<br>(170)<br>(172)<br>(172)<br>(173)<br>(174)<br>(175)                                     | 1.2<br>1.2<br>1.14<br>1.02<br>6.4<br>B<br>13.5<br>10.1<br>8.5<br>6.9<br>5.54<br>4.4<br>3.42                         | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(279)<br>(290)<br>(281)<br>(282)<br>(283)                                     | 3.42<br>5.42<br>5.14<br>2.74<br>2.74<br>2.74<br>3.5<br>9.1<br>6.4<br>8.5<br>9.8   | (277)<br>(300)<br>(301)<br>(302)  | 6.4<br>5.57<br>5.54<br>5.54<br>5.25<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.38<br>4.04<br>4.04                         | (307)<br>(308)<br>(309)<br>(210)<br>(311)<br>(312)<br>(313)<br>(314)<br>(314)<br>(314)<br>(314)<br>(317)<br>(318)<br>(319)<br>(329)                                     | 3.72<br>4.04<br>4.74<br>6.4<br>8.5<br>10.4<br>9.1<br>24<br>27.1<br>24<br>20.4<br>17.1<br>14.3                               | (326)<br>(326)<br>(327)<br>(329)<br>(329)<br>(321)<br>(332)<br>(332)<br>(333)<br>(333)<br>(334)<br>(335)<br>(337)<br>(339)                            | 8.5<br>9.1<br>9.3<br>8<br>7.4<br>5.9<br>4.4<br>5.97<br>5.97<br>5.54  | (344)<br>(344)<br>(345)<br>(345)<br>(343)<br>(343)<br>(343)<br>(354)<br>(355)<br>(355)<br>(355)<br>(355)   | 4.74<br>4.74<br>5.13<br>5.13<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74                  |
| 91)<br>92)<br>93)<br>94)<br>95)<br>97)<br>97)<br>99)<br>100)<br>101)<br>102)<br>103)                                  | 1.87<br>1.59<br>1.14<br>0.96<br>0.96<br>0.96<br>1.2<br>1.87<br>2.94<br>2.94<br>3.15<br>3.42                         | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(115)<br>(116)<br>(117)<br>(118)<br>(119)<br>(120)<br>(121)          | 1.87<br>1.46<br>1.26<br>1.14<br>1.25<br>2.55<br>4.04<br>4.4<br>4.04<br>4.04<br>4.04<br>3.72<br>3.72                 | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(137)<br>(138)<br>(137)<br>(138)<br>(137)<br>(139)<br>(140) | 6.9<br>5.13<br>4.74<br>3.7<br>3.15<br>2.55<br>2.21<br>1.40<br>1.33<br>1.26<br>1.33                 | (145)<br>(145)<br>(147)<br>(147)<br>(146)<br>(150)<br>(151)<br>(151)<br>(151)<br>(152)<br>(153)<br>(154)<br>(155)<br>(156)<br>(157)<br>(159)          | 1.2<br>1.30<br>1.25<br>1.2<br>1.0<br>0.96<br>0.85<br>0.8<br>0.45<br>0.45<br>0.45<br>0.45<br>0.45                                 | (162)<br>(164)<br>(155)<br>(166)<br>(167)<br>(169)<br>(169)<br>(169)<br>(172)<br>(172)<br>(172)<br>(173)<br>(174)<br>(175)<br>(177)          | 1.2<br>1.2<br>1.14<br>1.02<br>6.4<br>8<br>13.5<br>10.1<br>8.5<br>6.9<br>5.34<br>4.4<br>3.42<br>2.74                 | (271)<br>(272)<br>(272)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(277)<br>(290)<br>(290)<br>(291)<br>(293)<br>(293)<br>(294)<br>(294)<br>(294) | 3.42<br>5.15<br>2.74<br>2.74<br>2.74<br>3.5<br>9.1<br>6.4<br>9.1<br>9.1   | (299)<br>(300)<br>(302)<br>(303)  | 6.4<br>5.97<br>5.54<br>5.54<br>5.13<br>4.74<br>4.74<br>4.74<br>4.38<br>4.04<br>4.04<br>4.04<br>4.04                         | (307)<br>(508)<br>(509)<br>(510)<br>(511)<br>(312)<br>(313)<br>(314)<br>(314)<br>(314)<br>(314)<br>(318)<br>(319)<br>(318)<br>(320)<br>(321)                            | 3.72<br>4.04<br>4.74<br>6.4<br>8.5<br>10.4<br>9.1<br>24<br>27.1<br>24<br>20.4<br>17.1<br>14.3<br>11.9                       | (326)<br>(326)<br>(327)<br>(329)<br>(329)<br>(321)<br>(332)<br>(332)<br>(333)<br>(333)<br>(334)<br>(335)<br>(337)<br>(339)                            | 8.5<br>9.1<br>9.5<br>8<br>7.4<br>5.97<br>5.97<br>5.54<br>5.54<br>5.54<br>5.24                              | (344)<br>(344)<br>(345)<br>(345)<br>(347)<br>(347)<br>(348)<br>(350)<br>(351)<br>(353)<br>(353)<br>(354)<br>(355)<br>(355)<br>(355)<br>(357)<br>(357)          | 4.74<br>4.74<br>4.1315<br>5.15<br>5.15<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.7 |
| 91)<br>92)<br>93)<br>94)<br>95)<br>94)<br>97)<br>97)<br>100)<br>101)<br>100)<br>101)<br>102)<br>103}<br>102)          | 1.87<br>1.59<br>1.73<br>1.14<br>0.96<br>0.96<br>0.96<br>0.91<br>1.2<br>1.87<br>2.94<br>3.15<br>3.15<br>3.42<br>3.72 | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(119)<br>(120)<br>(122) | 1.87<br>1.46<br>1.26<br>1.14<br>1.25<br>2.55<br>4.04<br>4.4<br>4.04<br>4.04<br>4.04<br>4.04<br>3.72<br>3.72<br>4.04 | (127)<br>(120)<br>(120)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(137)<br>(139)<br>(139)<br>(140)                            | 6.9<br>5.13<br>4.74<br>3.7<br>3.15<br>2.55<br>2.21<br>1.40<br>1.33<br>1.26<br>1.33                 | (145)<br>(145)<br>(147)<br>(147)<br>(147)<br>(150)<br>(151)<br>(152)<br>(153)<br>(154)<br>(153)<br>(154)<br>(155)<br>(156)<br>(157)<br>(159)<br>(160) | 1.2<br>1.30<br>1.20<br>1.2<br>1.2<br>1.06<br>0.95<br>0.85<br>0.85<br>0.45<br>0.45<br>0.45<br>0.45<br>0.45<br>0.45<br>0.45<br>0.4 | (163)<br>(164)<br>(155)<br>(166)<br>(167)<br>(168)<br>(169)<br>(170)<br>(177)<br>(173)<br>(174)<br>(177)<br>(177)<br>(177)                   | 1.2<br>1.2<br>1.14<br>1.05<br>1.02<br>6.4<br>8<br>13.5<br>10.1<br>8.5<br>6.9<br>5.54<br>4.4<br>3.42<br>2.74<br>2.21 | (271)<br>(272)<br>(272)<br>(274)<br>(275)<br>(276)<br>(277)<br>(277)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(295)<br>(296)          | 3.42<br>3.3.32<br>2.2.2.3<br>8.1<br>4.5<br>9.1<br>4.5<br>9.1<br>4.5<br>9.1<br>4.5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>9.1<br>5<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | (299)<br>(300)<br>(301)<br>(302)<br>(303)<br>(304)  | 6.4<br>5.97<br>5.54<br>5.54<br>5.26<br>5.13<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.38<br>4.04<br>4.04<br>4.04<br>4.04 | (307)<br>(508)<br>(509)<br>(510)<br>(511)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)<br>(315)<br>(317)<br>(318)<br>(317)<br>(318)<br>(320)<br>(321)<br>(322)          | 3.72<br>4.04<br>4.74<br>6.4<br>8.5<br>10.4<br>9.1<br>24<br>27.1<br>24<br>27.1<br>24<br>20.4<br>17.1<br>14.3<br>11.9<br>10.4 | (326)<br>(326)<br>(327)<br>(329)<br>(329)<br>(329)<br>(329)<br>(329)<br>(337)<br>(334)<br>(336)<br>(339)<br>(339)<br>(339)<br>(339)                   | 8.5<br>9.1<br>9.5<br>8<br>7.4<br>5.9<br>6.4<br>5.97<br>6.4<br>5.54<br>5.54<br>5.54<br>5.54<br>5.54<br>5.54 | (344)<br>(344)<br>(345)<br>(345)<br>(347)<br>(347)<br>(348)<br>(350)<br>(351)<br>(353)<br>(353)<br>(354)<br>(355)<br>(355)<br>(355)<br>(357)<br>(357)          | 4.74<br>4.74<br>5.15<br>5.15<br>5.15<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.7   |
| 91)<br>92)<br>93)<br>94)<br>95)<br>94)<br>97)<br>98)<br>100)<br>101)<br>102)<br>101)<br>102)<br>104)<br>105)<br>(104) | 1.87<br>1.59<br>1.14<br>0.96<br>0.96<br>0.96<br>1.2<br>1.87<br>2.94<br>2.94<br>3.15<br>3.42                         | (109)<br>(110)<br>(111)<br>(112)<br>(113)<br>(114)<br>(115)<br>(116)<br>(117)<br>(118)<br>(119)<br>(120)<br>(121)<br>(122)<br>(122) | 1.87<br>1.46<br>1.26<br>1.14<br>1.20<br>2.55<br>2.55<br>4.04<br>4.4<br>4.04<br>4.04<br>3.72<br>3.72<br>4.04<br>4.04 | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(136)<br>(137)<br>(138)<br>(137)<br>(138)<br>(137)<br>(139)<br>(140) | 6.9<br>5.13<br>4.74<br>3.7<br>3.15<br>2.21<br>1.59<br>1.43<br>1.33<br>1.33                         | (145)<br>(145)<br>(147)<br>(148)<br>(150)<br>(151)<br>(152)<br>(153)<br>(153)<br>(154)<br>(157)<br>(158)<br>(159)<br>(160)<br>(161)                   | 1.2<br>1.30<br>1.25<br>1.2<br>1.0<br>0.96<br>0.85<br>0.8<br>0.45<br>0.45<br>0.45<br>0.45<br>0.45                                 | (163)<br>(164)<br>(155)<br>(166)<br>(167)<br>(169)<br>(170)<br>(170)<br>(171)<br>(172)<br>(174)<br>(175)<br>(176)<br>(177)<br>(178)<br>(179) | 1.2<br>1.2<br>1.14<br>1.02<br>6.4<br>8<br>13.5<br>10.1<br>8.5<br>6.9<br>5.34<br>4.4<br>3.42<br>2.74                 | (271)<br>(272)<br>(272)<br>(274)<br>(275)<br>(276)<br>(277)<br>(278)<br>(277)<br>(290)<br>(290)<br>(291)<br>(293)<br>(293)<br>(294)<br>(294)<br>(294) | 3.42<br>3.3.32<br>2.2.2.3<br>8.4.5<br>4.5<br>7.7.7.9.4<br>5.1.4<br>4.5<br>8.1.5<br>9.6.4<br>4.5<br>8.1.5<br>9.6.6<br>8.6<br>9.6<br>6.6<br>9.6<br>6.6<br>9.6<br>6.6<br>9.6<br>6.6<br>9.6<br>6.6<br>9.6<br>9  | (299)<br>(300)<br>(301)<br>(302)<br>(303)<br>(304)<br>(304)<br>(305)                            | 6.4<br>5.97<br>5.54<br>5.54<br>5.13<br>4.74<br>4.74<br>4.74<br>4.38<br>4.04<br>4.04<br>4.04<br>4.04                         | (307)<br>(508)<br>(509)<br>(510)<br>(511)<br>(312)<br>(313)<br>(314)<br>(314)<br>(315)<br>(314)<br>(314)<br>(312)<br>(318)<br>(319)<br>(320)<br>(321)<br>(322)<br>(322) | 3.72<br>4.04<br>4.74<br>6.4<br>8.5<br>10.4<br>9.1<br>24<br>27.1<br>24<br>20.4<br>17.1<br>14.3<br>11.9                       | (326)<br>(326)<br>(327)<br>(329)<br>(329)<br>(329)<br>(321)<br>(332)<br>(333)<br>(333)<br>(334)<br>(336)<br>(337)<br>(339)<br>(339)<br>(340)<br>(341) | 8.5<br>9.1<br>9.5<br>8<br>7.4<br>5.97<br>5.97<br>5.54<br>5.54<br>5.54<br>5.24                              | (344)<br>(344)<br>(345)<br>(345)<br>(345)<br>(347)<br>(347)<br>(351)<br>(351)<br>(355)<br>(355)<br>(355)<br>(355)<br>(355)<br>(355)<br>(356)<br>(358)<br>(358) | 4.74<br>4.74<br>4.1315<br>5.15<br>5.15<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.74<br>4.7 |

.

# River discharge data at 12-hourly intervals for Station: 23D Period : 3

· .

|  |   |   |  |   |   |   |   | ~   |   |                |              |
|--|---|---|--|---|---|---|---|---|---|----------------|--------------|
| Variable: DRIE4.vari (lengt  | :h = 344)   |   |  |   |   | 17171   | 18.2  | (235)   | 14.3  | (250)          | 18.2         |
|  | (37) 10.4 (55) 276  | (73) 54.7   | (181) 40.4   | (199)   |   |   | 17.1  | (236)   | 35.3  | (254)          | 19.2         |
| (1) 4.04 (19) 19.2   |   | (74) 53.9   | (182) 40.4   | (200)   | 29.8  |   |   | (237)   | 33.9  | (255)          | 19.2         |
| (2) 3.9 $(20)$ 16.5  |   | (75) 67.8   | (183) 38.2   | (201)   | 29.1  |   | 17.1  | (239)   | 40.4  | (256)          | 18.2         |
| 3) 3.72 (21) 16.2  |   | ( 15) 61.8  | (184) 36.7   | (202)   | 28.4  | (220).  |   |   |   |                | 16.2         |
| 4) 3.9 (22) 27.8   | (40) 11.1 (58) 273  | (77) 52.2   | (185) 35.3   | (203)   | 25.5  |   | 17.1  | (239)   | 40.4  | (258)          | 15.2         |
| 5) 3.72 (23) 28.4  | (41) 11.1 (59) 191  | • • • • •   | (186) 33.9   | (204)   | 24.9  |   | 17.1  | (240)   | 35.3  |                | 15.2         |
| ( 6) 3.9 ( 24) 16.2  | (42) 11.1 (60) 169  | • • • • • •   | (187) 31.8   | (205)   | 24.5  | (225)   | 16.2  | (241)   | 29.1  | · · /          | 16.65        |
| (7) 4.04 (25) 14.3   | (43) 10.4 (61) 135  | (79) 38.2   | (188) 30.4   | (206)   | 23.3  |   | 16.2  | (242)   | 26.5  |                |              |
| (8) 4.04 (26) 17.1   | (44) 9.8 (62) 129   | (80) 35.3   |  | (207)   | 22.7  | (225)   | 15.2  | (243)   | 24  | (251)          | 14           |
| ( 0) + 0 7   | (45) 9.8 (63) 153   | (81) 35.3   |  | (208)   | 22,1  |   | 14.3  | (244)   | 22.1  | (252)          | 18.7         |
|  | (46) 9.8 (64) 120   | (82) 33.9   | (190) 29.4   | (209)   | 22.1  |   | 14.3  | (245)   | 21.5  | (253)          | 1.5          |
|  | (47) 9.8 (65) 89.8  | (83) 33.2   | (191) 28.4   | •   | 21.5  |   | 14.3  | (245)   | 18.7  | (254)          |              |
| ( 11) 0010   | (43) 9.1 (66) 72.4  | (84) 31.1   | (192) 27.8   | (210)   |   |   | 14.3  | (247)   | 17.1  | (265)          | 12           |
|  | (49) 9.1 (67) 62.5  | (85) 27.8   | (193) 26.5   | (211)   | 20.4  | (230)   |   | (248)   | 17.1  | (265)          | 19.2         |
| (13) 27.8 (31) 11.9  |   | (86) 28.4   | (194) 25.8   | (212)   | 20.4  | (231)   |   |   | 17.1  | (257)          | 11           |
| (14) 45.8 (32) 11.1  |   | (87) 28.4   | (195) 28.4   | (213)   | 20.4  |   |   | (250)   | 16.2  | (268)          |              |
| (15) 50.6 (33) 10.4  |   | (88) 28.4   | (196) 39.7   | (214)   |   |   | 13.5  | (251)   |   | (259)          |              |
| (16) 35 (34) 10.4  |   | (89) 27.8   | (197) 53.2   | (215)   | 18.2  |   | 13.5  |   |   | (270)          | 19.2         |
| (17) 26.5 (35) 9.3   |   | (90) 26.5   | (100) 75 7   | (216)   | 18.2  | (234)   | 1   | (252)   | 17.~  |                |              |
|  |   |   |  |   |   |   |   |   |   |                |              |
| (18) 22.1 (36) 10.4  | (54) 336 (72) 54.7  |   | (198)  |   |   |   |   |   |   |                |              |
|  | (127) 26 (145) 22.1   | (167) 307   | (221) 10.8   | (289)   |   |   | <br>11.9<br>10.4  | (325)<br>(326)  | 4,38  | (342)<br>(244) | 4.74<br>4.56 |
| (91) 25.2 (109) 198  | (127) 36 (145) 22.1<br>(123) 35.3 (145) 22.1  | (167) 307<br>(164) 389  | (271) 10.8<br>(272) 19.2   | (289)   | 12.7  | (307)   | 11.9  | (325)<br>(326)<br>(327)   | 4.39  | (              |              |
| ( 91) 25.2 (109) 198<br>( 92) 24.6 (110) 356<br>( 93) 25.3 (111) 254   | $(127) \ 36 \ (145) \ 22.1 \\ (123) \ 35.3 \ (145) \ 22.1 \\ (129) \ 33.2 \ (147) \ 22.1 \\ (129) \ 33.2 \ (147) \ 22.1 \\ (129) \ 33.2 \ (147) \ 22.1 \\ (147) $ | (167) 307<br>(164) 389<br>(165) 247   | (271) 10.8<br>(272) 19.2<br>(272) 20.4   | (289)<br>(290)<br>(291)   | 12.7<br>12.7  | (307)<br>(308)  | 11.9<br>10.4<br>3.5<br>7.4  | (325)<br>(326)<br>(327)<br>(328)  | 4,39<br>4,39<br>4,38<br>4,38  | (              |              |
| ( 91) 25.2 (109) 198<br>( 92) 24.6 (110) 356<br>( 93) 25.3 (111) 254   | $\begin{array}{c} (127) & 26 & (145) & 22.1 \\ (123) & 35.3 & (146) & 22.1 \\ (129) & 32.2 & (147) & 22.1 \\ (150) & 51.3 & (148) & 22.1 \end{array}$   | (167) 307<br>(164) 389<br>(165) 247<br>(165) 239.3  | (271) 10.8<br>(272) 19.2<br>(271) 20.4<br>(274) 20.9   | (289)<br>(290)<br>(291)<br>(292)  | 12.7<br>12.7<br>11.9<br>11.9  | (.307)<br>(308)<br>(309)  | 11.9<br>10.4<br>3.5   | (325)<br>(326)<br>(327)<br>(328)<br>(328)<br>(329)  | 4,39<br>4,39<br>4,38<br>4,38<br>4,38  | (              |              |
| ( 91) 25.2 (109) 198<br>( 92) 24.6 (110) 356<br>( 93) 25.3 (111) 254<br>( 94) 22.7 (112) 232   | $\begin{array}{c} (127) & 26 & (145) & 22.1 \\ (123) & 35.3 & (145) & 22.1 \\ (129) & 30.2 & (147) & 22.1 \\ (150) & 31.3 & (148) & 22.1 \\ (151) & 31.1 & (149) & 21.5 \end{array}$  | (167) 307<br>(164) 389<br>(165) 147<br>(165) 129.3<br>(167) 104   | (271) 10.8<br>(272) 19.2<br>(271) 20.4<br>(274) 20.9<br>(275) 20.4   | (289)<br>(290)<br>(291)<br>(292)<br>(292)<br>(293)  | 12.7<br>12.7<br>11.9<br>11.9<br>11.1  | (307)<br>(308)<br>(309)<br>(310)  | 11.9<br>10.4<br>3.5<br>7.4  | (325)<br>(326)<br>(327)<br>(328)  | 4,38<br>4,38<br>4,38<br>4,38<br>4,38  | (              |              |
| ( 91) 25.2 (109) 198<br>( 92) 24.6 (110) 356<br>( 93) 20.3 (111) 254<br>( 94) 22.7 (112) 232<br>( 95) 22.1 (113) 232   | $\begin{array}{c} (127) & 26 & (145) & 22.1 \\ (123) & 35.3 & (145) & 22.1 \\ (129) & 30.2 & (147) & 22.1 \\ (150) & 51.3 & (148) & 22.1 \\ (150) & 51.1 & (149) & 21.5 \\ (152) & 29.1 & (150) & 18.2 \end{array}$   | (167) 307<br>(164) 389<br>(155) 247<br>(165) 2973<br>(167) 204<br>(163) 254   | (271) 10.8<br>(172) 19.2<br>(271) 20.4<br>(274) 20.9<br>(275) 20.4<br>(275) 20.4<br>(276) 20.4   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)   | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.7  | (307)<br>(308)<br>(309)<br>(310)<br>(311)   | 11.9<br>10.4<br>3.5<br>7.4<br>6.9   | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(320)<br>(331)  | 4,39<br>4,39<br>4,38<br>4,38<br>4,38<br>4,38<br>4,38  | (              |              |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{c} (127) & 26 & (145) & 22.1 \\ (123) & 35.3 & (145) & 22.1 \\ (129) & 30.2 & (147) & 22.1 \\ (150) & 51.3 & (148) & 22.1 \\ (151) & 51.1 & (149) & 21.5 \\ (152) & 29.1 & (150) & 18.2 \\ (133) & 28.4 & (151) & 18.2 \\ \end{array}$   | (167) 307<br>(164) 389<br>(165) 247<br>(165) 239.3<br>(167) 204<br>(163) 254<br>(169) 247   | (271) 10.8<br>(272) 19.2<br>(272) 20.4<br>(274) 20.9<br>(275) 20.4<br>(275) 20.4<br>(275) 20.4<br>(277) 19.2   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)  | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.9<br>10.4  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)   | 11.9<br>10.4<br>3.5<br>7.4<br>6.9<br>6.4  | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(330)   | 4,38<br>4,38<br>4,38<br>4,38<br>4,38  | (              |              |
| ( 91) 25.2 (109) 198<br>( 92) 24.6 (110) 356<br>( 92) 23.3 (111) 254<br>( 94) 22.7 (112) 232<br>( 95) 22.1 (113) 232<br>( 95) 22.1 (114) 191<br>( 97) 20.4 (115) 147   | $\begin{array}{c} (127) & 36 & (145) & 22.1 \\ (123) & 35.3 & (146) & 22.1 \\ (129) & 30.2 & (147) & 22.1 \\ (150) & 51.3 & (148) & 22.1 \\ (151) & 31.1 & (149) & 21.5 \\ (132) & 29.1 & (150) & 18.2 \\ (133) & 28.4 & (151) & 18.2 \\ (134) & 28.1 & (152) & 19.2 \end{array}$   | (167) 307<br>(164) 389<br>(165) 247<br>(165) 259, 3<br>(167) 204<br>(163) 254<br>(169) 247<br>(170) 211   | (271) 10.8<br>(272) 19.2<br>(271) 20.4<br>(274) 20.9<br>(275) 20.4<br>(275) 20.4<br>(277) 19.2<br>(278) 18.2   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(295)  | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.9<br>10.4<br>9.8   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)  | 11.9<br>10.4<br>3.5<br>7.4<br>6.9<br>6.4<br>6.4<br>5.97   | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(320)<br>(331)  | 4,39<br>4,39<br>4,38<br>4,38<br>4,38<br>4,38<br>4,38  | (              |              |
| ( 91) 25.2 (109) 198<br>( 92) 24.6 (110) 356<br>( 93) 25.3 (111) 254<br>( 94) 22.7 (112) 232<br>( 95) 22.1 (115) 232<br>( 95) 22.1 (115) 232<br>( 95) 21.5 (114) 191<br>( 97) 20.4 (115) 147<br>( 98) 45.8 (116) 118   | $\begin{array}{c} (127) & 26 & (145) & 22.1 \\ (123) & 35.3 & (145) & 22.1 \\ (129) & 30.2 & (147) & 22.1 \\ (150) & 31.3 & (148) & 22.1 \\ (150) & 31.4 & (149) & 21.5 \\ (152) & 29.1 & (150) & 18.2 \\ (133) & 28.4 & (151) & 18.2 \\ (134) & 29.1 & (152) & 19.2 \\ \end{array}$  | (167) 307<br>(164) 389<br>(165) 1247<br>(165) 129.3<br>(167) 104<br>(163) 1254<br>(169) 1247<br>(170) 211<br>(171) 239  | (271) 10.8<br>(272) 19.2<br>(271) 20.4<br>(273) 20.9<br>(275) 20.4<br>(275) 20.4<br>(275) 20.4<br>(276) 20.4<br>(277) 19.2<br>(278) 16.2<br>(279) 18.2   | (289)<br>(290)<br>(291)<br>(292)<br>(292)<br>(293)<br>(294)<br>(295)<br>(296)<br>(297)  | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.9<br>10.4<br>9.8<br>8.5  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)   | 11.9<br>10.4<br>3.5<br>7.4<br>6.9<br>4.4<br>6.4<br>5.97<br>5.97   | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(320)<br>(331)<br>(331)<br>(332)  | 4,39<br>4,39<br>4,39<br>4,38<br>4,38<br>4,38<br>4,94  | (              |              |
| ( 91) 25.2 (109) 198<br>( 92) 24.6 (110) 356<br>( 92) 20.3 (111) 254<br>( 94) 22.7 (112) 232<br>( 95) 22.1 (113) 232<br>( 95) 22.1 (113) 232<br>( 95) 21.5 (114) 191<br>( 97) 20.4 (115) 147<br>( 98) 45.8 (116) 118<br>( 99) 135 (117) 172  | $\begin{array}{c} (127) & 36 & (145) & 22.1 \\ (123) & 35.3 & (146) & 22.1 \\ (129) & 30.2 & (147) & 22.1 \\ (150) & 51.3 & (148) & 22.1 \\ (151) & 31.1 & (149) & 21.5 \\ (132) & 29.1 & (150) & 18.2 \\ (133) & 28.4 & (151) & 18.2 \\ (134) & 28.1 & (152) & 19.2 \\ (135) & 27.8 & (153) & 22.7 \end{array}$  | (167) 307<br>(164) 389<br>(165) 247<br>(165) 2973<br>(167) 204<br>(163) 254<br>(169) 247<br>(170) 211<br>(171) 239<br>(172) 218   | $ \begin{array}{c} (271) & 10.8 \\ (272) & 19.2 \\ (272) & 20.4 \\ (273) & 20.9 \\ (275) & 20.4 \\ (275) & 20.4 \\ (275) & 20.4 \\ (276) & 20.4 \\ (277) & 19.2 \\ (278) & 16.2 \\ (279) & 18.2 \\ (280) & 13.9 \end{array} $  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(296)<br>(296)<br>(298)  | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.9<br>10.4<br>9.8<br>8.5<br>8.5<br>8.5  | (.507)<br>(308)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(316)  | 11.9<br>10.4<br>3.5<br>7.4<br>6.9<br>6.4<br>6.4<br>5.97<br>5.97<br>5.54   | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(329)<br>(323)<br>(322)<br>(333)  | 4,39<br>4,39<br>4,39<br>4,38<br>4,38<br>4,38<br>4,38<br>4,39<br>4,04  | (              |              |
| ( 91) 25.2 (109) 198<br>( 92) 24.5 (110) 356<br>( 92) 24.5 (110) 356<br>( 93) 25.3 (111) 254<br>( 94) 22.7 (112) 232<br>( 95) 22.1 (113) 232<br>( 95) 21.5 (114) 191<br>( 97) 20.4 (115) 147<br>( 98) 45.8 (115) 118<br>( 99) 135 (117) 172<br>(100) 479 (118) 82  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (167) 307<br>(164) 389<br>(165) 1247<br>(165) 129.3<br>(167) 104<br>(163) 1254<br>(169) 1247<br>(170) 211<br>(171) 239  | (271) 10.8<br>(172) 19.2<br>(271) 20.4<br>(274) 20.9<br>(275) 20.4<br>(275) 20.4<br>(275) 20.4<br>(275) 20.4<br>(277) 19.2<br>(278) 16.2<br>(279) 18.2<br>(280) 13.9<br>(281) 15.2   | (289)<br>(290)<br>(291)<br>(292)<br>(292)<br>(293)<br>(294)<br>(295)<br>(296)<br>(297)<br>(298)<br>(299)  | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.1<br>10.4<br>9.8<br>8.5<br>8.5<br>8.5<br>8.5   | (307)<br>(308)<br>(309)<br>(310)<br>(312)<br>(313)<br>(314)<br>(314)<br>(314)<br>(314)<br>(317)   | 11.9<br>10.4<br>3.5<br>7.4<br>6.9<br>6.4<br>6.4<br>5.97<br>5.97<br>5.54<br>5.54   | (325)<br>(324)<br>(322)<br>(329)<br>(320)<br>(331)<br>(331)<br>(332)<br>(333)<br>(335)  | 4,39<br>4,39<br>4,38<br>4,38<br>4,38<br>4,38<br>4,38<br>4,38<br>4,04<br>4,04<br>3,42  | (              |              |
| ( 91) 25.2 (109) 198<br>( 92) 24.6 (110) 356<br>( 92) 24.6 (110) 356<br>( 93) 23.3 (111) 254<br>( 94) 22.7 (112) 232<br>( 95) 22.1 (113) 232<br>( 95) 22.1 (114) 121<br>( 97) 20.4 (115) 147<br>( 98) 45.8 (116) 118<br>( 97) 135 (117) 172<br>(100) 479 (118) 82<br>(101) 284 (119) 202   | $\begin{array}{c} (127) & 26 & (145) & 22.1 \\ (123) & 35.3 & (146) & 22.1 \\ (129) & 30.2 & (147) & 22.1 \\ (129) & 30.2 & (147) & 22.1 \\ (150) & 51.8 & (148) & 22.1 \\ (151) & 31.1 & (149) & 21.5 \\ (152) & 29.1 & (150) & 18.2 \\ (133) & 28.4 & (151) & 18.2 \\ (134) & 28.4 & (151) & 18.2 \\ (135) & 27.8 & (153) & 22.7 \\ (136) & 26.5 & (153) & 22.7 \\ (136) & 26.5 & (154) & 28.4 \\ (137) & 26.5 & (155) & 40.4 \\ \end{array}$   | (167) 307<br>(164) 389<br>(165) 247<br>(165) 2973<br>(167) 204<br>(163) 254<br>(169) 247<br>(170) 211<br>(171) 239<br>(172) 218   |  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(297)<br>(298)<br>(298)<br>(299)<br>(300)  | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.9<br>10.4<br>9.8<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(316)<br>(317)<br>(318)  | 11.9<br>10.4<br>3.5<br>7.4<br>6.9<br>6.4<br>6.4<br>5.97<br>5.97<br>5.54<br>5.54<br>5.13                                 | (325)<br>(324)<br>(327)<br>(328)<br>(329)<br>(329)<br>(331)<br>(331)<br>(331)<br>(332)<br>(333)<br>(334)  | 4.39<br>4.39<br>4.39<br>4.38<br>4.38<br>4.38<br>4.38<br>4.39<br>4.04<br>4.04<br>3.42<br>3.15<br>3.42                              | (              |              |
| ( 91) 25.2 (109) 198<br>( 92) 24.6 (110) 356<br>( 93) 25.3 (111) 254<br>( 94) 22.7 (112) 232<br>( 95) 22.1 (115) 232<br>( 95) 22.1 (115) 137<br>( 95) 22.1 (115) 147<br>( 97) 20.4 (115) 147<br>( 98) 45.8 (116) 118<br>( 97) 135 (117) 172<br>(100) 479 (118) 82<br>(101) 284 (119) 202<br>(122) 232 (120) 41.6                         | $\begin{array}{c} (127) & 26 & (145) & 22.1 \\ (123) & 25.3 & (145) & 22.1 \\ (129) & 30.2 & (147) & 22.1 \\ (129) & 30.2 & (147) & 22.1 \\ (150) & 51.3 & (148) & 22.1 \\ (151) & 31.1 & (149) & 21.5 \\ (152) & 29.1 & (150) & 18.2 \\ (133) & 28.4 & (151) & 18.2 \\ (133) & 28.4 & (151) & 18.2 \\ (134) & 28.4 & (152) & 19.2 \\ (135) & 27.8 & (153) & 22.7 \\ (136) & 26.5 & (155) & 40.4 \\ (137) & 26.5 & (155) & 40.4 \\ (138) & 25.2 & (156) & 101 \\ \end{array}$   | (167) 307<br>(164) 389<br>(165) 247<br>(165) 259<br>(167) 204<br>(163) 254<br>(169) 247<br>(170) 211<br>(171) 239<br>(172) 218<br>(173) 158   |  | (289)<br>(290)<br>(291)<br>(292)<br>(292)<br>(294)<br>(295)<br>(298)<br>(298)<br>(297)<br>(298)<br>(299)<br>(300)<br>(301)  | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.9<br>10.4<br>9.8<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5                              | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)<br>(315)<br>(318)<br>(319)   | 11.9<br>10.4<br>3.5<br>7.4<br>6.9<br>4.4<br>6.4<br>5.97<br>5.97<br>5.54<br>5.13<br>5,13                                 | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(331)<br>(331)<br>(332)<br>(333)<br>(333)<br>(335)<br>(336)<br>(337)   | 4,39<br>4,39<br>4,38<br>4,38<br>4,38<br>4,38<br>4,38<br>4,38<br>4,38<br>4,04<br>4,04<br>4,04<br>3,42<br>3,42<br>3,42<br>3,42      | (              |              |
| ( 91) 25.2 (109) 198<br>( 92) 24.6 (110) 356<br>( 92) 20.3 (111) 254<br>( 94) 22.7 (112) 232<br>( 95) 22.1 (113) 252<br>( 95) 22.1 (113) 252<br>( 95) 22.1 (113) 147<br>( 97) 20.4 (115) 147<br>( 98) 45.8 (114) 118<br>( 99) 135 (117) 172<br>(100) 479 (118) 82<br>(101) 284 (119) 202<br>(102) 232 (120) 61.6<br>(103) 272 (121) 57.3 | $\begin{array}{c} (127) & 36 & (145) & 22.1 \\ (123) & 35.3 & (146) & 22.1 \\ (123) & 35.3 & (146) & 22.1 \\ (150) & 31.3 & (148) & 22.1 \\ (150) & 31.3 & (148) & 22.1 \\ (151) & 31.1 & (149) & 21.5 \\ (132) & 29.1 & (150) & 18.2 \\ (133) & 28.4 & (151) & 18.2 \\ (134) & 28.4 & (151) & 18.2 \\ (135) & 27.8 & (153) & 22.7 \\ (136) & 26.5 & (155) & 40.4 \\ (137) & 26.5 & (155) & 40.4 \\ (138) & 25.2 & (156) & 40.4 \\ (139) & 24.6 & (157) & 83.9 \\ (137) & 26.5 & 0.2 \\ (157) & 83.9 \\ (137) & 24.6 & (157) & 83.9 \\ (137) & 24.8 & (157) & 83.9 \\ (137) & 24.8 & (157) & 83.9 \\ (137) & 24.8 & (157) & 83.9 \\ (137) & 24.8 & (157) & 83.9 \\ (137) & 24.8 & (157) & 83.9 \\ (137) & 24.8 & (157) & 83.9 \\ (157) & 24.8 & (157) & 83.9 \\ (157) & 24.8 & (157) & 83.9 \\ (157) & 24.8 & (157) & 83.9 \\ (157) & 24.8 & (157) & 83.9 \\ (157) & 24.8 & (157) & 83.9 \\ (157) & 24.8 & (157) & 83.9 \\ (157) & 24.8 & (157) & 83.9 \\ (157) & 24.8 & (157) & 83.9 \\ (157) & 24.8 & (157) & 83.9 \\ (157) & 24.8 & (157) & 83.9 \\ (157) & 24.8 & (157) & 83.9 \\ (157) & 24.8 & (157) & 83.9 \\ (157) & 24.8 & (157) & 83.9 \\ (157) & 24.8 & (157) & 24.8 \\ (157) & 24.8 & (157) & 24.8 \\ (157) & 24.8 & (157) & 24.8 \\ (157) & 24.8 & (157) & 24.8 \\ (157) & 24.8 & (157) & 24.8 \\ (157) & 24.8 & (157) & 24.8 \\ (157) & 24.8 & (157) & 24.8 \\ (157) & 24.8 & (157) & 24.8 \\ (157) & 24.8 & (157) & 24.8 \\ (157) & 24.8 & (157) & 24$  | (167) 307<br>(164) 389<br>(165) 247<br>(165) 239.3<br>(167) 204<br>(163) 254<br>(163) 254<br>(169) 247<br>(170) 211<br>(171) 239<br>(172) 218<br>(173) 158<br>(174) 112   |  | (289)<br>(290)<br>(291)<br>(292)<br>(292)<br>(293)<br>(294)<br>(295)<br>(297)<br>(298)<br>(297)<br>(298)<br>(299)<br>(300)<br>(301)<br>(302)                            | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.9<br>10.4<br>9.8<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8                                | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)<br>(315)<br>(316)<br>(317)<br>(318)<br>(319)<br>(320)                            | 11.9<br>10.4<br>3.5<br>7.4<br>6.9<br>4.4<br>5.97<br>5.97<br>5.54<br>5.54<br>5.13<br>5.13<br>4.74                        | (325)<br>(324)<br>(327)<br>(329)<br>(329)<br>(329)<br>(321)<br>(331)<br>(331)<br>(333)<br>(333)<br>(334)<br>(335)<br>(334)<br>(337)<br>(338)  | 4.39<br>4.39<br>4.38<br>4.38<br>4.38<br>4.38<br>4.38<br>4.38<br>4.38<br>4.38  | (              |              |
|  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | (167) 307<br>(164) 389<br>(155) 247<br>(165) 247<br>(165) 204<br>(167) 204<br>(163) 254<br>(169) 247<br>(170) 211<br>(171) 239<br>(172) 218<br>(172) 218<br>(173) 158<br>(174) 112<br>(175) 90.8<br>(176) 75                      |  | (289)<br>(290)<br>(291)<br>(291)<br>(292)<br>(293)<br>(294)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(300)<br>(301)<br>(301)<br>(303)                            | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.9<br>10.4<br>9.8<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8<br>8<br>8<br>8<br>8<br>8<br>8  | (307)<br>(309)<br>(319)<br>(311)<br>(313)<br>(314)<br>(314)<br>(314)<br>(317)<br>(318)<br>(317)<br>(318)<br>(319)<br>(320)<br>(321)                                     | 11.9<br>10.4<br>3.5<br>7.4<br>6.9<br>6.4<br>6.4<br>5.97<br>5.97<br>5.54<br>5.13<br>5.13<br>4.74<br>4.38                 | (325)<br>(324)<br>(322)<br>(329)<br>(330)<br>(331)<br>(331)<br>(333)<br>(334)<br>(335)<br>(334)<br>(337)<br>(338)<br>(339)  | 4,39<br>4,39<br>4,39<br>4,38<br>4,38<br>4,38<br>4,39<br>4,04<br>3,404<br>3,42<br>3,15<br>3,42<br>6,4<br>7,4<br>8,9                | (              |              |
|  | $\begin{array}{c} (127) & 26 & (145) & 22.1 \\ (123) & 35.3 & (146) & 22.1 \\ (129) & 30.2 & (147) & 22.1 \\ (129) & 30.2 & (147) & 22.1 \\ (150) & 51.8 & (148) & 22.1 \\ (151) & 31.1 & (149) & 21.5 \\ (152) & 29.1 & (150) & 18.2 \\ (133) & 28.4 & (151) & 18.2 \\ (134) & 28.1 & (152) & 19.2 \\ (135) & 27.8 & (153) & 22.7 \\ (136) & 26.5 & (153) & 22.7 \\ (136) & 26.5 & (155) & 40.4 \\ (137) & 26.5 & (155) & 40.4 \\ (138) & 25.2 & (156) & 101 \\ (139) & 24.6 & (157) & 83.9 \\ (140) & 23.3 & (159) & 96.9 \\ (141) & 23.3 & (159) & 104.3 \\ \end{array}$   | (167) 307<br>(164) 389<br>(165) 247<br>(165) 247<br>(165) 204<br>(167) 204<br>(163) 254<br>(169) 247<br>(170) 211<br>(171) 239<br>(172) 218<br>(173) 158<br>(174) 112<br>(175) 90.8<br>(176) 75<br>(177) 63.4                     | $ \begin{array}{c} (271) & 10.8 \\ (272) & 19.2 \\ (272) & 20.4 \\ (273) & 20.9 \\ (275) & 20.4 \\ (275) & 20.4 \\ (275) & 20.4 \\ (275) & 20.4 \\ (276) & 16.2 \\ (276) & 16.2 \\ (277) & 18.2 \\ (280) & 13.9 \\ (281) & 16.2 \\ (282) & 16.2 \\ (283) & 15.2 \\ (284) & 15.2 \\ \end{array} $ | (289)<br>(290)<br>(291)<br>(292)<br>(292)<br>(293)<br>(294)<br>(295)<br>(297)<br>(298)<br>(297)<br>(298)<br>(299)<br>(300)<br>(301)<br>(302)                            | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.9<br>10.4<br>9.8<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8                                | (307)<br>(308)<br>(309)<br>(310)<br>(511)<br>(313)<br>(314)<br>(314)<br>(315)<br>(317)<br>(318)<br>(317)<br>(318)<br>(317)<br>(320)<br>(321)<br>(322)                   | 11.9<br>10.4<br>3.5<br>1.4<br>6.9<br>6.4<br>6.4<br>5.97<br>5.54<br>5.54<br>5.13<br>5.13<br>5.13<br>4.38<br>4.38         | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(329)<br>(331)<br>(331)<br>(331)<br>(332)<br>(3334)<br>(335)<br>(334)<br>(337)<br>(337)<br>(339)<br>(340)  | 4,39<br>4,39<br>4,39<br>4,38<br>4,38<br>4,38<br>4,38<br>4,38<br>4,38<br>4,38<br>4,38  | (              |              |
|  | $\begin{array}{c} (127) & 26 & (145) & 22.1 \\ (123) & 25.3 & (145) & 22.1 \\ (129) & 30.2 & (147) & 22.1 \\ (129) & 30.2 & (147) & 22.1 \\ (150) & 31.3 & (148) & 22.1 \\ (151) & 31.1 & (149) & 21.5 \\ (132) & 29.1 & (150) & 18.2 \\ (133) & 28.4 & (151) & 18.2 \\ (133) & 28.4 & (151) & 18.2 \\ (134) & 29.1 & (152) & 19.2 \\ (135) & 27.8 & (153) & 22.7 \\ (136) & 26.5 & (154) & 28.4 \\ (137) & 26.5 & (155) & 40.4 \\ (138) & 25.2 & (156) & 101 \\ (139) & 24.6 & (157) & 83.9 \\ (140) & 23.3 & (159) & 104.3 \\ (142) & 23.3 & (140) & 77.1 \\ \end{array}$   | (167) 307<br>(164) 389<br>(165) 247<br>(165) 259, 5<br>(167) 204<br>(163) 254<br>(169) 247<br>(170) 211<br>(171) 239<br>(172) 218<br>(172) 218<br>(173) 158<br>(174) 112<br>(175) 90, 8<br>(176) 75<br>(177) 63, 4<br>(178) 55, 9 |  | (289)<br>(290)<br>(291)<br>(291)<br>(292)<br>(293)<br>(294)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(300)<br>(301)<br>(301)<br>(303)                            | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.9<br>10.4<br>9.8<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8<br>8<br>8<br>8<br>8<br>8<br>8  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(314)<br>(314)<br>(317)<br>(318)<br>(317)<br>(318)<br>(317)<br>(320)<br>(321)<br>(322)<br>(323) | 11.9<br>10.4<br>3.5<br>7.4<br>6.9<br>6.4<br>6.4<br>5.97<br>5.54<br>5.13<br>5.13<br>5.13<br>4.74<br>4.38<br>4.38         | (325)<br>(324)<br>(327)<br>(328)<br>(329)<br>(329)<br>(331)<br>(331)<br>(331)<br>(332)<br>(333)<br>(334)<br>(335)<br>(334)<br>(337)<br>(338)<br>(339)<br>(340)<br>(341)                                     | 4.39<br>4.39<br>4.39<br>4.38<br>4.38<br>4.38<br>4.38<br>4.04<br>4.04<br>4.04<br>3.42<br>3.42<br>3.42<br>6.4<br>7.4<br>6.4<br>5.54 | (              |              |
|  | $\begin{array}{c} (127) & 26 & (145) & 22.1 \\ (123) & 35.3 & (146) & 22.1 \\ (129) & 30.2 & (147) & 22.1 \\ (129) & 30.2 & (147) & 22.1 \\ (150) & 51.8 & (148) & 22.1 \\ (151) & 31.1 & (149) & 21.5 \\ (152) & 29.1 & (150) & 18.2 \\ (133) & 28.4 & (151) & 18.2 \\ (134) & 28.1 & (152) & 19.2 \\ (135) & 27.8 & (153) & 22.7 \\ (136) & 26.5 & (153) & 22.7 \\ (136) & 26.5 & (155) & 40.4 \\ (137) & 26.5 & (155) & 40.4 \\ (138) & 25.2 & (156) & 101 \\ (139) & 24.6 & (157) & 83.9 \\ (140) & 23.3 & (159) & 96.9 \\ (141) & 23.3 & (159) & 104.3 \\ \end{array}$   | (167) 307<br>(164) 389<br>(165) 247<br>(165) 247<br>(165) 204<br>(167) 204<br>(163) 254<br>(169) 247<br>(170) 211<br>(171) 239<br>(172) 218<br>(173) 158<br>(174) 112<br>(175) 90.8<br>(176) 75<br>(177) 63.4                     |  | (289)<br>(290)<br>(291)<br>(292)<br>(292)<br>(293)<br>(294)<br>(295)<br>(296)<br>(297)<br>(298)<br>(297)<br>(300)<br>(301)<br>(301)<br>(303)<br>(304)<br>(305)<br>(306) | 12.7<br>12.7<br>11.9<br>11.9<br>11.1<br>11.9<br>10.4<br>9.8<br>8.5<br>8.5<br>8.5<br>8.5<br>8.5<br>8<br>8<br>8<br>8<br>8<br>8<br>8<br>10.4 | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(313)<br>(314)<br>(315)<br>(314)<br>(315)<br>(316)<br>(317)<br>(318)<br>(317)<br>(320)<br>(321)<br>(322)<br>(322)<br>(324) | 11.9<br>10.4<br>3.5<br>7.4<br>6.9<br>4.4<br>6.4<br>5.97<br>5.97<br>5.54<br>5.13<br>5.13<br>4.74<br>4.38<br>4.38<br>4.38 | (325)<br>(324)<br>(322)<br>(329)<br>(329)<br>(329)<br>(329)<br>(331)<br>(331)<br>(331)<br>(333)<br>(334)<br>(335)<br>(334)<br>(337)<br>(336)<br>(337)<br>(336)<br>(337)<br>(336)<br>(340)<br>(340)<br>(342) | 4,39<br>4,39<br>4,39<br>4,38<br>4,38<br>4,38<br>4,38<br>4,38<br>4,38<br>4,38<br>4,38  | (              |              |

.

| 1adie: Unic   | 5.varl (lengi   |   |  |   |   | ( 73)  |  | (121)   |   | (199)  |   | (217)  | 1.59  | (235)  | 1,00  | (253)   | ····  |
|---|---|---|--|---|---|--|--|---|---|--|---|--|---|--|---|---|---|
| 4.55  | (19) 1.87   | (37) 0  | 55 E   | - (00   | - • •   | (74)   |  | (182)   |   | (200)  | 1.8   |  | 1.52  | (236)  |   | (254)   |   |
| 4.38  | ( 20) 1.59  | ( CB) 0   |  | 56)   |   |  |  | (153)   |   | (201)  | 1.52  | (219)  | 1.59  | (237)  |   | (255)   | 0.7   |
| ) 3.7   | (21) 1.46   | (37) 0  |  | 57) :   |   | (75)   |  | (134)   |   | (202)  |   | (220)  | 1.70  | (238)  |   |   | 0.85  |
| ) 3.42  | (22) 1.33   | (40) 0  | 1,512 (  | 5B) (   |   |  | 0.96   | (135)   |   | (203)  |   | (221)  | 1.97  | (239)  |   |   | 0.96  |
| ) 3.15  | (23) 1.2  | (41) 0  |  | 57)   |   | ( 77)  |  | (135)   |   | (204)  |   | (222)  | 1.37  | (240)  |   |   | 0.95  |
| ) 3.42  | (24) 1.2  |   | ),469 {  | 60).  |   | (78)   |  | (193)   |   | (205)  |   | (223)  | 2.21  | (241)  |   | (259)   |   |
| ) ~.42  | ( 25) 1.1   | ( 43) 0   | 1,467 (  | 61)   | 3   | (79)   |  |   | 1.2   | (206)  |   |  | 2.74  | (242)  | 1.14  |   | 0.7   |
|   | (26) 1.02   | (44) 0  | ).427 (  | (62)  | 1   | <b>x</b> =   | 0.75   |   |   | (207)  | 1.33  |  | 2.94  | (243)  | 1.14  | (151)   |   |
| -   | (27) 0.91   | (45) 0  |  | (65)  | 2   |  | Ŭ.7  | (189)   | 1.05  | (208)  |   |  | 3.15  | (244)  | 1.02  | (252)   | 0.65  |
| ) 4.04  | (28) 0.75   | (45) 0  | ).56 (   | (64)  | 1   | · · ·  | 0.8  |   | 0.96  | (208)  |   |  | 2,94  | (245)  |   | (262)   | 4.6   |
| ) 3.72  | (29) 0.7  | (47) 0  |  | ( 55)   | 2   |  | 0.91   | (191)   |   | (207)<br>(210)   |   |  | 2.55  | (246)  |   | (264)   | 0.50  |
| ) 3.7   |   | (48) 0  |  | (66)  |   | (84)   |  | (192)   |   |  |   | (229)  |   | (247)  |   | (265)   | 0.58  |
| ) 4.04  | ( 30) 0.56  | (49) 0  |  | ( 67)   |   | (85)   |  | (193)   |   | (211)  |   |  | 1.66  | (248)  |   | (255)   | 0.50  |
| ) 4.39  | ( 31) 0.512   | (50) 0  |  | (68)  |   | (86)   | 1.59   | (174)   |   | (212)  |   |  | 1.42  | (249)  |   | (257)   |   |
| ) 4.04  | ( 32) 0.427   | (51)  |  | ( 69)   |   | (87)   | 1.46   | (195)   |   | (213)  |   | (232)  |   | (250)  |   | (263)   |   |
| ) 3.72  | ( 33) 0.387   | (51) (  |  | (70)  |   | ( 88)  |  | (176)   | 2.02  | (214)  |   |  | 1.20  | (251)  |   | (269)   |   |
| ) 3.15  | (34) 0.387  | (52)<br>(53)0   |  | (71)  |   | (89)   |  | (197)   | 2.21  | (215)  |   | (203)<br>(234)   |   | (252)  |   | (270)   |   |
| 1) 2,74<br>1) 2,21  | (35) 0.512<br>(36) 0.56   | (53) 0  |  | (72)  |   | ( 90)  |  | (178)   | 2.21  | (215)  | 1.59  | (254)  | 1.14  | 12247  | 0.00  |   |   |
|   | (38) 0.55   |   |  |   |   |  |  |   | -   |  |   |  |   |  |   |   |   |
|   |   |   |  |   |   |  |  |   |   |  |   |  |   |  | 17.5  | (7.4%)  | 4.38  |
|   |   |   |  |   |   |  |  | (271)   | 1.52  | (2B9)  | 1.75  | (307)  | 1.8   | (325)  | 12.0  | 1.4.21  | 4.30  |
| .) 1.26   | (109) 1.7   | (127)   | 0.96   | (145)   | 1.59  |  | 0.96   | (271)<br>(272)  | 1.52  | (289)<br>(290)   | 1.73<br>1.73  | (307)<br>(308)   | 1.8<br>1.73   | (325)<br>(325)   | 15.5  | (343)<br>(744)<br>(345)   | 4.38  |
| ) 1.26  | (109) 1.7<br>(110) 1.8  | (127) (<br>(128) (  | 0.94   | <br>(145)<br>(146)  | 1.59<br>1.59  | (163)  | 0. <b>7</b> 6<br>1.02  | (271)<br>(272)<br>(273)   | 1.52<br>1.39<br>1.33  | (289)<br>(290)<br>(291)  | 1.73<br>1.73<br>1.73  | (307)<br>(308)<br>(309)  | 1.8<br>1.73<br>1.66   | (325)<br>(325)<br>(325)<br>(327)   | 13.5<br>16.2<br>13.5  | (343)<br>(344)<br>(345)   | 4.38<br>4.04  |
| ) 1.26<br>2) 1.14<br>5) 1.14  | (109) 1.7<br>(110) 1.8<br>(111) 2.37  | (127)<br>(128)<br>(129)   | 0.94<br>0.85<br>0.825  | (145)<br>(146)<br>(147)   | 1.59<br>1.59<br>2.1   | (163)<br>(164)   | 0.96<br>1.02<br>0.91   | (271)<br>(272)<br>(273)<br>(274)  | 1.52<br>1.39<br>1.23<br>1.25  | (289)<br>(290)<br>(291)<br>(292)   | 1.73<br>1.73<br>1.73<br>1.8   | (307)<br>(308)<br>(309)<br>(310)   | 1.8<br>1.73<br>1.66<br>1.66   | (325)<br>(326)<br>(327)<br>(327)   | 15.5<br>16.2<br>15.5<br>10.4  | (343)<br>(344)<br>(345)<br>(345)  | 4.38<br>4.04<br>4.04  |
| ) 1.26<br>) 1.14<br>) 1.14<br>) 1.14  | (109) 1.7<br>(110) 1.8<br>(111) 2.37<br>(112) 2.02  | (127) (<br>(128) (<br>(129) (<br>(130) (  | 0.94<br>0.85<br>0.825<br>0.91  | (145)<br>(146)<br>(147)<br>(148)  | 1.59<br>1.59<br>2.1<br>2.55   | (163)<br>(164)<br>(165)  | 0.96<br>1.02<br>0.91<br>0.8  | (271)<br>(272)<br>(273)<br>(274)<br>(274)<br>(275)  | 1.52<br>1.39<br>1.23<br>1.25<br>1.25  | (289)<br>(290)<br>(291)<br>(292)<br>(293)  | 1.73<br>1.73<br>1.73<br>1.8<br>1.8  | (307)<br>(308)<br>(309)<br>(311)   | 1.8<br>1.73<br>1.66<br>1.66<br>1.66   | (325)<br>(325)<br>(327)<br>(328)<br>(328)<br>(329)   | 15.5<br>16.2<br>13.5<br>10.4<br>8.5   | (343)<br>(344)<br>(345)   | 4.38<br>4.38<br>4.04<br>4.04<br>5.72  |
| ) 1.26<br>) 1.14<br>) 1.14<br>) 1.14<br>) 1.26  | (109) 1.7<br>(110) 1.8<br>(111) 2.37<br>(112) 2.02<br>(113) 2.74  | (127) (<br>(129) (<br>(129) (<br>(130) (<br>(131) (   | 0.94<br>0.85<br>0.825<br>0.91<br>0.96  | (145)<br>(146)<br>(147)<br>(148)<br>(149)   | 1.59<br>1.59<br>2.1<br>2.55<br>2.37   | (163)<br>(164)<br>(165)<br>(166)   | 0.96<br>1.02<br>0.91<br>0.8<br>0.8   | (271)<br>(272)<br>(275)<br>(274)<br>(275)<br>(275)  | 1.52<br>1.39<br>1.23<br>1.25<br>1.25<br>1.25<br>1.2   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)   | 1.73<br>1.73<br>1.73<br>1.8<br>1.8<br>1.8<br>5.34   | (307)<br>(308)<br>(309)<br>(310)<br>(312)  | 1.8<br>1.73<br>1.66<br>1.66<br>1.66<br>1.64   | (325)<br>(325)<br>(327)<br>(328)<br>(329)<br>(329)<br>(330)  | 12.5<br>16.2<br>17.5<br>10.4<br>8.5<br>8.5  | (343)<br>(344)<br>(345)<br>(345)<br>(347)<br>(348)  | 4.38<br>4.04<br>4.04<br>5.72<br>3.42  |
| ) 1.26<br>) 1.14<br>) 1.14<br>) 1.14<br>) 1.26<br>) 1.39  | (109) 1.7<br>(110) 1.8<br>(111) 2.37<br>(112) 2.02<br>(113) 2.74<br>(114) 2.74  | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)  | 0.94<br>0.85<br>0.825<br>0.91<br>0.96<br>0.85  | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)  | 1.59<br>1.59<br>2.1<br>2.55<br>2.37<br>1.95   | (163)<br>(164)<br>(165)<br>(166)<br>(157)  | 0.76<br>1.02<br>0.71<br>0.8<br>0.7   | (271)<br>(272)<br>(273)<br>(274)<br>(274)<br>(275)<br>(275)<br>(277)  | 1.52<br>1.39<br>1.23<br>1.25<br>1.25<br>1.25<br>1.25  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)   | 1.73<br>1.73<br>1.73<br>1.8<br>1.8<br>5.34<br>8   | (307)  (308)  (509)  (510)  (511)  (312)  (313)  | 1.8<br>1.73<br>1.66<br>1.66<br>1.66<br>1.64<br>1.64   | (325)<br>(325)<br>(327)<br>(328)<br>(329)<br>(330)<br>(331)  | 12.5<br>16.2<br>13.5<br>10.4<br>8.5<br>8.5<br>22.7  | (343)<br>(344)<br>(345)<br>(345)<br>(345)<br>(347)<br>(348)<br>(349)  | 4.38<br>4.04<br>4.04<br>5.72<br>5.42<br>5.42  |
| ) 1.26<br>) 1.14<br>) 1.14<br>) 1.14<br>) 1.14<br>) 1.26<br>) 1.37<br>) 1.65  | (109) 1.7<br>(110) 1.8<br>(111) 2.37<br>(112) 2.02<br>(113) 2.74<br>(114) 2.74<br>(115) 2.74  | (127)<br>(128)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)   | 0.94<br>0.85<br>0.825<br>0.91<br>0.96<br>0.85<br>0.85  | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(149)<br>(150)<br>(151)  | 1.59<br>1.59<br>2.1<br>2.55<br>2.37<br>1.95<br>1.73   | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)   | 0.76<br>1.02<br>0.71<br>0.8<br>0.7<br>0.7  | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(275)<br>(275)<br>(277)<br>(278)  | 1.52<br>1.39<br>1.23<br>1.25<br>1.26<br>1.26<br>1.22<br>1.37  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)<br>(296)  | 1.73<br>1.73<br>1.73<br>1.8<br>1.8<br>1.8<br>5.54<br>8<br>8   | (307)  (308)  (509)  (510)  (311)  (312)  (313)  (314)   | 1.8<br>1.73<br>1.66<br>1.66<br>1.66<br>1.64<br>1.64<br>1.66   | (325)<br>(325)<br>(327)<br>(328)<br>(329)<br>(329)<br>(330)<br>(331)<br>(332)  | 15.5<br>16.2<br>15.5<br>10.4<br>8.5<br>8.5<br>20.7<br>24                                      | (343)<br>(744)<br>(745)<br>(745)<br>(746)<br>(746)<br>(746)<br>(750)  | 4.38<br>4.38<br>4.04<br>5.72<br>5.42<br>5.42<br>5.42<br>5.42  |
| ) 1.26<br>) 1.14<br>) 1.14<br>) 1.14<br>) 1.26<br>) 1.87<br>) 1.66<br>) 1.95  | (109) 1.7<br>(110) 1.8<br>(111) 2.37<br>(112) 2.02<br>(113) 2.74<br>(114) 2.74<br>(115) 2.74<br>(115) 2.74  | (127)<br>(129)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)  | 0.94<br>0.85<br>0.825<br>0.91<br>0.96<br>0.85<br>0.75<br>0.45  | (145)<br>(144)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(151)  | 1.59<br>1.59<br>2.1<br>2.55<br>2.37<br>1.95<br>1.73<br>1.52   | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(169)  | 0.76<br>1.02<br>0.91<br>0.8<br>0.7<br>0.7<br>0.7   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(275)<br>(277)<br>(277)<br>(279)  | 1.52<br>1.39<br>1.23<br>1.25<br>1.25<br>1.25<br>1.25<br>1.37<br>1.39  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)<br>(296)<br>(296)<br>(297)  | 1.73<br>1.73<br>1.73<br>1.8<br>1.8<br>1.8<br>5.54<br>8<br>6.9<br>5.97   | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)  | 1.8<br>1.73<br>1.66<br>1.65<br>1.66<br>1.66<br>1.66<br>1.66<br>1.59<br>1.52   | (325)<br>(326)<br>(327)<br>(328)<br>(328)<br>(329)<br>(332)<br>(332)<br>(332)<br>(333)   | 13.5<br>16.2<br>15.5<br>10.4<br>8.5<br>8.5<br>22.7<br>24<br>18.2                              | (343)<br>(344)<br>(345)<br>(345)<br>(347)<br>(348)<br>(350)<br>(350)<br>(351)   | 4.38<br>4.04<br>4.04<br>5.72<br>5.42<br>5.42<br>5.42<br>5.42<br>5.42<br>5.42  |
| ) 1.26<br>) 1.14<br>) 1.14<br>) 1.14<br>) 1.26<br>) 1.37<br>) 1.66<br>3) 1.95<br>) 2.21   | (109) 1.7 $(110) 1.8$ $(111) 2.37$ $(112) 2.02$ $(113) 2.74$ $(114) 2.74$ $(115) 2.74$ $(115) 2.74$ $(116) 2.74$ $(116) 2.74$   | (127) (<br>(129) (<br>(129) (<br>(130) (<br>(131) (<br>(132) (<br>(133) (<br>(133) (<br>(134) (<br>(135) (  | 0.94<br>0.85<br>0.825<br>0.91<br>0.96<br>0.85<br>0.75<br>0.45<br>0.45  | (145)<br>(144)<br>(147)<br>(148)<br>(147)<br>(150)<br>(151)<br>(151)<br>(152)<br>(153)                            | 1.59<br>1.59<br>2.1<br>2.55<br>2.37<br>1.95<br>1.73<br>1.52<br>1.33   | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(169)<br>(169)<br>(170)<br>(171)                                     | 0.76<br>1.02<br>0.91<br>0.8<br>0.7<br>0.7<br>0.7   | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(275)<br>(277)<br>(277)<br>(279)<br>(290)                                     | 1.52<br>1.39<br>1.23<br>1.25<br>1.25<br>1.26<br>1.20<br>1.37<br>1.36<br>1.26                                  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(293)<br>(295)<br>(295)<br>(296)<br>(297)<br>(298)   | 1.73<br>1.73<br>1.73<br>1.8<br>1.8<br>5.34<br>8<br>6.9<br>5.97<br>5.13  | (307)<br>(308)<br>(709)<br>(710)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)   | 1.8<br>1.73<br>1.66<br>1.66<br>1.66<br>1.64<br>1.64<br>1.59<br>1.52<br>1.52   | (325)<br>(326)<br>(327)<br>(327)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(334)   | 13.5<br>16.2<br>13.5<br>10.4<br>8.5<br>22.7<br>24<br>18.2<br>13.5                             | (343)<br>(744)<br>(745)<br>(745)<br>(748)<br>(748)<br>(748)<br>(748)<br>(749)<br>(750)<br>(751)<br>(752)  | 4.38<br>4.38<br>4.04<br>5.42<br>5.42<br>3.42<br>3.42<br>3.42<br>3.42<br>3.42  |
| ) $1.26$<br>) $1.14$<br>) $1.14$<br>) $1.14$<br>) $1.26$<br>) $1.39$<br>) $1.66$<br>3) $1.95$<br>) $2.21$<br>) $2.21$   | (109) 1.7 $(110) 1.8$ $(111) 2.37$ $(112) 2.02$ $(113) 2.74$ $(114) 2.74$ $(115) 2.74$ $(115) 2.74$ $(116) 2.74$ $(116) 2.74$ $(116) 2.74$  | (127) (<br>(129) (<br>(129) (<br>(131) (<br>(131) (<br>(133) (<br>(133) (<br>(134) (<br>(135) (<br>(135) (  | 0.94<br>0.85<br>0.825<br>0.91<br>0.96<br>0.85<br>0.75<br>0.45<br>0.4<br>0.4  | (145)<br>(144)<br>(144)<br>(148)<br>(149)<br>(150)<br>(151)<br>(152)<br>(153)<br>(154)                            | 1.59<br>1.59<br>2.1<br>2.55<br>2.37<br>1.95<br>1.73<br>1.52<br>1.33<br>1.2  | (163)<br>(164)<br>(165)<br>(165)<br>(168)<br>(168)<br>(169)<br>(149)<br>(170)<br>(171)<br>(172)                            | 0.76<br>1.02<br>0.71<br>0.8<br>0.8<br>0.7<br>0.7<br>0.7<br>0.6<br>0.6<br>0.512                         | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(275)<br>(277)<br>(278)<br>(279)<br>(280)<br>(281)                            | 1.52<br>1.39<br>1.23<br>1.25<br>1.25<br>1.2<br>1.39<br>1.36<br>1.26<br>1.14                                   | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(295)<br>(295)<br>(295)<br>(297)<br>(298)<br>(299)  | 1.73<br>1.73<br>1.22<br>1.8<br>1.8<br>5.34<br>8<br>6.9<br>5.97<br>5.13<br>4.38  | (307)<br>(308)<br>(309)<br>(310)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)<br>(315)  | 1.8<br>1.73<br>1.66<br>1.66<br>1.66<br>1.66<br>1.66<br>1.59<br>1.52<br>1.95<br>4.04   | (325)<br>(326)<br>(327)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(334)<br>(335)   | 10.5<br>16.2<br>10.5<br>10.4<br>8.5<br>20.7<br>24<br>18.2<br>13.5<br>7.8                      | (343)<br>(744)<br>(745)<br>(745)<br>(746)<br>(746)<br>(746)<br>(746)<br>(746)<br>(756)<br>(752)<br>(752)<br>(752)   | 4.38<br>4.38<br>4.04<br>5.72<br>5.42<br>5.42<br>5.42<br>3.42<br>3.42<br>3.42<br>3.42  |
| ) 1.26<br>) 1.14<br>) 1.14<br>) 1.14<br>) 1.14<br>) 1.26<br>) 1.37<br>) 1.66<br>() 1.95<br>) 2.21<br>) 2.21   | (109) 1.7<br>(110) 1.8<br>(111) 2.37<br>(112) 2.02<br>(113) 2.74<br>(114) 2.74<br>(115) 2.74<br>(115) 2.74<br>(116) 2.74<br>(117) 2.1<br>(118) 2.37<br>(119) 1.73   | (127) (<br>(128) (<br>(129) (<br>(131) (<br>(132) (<br>(133) (<br>(133) (<br>(134) (<br>(135) (<br>(135) (<br>(135) (<br>(135) (<br>(135) (<br>(137) ())))))))))))))))))))))))))))))))))) | 0.94<br>0.85<br>0.825<br>0.91<br>0.95<br>0.75<br>0.45<br>0.45<br>0.4<br>0.56   | (145)<br>(146)<br>(147)<br>(148)<br>(149)<br>(150)<br>(151)<br>(155)  | 1.59<br>1.59<br>2.1<br>2.55<br>2.37<br>1.95<br>1.73<br>1.32<br>1.33<br>1.2<br>1.2                                 | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(169)<br>(169)<br>(177)<br>(172)<br>(172)                            | 0.76<br>1.02<br>0.71<br>0.8<br>0.7<br>0.7<br>0.7<br>0.6<br>0.512<br>0.51                               | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(277)<br>(276)<br>(276)<br>(276)<br>(2611)<br>(281)<br>(282)                  | 1.52<br>1.39<br>1.23<br>1.25<br>1.25<br>1.25<br>1.39<br>1.39<br>1.39<br>1.36<br>1.26<br>1.14<br>1.52          | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(293)<br>(293)<br>(293)<br>(293)<br>(294)<br>(297)<br>(298)<br>(299)<br>(290)  | 1.73<br>1.73<br>1.73<br>1.8<br>1.8<br>5.34<br>8<br>6.9<br>5.97<br>5.97<br>5.13<br>4.39<br>3.42                        | (307)<br>(308)<br>(309)<br>(316)<br>(311)<br>(312)<br>(313)<br>(314)<br>(314)<br>(314)<br>(314)<br>(318)   | 1.8<br>1.73<br>1.66<br>1.66<br>1.66<br>1.66<br>1.66<br>1.59<br>1.52<br>1.95<br>4.04<br>4.38   | (325)<br>(326)<br>(327)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(334)<br>(335)<br>(335)  | 10.5<br>16.2<br>10.4<br>0.5<br>8.5<br>20.7<br>24<br>10.2<br>13.5<br>13.5<br>8.5               | (343)<br>(744)<br>(745)<br>(745)<br>(746)<br>(746)<br>(746)<br>(746)<br>(746)<br>(747)<br>(746)<br>(747)<br>(747)<br>(747)<br>(747)<br>(747)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(745)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(755)<br>(75)<br>(7 | 4.388<br>4.04<br>4.04<br>5.42<br>5.42<br>5.42<br>3.42<br>3.42<br>3.42<br>3.42<br>3.42<br>3.42<br>3.42<br>3  |
| ) 1.26<br>) 1.14<br>) 1.14<br>) 1.14<br>) 1.26<br>) 1.37<br>) 1.65<br>) 1.95<br>) 2.21<br>) 2.21<br>) 2.1<br>2) 1.95  | $\begin{array}{c} (109) & 1.7 \\ (110) & 1.8 \\ (111) & 2.37 \\ (112) & 2.02 \\ (113) & 2.74 \\ (114) & 2.74 \\ (115) & 2.74 \\ (115) & 2.74 \\ (116) & 2.74 \\ (116) & 2.74 \\ (117) & 2.1 \\ (118) & 2.37 \\ (119) & 1.73 \\ (120) & 1.95 \end{array}$                                | (127)<br>(129)<br>(129)<br>(130)<br>(131)<br>(132)<br>(133)<br>(134)<br>(135)<br>(134)<br>(135)<br>(136)  | 0.94<br>0.85<br>0.825<br>0.91<br>0.96<br>0.85<br>0.75<br>0.45<br>0.4<br>0.56<br>0.512  | (145)<br>(144)<br>(147)<br>(148)<br>(147)<br>(151)<br>(151)<br>(151)<br>(155)<br>(155)<br>(156)                   | 1.59<br>1.59<br>2.1<br>2.55<br>2.37<br>1.95<br>1.73<br>1.33<br>1.2<br>1.24<br>1.33                                | (163)<br>(164)<br>(165)<br>(166)<br>(167)<br>(168)<br>(168)<br>(168)<br>(169)<br>(170)<br>(171)<br>(172)<br>(173)<br>(174) | 0.76<br>1.02<br>0.71<br>0.8<br>0.7<br>0.7<br>0.7<br>0.6<br>0.6<br>0.512<br>0.56                        | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(276)<br>(277)<br>(279)<br>(280)<br>(281)<br>(282)<br>(282)                   | 1.52<br>1.39<br>1.25<br>1.25<br>1.25<br>1.33<br>1.33<br>1.33<br>1.33<br>1.34<br>1.4<br>1.52<br>2.74           | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(293)<br>(293)<br>(294)<br>(295)<br>(296)<br>(297)<br>(298)<br>(298)<br>(299)<br>(298)<br>(290)<br>(300)  | 1.73<br>1.73<br>1.72<br>1.8<br>1.8<br>5.54<br>8<br>6.9<br>5.97<br>5.13<br>4.39<br>3.42<br>3.15                        | (307)<br>(308)<br>(309)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)<br>(315)<br>(314)<br>(317)<br>(318)<br>(319)                                     | 1.8<br>1.73<br>1.66<br>1.66<br>1.66<br>1.66<br>1.66<br>1.66<br>1.59<br>1.52<br>1.93<br>4.04<br>4.38<br>4.04                         | (325)<br>(325)<br>(327)<br>(329)<br>(329)<br>(330)<br>(330)<br>(332)<br>(333)<br>(334)<br>(335)<br>(336)<br>(337)  | 10.5<br>16.2<br>10.5<br>10.5<br>8.5<br>224<br>18.5<br>24<br>18.5<br>8.5<br>13.5<br>8.5<br>7.4 | (343)<br>(744)<br>(745)<br>(745)<br>(747)<br>(748)<br>(747)<br>(748)<br>(747)<br>(748)<br>(747)<br>(748)<br>(751)<br>(751)<br>(752)<br>(754)<br>(754)<br>(754)  | 4.388<br>4.04<br>4.04<br>1.72<br>3.42<br>3.42<br>3.42<br>3.42<br>3.42<br>3.42<br>3.45<br>3.15   |
| ) 1.26<br>) 1.14<br>) 1.14<br>) 1.14<br>) 1.26<br>) 1.37<br>) 1.65<br>) 1.95<br>) 2.21<br>) 2.21<br>) 2.21<br>2) 1.95<br>5) 1.8   |   | (127) (<br>(129) (<br>(129) (<br>(130) (<br>(131) (<br>(133) (<br>(133) (<br>(134) (<br>(135) (<br>(135) (<br>(135) (<br>(135) (<br>(137) (<br>(138) (<br>(139) (                         | 0.94<br>0.85<br>0.85<br>0.94<br>0.95<br>0.75<br>0.45<br>0.45<br>0.45<br>0.4<br>0.54<br>0.54<br>0.512<br>0.5                                  | (145)<br>(144)<br>(147)<br>(148)<br>(151)<br>(151)<br>(152)<br>(153)<br>(154)<br>(155)<br>(156)                   | 1.59<br>1.59<br>2.1<br>2.55<br>2.37<br>1.95<br>1.33<br>1.32<br>1.26<br>1.33<br>1.2<br>1.33<br>1.2                 | (163)<br>(164)<br>(165)<br>(166)<br>(168)<br>(168)<br>(168)<br>(170)<br>(170)<br>(171)<br>(172)<br>(173)<br>(174)          | 0.76<br>1.02<br>0.71<br>0.8<br>0.7<br>0.7<br>0.7<br>0.6<br>0.512<br>0.51<br>0.56<br>0.7                | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(276)<br>(277)<br>(276)<br>(260)<br>(281)<br>(281)<br>(282)<br>(283)<br>(283) | 1.52<br>1.39<br>1.25<br>1.25<br>1.25<br>1.25<br>1.25<br>1.39<br>1.39<br>1.39<br>1.36<br>1.14<br>1.52<br>2.94  | (289)<br>(290)<br>(291)<br>(291)<br>(291)<br>(295)<br>(295)<br>(296)<br>(296)<br>(297)<br>(298)<br>(299)<br>(299)<br>(300)<br>(300)<br>(302)   | 1.73<br>1.73<br>1.73<br>1.8<br>5.34<br>8<br>6.9<br>5.97<br>5.13<br>4.39<br>3.42<br>3.42<br>3.42<br>3.45<br>2.74       | (307)<br>(308)<br>(509)<br>(510)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)<br>(315)<br>(318)<br>(319)<br>(320)                                     | 1.8<br>1.75<br>1.66<br>1.66<br>1.66<br>1.66<br>1.66<br>1.52<br>1.95<br>4.08<br>4.08<br>4.04   | (325)<br>(325)<br>(327)<br>(329)<br>(329)<br>(321)<br>(321)<br>(323)<br>(323)<br>(324)<br>(335)<br>(336)<br>(337)<br>(338)                                     | 10.5<br>16.5<br>10.4<br>8.5<br>224<br>18.2<br>24<br>13.5<br>8.5<br>7.8<br>8.5<br>4.4          | (343)<br>(744)<br>(745)<br>(745)<br>(746)<br>(748)<br>(748)<br>(746)<br>(756)<br>(755)<br>(755)<br>(755)<br>(755)   | 4.388<br>4.04<br>4.04<br>5.72<br>5.42<br>5.42<br>5.42<br>5.42<br>5.42<br>5.42<br>5.42<br>5.4  |
| ) $1.26$<br>) $1.14$<br>) $1.14$<br>) $1.14$<br>) $1.26$<br>) $1.37$<br>) $1.66$<br>3) $1.95$<br>) $2.21$<br>) $2.21$<br>) $2.12$<br>1.95<br>3) $1.8$   | (109) 1.7 $(110) 1.8$ $(111) 2.37$ $(112) 2.02$ $(113) 2.74$ $(114) 2.74$ $(115) 2.74$ $(116) 2.74$ $(116) 2.74$ $(116) 2.74$ $(116) 2.74$ $(117) 2.1$ $(118) 2.37$ $(119) 1.73$ $(120) 1.93$ $(121) 1.52$ $(122) 1.59$   | (127) (<br>(128) (<br>(129) (<br>(131) (<br>(131) (<br>(133) (<br>(133) (<br>(134) (<br>(135) (<br>(135) (<br>(135) (<br>(135) (<br>(137) (<br>(138) (<br>(139) (<br>(140) (              | 0.94<br>0.825<br>0.925<br>0.94<br>0.85<br>0.75<br>0.45<br>0.45<br>0.45<br>0.4<br>0.56<br>0.512<br>0.6<br>0.6                                 | (145)<br>(144)<br>(147)<br>(148)<br>(150)<br>(151)<br>(152)<br>(153)<br>(154)<br>(155)<br>(156)<br>(157)          | 1.59<br>1.59<br>2.1<br>2.55<br>2.37<br>1.95<br>1.73<br>1.52<br>1.33<br>1.2<br>1.23<br>1.23<br>1.33                | (163)<br>(164)<br>(165)<br>(166)<br>(168)<br>(168)<br>(169)<br>(170)<br>(171)<br>(172)<br>(173)<br>(174)<br>(175)<br>(176) | 0.76<br>1.02<br>0.71<br>0.8<br>0.7<br>0.7<br>0.6<br>0.6<br>0.512<br>0.51<br>0.56<br>0.7<br>1.2         | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(276)<br>(277)<br>(279)<br>(280)<br>(281)<br>(282)<br>(283)<br>(283)          | 1.52<br>1.39<br>1.25<br>1.25<br>1.25<br>1.25<br>1.25<br>1.39<br>1.39<br>1.36<br>1.14<br>1.52<br>2.74<br>2.74  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(295)<br>(294)<br>(296)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(301)<br>(301)<br>(302)<br>(303)                   | 1.73<br>1.73<br>1.73<br>1.8<br>5.54<br>8<br>6.9<br>5.13<br>4.39<br>5.13<br>4.39<br>3.42<br>3.15<br>2.74<br>2.37       | (307)<br>(308)<br>(509)<br>(511)<br>(312)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)<br>(315)<br>(314)<br>(317)<br>(318)<br>(319)<br>(320)<br>(321)          | 1.8<br>1.73<br>1.66<br>1.66<br>1.66<br>1.66<br>1.66<br>1.52<br>1.95<br>4.04<br>4.38<br>4.04<br>3.72                                 | (325)<br>(326)<br>(327)<br>(329)<br>(329)<br>(330)<br>(331)<br>(332)<br>(334)<br>(335)<br>(335)<br>(335)<br>(335)<br>(337)<br>(338)<br>(339)                   | 10.5<br>16.5<br>10.4<br>0.5<br>20.7<br>248.2<br>13.5<br>8.5<br>7.4<br>5.97<br>6.97            | (343)<br>(744)<br>(745)<br>(745)<br>(746)<br>(746)<br>(746)<br>(746)<br>(755)<br>(7552)<br>(7552)<br>(7553)<br>(7554)<br>(7554)<br>(7554)<br>(7554)   | 4.38<br>4.09<br>1.09<br>1.2.34<br>4.09<br>1.2.34<br>3.49<br>1.2.3<br>3.49<br>1.2.3<br>3.49<br>1.2.3<br>3.49<br>1.5<br>3.49<br>1.5<br>5.15<br>5.13 |
| $\begin{array}{c} 1 & 1.26 \\ 21 & 1.14 \\ 31 & 1.14 \\ 41 & 1.14 \\ 41 & 1.26 \\ 51 & 1.37 \\ 71 & 1.66 \\ 81 & 1.95 \\ 71 & 1.66 \\ 83 & 1.95 \\ 71 & 1.61 \\ 12.1 \\ 2.1 \\ 2.1 \\ 2.1 \\ 2.1 \\ 1.95 \\ 31 & 1.8 \\ 41 & 1.73 \\ 51 & 1.59 \end{array}$ | $\begin{array}{c} (109) & 1.7 \\ (110) & 1.8 \\ (111) & 2.37 \\ (112) & 2.02 \\ (113) & 2.74 \\ (114) & 2.74 \\ (115) & 2.74 \\ (115) & 2.74 \\ (116) & 2.74 \\ (117) & 2.1 \\ (118) & 2.37 \\ (119) & 1.73 \\ (120) & 1.95 \\ (121) & 1.52 \\ (122) & 1.59 \\ (123) & 1.3 \end{array}$ | (127)<br>(128)<br>(129)<br>(131)<br>(131)<br>(133)<br>(133)<br>(134)<br>(135)<br>(135)<br>(137)<br>(138)<br>(137)<br>(138)<br>(137)<br>(140)  | 0.94<br>0.85<br>0.825<br>0.91<br>0.95<br>0.75<br>0.45<br>0.45<br>0.45<br>0.4<br>0.54<br>0.54<br>0.54<br>0.54                                 | (145)<br>(144)<br>(147)<br>(148)<br>(150)<br>(151)<br>(152)<br>(155)<br>(155)<br>(155)<br>(155)<br>(158)<br>(157) | 1.59<br>1.59<br>2.1<br>2.55<br>2.37<br>1.95<br>1.73<br>1.32<br>1.33<br>1.2<br>1.33<br>1.39<br>1.33<br>1.39        | (163)<br>(164)<br>(165)<br>(166)<br>(168)<br>(169)<br>(170)<br>(171)<br>(172)<br>(173)<br>(174)<br>(177)                   | 0.76<br>1.02<br>0.71<br>0.8<br>0.7<br>0.7<br>0.6<br>0.51<br>0.51<br>0.56<br>0.7<br>1.2<br>1.8          | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(276)<br>(277)<br>(279)<br>(280)<br>(281)<br>(282)<br>(282)                   | 1.52<br>1.39<br>1.25<br>1.25<br>1.25<br>1.25<br>1.25<br>1.39<br>1.39<br>1.36<br>1.14<br>1.52<br>2.74<br>2.74  | (289)<br>(290)<br>(291)<br>(292)<br>(293)<br>(294)<br>(294)<br>(295)<br>(295)<br>(295)<br>(295)<br>(295)<br>(297)<br>(298)<br>(298)<br>(297)<br>(298)<br>(297)<br>(298)<br>(200)<br>(301)<br>(302)<br>(303)<br>(304) | 1.73<br>1.73<br>1.73<br>1.8<br>1.8<br>5.54<br>8<br>5.97<br>5.13<br>6.9<br>5.13<br>4.39<br>3.15<br>2.74<br>2.37<br>2.1 | (307)<br>(308)<br>(309)<br>(311)<br>(312)<br>(313)<br>(314)<br>(314)<br>(314)<br>(314)<br>(316)<br>(317)<br>(318)<br>(319)<br>(320)<br>(322)                   | $\begin{array}{c} 1.8\\ 1.75\\ 1.66\\ 1.66\\ 1.66\\ 1.66\\ 1.59\\ 1.52\\ 1.95\\ 4.58\\ 4.58\\ 4.58\\ 4.58\\ 4.58\\ 3.72\end{array}$ | (325)<br>(325)<br>(327)<br>(329)<br>(330)<br>(331)<br>(332)<br>(333)<br>(334)<br>(335)<br>(335)<br>(336)<br>(337)<br>(339)<br>(340)                            | 10.5<br>16.5<br>10.5<br>10.5<br>10.5<br>10.5<br>10.5<br>10.5<br>10.5<br>10                    | $\begin{array}{c} (343)\\ (744)\\ (745)\\ (745)\\ (747)\\ (748)\\ (748)\\ (748)\\ (748)\\ (748)\\ (757)\\ (757)\\ (757)\\ (757)\\ (758)\\ (758)\end{array}$   | 4.38<br>4.004<br>2.304<br>4.004<br>2.3442<br>2.3442<br>2.3442<br>2.3442<br>2.3442<br>3.45<br>3.15<br>4.01<br>3.13                                 |
|   | (109) 1.7 $(110) 1.8$ $(111) 2.37$ $(112) 2.02$ $(113) 2.74$ $(114) 2.74$ $(115) 2.74$ $(116) 2.74$ $(116) 2.74$ $(116) 2.74$ $(116) 2.74$ $(117) 2.1$ $(118) 2.37$ $(119) 1.73$ $(120) 1.93$ $(121) 1.52$ $(122) 1.59$   | (127) (<br>(128) (<br>(129) (<br>(131) (<br>(131) (<br>(133) (<br>(133) (<br>(134) (<br>(135) (<br>(135) (<br>(135) (<br>(135) (<br>(137) (<br>(138) (<br>(139) (<br>(140) (              | 0.94<br>0.825<br>0.825<br>0.91<br>0.96<br>0.85<br>0.45<br>0.4<br>0.54<br>0.54<br>0.512<br>0.6<br>0.512<br>0.6<br>0.512<br>0.6<br>0.7<br>1.14 | (145)<br>(144)<br>(147)<br>(148)<br>(150)<br>(151)<br>(152)<br>(153)<br>(154)<br>(155)<br>(156)<br>(157)          | 1.59<br>1.59<br>2.1<br>2.55<br>2.37<br>1.95<br>1.73<br>1.52<br>1.33<br>1.2<br>1.33<br>1.39<br>1.33<br>1.2<br>1.08 | (163)<br>(164)<br>(165)<br>(166)<br>(168)<br>(168)<br>(169)<br>(170)<br>(171)<br>(172)<br>(173)<br>(174)<br>(175)<br>(176) | 0.76<br>1.02<br>0.71<br>0.8<br>0.7<br>0.7<br>0.6<br>0.512<br>0.51<br>0.56<br>0.7<br>1.2<br>1.8<br>1.87 | (271)<br>(272)<br>(273)<br>(274)<br>(275)<br>(275)<br>(276)<br>(277)<br>(279)<br>(280)<br>(281)<br>(282)<br>(283)<br>(283)          | 1.52<br>1.39<br>1.25<br>1.22<br>1.22<br>1.37<br>1.37<br>1.37<br>1.32<br>1.132<br>1.14<br>2.74<br>2.74<br>2.21 | (289)<br>(290)<br>(291)<br>(291)<br>(292)<br>(293)<br>(293)<br>(294)<br>(296)<br>(297)<br>(298)<br>(297)<br>(298)<br>(297)<br>(300)<br>(301)<br>(302)<br>(303)<br>(304)<br>(205)                                     | 1.73<br>1.73<br>1.73<br>1.8<br>5.54<br>8<br>6.9<br>5.13<br>4.39<br>5.13<br>4.39<br>3.42<br>3.15<br>2.74<br>2.37       | (307)<br>(308)<br>(309)<br>(311)<br>(312)<br>(313)<br>(314)<br>(315)<br>(314)<br>(315)<br>(314)<br>(317)<br>(318)<br>(317)<br>(320)<br>(321)<br>(322)<br>(323) | $\begin{array}{c} 1.8\\ 1.75\\ 1.66\\ 1.66\\ 1.66\\ 1.66\\ 1.59\\ 1.52\\ 1.95\\ 4.58\\ 4.58\\ 4.58\\ 4.58\\ 4.58\\ 3.72\end{array}$ | (325)<br>(325)<br>(327)<br>(329)<br>(329)<br>(330)<br>(330)<br>(332)<br>(334)<br>(335)<br>(337)<br>(338)<br>(339)<br>(339)<br>(339)<br>(340)<br>(340)<br>(341) | 10.5<br>16.5<br>10.4<br>0.5<br>20.7<br>248.2<br>13.5<br>8.5<br>7.4<br>5.97<br>6.97            | (343)<br>(344)<br>(345)<br>(345)<br>(347)<br>(347)<br>(347)<br>(347)<br>(347)<br>(350)<br>(354)<br>(354)<br>(354)<br>(354)<br>(359)   | 4.38<br>4.09<br>1.09<br>1.2.34<br>4.09<br>1.2.34<br>3.49<br>1.2.3<br>3.49<br>1.2.3<br>3.49<br>1.2.3<br>3.49<br>1.5<br>3.49<br>1.5<br>5.15<br>5.13 |

|       | at a sub-super | data | at | 12-hourly | intervals | far | Station: | 23D |  |
|-------|----------------|------|----|-----------|-----------|-----|----------|-----|--|
| Kiver | oischarge      | uata | ac | 12 1120 / |           |     | Period : | 5   |  |

k.

.

\_\_\_\_

River discharge data at 12-hourly intervals for Station: 23D Period : 6

|  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ |  | 39.7         (271)           35.3         (272)           35.3         (273)           40.4         (274)           45         (275)           40.4         (274)           45         (275)           40.4         (274)           45         (275)           40.4         (274)           24.6         (277)           29.8         (279)           29.8         (279)           20.4         (280)           27.8         (281)           26.5         (292)           24.6         (283)           23.3         (284)           23.3         (284)           20.4         (287)           20.4         (287)           29.2         (284) | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 20.4<br>19.2<br>18.2<br>17.1<br>17.1<br>16.2<br>16.2<br>16.2<br>15.2<br>14.3<br>14.3<br>14.3<br>13.5<br>11.9<br>11.1<br>11.1 | $\begin{array}{c} (307) \\ (208) \\ (209) \\ (310) \\ (312) \\ (312) \\ (312) \\ (313) \\ (314) \\ (314) \\ (314) \\ (314) \\ (312) \\ (318) \\ (319) \\ (320) \\ (321) \\ (322) \\ (322) \\ (324) \end{array}$ | 19.2<br>10.4<br>19.2<br>11.1<br>11.1<br>11.1<br>11.1<br>11.1<br>11.1<br>10.4<br>9.8<br>7.1<br>9.1<br>9.1<br>9.1<br>8.5<br>8.5<br>8 | (325)<br>(326)<br>(327)<br>(328)<br>(329)<br>(320)<br>(331)<br>(331)<br>(332)<br>(333)<br>(334)<br>(335)<br>(336)<br>(337)<br>(338)<br>(337)<br>(338)<br>(339)<br>(340)<br>(341)<br>(342) | 8<br>8<br>7.4<br>7.4<br>6.4<br>6.4<br>6.4<br>6.4<br>6.5<br>5.54<br>5.54 | (343)<br>(344)<br>(344)<br>(346)<br>(347)<br>(349)<br>(349)<br>(354)<br>(354)<br>(354)<br>(354)<br>(356)<br>(359)<br>(359)<br>(359) |  | A3.88 |
|--|--|--|---|--|--|---|--|---|---|---|--|-------|
|--|--|--|---|--|--|---|--|---|---|---|--|-------|

| 3.72<br>3.42<br>3.15<br>2.94<br>2.94<br>2.74<br>2.55<br>2.55 | ( 19)<br>( 20)<br>( 21)<br>( 22)<br>( 23)<br>( 23)<br>( 24)<br>( 25)<br>( 26) | 21.5<br>21.5<br>16.2<br>22.1<br>24.6<br>22.1<br>19.2<br>17.1                                | ( 37)<br>( 38)<br>( 39)<br>( 40)<br>( 41)<br>( 42)<br>( 43) | 6.4<br>5.77<br>5.97<br>5.54<br>5.54<br>5.54<br>5.54  | ( 55)<br>( 55)<br>( 57)<br>( 58)<br>( 59)<br>( 59)<br>( 60)<br>( 61) | 22.1<br>17.1<br>13.5<br>17.1<br>25.0<br>20.4<br>32.5 | ( 73)<br>( 74)<br>( 75)<br>( 74)<br>( 74)<br>( 77)<br>( 78)<br>( 79) | 10.4<br>10.4<br>9.8<br>9.8<br>10.4<br>11.9<br>14.3   |
|--|---|---|---|--|--|--|--|--|
| 3.15<br>2.94<br>2.94<br>2.74<br>2.55                         | (21)<br>(22)<br>(23)<br>(24)<br>(25)  | 16.2<br>22.1<br>24.6<br>22.1<br>19.2  | ( 39)<br>( 40)<br>( 41)<br>( 42)<br>( 43)                   | 5.97<br>5.97<br>5.54<br>5.54<br>5.54                 | ( 57)<br>( 58)<br>( 59)<br>( 60)                                     | 13.5<br>17.1<br>25.8<br>20.4                         | (75)<br>(74)<br>(77)<br>(78)   | 9.9<br>7.8<br>10.4<br>11.9                           |
| 2.94<br>2.94<br>2.74<br>2.55                                 | (22)<br>(23)<br>(24)<br>(25)  | 22.1<br>24.6<br>22.1<br>19.2  | (40)<br>(41)<br>(42)<br>(43)                                | 5.97<br>5.54<br>5.54<br>5.54                         | (58)<br>(59)<br>(60)   | 17.1<br>25.0<br>20.4                                 | (74)<br>(77)<br>(78)   | 7.8<br>10.4<br>11.9                                  |
| 2.94<br>2.74<br>2.55   | (23)<br>(24)<br>(25)  | 24.6<br>22.1<br>19.2  | (41)<br>(42)<br>(43)  | 5.54<br>5.54<br>5.54                                 | (59)<br>(60)   | 25.0<br>20.4   | (77)<br>(78)   | $10.4 \\ 11.9$                                       |
| 2.94<br>2.74<br>2.55   | (24)<br>(25)  | $22.1 \\ 19.2$  | (42)<br>(43)  | 5.54<br>5.54   | ( 60)  | 20.4   | (78)   | 11.9   |
| 2.74<br>2.55   | (24)<br>(25)  | 19.2  | (43)  | 5.54   | • •  |  | • • • •  |  |
| 2.55   | (25)  | 19.2  |   |  | (61)   | 32.5   | ( 79)  | 14.3   |
|  | •   |   |   |  |  |  |  |  |
|  |   |   | (44)  | 5.13   | ( 62)  | 46.6   | (80)   | 22.7   |
|  | •   |   |   |  | (63)   | 44.2   | ( 81)  | 40.4   |
|  | •   |   |   |  | • • •  |  | •  | 66   |
| 4.58   | •   |   |   |  | •  |  | • •  | 57.3   |
| 1.9  | (29)  | 11.1  | • • •   |  | • •  | -  | •  | 49,4   |
| 7,4  | ( 30)   | 9.3   | (48)  | 4.74   | •  |  | • - •  |  |
| 5.2  | (31)  | 8,5   | ( 49)   | 4.38   | ( 67)  | 22.1   | (85)   | 31.1   |
|  | ( 32)   | 8   | ( 50)   | 4.74   | ( 58)  | 19.2   | (86)   | 17.8   |
|  | •   | 8   | (51)  | 4.74   | ( 69)  | 16.2   | (87)   | 25.2   |
|  | •   | -   | • •   |  | ( 70)  | 14.3   | (88)   | 24   |
| -  |   |   |   |  |  |  |  | 24.6   |
|  | • - · ·   | - •   | • •   |  | •  | 4  |  | 27.1   |
|  |   | 4.30 (29)<br>1.9 (29)<br>7.4 (20)<br>5.2 (31)<br>4 (32)<br>7.1 (33)<br>0.4 (34)<br>7.8 (35) | $\begin{array}{cccccccccccccccccccccccccccccccccccc$        | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$                 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$                 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ |

-

| (191) | 18.2 | (199) 71.5  | (217)   | 45.8 | (235) | 30.4 | (253) | 26.5 |
|-------|------|-------------|---------|------|-------|------|-------|------|
| (192) | 18.2 | (200) 71.5  | (218)   | 42.7 | (254) | 42.7 | (254) | 27.5 |
| (183) | 21.5 | (201) 64.3  | (219)   | 41.2 | (207) | 78.1 | (255) | 28.4 |
| (184) |      | (202) 53.1  | (220)   | 38.9 | (238) | 80.9 | (256) | 29.1 |
| (185) |      | (20.3) 56.4 | (221)   | 36.7 | (239) | 58.1 | (257) | 27.8 |
| (18a) |      | (204) 372   | (222)   | 34.5 | (240) | 43.5 | (258) | 26.5 |
| (187) |      | (205) 209.8 | (223)   | 53.9 | (241) | 33.6 | (257) | 25.8 |
| (188) |      | (204) 213   | (224)   | 32,5 | (242) | 29.1 | (250) | 62.5 |
| (189) |      | (207) 258   | (225)   | 51.8 | (243) | 28.4 | (261) | 59.6 |
| (190) |      | (208) 218   | (226)   | 51.1 | (244) | 29.8 | (262) | 65.1 |
| (191) |      | (209) 153   | (227)   | 29.8 | (245) | 29.1 | (263) | 75.2 |
| (192) |      | (210) 112   | (228)   | 29.8 | (246) | 27.5 | (264) | 69.c |
| (193) |      | (211) 90.8  | (229)   | C9.8 | (247) | 26.5 | (265) | 52.2 |
| (194) |      | (212) 76 3  | 2 (230) | 29.1 | (248) | 25.8 | (256) | 40.4 |
| (175) | 91.8 | (213) 64.2  |         | 29.1 | (249) | 25.2 | (247) | 35.3 |
| (196) | 83.9 | (214) 58.1  | ·       | 29.8 | (250) | 25.2 | (26日) | 40.4 |
| (197) | 75.2 | (215) 53.1  |         | 29.1 | (251) | 25.2 | (269) | 49.2 |
| (198) | 76.2 | (216) 49    | (2:4)   | 29.8 | (252) | 25.2 | (270) | 57.3 |