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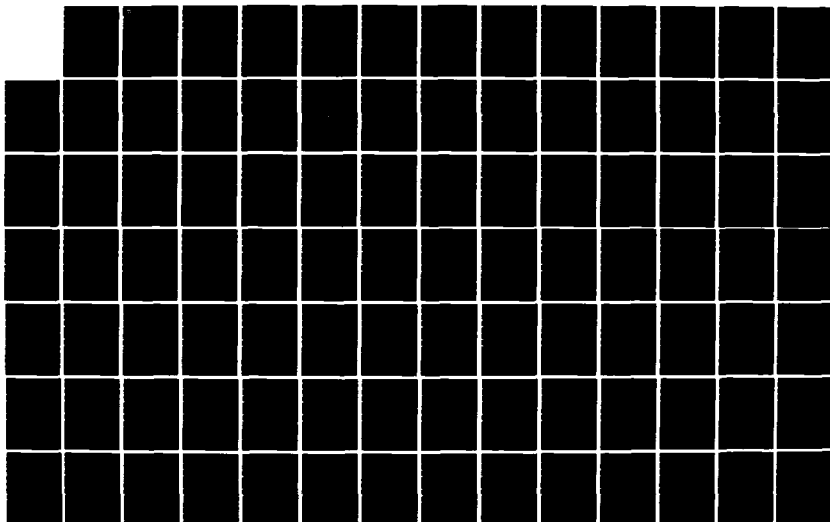
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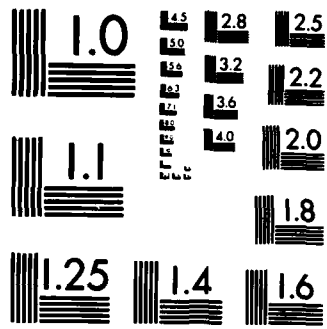
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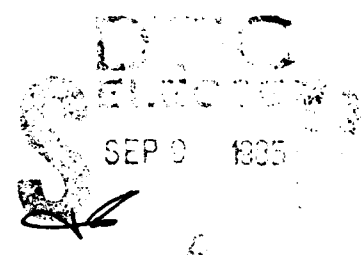
**The Hydrologic  
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AD-A158 888

# Water Supply Simulation

## Using HEC-5



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**August 1985**

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WATER SUPPLY SIMULATION USING HEC-5

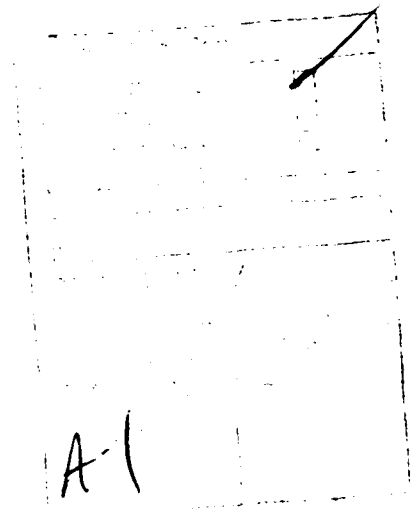
August 1985

The Hydrologic Engineering Center

Corps of Engineers

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# WATER SUPPLY SIMULATION USING HEC-5

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## FOREWORD

This document is intended to assist users of computer program HEC-5 who are engaged in modeling surface water systems for water supply. Using a single reservoir operation for illustration, the document describes the input data needed to utilize a variety of analysis capabilities available in HEC-5. Input data for multiple reservoir systems are similar to those for single reservoirs but include certain data which specify the system linkages and operation. A description of this information is also included. Two Appendices are part of the document. The first describes the method of automatically determining conservation storage. It was felt that such an explanation would be useful since the capability exists in HEC-5 to derive a number of important reservoir parameters and a better understanding of the methodology would be helpful. A second Appendix contains summary output for the runs developed to illustrate input preparation.

All data in this document were developed for and output from the March 1985 version of HEC-5 on the Hydrologic Engineering Center's (HEC) Harris 500. Older versions of the computer program may require somewhat different input or give somewhat different output.

Preparation of the input data, analysis of output, and research into some of the methodology used by HEC-5 was performed by Chau-ling Tyan, graduate student at the University of California, Davis. Subsequent modifications and invaluable assistance was provided by Richard Hayes, Marilyn Hurst and Teresa Bowen of the HEC staff. Bill S. Eichert, author of HEC-5 and Director of the Hydrologic Engineering Center, gave generously of his time in developing the routines, debugging tests, and in review and editing.

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## WATER SUPPLY SIMULATION USING HEC-5

### Introduction

It is the purpose of this document to illustrate the use of computer program HEC-5, Simulation of Flood Control and Conservation Systems, for simulating the operation of surface water reservoirs for water supply. HEC-5 is a widely used, comprehensive, computer model which has been used for a wide range of applications in flood control and hydroelectric power. Modifications to the program over the past few years have extended and improved its capability for water supply purposes. This document describes and illustrates this capability.

The principal components of a surface water reservoir operation which are necessary for simulations include: streamflow records, including local inflow between gaged points; physical and operational characteristics of system storage facilities, and in-stream, diversion and operation requirements at control points within the system. These components are common to all surface water simulations regardless of purpose. What differs with each purpose is the nature of the streamflow, operational criteria, and demand. For water supply, low-flow periods are of special concern because it is during these periods that the possibility of not meeting water supply needs is greatest. Low-flows normally have the characteristic that they are relatively constant over a week or month period and therefore monthly streamflows are commonly used in simulation. Also, low-flows are commonly within channel and consequently routing criteria and water surface elevations, which are especially significant in flood control simulation, are of less importance in water supply. Yet, low-flow, because it is low, can be significantly affected by local inflow, effluent discharge from waste-water treatment plants, seepage to or from a river, evaporation and other manmade and natural phenomena. Operating criteria for water supply is principally concerned with meeting demands over prolonged low-flow periods (droughts). Determining which is the critical low-flow period is itself part of the task of water supply simulation. For most streamflow records a number of possible critical periods exist. In addition, criteria needs to be developed to distinguish between what is "desired" and what is "required". What is desired can be supplied when there is ample conservation storage in the reservoir to meet demands. Desired flows will be released when the reservoir pool elevation is above the buffer level. Required flows have a higher priority than desired flows and are attempted to be met when the reservoir storage level is between the buffer and inactive levels.

This document is designed to illustrate how HEC-5 input data are to be prepared to model a variety of features often desired for water supply simulation. For each feature a number of options exist. A simulation, for example, may be run for a period of record, partial record, or critical period. Desired and required flow requirements may be specified as constant for the simulation period, vary monthly or vary by period. The same three options exist for specifying diversions. In addition, diversion may be a function of reservoir storage, or inflow. Optimization capability exists for determining minimum conservation storage requirements given flow and diversion needs. Conversely, the dependable desired flow, required flow or diversion at a reservoir may be determined given a specified conservation storage. The capability also exists in the March 1985 version of the program to optimize the yield at a downstream control point.



Most of the features and options described in this document are illustrated with single reservoir examples. They also apply to multiple-reservoir systems. Multiple-reservoirs also have operating features which are unique: parallel and tandem reservoir operations, for example. These features are also described and illustrated. Lastly, example output and the optimization methodology of the program are described in the Appendices.

Other capabilities at HEC which aid the user in creating input files are programs INFIVE and MATHPAK. INFIVE is an interactive program designed to generate a data file for input into the HEC-5 program. Through a series of questions and answers, a list of cards necessary to simulate the system is created, and optionally, variable names can be requested on a comment card for each card field.

MATHPAK allows the user to manipulate data stored in an HECDSS data file. The program can be useful in water supply simulations to compute natural flows, instream flows, diversions, etc., to be used as input into HEC-5.

A recent option to HEC-5 (but not illustrated in this document) is the capability to provide different priority releases by allowing reservoirs to be drawn down to a level specified on the CP card, field 7. This capability is in the March 1985 program version. More information on this option can be found in the March 1985 Exhibit 8 (Input Description).

### Basic Reservoir System

Input data. Figure 1 shows a schematic diagram of a single reservoir system. One downstream control point is specified at Control Point (CP) 213. Water supply requirements at CP 213 are met from conservation storage releases at the reservoir. Figure 2 shows the storage levels and volumes for the reservoir. Conservation storage is 71,200 acre-feet with 1700 acre-feet of it in the buffer zone. Releases to meet downstream water supply requirements are made from conservation storage. Tables 1 through 3 show data on the reservoir and downstream flow requirements. The elevation-area-storage-outflow data are necessary to define reservoir storage levels, to compute the volume evaporated, and to determine outflows under flood conditions. Net evaporation (Table 2) multiplied times the reservoir surface area is the volume lost from storage. Negative evaporation values indicate rainfall in excess of evaporation is occurring. The monthly desired flows, required flows and diversions in Table 3 are the average monthly water supply requirements at control point 213.

Monthly streamflow into the reservoir is shown in Table 4. All values are monthly averages. They cover the period October 1927 to September 1937, a low-flow period in the streamflow record. The full record is 1927-1977.

The foregoing data constitute the basic reservoir system to be simulated. Table 5 shows these data as input for the HEC-5 simulation model. In addition various job control data are also specified. The reader is referred to the HEC-5 Users Manual, Exhibit 8, Input Description (March 1985), for instructions on the preparation of these data.

## Simulation Period Options

It is often desired to select different periods of record for simulation or output. While the entire available record is commonly input, it may be that only a portion of that record is desired for computation or output. Two options exist for specifying shorter records: partial record and critical period. These, together with the option of using the entire record are described below.

Period of record. The basic reservoir system shown in Table 5 (Run 1) illustrates the use of a low-flow period for simulation. Partial HEC-5 output from Run 1 corresponding to Table 5 input is shown in Appendix B along with output from other examples (Runs 1-24). Data shown on the IN cards in Table 5 are inflow data to the reservoir for October 1927 to September 1937, a total of 120 monthly periods. The number of periods is specified in field 2 of the BF Card.

Partial record. The simulation period can be truncated and only part of the record used in the computations. This option is specified on the BF Card, field 6 (Table 6, Run 2). In this example the simulation period is truncated after 60 periods and only the first 60 monthly periods of inflow are used in the computations. See also description below of the use of negative value in field 5, J3 Card. This option should always be used to reduce computation time and output volume when making the first few runs for a new data set. When the operations and output are correct for the initial set of input (normally 12-30 periods), then the full period of simulation should be initiated by removing the ending period from field 6 of the BF card.

Critical period. Three options exist for selecting the period of low-flow referred to as the "critical period". The critical period can be selected from within the flow record (IN Cards) based upon the option specified. The three options are specified in field 5, J3 Card.

One option is to directly specify the critical period or any partial period desired. In this case the simulation output will be for the periods specified. Table 7 (Run 3) illustrates the option. A value, -10.060, is specified (J3 Card, field 5). This indicates the period to be simulated is from period 10 through 60 which corresponds to July 1928 through September 1932.

A second option for specifying critical period is to specify a specific reservoir drawdown duration. HEC-5 automatically examines the period of record and finds the beginning and ending periods for the duration specified corresponding to the minimum flow volume. To help insure the critical period is within this duration for the simulation run, five periods are added to the end and the beginning is set back to the first month of the simulation year (see J1 card, field 2). If the minimum flow duration is eight months (period 9 to 16) the ending period is extended five periods to period 21. If period 9 represents June 1928 and the month of the first monthly value of demand data (J1, field 2) is January then the beginning period is extended back to January 1928. This procedure of extension helps to insure that the low-flow period is properly bracketed. To specify this option the duration desired is entered in field 5, J3 Card.

A third critical period option is to use as the duration a preselected multiplier times the ratio of conservation storage to mean annual flow. The multiplier automatically used by the program is 70. It has been found from looking at numerous projects throughout the United States, that a reasonable estimate of critical period duration is the numerical value of 70 times the specified ratio. If the ratio of conservation storage to mean annual flow were .2 then the duration for the simulation run would be 14 months (assuming a monthly simulation). The beginning and ending periods of this duration would be those which correspond to the minimum flow volume for the 14 months duration which is determined in HEC-5 by examining the whole period of record. This option may be specified by using a 1 or 2 in field 5, J3 Card.

#### Required and Desired Flow Options

Instream flow demands may be specified at control points within the system being simulated. They may represent a variety of low-flow requirements: minimum flows for fishery or wildlife, navigation, stream recreation, minimum water quality flows, and various other water supply conditions. Two types of low-flow may be specified: minimum desired and minimum required. Minimum desired flows are those which are the target when reservoir storage is above the top of the buffer level. When streamflow is low and reservoir storage is low (below the top of the buffer) the minimum required flow allows the user to cut-back and reduce requirements allowing minimum needs to be met until supplies are replenished.

Four options exist for specifying required or desired flow: constant, monthly, period by period or seasonally. A constant value means that the required or desired flow is the same for each time period in the simulation. A monthly specification allows required or desired flows to vary from month to month (but not year to year). A period by period specification allows the user to vary the flow by period throughout the period or record. For example, a monthly desired or required flow can be varied each month and each year for the entire simulation period. In the seasonal option, up to 18 seasons (in number of days from January 1) can be defined on the CS card. Minimum desired or required flows (on QM cards) can vary throughout the year and the release is based on the reservoir level for the specified season.

Constant required and desired flow. The basic reservoir system (Table 5) illustrates the specification of constant desired and required flows. These values, 400 cfs and 100 cfs respectively, are shown on the CP Card for control point 213.

Monthly required and desired flow. To change desired or required flows from a constant to a monthly varying value QM Cards are used. An example is shown in Table 8 (Run 4) for desired flow. In this example desired flow varies by month and required flow is a constant 100 cfs.

When required flow varies by month and desired flow is constant, or when both required and desired flow vary by month it is necessary to put in a fictitious control point because only one QM array is available for a given

control point. Whenever desired flow is specified either constant (CP Card, field 3) or monthly varying (QM Cards), this array is used. Therefore, when specifying a minimum required flow varying monthly it is necessary to create a fictitious control point to use the QM array. Table 9 (Run 5) illustrates the input for specifying monthly varying required flow with constant desired flow. The monthly required flows are entered on the QM Cards for the control point 213. A negative value (-1) is entered in field 4 of the CP Card to indicate that the QM Cards will be used for required flow instead of desired flow. The constant desired flow is shown in field 3 of the CP Card for dummy location 212. Table 10 (Run 6) illustrates the input data where both required and desired flows vary monthly.

Period varying required and desired flow. Tables 11, 12, and 13 illustrate the manner of specifying period by period desired and required flows. Each period is assigned a minimum flow value on an MR Card. In Table 11 (Run 7) the desired flow varies by period and the required flow is a constant 100 cfs. When required flows vary by period and desired flows are also used then a fictitious (dummy) control point must be specified because there is only one MR array and it is normally used by the desired flow. The use of dummy control points is illustrated in Tables 12 (Run 8) and 13 (Run 9). As in the monthly varying illustration (Tables 9 and 10) a -1 in field 4 of the CP Card is required to indicate period varying required flows.

Seasonally varying required and desired flows. In addition to desired or required flows varying monthly, the user can also specify a seasonal rule curve to vary required or desired flows. Figure 4, Table 15 (Run 11) illustrate this option. This example, using additional RL cards and a CS card, also shows a conservation pool varying by season, though this is not required to vary the releases seasonally. The CS card for location 213 defines the seasons for each year (for the CG and QM cards) and the CG card specifies the elevations corresponding to the defined seasons. Each minimum desired flow given on the QM card corresponds to one seasonal guide curve on the CG card. To vary required flows instead of desired flows, use a -1 in field 4 of the CP card as previously illustrated for monthly varying flows (Tables 9 and 10).

Seasonally varying conservation and buffer pools.

Table 14 (Run 10) and Figure 3 illustrate the option of varying storage allocation levels which change during the year. Additional RL cards are required for each level; the first field of the additional RL card indicates the reservoir level number; field 2 is the control point number, the varying storages are given on fields 5-10. A second additional RL card with storages in fields 5-10 can be used if more than six storages are required. Seasons are specified on the CS card if the seasons are not monthly: field one indicates the number of seasons, (maximum of 11), Fields 2-19 are the cumulative number of days from the beginning of the calendar year for each season which correspond to the storages on the additional RL cards. This example illustrates a common method of storage allocation in the west where less flood control storage is required in the dry summer months, thereby increasing the top of conservation pool (level 3, J1.4) and top of buffer pools (level 2, J1.6).

## Diversion Options

Diversions allow water to be withdrawn from the main surface system to meet water supply needs elsewhere. There are three characteristics of a diversion which need to be specified: location, magnitude, and timing of source and return flow. A number of options exist for specifying each and these will be described and illustrated in the subsequent sections.

Diversions may be made at reservoirs and at downstream control points. Only one diversion can be made from a given location, but any number of diversions can return to a given location. Return flows must be downstream of the point of withdrawal (i.e., cards later in sequence) unless a special pumping option is specified (DR.7=-4). Both diversion and return flow locations must be designated as control points. Seepage from a river can be simulated by specifying a series of diversions at discrete control points along the river. The amount diverted at each point would equal the seepage rate for the reach of river represented by the point.

The magnitude of water diverted and returned may be expressed in several ways. It may be a direct quantity unrelated to anything except the water needs supplied by the diversion. Alternately, diversion may be a function of the flow at the control point; a function of the reservoir storage where water is diverted at a reservoir; or a function of off-peak energy in pumped storage projects. These options provide flexibility in relating diversions to in-stream and in-reservoir conditions.

Return flow is commonly expressed as a percentage of the diversion. This is usually adequate since what is returned is often a function of what is diverted. Thus, a 20% return could apply to each time period whether the diversion is constant, varies monthly, or by period. An additional characteristic of timing is the time lag or routing desired for return flow. When diverted flow travels out of the river and eventually returns, it may travel at a different rate than the river flow traveling from the diversion point to the return flow point. Consequently, routing criteria for the diverted flow may be specified on the DR card (only linear routing criteria can be used).

Constant diversion. Table 16 (Run 12) illustrates the use of the DR Card (field 8) to specify a constant diversion of 150 cfs each time period. A return flow of 20% is also specified (field 6). The flow is diverted at control point 4 and returned at control point 213 (fields 1 and 2). No routing is used either between the two control points or for the diversion (field 3, RT Card and DR Card).

Monthly varying diversion. A diversion varying by month may be specified by using the QD Card. This is illustrated in Table 17 (Run 13). Twelve monthly flow values are specified on the QD Cards beginning with January (Field 2, J1 Card). As shown in Table 17, field 7 of the DR Card is used to indicate that monthly diversions will be specified on QD cards for control point 213.

Period varying diversion. Period by period diversions are specified by using a -5 in field 7, DR Card. In this option the QD Cards, with period varying diversions, are inserted after the BF Card. Table 18 (Run 14) shows the input data for this option.

Diversion as a function of reservoir storage. Diversions are sometimes a function of reservoir storage. Such diversions must be at a reservoir and return flow must be downstream. Field 7 of the DR Card is used to indicate that diversions will be a function of storage. The value -2 is entered in field 7. The diversion rates are specified on the RD Card for corresponding storages on the RS Card. Table 19 (Run 15) illustrates this capability.

Diversion of flood waters at a reservoir. A variation of the reservoir storage option is to divert excess flood waters above the top of conservation pool. This may be specified in field 1 of the RD Card with a -1. This option can be useful in considering artificial recharge using flood waters. Using this option the quantity which may be diverted can be limited by the capacity of the diversion outlet. Also, in making the decision on how much to divert, the reservoir first meets the desired and required flow requirements at the reservoir (CP4). Example input are shown in Table 20 (Run 16).

Diversion as a function of inflow. Where it is desired to specify diversions at a control point as a function of inflow, a table of inflow versus diversion needs to be specified. In HEC-5 the diversion as a function of inflow option is indicated by a -1 in field 7, DR Card and the table of inflows and diversions are specified on the QS and QD Cards respectively. Table 21 (Run 17) illustrates the data required. Inflows at the control point are compared with data on the QS Card and corresponding diversion flows are determined from data on the QD Cards.

Diversion options also exist for pumping-diversion and an off-peak energy and pump-back storage diversion.

### Optimization Options

In water supply planning it is often desired to know the minimum conservation storage required to meet reservoir or downstream flow and diversion requirements. The solution is an iterative process of assuming different storage volumes until the minimum storage is found that will meet requirements. The inverse is also common. Given a fixed storage volume, what is the maximum desired flow, required flow, or diversion which the reservoir will yield? In this case two of the three requirements are held fixed while the third is varied until the maximum is reached for a given reservoir storage. The maximum desired flow, for example, can be determined while holding the required flow and diversion constant.

The foregoing task of finding minimum conservation storage or maximum yield (desired flow, required flow or diversion) is handled in HEC-5 through its optimization capability. In addition to water supply yield the program can optimize monthly firm energy and monthly plant factors for hydropower. The time interval of inflow for optimizing must be monthly. Also, only single reservoirs or up to four independent reservoirs in a system can be optimized. Each reservoir must be optimized for its own independent set of flow requirements or conservation storage. At this time tandem reservoirs cannot be derived automatically in the same run. Optimization of an upstream reservoir for yield at a downstream control point can be accomplished in the March 1985 version of the program.

Optimization period options. The same options for selection of the simulation period discussed under "Simulation Period Options" are available using the optimization capability. These are period-of-record, partial record, and critical period. Period of record and partial record options are specified using the BF Card discussed previously. For the critical period, the options are specified on the J7 Card, Field 8 instead of on the J3 Card for non-optimizing runs (See Table 22, Run 18). These options include: specifying the time periods desired for the simulation run; specifying a monthly reservoir drawdown duration; and specifying a duration equal to 70 times the ratio of conservation storage to mean annual flow. These are referred to as the "critical period" options.

In addition to the options described in the preceding paragraph, there also exists the capability to simulate using several combinations of critical period and period of records simulations. For this option, a code is input in field 9, J7 Card (See Table 22). Five such options exist and are summarized below, however, it is strongly recommended that code 6 be used.

#### OPTIMIZATION OPTIONS FOR COMBINATIONS OF PERIODS

<u>Indicator (Field 9, J7 Card)</u>	<u>Simulation Periods</u>
0, 1	Optimize for period of record (flow data on IN Cards)
2	Optimize for critical period and period of record
3	Optimize for critical period and check with period of record (1 cycle)
4	Optimize for critical period, check with period of record; adjust critical period; optimize for adjusted critical period and check with period-of-record (2 cycles).
6	Make three cycles of adjusting, optimizing and checking as opposed to one and two cycles, as described above. (Recommended option)

These options allow for both critical period and period of record simulation. A check is made to see if the optimal storage (or flow, or diversion) computed for the assumed critical period can be maintained for the period of record. If the assumed critical period is in fact, the true critical period then the firm yield can be maintained for the period-of-record. If the drawdown using the period-of-record is greater than the drawdown using the assumed critical period, and not within the specified allowable error, then a new critical period is selected and the storage optimized. This capability also applies to optimizing desired flow, required flow and diversion.

Optimization of reservoir conservation storage. Table 22 (Run 18) illustrates the use of the J7 Card to specify the optimization routine for conservation storage. In field 1 a value of 4.0 specifies the location where optimization is to take place (control point 4), and that conservation storage above the top of buffer pool will be optimized (specified by .0.). Field 8 (value of 2) specifies the optimization will start with an initial critical duration equal to 70 times the ratio of conservation storage to mean annual flow. An allowable error ratio (positive and negative) of .05 is specified in field 10. This is the ratio of the storage error (difference between the target drawdown storage and the minimum storage in the simulation) to the total conservation storage above the target drawdown storage.

When reservoir storage is being optimized, the desired and required flow requirements may be specified for either the reservoir or a downstream control point. When optimizing for any yield (required or desired flow or diversions), the water yield being optimized is at the reservoir unless the downstream control point (J7, field 5) is specified.

The methodology used to optimize conservation storage is described and illustrated in Appendix A.

Optimization of desired flow. This optimization option determines the maximum desired flow available during the critical period or period of record given a specified volume of conservation storage. Other system requirements such as diversions and required flow are met as specified. Note however, that required flow is not competitive with desired flow because it is not drawn upon until the storage reaches the top of buffer at which time desired flow is no longer met.

Table 23 (Run 19) illustrates the input and output for this option. In field 1 of the J7 card a 4.2 is specified which indicated the desired flow (.2) at control point 4 (4.) will be optimized. The other input on the J7 Card are the same as used for the storage optimization. The monthly varying desired flow to be optimized is specified using the QM Card. Constant and period varying desired flow may also be optimized.

Table 24 (Run 20) illustrates input data necessary to optimize desired flow when it is varied by period. Data on the J7 Card remain unchanged from that described in the previous paragraph. The desired flows are required as input on the MR Cards in order to provide an initial estimate of the optimal flows and as a pattern for determining the optimal ratios of the MR Card values.

Optimization of required flow. This option determines the maximum required flow for the critical period or period of record that can be maintained through the period of historical flow data given a specified volume of conservation storage. Other system requirements such as diversions and desired flows are met as specified.



Table 25 illustrates the input required on the J7 Card to specify this option (Run 21). The 4.3 in field 1 specifies optimization of required flow at control point 4. The other input on the J7 Card are the same as for the storage optimization. An initial estimate of 200 cfs for the required flow (constant for each period) is input on the CP Card, field 4. Monthly and period varying required flow may also be optimized.

Optimization of monthly diversion. Optimization of diversion determines the maximum diversion flow for the critical period or period of record. A given volume of conservation storage, with other system requirements being met, is specified. Both desired and required flow requirements may be competitive with diversions since the diversion requirement applies to storage above and below the buffer level.

Table 26 (Run 22) shows the input required on the J7 Card. A 4.4 is used in field 1 to specify optimization of diversion (.4) at control point 4 (4.). The other input data on the J7 Card are the same as for the preceding optimization runs. An initial estimate of the monthly varying diversion is input on the QD Card. Subsequent estimates for the optimal values will be proportional to these initial estimates.

Optimization of all reservoir yields. By specifying a 4.9 in field 1 (Table 27, Run 23) of the J7 Card, all yields i.e., desired flow, required flow and diversion, are optimized for a given storage at the reservoir. Each of the yields is multiplied iteratively by the same constant until the drawdown storage is within the target error specified. All yields must be at the reservoir.

Optimization at a downstream control point. In addition to optimization of reservoir yields at the reservoir, yield can also be optimized at a downstream control point. This option is available in the March 1985 program version and is accomplished by inputting the downstream control point number to be optimized in field 5 of the J7 card.

### Multiple Reservoir System Simulation

Basic system specifications. A multiple reservoir system is made up of individual reservoirs which operate either independently or in conjunction with the other reservoirs. The requirements for computer simulation are the same as for single reservoirs with the added requirement of linking the individual reservoirs together as required for system operations. The descriptions and examples for single reservoirs presented earlier in this document apply also to multiple reservoir systems. Linkages between reservoirs are additional specifications which are added to the single reservoir cards. To illustrate the input data necessary for a multiple reservoir system consider the three reservoir configuration shown in Figure 5. Storage levels and volumes for each reservoir are shown in Figure 6. To simulate the operation of this system using HEC-5 the input data listed in Table 28 (Run 24) was prepared. Note that all flows and volumes are in metric units (Field 1, J1 Card).

Parallel reservoir operation. Reservoirs are in parallel when they are on different streams above a common control point. All parallel reservoirs that are operated for a common downstream control point are operated as a system. In Figure 5 reservoir 2 is in parallel with reservoir 3. Reservoir 1 operates independently of reservoir 3; reservoir 2 operates with reservoir 3 to meet the requirements of control point 4. The operating criteria used by HEC-5 for parallel reservoirs can be illustrated by the system in Figure 5. Reservoir 3 will meet its own flow requirements and make releases for control point 4. Reservoir 2 will do the same. In operating jointly reservoirs 2 and 3 will make releases for control point 4 such that their levels are nearly the same at the end of each period. Releases are made from reservoirs beginning with the highest level. Thus, in Figure 6 releases are not made from reservoirs 1 and 3 until reservoir 2 reaches level 4, since reservoir 2 has storage in zone 4-5 and the other reservoirs do not.

Tandem reservoir operation. Reservoirs are in tandem when two or more reservoirs are on the same stream. They may operate independently of one another or as a reservoir system. In Figure 5 reservoirs 1 and 2 are in tandem with each other, reservoir 1 operates for downstream reservoir 2 and reservoir 2 operates for control point 4. Using HEC-5, two options are available for balancing the storage levels between reservoirs 1 and 2 (J2 Card, field 4). The first uses the storage index level for the downstream reservoir, the second the equivalent index level for the two tandem reservoirs. The equivalent index level is determined by weighting the level of each reservoir in a subsystem by the storage in the reservoir to determine a storage-weighted level for the subsystem. For the current time period the upstream tandem reservoir (reservoir 1) attempts to release water to draw its level to the previous period's index level (or equivalent level under option 2) for reservoir 2. With releases from reservoir 1 known for the current period, releases from reservoir 2 can be determined. The objective is to meet downstream flow requirements and keep the tandem reservoirs in balance. Depending upon the storage and flow requirements for the reservoirs this balancing may occur immediately or may take several time periods. The HEC-5 users manual presents an equivalent reservoir example.

Simulation of complicated water supply systems. When simulation results for complicated water supply models indicate shortages in meeting minimum flow demands while water supply storage exists in the system, a recycle option in HEC-5 (J2 card, field 4, include 32 in sum), can be used to provide better results. This code causes the program to recycle through the solution process twice (instead of once). It is suggested that this option be applied only when water supply simulation results are unsatisfactory, producing reservoir release error messages. Output error messages must be requested by including 4 (output error check) in the sum of values on the J3 card, field 1. For analyses it is helpful to request user-defined output tables with J8 cards which include a listing of shortages (codes .06, .08, and .31), for each control point with minimum flow or diversion requirements. The execution time for HEC5A may be increased by 100% by using this recycle option; it is suggested that it be used only after a complete review of the output indicates shortages are occurring. This option is available in the March 1985 version of the program and documented in the January 1985, Exhibit 8 of the HEC-5 Users Manual.

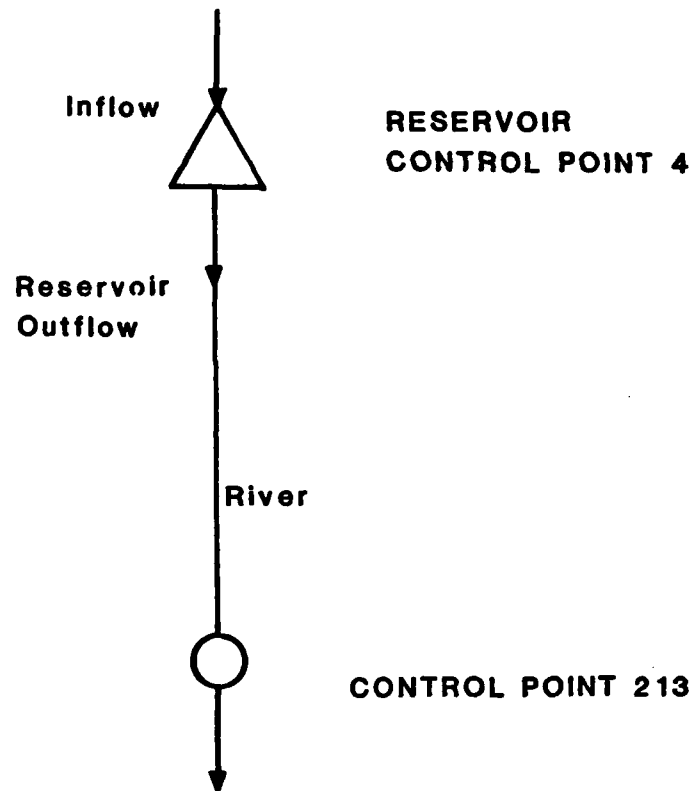
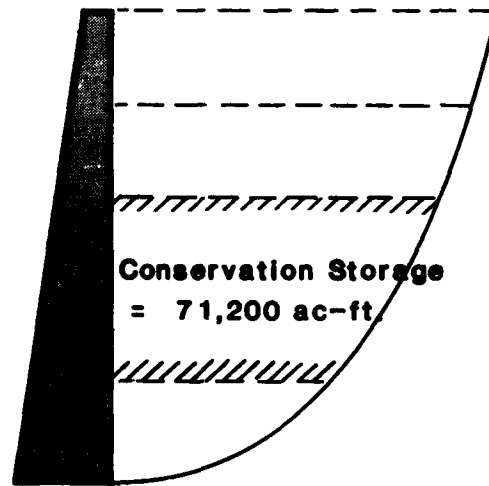


Figure 1. SINGLE RESERVOIR WATER SUPPLY SYSTEM

LEVELS

STORAGE VOLUME (ac-ft)

- 5 TOP OF DAM
- 4 TOP FLOOD CONTROL
- 3 TOP CONSERVATION
- 2 TOP BUFFER
- 1 TOP INACTIVE



- 240,000
- 180,200
- 71,500
- 2,000
- 300

Figure 2. RESERVOIR STORAGE LEVELS AND VOLUMES

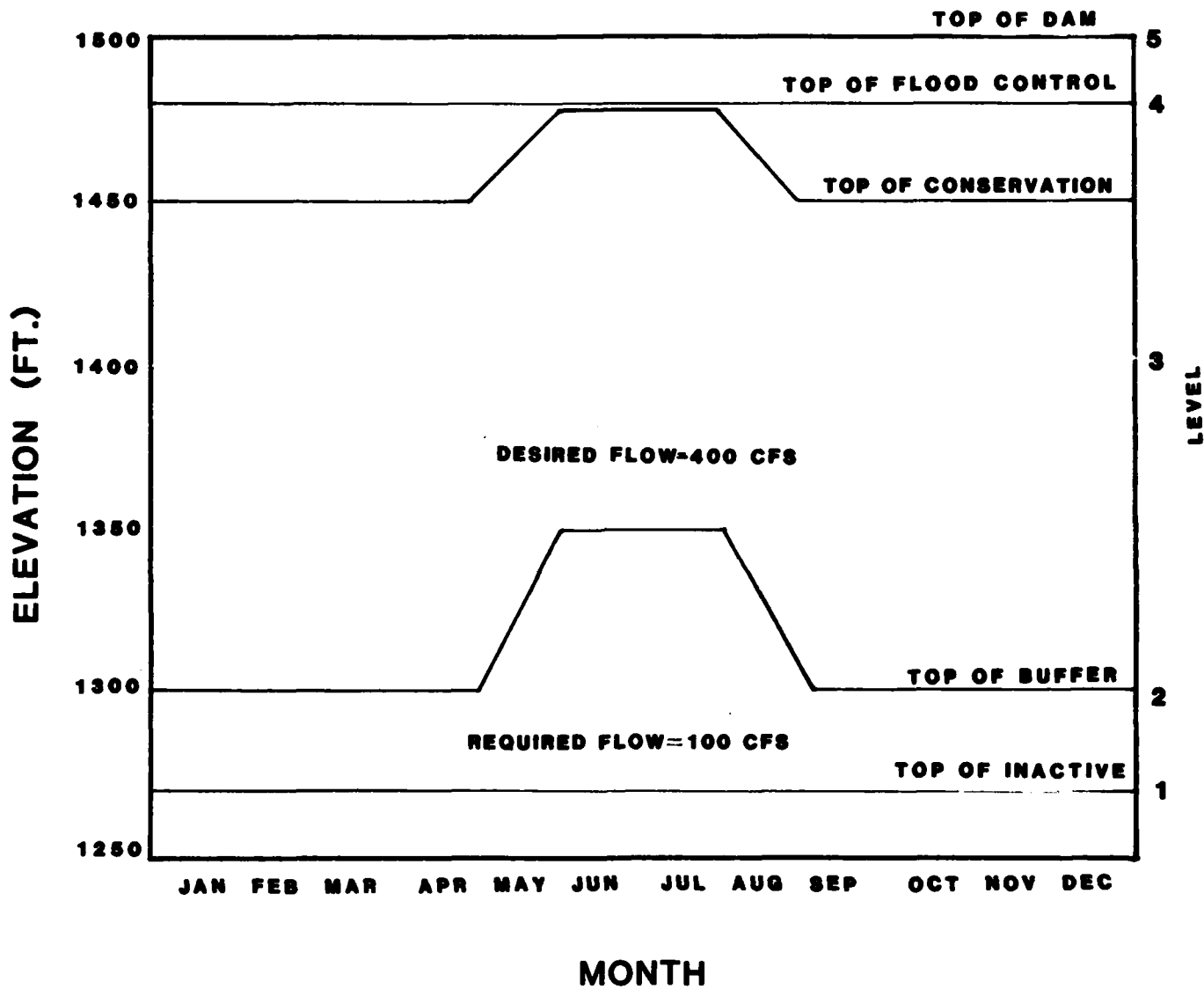


Figure 3. SEASONALLY VARYING CONSERVATION

AND BUFFER POOLS

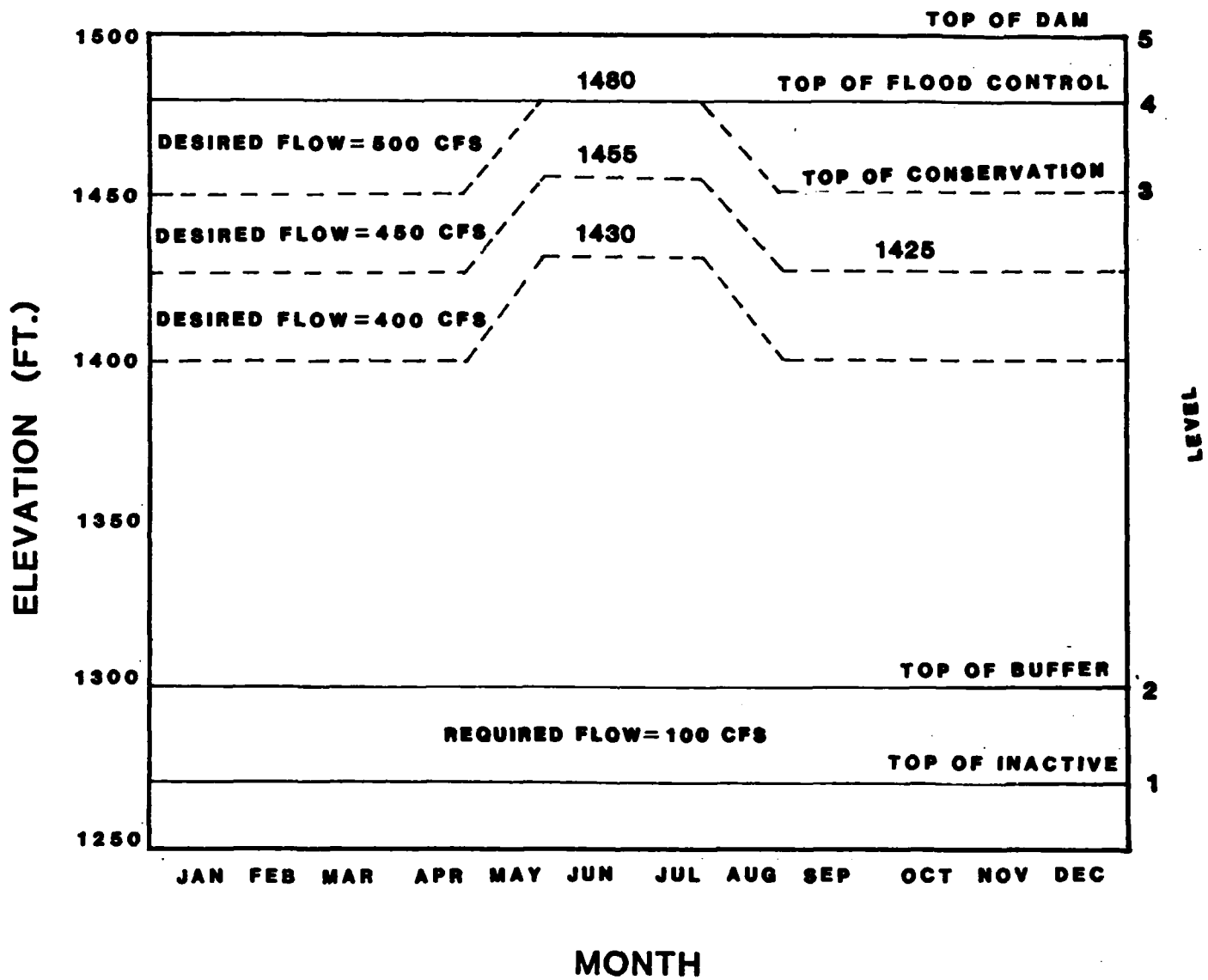


Figure 4. SEASONALLY VARYING DESIRED FLOW

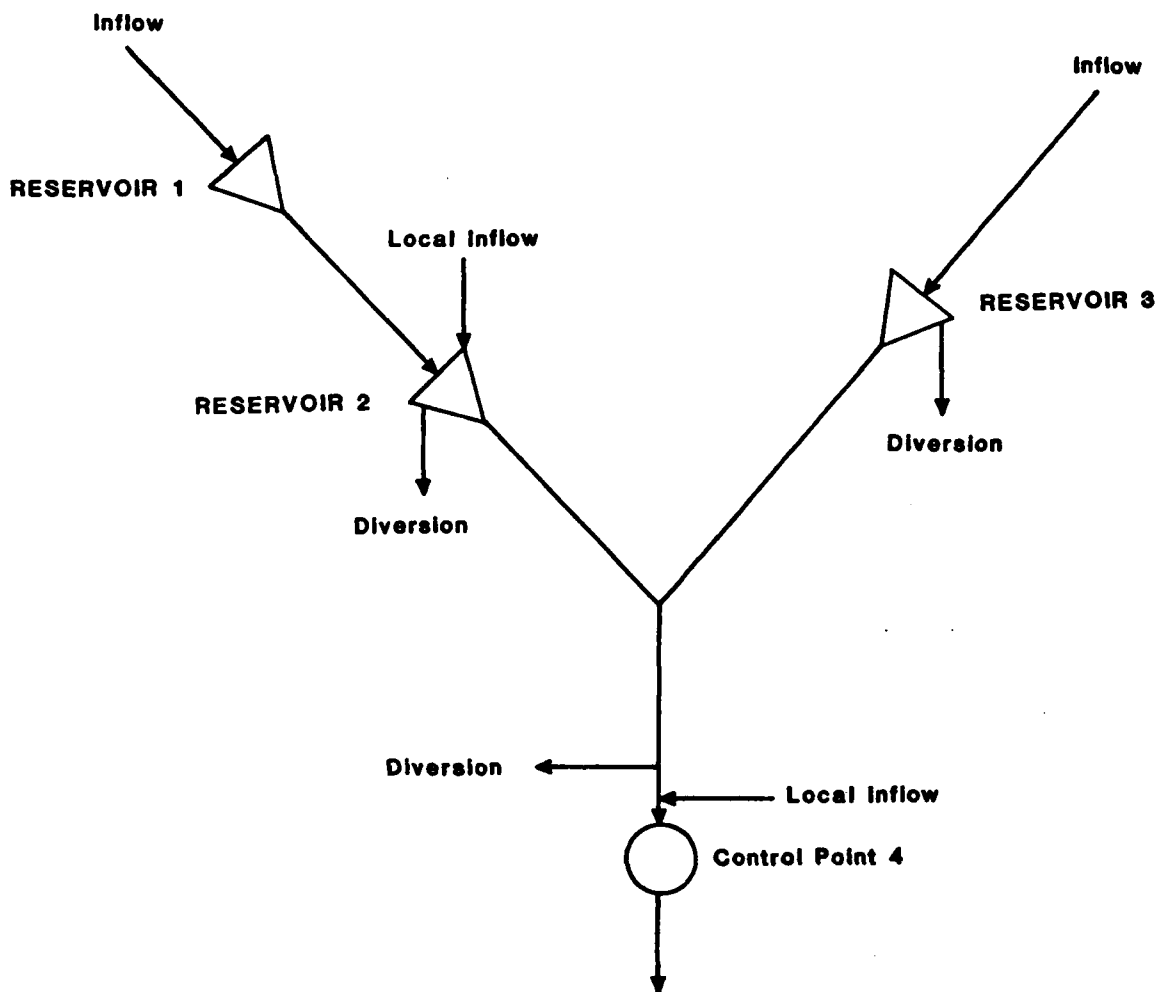
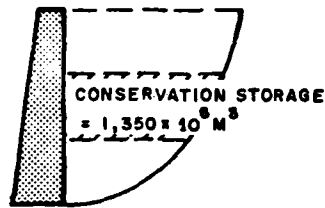


Figure 5. THREE RESERVOIR WATER SUPPLY SYSTEM

**LEVELS**

**VOLUME ( $10^6 \text{ M}^3$ )**

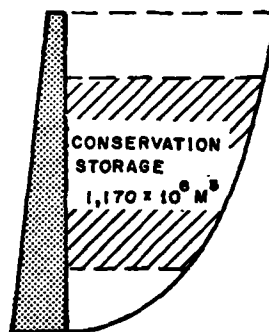
6	Top Flood Control
5, 4	Top Conservation
3, 2, 1	Top Buffer
	(= Top Inactive)



**RESERVOIR 1**

4,210
3,330
1,980

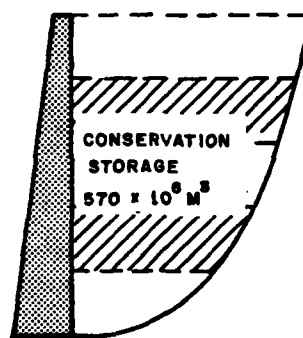
6	Top Flood Control
5	Top Conservation
4	
3, 2	Top Buffer
1	Top Inactive



**RESERVOIR 2**

6,670
3,760
3,320
2,880
2,590

6	Top Flood Control
5, 4	Top Conservation
3	
2	Top Buffer
1	Top Inactive



**RESERVOIR 3**

2,440
1,540
1,325
1,110
970

**Figure 6 THREE RESERVOIR STORAGE LEVELS AND VOLUMES**



TABLE 1

## Reservoir Elevation, Area, Storage, Outflow Data

<u>Elevation (ft.)</u>	<u>Reservoir</u>		
	<u>Area (Acre)</u>	<u>Storage (acre-feet)</u>	<u>Outflow (cfs)</u>
1250.	0	0	0
1265.	20.	150.	100.
1280.	40.	580.	100.
1300.	80.	2000.	9000.
1325.	185.	5380.	10500.
1350.	350.	12020.	12000.
1370.	587.	21410.	13000.
1390.	800.	35560.	14000.
1410.	1040.	54300.	15000.
1430.	1390.	78340.	16000.
1450.	1830.	110,690.	17000.
1454.	1922.	118,140.	30000.
1458.	2014.	126,000.	54000.
1462.	2106.	134,200.	86000.
1466.	2198.	142,800.	128000.
1469.	2267.	149,700.	160000.
1472.	2336.	156,500.	198000.
1481.	2500.	180,200.	218000.

TABLE 2

Monthly Reservoir Net Evaporation (inches)

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-.40	-0.02	0.52	-2.63	-2.38

TABLE 3

Monthly Desired Flow, Required Flow and Diversion (cfs)  
Control Point 213

	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
Desired Flow	420	440	480	500	520	540	550	530	490	440	410	400
Required Flow	100	120	130	140	150	150	140	130	120	110	100	100
Diversion	150	140	120	100	100	100	100	100	100	100	140	150

TABLE 4

MONTHLY RESERVOIR INFLOW (cfs)  
 (Period 1 = Oct 1927; Period 120 = Sep 1937)

<u>Date</u>	<u>Period</u>	<u>Inflow</u>	<u>Date</u>	<u>Period</u>	<u>Inflow</u>	<u>Date</u>	<u>Period</u>	<u>Inflow</u>
Oct 1927	1	1222.	Feb	41	669.	Jun	81	194.
Nov	2	1268.	Mar	42	878.	Jul	82	171.
Dec	3	497.	Apr	43	804.	Aug	83	513.
Jan 1928	4	733.	May	44	367.	Sep	84	424.
Feb	5	647.	Jun	45	420.	Oct	85	620.
Mar	6	1385.	Jul	46	206.	Nov	86	1219.
Apr	7	999.	Aug	47	145.	Dec	87	566.
May	8	1365.	Sep	48	74.	Jan 1935	88	354.
Jun	9	1308.	Oct	49	80.	Feb	89	1044.
Jul	10	360.	Nov	50	133.	Mar	90	763.
Aug	11	282.	Dec	51	475.	Apr	91	545.
Sep	12	176.	Jan 1932	52	433.	May	92	388.
Oct	13	193.	Feb	53	530.	Jun	93	1177.
Nov	14	261.	Mar	54	1106.	Jul	94	252.
Dec	15	481.	Apr	55	506.	Aug	95	187.
Jan 1929	16	431.	May	56	513.	Sep	96	179.
Feb	17	1130.	Jun	57	276.	Oct	97	872.
Mar	18	1230.	Jul	58	130.	Nov	98	697.
Apr	19	810.	Aug	59	77.	Dec	99	613.
May	20	283.	Sep	60	429.	Jan 1936	100	331.
Jun	21	163.	Oct	61	1205.	Feb	101	3094.
Jul	22	150.	Nov	62	400.	Mar	102	820.
Aug	23	208.	Dec	63	438.	Apr	103	354.
Sep	24	608.	Jan 1933	64	526.	May	104	268.
Oct	25	614.	Feb	65	909.	Jun	105	126.
Nov	26	553.	Mar	66	1224.	Jul	106	65.
Dec	27	524.	Apr	67	655.	Aug	107	43.
Jan 1930	28	475.	May	68	348.	Sep	108	140.
Feb	29	760.	Jun	69	212.	Oct	109	172.
Mar	30	891.	Jul	70	1032.	Nov	110	560.
Apr	31	491.	Aug	71	1237.	Dec	111	1004.
May	32	575.	Sep	72	524.	Jan 1937	112	859.
Jun	33	317.	Oct	73	385.	Feb	113	679.
Jul	34	105.	Nov	74	354.	Mar	114	1282.
Aug	35	94.	Dec	75	712.	Apr	115	793.
Sep	36	75.	Jan 1934	76	139.	May	116	364.
Oct	37	76.	Feb	77	459.	Jun	117	270.
Nov	38	102.	Mar	78	1195.	Jul	118	319.
Dec	39	124.	Apr	79	550.	Aug	119	224.
Jan 1931	40	164.	May	80	307.	Sep	120	753.

TABLE 5

T1	SINGLE RESERVOIR WATER SUPPLY SYSTEM									
T2	* BASIC RESERVOIR SYSTEM *									RUN 1
T3	MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)									
J1	1	5	3	4	2	1				
J3	6									
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-0.40	0.02	0.52
J6	-2.63	-2.38								
J8	4.11	4.22	4.13	4.12	4.10	213.05	213.06	213.07	213.08	213.04
RL	4	71500	300	2000	71500	180200	240000			
RD	1	213								
RS	18	0	150	580	2000	5380	12020	21410	35560	54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RQ	18	0	600	1000	9000	10500	12000	13000	14000	15000
RQ	16000	17000	30000	54000	86000	128000	160000	198000	218000	
RA	18	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
CP	4	8500								
ID	RES NO. 4									
RT	4	213								
CP	213	12000	400	100						
ID	C.P. 213									
RT	213									
ED										
BF	2	120		27100100		720				
IN	40CT	1927								
IN	1222	1268	497	733	647	1385	999	1365	1308	360
IN	282	176	193	261	481	431	1130	1230	810	283
IN	163	150	208	608	614	553	524	475	760	891
IN	491	575	317	105	94	75	76	102	124	164
IN	669	878	804	367	420	206	145	74	80	133
IN	475	433	530	1106	506	513	276	130	77	429
IN	1205	400	438	526	909	1224	655	348	212	1032
IN	1237	524	385	354	712	139	459	1195	550	307
IN	194	171	513	424	620	1219	566	354	1044	763
IN	545	388	1177	252	187	179	872	697	613	331
IN	3094	820	354	268	126	65	43	140	172	560
IN	1004	859	679	1282	793	364	270	319	224	753
EJ										
ER										

TABLE 6

T1 SINGLE RESERVOIR WATER SUPPLY SYSTEM										
T2	* PARTIAL RECORD SIMULATION * RUN2									
T3	MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)									
J1	1	5	3	4	2	1	2	3	4	5
J3	6									
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-0.40	0.02	0.52
J6	-2.63	-2.38								
J8	4.11	4.22	4.13	4.12	4.10	213.05	213.06	213.07	213.08	213.04
RL	4	71500	300	2000	71500	180200	240000			
RO	1	213								
RS	18	0	150	580	2000	5380	12020	21410	35560	54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RQ	18	0	600	1000	9000	10500	12000	13000	14000	15000
RQ	16000	17000	30000	54000	86000	128000	160000	198000	218000	
RA	18	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
CP	4	8500								
ID RES NO.4										
RT	4	213								
CP	213	12000	400	100						
ID C.P. 213										
RT	213									
ED										
BE	2	120			27100100	60	720			
IN	40CT 1927									
IN	1222	1268	497	733	647	1385	999	1365	1308	360
IN	282	176	193	261	481	431	1130	1230	810	283
IN	163	150	208	608	614	553	524	475	760	891
IN	491	575	317	105	94	75	76	102	124	164
IN	669	878	804	367	420	206	145	74	80	133
IN	475	433	530	1106	506	513	276	130	77	429
IN	1205	400	438	526	909	1224	655	348	212	1032
IN	1237	524	385	354	712	139	439	1195	550	307
IN	194	171	513	424	620	1219	566	354	1044	763
IN	545	388	1177	252	187	179	872	697	613	331
IN	3094	820	354	268	126	65	43	140	172	560
IN	1004	859	679	1282	793	364	270	319	224	753
EJ										
ER										

TABLE 7

T1 SINGLE RESERVOIR WATER SUPPLY SYSTEM										
T2 * CRITICAL PERIOD SIMULATION * RUN 3										
T3 MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)										
J1	1	5	3	4	2					
J3	6	-10,000								
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-0.40	0.02	0.52
J6	-2.63	-2.38								
J8	4.11	4.22	4.13	4.12	4.10	213.05	213.06	213.07	213.08	213.04
RL	4	71500	300	2000	71500	180200	240000			
RO	1	213								
RS	18	0	150	580	2000	5380	12020	21410	35560	54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RD	18	0	600	1000	9000	10500	12000	13000	14000	15000
RD	16000	17000	30000	54000	86000	128000	160000	198000	218000	
RA	18	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
CP	4	8500								
ID	RES NO.4									
RT	4	213								
CP	213	12000	400	100						
ID	C.P. 213									
RT	213									
ED										
BF	2	120			27100100		720			
IN	40CT	1927								
IN	1222	1268	497	733	647	1385	999	1365	1308	360
IN	282	176	193	261	481	431	1130	1230	810	283
IN	163	150	208	608	614	553	524	475	760	891
IN	491	575	317	105	94	75	74	102	124	164
IN	669	878	804	367	420	206	145	74	80	133
IN	475	433	530	1106	506	513	276	130	77	429
IN	1205	400	438	526	909	1224	655	348	212	1032
IN	1237	524	385	354	712	139	459	1195	590	307
IN	194	171	513	424	620	1219	566	354	1044	763
IN	545	388	1177	252	187	179	872	697	613	331
IN	3094	820	354	268	126	65	43	140	172	560
IN	1004	859	679	1282	793	364	270	319	224	753
EJ										
ER										

TABLE 8

T1 SINGLE RESERVOIR WATER SUPPLY SYSTEM									
T2 * DESIRED FLOWS VARIED MONTHLY, REQUIRED FLOWS CONSTANT * RUN 4									
T3 MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)									
J1	1	5	3	4	2				
J3	6				1				
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-.40	0.02
J6	-2.63	-2.38							0.52
J8	4.11	4.22	4.13	4.12	4.10	213.05	213.06	213.07	213.08
RL	4	71500	300	2000	71500	180200	240000		
RD	1	213							
RS	18	0	150	580	2000	5380	12020	21410	35560
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200
RD	18	0	600	1000	9000	10500	12000	13000	14000
RD	16000	17000	30000	54000	86000	128000	160000	198000	218000
RA	18	0	20	40	80	185	350	587	800
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500
RE	18	1250	1265	1280	1300	1325	1350	1370	1390
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481
CP	4	8500							
ID	RES NO.4								
RT	4	213							
CP	213	12000		100					
ID	C.P. 213								
RT	213								
RM	420	440	480	500	520	540	550	530	490
RM	410	400							440
ED									
BF	2	120					720		
IN	40CT 1927				27100100				
IN	1222	1268	497	733	647	1385	999	1365	1308
IN	282	176	193	261	481	431	1130	1230	810
IN	163	150	208	608	614	553	524	475	760
IN	491	575	317	105	94	75	76	102	124
IN	669	878	804	367	420	206	145	74	80
IN	475	433	530	1106	506	513	276	130	77
IN	1205	400	438	526	909	1224	655	348	212
IN	1237	524	385	354	712	139	459	1195	550
IN	194	171	513	424	620	1219	566	354	1044
IN	545	388	1177	252	187	179	872	697	613
IN	3094	820	354	268	126	65	43	140	172
IN	1004	859	679	1282	793	364	270	319	224
EJ									
ER									

TABLE 9

T1	SINGLE RESERVOIR WATER SUPPLY SYSTEM									
T2	* REQUIRED FLOWS VARY MONTHLY , DESIRED FLOWS CONSTANT. * RUN 5									
T3	MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)									
J1	1	5	3	4	2					
J3	6				1					
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-0.40	0.02	0.52
J6	-2.63	-2.38								
J8	4.11	4.22	4.13	4.12	4.10	212.05	212.06	213.07	213.08	213.04
RL	4	71500	300	2000	71500	180200	240000			
RD	2	212	213							
RS	18	0	150	580	2000	5380	12020	21410	35560	54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RD	18	0	600	1000	9000	10500	12000	13000	14000	15000
RQ	16000	17000	30000	54000	86000	128000	160000	198000	218000	
RA	18	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
CP	4	8500								
ID	RES NO. 4									
RT	4	212								
CP	212	12000	400							
ID	C.P. 212									
RT	212	213								
CP	213	12000		-1						
ID	C.P. 213									
RT	213									
QM	100	120	130	140	150	150	140	130	120	110
QM	100	100								
ED										
BF	2	120		27100100		720				
IN	40CT	1927								
IN	1222	1268	497	733	647	1385	999	1365	1308	360
IN	282	176	193	261	481	431	1130	1230	810	283
IN	163	150	208	608	614	553	524	475	760	891
IN	491	575	317	105	94	75	76	102	124	164
IN	669	878	804	367	420	206	145	74	80	133
IN	475	433	530	1106	506	513	276	130	77	429
IN	1205	400	438	526	909	1224	655	348	212	1032
IN	1237	524	385	354	712	139	459	1195	550	307
IN	194	171	513	424	620	1219	566	354	1044	763
IN	545	388	1177	252	187	179	872	697	613	331
IN	3094	820	354	268	126	65	43	140	172	560
IN	1004	859	679	1282	793	364	270	319	224	753
EJ										
ER										



TABLE 10

T1	SINGLE RESERVOIR WATER SUPPLY SYSTEM									
T2	* MONTHLY DESIRED AND REQUIRED FLOWS * RUN 6									
T3	MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)									
J1	1	5	3	4	2	1				
J3	6									
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-0.40	0.02	0.52
J6	-2.63	-2.38								
J8	4.11	4.22	4.13	4.12	4.10	212.05	212.06	213.07	213.08	213.04
RL	4	71500	300	2000	71500	180200	240000			
RO	2	212	213							
RS	18	0	150	580	2000	5380	12020	21410	35560	54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RQ	18	0	600	1000	9000	10500	12000	13000	14000	15000
RO	16000	17000	30000	54000	86000	128000	160000	198000	218000	
RA	18	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
CP	4	8500								
ID	RES NO.4									
RT	4	212								
CP	212	12000								
ID	DUMMY CP									
RT	212	213	0							
QH	420	440	480	500	520	540	550	530	490	440
QH	410	400								
CP	213	12000		-1						
ID	C.P. 213									
RT	213									
QH	100	120	130	140	150	150	140	130	120	110
QH	100	100								
ED										
BF	2	120		27100100			720			
IN	40CT	1927								
IN	1222	1268	497	733	647	1385	999	1365	1308	360
IN	282	176	193	261	481	431	1130	1230	810	283
IN	163	150	208	608	614	553	524	475	760	891
IN	491	575	317	105	94	75	76	102	124	164
IN	669	878	804	367	420	206	145	74	80	133
IN	475	433	530	1106	506	513	276	130	77	429
IN	1205	400	438	526	909	1224	655	348	212	1032
IN	1237	524	385	354	712	139	459	1195	550	307
IN	194	171	513	424	620	1219	566	354	1044	763
IN	545	388	1177	252	187	179	872	697	613	331
IN	3094	820	354	268	126	65	43	140	172	560
IN	1004	859	679	1282	793	364	270	319	224	753
EJ										
ER										

TABLE 11

SINGLE RESERVOIR WATER SUPPLY SYSTEM										
# DESIRED FLOWS VARY BY PERIOD # RUN 7										
MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)										
	1	5	3	4	2					
T1	6									
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-0.40	0.02	0.52
J6	-2.63	-2.38								
JB	4.11	4.22	4.13	4.12	4.10	213.05	213.06	213.07	213.08	213.04
RL	4	71500	300	2000	71500	180200	240000			
RD	1	213								
RS	10	0	150	580	2000	5380	12020	21410	35560	54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RD	10	0	600	1000	9000	10500	12000	13000	14000	15000
RD	16000	17000	30000	54000	86000	128000	160000	198000	218000	
RA	10	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500	
RE	10	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
CP	4	8500								
ID RES NO.4	4	213								
RT	4	213								
CP	213	12000	0	100						
ID C.P. 213	213									
ED										
DF	2	120		27100100		720				
IN	40CT	1927								
IN	1222	1260	497	733	647	1385	999	1365	1308	360
IN	282	176	193	261	481	431	1130	1230	810	283
IN	163	150	208	608	614	553	524	475	760	891
IN	491	575	317	105	94	75	76	102	124	164
IN	869	878	804	367	420	206	145	74	80	133
IN	475	433	530	1106	506	513	276	130	77	429
IN	1205	400	438	526	909	1224	655	348	212	1032
IN	1237	524	385	334	712	139	459	1195	550	307
IN	194	171	513	424	620	1219	566	354	1044	763
IN	545	388	1177	252	187	179	872	697	613	331
IN	3094	820	354	268	126	65	43	140	172	560
IN	1004	859	679	1282	793	364	270	319	224	753
NR	213OCT	1927								
NR	200	190	180	170	160	170	160	150	155	140
NR	110	120	115	145	153	120	110	140	110	125
NR	110	140	160	180	175	165	150	140	145	155
NR	170	180	190	195	400	190	180	185	175	165
NR	160	145	150	110	120	110	145	120	140	150
NR	110	115	140	145	120	115	100	110	105	110
NR	120	125	120	225	225	245	240	255	260	270
NR	110	125	240	260	265	255	265	270	260	255
NR	160	145	150	110	120	110	145	120	140	150
NR	110	115	140	145	120	115	100	110	105	110
NR	120	125	120	225	225	245	240	255	260	270
NR	110	125	240	260	265	255	265	270	260	255
EJ										
ER										

TABLE 12

T1	SINGLE RESERVOIR WATER SUPPLY SYSTEM									
T2	* REQUIRED FLOWS VARY BY PERIOD *									
T3	MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)									
J1	1		5		3		4		2	
J3	6		1		1		1		1	
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-0.40	0.02	0.52
J6	-2.63	-2.38								
J8	4.11	4.22	4.13	4.12	4.10	212.05	212.06	213.07	213.08	213.04
RL	4	71500	300	2000	71500	180200	240000			
RD	2	212	213							
RS	18	0	150	580	2000	5380	12020	21410	35560	54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RQ	18	0	600	1000	9000	10500	12000	13000	14000	15000
RD	16000	17000	30000	54000	86000	128000	160000	198000	218000	
RA	18	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
CP	4	8500								
ID	RES NO. 4									
RT	4	212								
CP	212	12000	400							
ID	DUMMY CP									
RT	212	213								
CP	213	12000	-1							
ID	C.P. 213									
RT	213									
ED										
BF	2	120			27100100		720			
IN	4OCT 1927									
IN	1222	1268	497	733	647	1385	999	1365	1308	360
IN	282	176	193	261	481	431	1130	1230	810	283
IN	163	150	208	608	614	553	524	475	760	891
IN	491	575	317	105	94	75	76	102	124	164
IN	669	878	804	367	420	206	145	74	80	133
IN	475	433	530	1106	506	513	276	130	77	429
IN	1205	400	438	526	909	1224	655	348	212	1032
IN	1237	524	385	354	712	139	459	1195	550	307
IN	194	171	513	424	620	1219	566	354	1044	763
IN	545	388	1177	252	187	179	872	697	613	331
IN	3094	820	354	268	126	65	43	140	172	560
IN	1004	859	679	1282	793	364	270	319	224	753
NR	213OCT 1927									
NR	100	190	180	170	160	170	160	150	155	140
NR	110	110	115	145	155	110	110	140	110	115
NR	110	140	160	180	175	165	150	140	145	155
NR	170	180	190	195	400	190	180	185	175	165
NR	160	145	150	110	110	110	145	110	140	150
NR	110	115	140	145	110	115	100	110	105	110
NR	110	115	110	115	115	145	140	155	160	170
NR	110	115	140	160	165	155	165	170	160	155
NR	100	190	180	170	160	170	160	150	155	140
NR	170	180	190	195	400	190	180	185	175	165
NR	160	145	150	110	110	110	145	110	140	150
NR	110	115	140	145	110	115	100	110	105	110

TABLE 13

T1 SINGLE RESERVOIR WATER SUPPLY SYSTEM										
T2 * PERIOD VARYING DESIRED AND REQUIRED FLOWS * RUN 9										
T3 MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)										
	1	5	3	4	2					
J1	6				1					
J3										
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-.40	0.02	
J6	-2.63	-2.38								
J8	4.11	4.22	4.13	4.12	4.10	212.05	212.06	213.07	213.08	
RL	4	71500	300	2000	71500	180200	240000			
RO	2	212	213							
RS	18	0	150	580	2000	5380	12020	21410	35560	
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RQ	18	0	600	1000	9000	10500	12000	13000	14000	
RO	16000	17000	30000	54000	86000	128000	160000	198000	218000	
RA	18	0	20	40	80	185	350	587	800	
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
CP	4	8500								
ID	RES NO. 4									
RT	4	212								
CP	212	12000								
ID	DUMMY CP									
RT	212	213								
CP	213	12000								
ID	C.P. 213									
RT	213									
ED										
BF	2	120		27100100		720				
IN	40CT	1927								
IN	1222	1268	497	733	647	1385	999	1365	1308	
IN	282	176	193	261	481	431	1130	1230	810	
IN	163	150	208	608	614	553	524	475	760	
IN	491	575	317	105	94	75	76	102	124	
IN	669	878	804	367	420	206	145	74	80	
IN	475	433	530	1106	506	513	276	130	77	
IN	1205	400	438	526	909	1224	655	348	212	
IN	1237	524	385	354	712	139	459	1195	550	
IN	194	171	513	424	620	1219	566	354	1044	
IN	545	388	1177	252	187	179	872	697	613	
IN	3094	820	354	268	126	65	43	140	172	
IN	1004	859	679	1282	793	364	270	319	224	
NR	2120CT	1927								
NR	200	290	280	270	260	270	260	250	255	
NR	220	220	225	245	255	220	220	240	220	
NR	220	240	260	280	275	265	250	240	245	
NR	270	280	290	295	400	290	280	285	275	
NR	260	245	250	220	220	220	245	220	240	
NR	220	225	240	245	220	225	200	220	205	
NR	220	225	220	225	225	245	240	255	260	
NR	220	225	240	260	265	255	265	270	260	
NR	200	290	280	270	260	270	260	250	255	
NR	220	220	225	245	255	220	220	240	220	
NR	220	240	260	280	275	265	250	240	245	
NR	270	280	290	295	400	290	280	285	275	
NR	2130CT	1927								
NR	100	190	180	170	160	170	160	150	155	
NR	110	110	115	145	155	110	110	140	110	
NR	110	140	160	180	175	165	150	140	145	
NR	170	180	190	195	400	190	180	185	175	
NR	160	145	150	110	110	110	145	110	140	
NR	110	115	140	145	110	115	100	110	105	
NR	110	115	110	115	115	145	140	155	160	
NR	110	115	140	160	165	155	165	170	160	
NR	100	190	180	170	160	170	160	150	155	
NR	170	180	190	195	400	190	180	185	175	
NR	160	145	150	110	110	110	145	110	140	
NR	110	115	140	145	110	115	100	110	105	
EJ										
ER										

TABLE 14

SINGLE RESERVOIR WATER SUPPLY SYSTEM										
* SEASONALLY VARYING BUFFER AND CONSERVATION POOLS *										
T1	DAILY FLOW 1929 RECORD (365 PERIODS)									
T2	RUN 10									
T3	1	5	3	4	2					
J1										
J2										
J3										
J6	6									
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-0.40	0.02	0.5
J6	-2.63	-2.38								
J8	4.09	4.38	4.11	4.13	4.22	213.05	213.06	213.07	213.08	213.04
RL	4	110690								
RL	1	4	-1	300						
RL	2	4	5	2000	12020	12020	2000	2000		
RL	3	4	5	110690	180000	180000	110690	110690		
RL	4	4	-1	180200						
RL	5	4	-1	240000						
RD	1	213								
RS	18	0	150	580	2000	5380	12020	21410	35560	54300
RS	78340	110690	118140	126000	134200	142800	156500	180200	240000	
RQ	18	0	100	100	9000	10500	12000	13000	14000	15000
RQ	16000	17000	30000	54000	86000	128000	198000	218000	218000	
RA	18	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2336	2500	2600	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1472	1481	1500	
CP	4	8500								
IDRES	4									
RT	4	213								
CS	5	120	151	240	265	363				
CP	213	12000	400	100						
ID	C P	213								
RT	213									
ED										
BF	2	365	29010100			24				
IN	4	01JAN29								
IN	1104	1090	1076	1062	1048	1034	1020	1006	992	978
IN	964	950	936	922	908	894	880	866	852	838
IN	824	810	792	774	757	739	722	704	687	669
IN	651	634	616	599	581	564	546	528	511	493
IN	476	458	441	423	405	388	370	353	335	318
IN	300	283	279	275	271	267	263	259	255	251
IN	247	243	239	235	231	227	223	219	215	211
IN	207	203	199	195	191	187	183	179	175	171
IN	167	163	162	162	161	161	160	160	159	159
IN	159	158	158	157	157	156	156	156	155	155
IN	154	154	153	153	153	152	152	151	151	150
IN	150	148	145	142	135	130	125	119	117	113
IN	112	109	99	99	98	96	94	94	92	91
IN	90	91	86	85	86	86	86	87	88	87
IN	75	75	74	75	73	71	70	60	60	50
IN	56	53	50	50	51	51	53	52	53	56
IN	55	59	50	50	54	53	55	55	58	50
IN	45	46	47	43	43	43	43	43	43	43
IN	43	43	40	40	40	40	38	38	38	37
IN	30	30	29	30	34	34	33	35	36	35
IN	34	35	37	37	38	39	39	39	39	38
IN	45	45	48	49	49	50	50	51	52	52
IN	88	88	89	89	90	92	91	92	93	95
IN	98	90	96	99	91	98	100	101	105	107
IN	128	135	140	144	147	150	151	157	159	161
IN	150	150	151	153	155	157	159	161	163	165
IN	167	169	171	173	175	177	179	180	182	184
IN	186	188	190	192	194	196	198	200	202	204
IN	206	208	221	234	247	261	274	287	301	314
IN	327	341	354	367	381	394	408	421	434	447
IN	461	474	487	501	514	527	541	554	567	581
IN	594	608	608	608	608	608	608	609	609	609
IN	609	609	610	610	610	610	611	611	611	611
IN	611	611	612	612	612	612	612	613	613	613
IN	613	614	611	609	607	605	603	601	599	597
IN	595	593	591	589	587	585	583	581	579	577
IN	575	573	571	569	567					
EJ										
ER										



TABLE 16

T1	SINGLE RESERVOIR WATER SUPPLY SYSTEM									
T2	* CONSTANT DIVERSION AT RESERVOIR * RUN12									
T3	MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)									
J1	1	5	3	4	2					
J3	6				1					
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-.40	0.02	0.52
J6	-2.63	-2.38								
J8	4.11	4.22	4.13	4.12	4.10	4.30	4.03	4.31	213.03	213.04
RL	4	71500	300	2000	71500	180200	240000			
RD	1	213								
RS	18	0	150	580	2000	5380	12020	21410	35560	54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RQ	18	0	600	1000	9000	10500	12000	13000	14000	15000
RQ	16000	17000	30000	54000	86000	128000	160000	198000	218000	
RA	18	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
CP	4	8500								
ID	RES NO.4									
RT	4	213								
DR	4	213				0.2		150		
CP	213	12000	400	100						
ID	C.P. 213									
RT	213									
ED										
BF	2	120		27100100		720				
IN	40CT	1927								
IN	1222	1268	497	733	647	1385	999	1365	1308	360
IN	282	176	193	261	481	431	1130	1230	810	283
IN	163	150	208	608	614	553	524	475	760	891
IN	491	575	317	105	94	75	76	102	124	164
IN	669	878	804	367	420	206	145	74	80	133
IN	475	433	530	1106	506	513	276	130	77	429
IN	1205	400	438	526	909	1224	655	348	212	1032
IN	1237	524	385	354	712	139	459	1195	550	307
IN	194	171	513	424	620	1219	566	354	1044	763
IN	545	388	1177	252	187	179	872	697	613	331
IN	3094	820	354	268	126	65	43	140	172	560
IN	1004	859	679	1282	793	364	270	319	224	753
EJ										
ER										

TABLE 17

T1 SINGLE RESERVOIR WATER SUPPLY SYSTEM										
T2 * MONTHLY DIVERSION DOWNSTREAM * RUN13										
T3 MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)										
J1	1	5	3	4	2					
J3	6				1					
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-0.40	0.02	0.52
J6	-2.63	-2.38								
J8	4.11	4.22	4.13	4.12	4.10	213.05	213.06	213.30	213.03	213.04
RL	4	71500	300	2000	71500	180200	240000			
RD	1	213								
RS	18	0	150	580	2000	5380	12020	21410	35560	54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RQ	18	0	600	1000	9000	10500	12000	13000	14000	15000
RD	16000	17000	30000	54000	86000	128000	160000	198000	218000	
RA	18	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2267	2334	2500	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
CP	4	8500								
ID	RES NO. 4									
RT	4	213								
CP	213	12000	400	100						
ID	C.P. 213									
RT	213									
DR	213					1				
DD	12	150	140	120	100	100	100	100	100	100
DD	100	140	150							
ED										
BF	2	120					720			
IN	40CT 1927			27100100						
IN	1222	1268	497	733	647	1385	999	1365	1308	360
IN	282	176	193	261	481	431	1130	1230	810	283
IN	163	150	208	608	614	553	524	475	760	891
IN	491	575	317	105	94	75	76	102	124	164
IN	669	878	804	367	420	206	145	74	80	133
IN	475	433	530	1106	506	513	276	130	77	429
IN	1205	400	438	526	909	1224	655	348	212	1032
IN	1237	524	385	354	712	139	459	1195	550	307
IN	194	171	513	424	620	1219	566	354	1044	763
IN	545	388	1177	252	187	179	872	697	613	331
IN	3094	820	354	268	126	65	43	140	172	560
IN	1004	859	679	1282	793	364	270	319	224	753
EJ										
ER										



TABLE 18

T1 SINGLE RESERVOIR WATER SUPPLY SYSTEM									
T2 *DIVERSION DOWNSTREAM VARYS BY PERIOD* RUN 14									
T3 MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)									
J1	1	5	3	4	2	1	2	3	4
J3	6								
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-0.40	0.02
J6	-2.63	-2.38							
J8	4.11	4.22	4.13	4.12	4.10	213.05	213.06	213.30	213.03
RL	4	71500	300	2000	71500	180200	240000		
RD	1	213							
RS	18	0	150	580	2000	5380	12020	21410	35360
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200
RD	18	0	600	1000	9000	10500	12000	13000	14000
RD	16000	17000	30000	54000	86000	128000	160000	198000	218000
RA	18	0	20	40	80	185	350	587	800
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500
RE	18	1250	1265	1280	1300	1325	1350	1370	1390
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481
CP	4	8500							
ID	RES NO. 4								
RT	4	213							
CP	213	12000	400	100					
ID	C.P. 213								
RT	213								
RR	213								
ED									
BF	2	120			27100100		720		
IN	4OCT 1927								
IN	1222	1268	497	733	647	1385	999	1365	1308
IN	282	176	193	261	481	431	1130	1230	810
IN	163	150	208	608	614	553	524	475	760
IN	491	575	317	105	94	75	76	102	124
IN	669	878	804	367	420	206	145	74	90
IN	475	433	530	1106	506	513	276	130	77
IN	1205	400	438	526	909	1224	655	348	212
IN	1237	524	385	354	712	139	459	1195	550
IN	194	171	513	424	620	1219	566	354	1044
IN	545	388	1177	252	187	179	872	697	613
IN	3094	820	354	268	126	65	43	140	172
IN	1004	859	679	1282	793	364	270	319	224
QD	213OCT 1927								
QD	200	190	180	170	160	170	160	150	155
QD	110	120	115	145	155	120	110	140	110
QD	110	140	160	180	175	165	150	140	145
QD	170	180	190	195	200	190	180	185	175
QD	160	145	150	110	120	110	145	120	140
QD	110	115	140	145	120	115	100	110	105
QD	120	125	120	225	225	245	240	255	260
QD	110	125	240	260	265	255	265	270	260
QD	160	145	150	110	120	110	145	120	140
QD	110	115	140	145	120	115	100	110	105
QD	120	125	120	225	225	245	240	255	260
QD	110	125	240	260	265	255	265	270	260
QD	160	145	150	110	120	110	145	120	140
QD	110	115	140	145	120	115	100	110	105
QD	120	125	120	225	225	245	240	255	260
QD	110	125	240	260	265	255	265	270	260
EJ									
ER									

TABLE 19

T1	SINGLE RESERVOIR WATER SUPPLY SYSTEM										
T2	* DIVERSION AT RESERVOIR A FUNCTION OF RESERVOIR STORAGE * RUN 15										
T3	MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)										
J1	1	5	3	4	2						
J3	6										
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-0.40	0.02	0.52	
J6	-2.63	-2.38									
J8	4.11	4.22	4.13	4.12	4.10	4.03	213.03	213.05	213.06	213.04	
RL	4	71500	300	2000	71500	180200	240000				
RD	1	213									
RS	18	0	150	580	2000	5380	12020	21410	35360	54300	
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200		
RQ	18	0	600	1000	9000	10500	12000	13000	14000	15000	
RQ	16000	17000	30000	54000	86000	128000	160000	198000	218000		
RA	18	0	20	40	80	185	330	587	800	1040	
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500		
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410	
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481		
RD	0	0	0	0	0	20	40	60	80	100	
RD	120	150	150	150	150	150	150	150	150		
CP	4	8500									
ID RES NO.4											
RT	4	213	0								
DR	4	213						0.2	-2		
CP	213	12000	400	100							
ID C.P. 213											
RT	213										
ED											
BF	2	120	27100100				720				
IN	40CT	1927									
IN	1222	1268	497	733	647	1385	999	1365	1308	360	
IN	282	176	193	261	481	431	1130	1230	810	283	
IN	163	150	208	608	614	553	524	475	760	891	
IN	491	575	317	105	94	75	76	102	124	164	
IN	669	878	804	367	420	206	145	74	80	133	
IN	475	433	530	1106	506	513	276	130	77	429	
IN	1205	400	438	526	909	1224	655	348	212	1032	
IN	1237	524	385	354	712	139	459	1195	550	307	
IN	194	171	513	424	620	1219	566	354	1044	763	
IN	545	388	1177	252	187	179	872	697	613	331	
IN	3094	820	354	268	126	65	43	140	172	560	
IN	1004	859	679	1282	793	364	270	319	224	753	
EJ											
ER											

TABLE 20

T1 SINGLE RESERVOIR WATER SUPPLY SYSTEM										
T2 * DIVERSION OF FLOOD WATERS AT RESERVOIR * RUN 16										
T3 MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)										
J1	1	5	3	4	2					
J3	6				1					
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-.40	0.02	0.52
J6	-2.63	-2.38								
J8	4.11	4.22	4.13	4.12	4.10	4.03	213.03	4.05	4.06	213.04
RL	4	71500	300	2000	71500	180200	240000			
RD	1	213								
RS	18	0	150	580	2000	5380	12020	21410	33560	54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RQ	18	0	600	1000	9000	10500	12000	13000	14000	15000
RQ	16000	17000	30000	54000	86000	128000	160000	198000	218000	
RA	18	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
RD	-1	100	200	300	400	500	600	700	800	900
RD	1000	1100	1200	1300	1400	1500	1600	1700	1800	
CP	4	8500	400	100						
ID RES NO.4										
RT	4	213								
DR	4	213					0.2			
CP	213	12000								
ID C.P. 213										
RT	213									
ED										
BF	2	120			27100000		720			
IN	40CT 1927									
IN	1222.	1268.	497.	733.	647.	1385.	999.	1365.	1308.	360.
IN	282.	176.	193.	261.	481.	431.	1130.	1230.	810.	283.
IN	163.	150.	208.	608.	614.	553.	524.	475.	760.	891.
IN	491.	575.	317.	105.	94.	75.	76.	102.	124.	164.
IN	669.	878.	804.	367.	420.	206.	145.	74.	80.	133.
IN	475.	433.	530.	1106.	506.	513.	276.	130.	77.	429.
IN	1205.	400.	438.	526.	909.	1224.	635.	348.	212.	1032.
IN	1237.	524.	385.	354.	712.	139.	459.	1195.	350.	307.
IN	194.	171.	513.	424.	620.	1219.	566.	354.	1044.	763.
IN	545.	388.	1177.	252.	187.	179.	872.	697.	613.	331.
IN	3094.	820.	354.	268.	126.	65.	43.	140.	172.	560.
IN	1004.	859.	679.	1282.	793.	364.	270.	319.	224.	753.
EJ										
ER										

TABLE 21

T1 SINGLE RESERVOIR WATER SUPPLY SYSTEM									
T2 * DIVERSION A FUNCTION OF INFLOW * RUN 17									
T3 MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)									
J1	1	5	3	4	2				
J3	6				1				
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-.40	0.02 0.52
J6	-2.63	-2.38							
J8	4.24	4.11	4.22	4.13	4.12	4.10	4.03	213.03	213.06 213.04
RL	4	71500	300	2000	71500	180200	240000		
RD	1	213							
RS	18	0	150	580	2000	5380	12020	21410	35560 54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200
RQ	18	0	600	1000	9000	10500	12000	13000	14000 15000
RQ	16000	17000	30000	54000	86000	128000	160000	198000	218000
RA	18	0	20	40	80	185	350	587	800 1040
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500
RE	18	1250	1265	1280	1300	1325	1350	1370	1390 1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481
CP	4	8500							
ID	RES NO.4								
RT	4	213							
DR	4	213				0.2	-1		
DS	6	0	100	200	400	800	10000		
DD	6	0	0	80	160	160	160		
CP	213	12000	400	100					
ID	C.P. 213								
RT	213								
ED									
BF	2	120			27100100		720		
IN	40CT	1927							
IN	1222	1268	497	733	647	1385	999	1365	1308 360
IN	282	176	193	261	481	431	1130	1230	810 283
IN	163	150	208	608	614	553	524	475	760 891
IN	491	575	317	105	94	75	76	102	124 164
IN	669	878	804	367	420	206	145	74	80 133
IN	475	433	530	1106	506	513	276	130	77 429
IN	1205	400	438	526	909	1224	655	348	212 1032
IN	1237	524	385	354	712	139	459	1195	550 307
IN	194	171	513	424	620	1219	566	354	1044 763
IN	545	388	1177	252	187	179	872	697	613 331
IN	3094	820	354	268	126	65	43	140	172 560
IN	1004	859	679	1282	793	364	270	319	224 753
EJ									
ER									

TABLE 22

SINGLE RESERVOIR WATER SUPPLY SYSTEM										
*OPTIMIZATION OF CONSERVATION STORAGE * RUN 18										
MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)										
	1	5	3	4	2					
T1										
T2										
T3										
J1										
J3	6									
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-.40	0.02	0.52
J6	-2.63	-2.38								
J7	4.0							2	6	.051
J8	4.11	4.13	4.12	4.09	4.10	4.05	4.06	213.04		
RL	4	71500	300	2000	71500	160500	180200			
RD	1	213								
RS	18	0	150	580	2000	5380	12020	21410	35560	54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RQ	18	0	600	1000	9000	10500	12000	13000	14000	15000
RQ	16000	17000	30000	54000	86000	128000	160000	198000	218000	
RA	18	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
CP	4	8500	400							
ID RES NO. 4										
RT	4	213								
CP	213	12000								
ID C.P. 213										
RT	213									
ED										
BF	2	120		27100100		720				
IN	40CT	1927								
IN	1222	1268	497	733	647	1385	999	1365	1308	360
IN	282	176	193	261	481	431	1130	1230	810	283
IN	163	150	208	608	614	553	524	475	760	891
IN	491	575	317	105	94	75	76	102	124	164
IN	669	878	804	367	420	206	145	74	80	133
IN	475	433	530	1106	506	513	276	130	77	429
IN	1205	400	438	526	909	1224	655	348	212	1032
IN	1237	524	385	354	712	139	459	1195	550	307
IN	194	171	513	424	620	1219	566	354	1044	763
IN	545	388	1177	252	187	179	872	697	613	331
IN	3094	820	354	268	126	65	43	140	172	560
IN	1004	859	679	1282	793	364	270	319	224	753
EJ										
ER										

TABLE 23

SINGLE RESERVOIR WATER SUPPLY SYSTEM										
* OPTIMIZATION OF MONTHLY DESIRED FLOW * RUN 19										
MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)										
	1	5	3	4	2					
T1										
T2										
T3										
J1	6									
J3										
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-.40	0.02	0.52
J6	-2.63	-2.38								
J7	4.2									0.05
J8	4.11	4.12	4.09	4.10	4.05	4.06	4.07	4.08	213.04	
RL	4	71500	300	2000	71500	180200	240000			
RD	1	213								
RS	18	0	150	580	2000	5380	12020	21410	33360	54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RD	18	0	600	1000	9000	10500	12000	13000	14000	15000
RD	16000	17000	30000	54000	86000	120000	160000	198000	219000	
RA	18	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
CP	4	8500		100						
ID RES NO. 4										
RT	4	213								
DM	420	440	480	500	520	540	550	530	490	440
DM	410	400								
CP	213	12000								
ID C.P. 213										
RT	213									
ED										
BF	2	120		27100100		720				
IN	40CT	1927								
IN	1222	1268	497	733	647	1385	999	1365	1308	360
IN	282	176	193	261	481	431	1130	1230	810	283
IN	163	150	208	608	614	553	524	475	760	891
IN	491	575	317	105	94	75	76	102	124	164
IN	669	878	804	367	420	206	145	74	80	133
IN	475	433	530	1106	506	513	276	130	77	429
IN	1205	400	438	526	909	1224	655	348	212	1032
IN	1237	524	385	354	712	139	459	1195	550	307
IN	194	171	513	424	620	1219	566	354	1044	763
IN	545	388	1177	252	187	179	872	697	613	331
IN	3094	820	354	268	126	65	43	140	172	560
IN	1004	859	679	1282	793	364	270	319	224	753
EJ										
ER										

TABLE 24

SINGLE RESERVOIR WATER SUPPLY SYSTEM										
*OPTIMIZATION OF PERIOD VARYING DESIRED FLOWS* RUN 20										
MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)										
	1	5	3	4	2	1	6	2	6	0.51
T1										
T2										
T3										
J1										
J3	6									
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-.40	0.02	0.52
J6	-2.63	-2.38								
J7	4.2									
J8	4.11	4.12	4.09	4.10	4.05	4.06	4.07	4.08	213.04	
RL	4	71500	300	2000	71500	180200	240000			
RD	1	213								
RS	18	0	150	580	2000	5380	12020	21410	35560	54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RG	18	0	600	1000	9000	10500	12000	13000	14000	15000
RG	16000	17000	30000	54000	86000	128000	160000	198000	218000	
RA	18	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
CP	4	8500		100						
ID RES NO.4										
RT	4	213								
CP	213	12000								
ID C.P. 213										
RT	213									
ED										
BF	2	120		27100100		720				
IN	40CT	1927								
IN	1222	1268	497	733	647	1385	999	1365	1308	360
IN	282	176	193	261	481	431	1130	1230	810	283
IN	163	150	208	608	614	553	324	475	760	891
IN	491	575	317	105	94	75	76	102	124	164
IN	669	878	804	367	420	206	145	74	80	133
IN	475	433	530	1106	506	513	276	130	77	429
IN	1205	400	438	526	909	1224	655	348	212	1032
IN	1237	524	385	354	712	139	459	1195	550	307
IN	194	171	513	424	620	1219	566	354	1044	763
IN	545	388	1177	252	187	179	872	697	613	331
IN	3094	820	354	268	126	65	43	140	172	560
IN	1004	859	679	1282	793	364	270	319	224	753
NR	40CT	1927								
NR	400	390	380	370	360	370	360	350	355	340
NR	330	320	335	345	355	320	310	340	330	325
NR	330	340	360	380	375	365	350	340	345	355
NR	370	380	390	395	400	390	380	385	375	365
NR	360	345	350	330	320	330	345	320	340	350
NR	330	335	340	345	320	315	300	310	305	310
NR	320	325	330	325	335	345	340	355	360	370
NR	330	335	340	360	365	355	365	370	360	355
NR	360	345	350	330	320	330	345	320	340	350
NR	330	335	340	345	320	315	300	310	305	310
NR	320	325	330	325	335	345	340	355	360	370
NR	330	335	340	360	365	355	365	370	360	355
EJ										
ER										

TABLE 25

SINGLE RESERVOIR WATER SUPPLY SYSTEM										
*OPTIMIZATION OF REQUIRED FLOWS* RUN 21										
MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)										
	1	5	3	4	2	1				
T1										
T2										
T3										
J1										
J3	6									
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-0.40	0.02	0.52
J6	-2.63	-2.38								
J7	4.3									
J8	4.11	4.13	4.12	4.09	4.10	4.05	4.06	4.07	4.08	213.04
RL	4	71500	300	2000	71500	180200	240000			
RO	1	213								
RS	18	0	150	580	2000	5380	12020	21410	35560	54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RO	18	0	600	1000	9000	10500	12000	13000	14000	15000
RO	16000	17000	30000	54000	86000	128000	160000	198000	218000	
RA	18	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
CP	4	8500	400	200						
ID	RES NO. 4									
RT	4	213								
CP	213	12000								
ID	C.P. 213									
RT	213									
ED										
BF	2	120								
IN	40CT	1927								
IN	1222	1268	497	733	647	1385	999	1365	1308	360
IN	282	176	193	261	481	431	1130	1230	810	283
IN	163	150	208	608	614	533	524	475	760	891
IN	491	575	317	105	94	75	76	102	124	164
IN	669	878	804	367	420	206	145	74	80	133
IN	475	433	530	1106	506	513	276	130	77	429
IN	1205	400	438	526	909	1224	655	348	212	1032
IN	1237	524	385	354	712	139	459	1195	550	307
IN	194	171	513	424	620	1219	566	354	1044	763
IN	545	388	1177	252	187	179	872	697	613	331
IN	3094	820	354	268	126	65	43	140	172	560
IN	1004	859	679	1282	793	364	270	319	224	753
EJ										
ER										



TABLE 26

SINGLE RESERVOIR WATER SUPPLY SYSTEM										
*OPTIMIZATION OF MONTHLY DIVERSION* RUN 22										
MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)										
	1	5	3	4	2	1	2	6	6	0.52
T1										
T2										
T3										
J1										
J3	6									
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-.40	0.02	0.52
J6	-2.63	-2.38								
J7	4.4									
J8	4.11	4.13	4.12	4.24	4.09	4.10	4.30	4.03	213.03	213.04
RL	4	71500	300	2000	71500	180200	240000			
RD	1	213								
RS	18	0	150	580	2000	5380	12020	21410	35560	54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RQ	18	0	600	1000	9000	10500	12000	13000	14000	15000
RQ	16000	17000	30000	54000	86000	128000	160000	198000	218000	
RA	18	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
CP	4	8500								
ID RES NO. 4										
RT	4	213								
DR	4	213				0.2	1			
DD	12	250	240	220	200	200	200	200	200	200
DD	200	240	250							
CP	213	12000	150	100						
ID C.P. 213										
RT	213									
ED										
BF	2	120		27100100			720			
IN	40CT 1927									
IN	1222	1268	497	733	647	1385	999	1365	1308	360
IN	282	176	193	261	481	431	1130	1230	810	283
IN	163	150	208	608	614	553	524	475	760	891
IN	491	575	317	105	94	75	76	102	124	164
IN	669	878	804	367	420	206	145	74	80	133
IN	475	433	530	1106	506	513	276	130	77	429
IN	1205	400	438	526	909	1224	655	348	212	1032
IN	1237	524	385	354	712	139	459	1195	550	307
IN	194	171	513	424	620	1219	566	354	1044	763
IN	545	388	1177	252	187	179	872	697	613	331
IN	3094	820	354	268	126	65	43	140	172	560
IN	1004	859	679	1282	793	364	270	319	224	753
EJ										
ER										

TABLE 27

SINGLE RESERVOIR WATER SUPPLY SYSTEM										
*OPTIMIZATION OF ALL RESERVOIR YIELDS* RUN 23										
MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)										
	1	5	3	4	2	1				
T1										
T2										
T3										
J1										
J3	6									
J6	-1.59	-1.54	-2.03	-2.39	-0.52	-0.36	-0.54	-.40	0.02	0.52
J6	-2.63	-2.38								
J7	4.9							2	6	.05
J8	4.11	4.13	4.12	4.24	4.09	4.10	4.30	4.03	213.03	213.04
RL	4	71500	300	2000	71500	180200	240000			
RD	1	213								
RS	18	0	150	580	2000	5380	12020	21410	35560	54300
RS	78340	110690	118140	126000	134200	142800	149700	156500	180200	
RD	18	0	600	1000	9000	10500	12000	13000	14000	15000
RD	16000	17000	30000	54000	86000	128000	160000	198000	218000	
RA	18	0	20	40	80	185	350	587	800	1040
RA	1390	1830	1922	2014	2106	2198	2267	2336	2500	
RE	18	1250	1265	1280	1300	1325	1350	1370	1390	1410
RE	1430	1450	1454	1458	1462	1466	1469	1472	1481	
CP	4	8500								
ID RES NO. 4										
RT	4	213								
DR	4	213				0.2	1			
OD	12	250	240	220	200	200	200	200	200	200
OD	200	240	250							
CP	213	12000	150	100						
ID C.P. 213										
RT	213									
ED										
BF	2	120		27100100			720			
IN	40CT 1927									
IN	1222	1268	497	733	647	1385	999	1365	1308	360
IN	282	176	193	261	481	431	1130	1230	810	283
IN	163	150	208	608	614	553	524	475	760	891
IN	491	575	317	105	94	75	76	102	124	164
IN	669	878	804	367	420	206	145	74	80	133
IN	475	433	530	1106	506	513	276	130	77	429
IN	1205	400	438	526	909	1224	655	348	212	1032
IN	1237	524	385	354	712	139	459	1195	550	307
IN	194	171	513	424	620	1219	566	354	1044	763
IN	545	388	1177	252	187	179	872	697	613	331
IN	3094	820	354	268	126	65	43	140	172	560
IN	1004	859	679	1282	793	364	270	319	224	733
EJ										
ER										

TABLE 28

THREE RESERVOIR WATER SUPPLY SYSTEM													
* BASIC THREE RESERVOIR SYSTEM * RUN 24													
MONTHLY FLOW RECORD MAR 1953 - APR 1954 (14 PERIODS)													
J1	1	3	6	5	6	2							
J2	16												
J3	21												
JB	1.14	2.14	3.14	2.31	3.31	4.31	4.08	4.06					
RL	1	3070000	1980000	1980000	1980000	3330000	3330000	4210000					
RD	1	2											
RS	3	1980000	3330000	4210000									
RQ	3	1100	1200	1500									
CP	1	999											
ID RES1													
RT	1	2											
RL	2	3461000	2590000	2880000	2880000	3320000	3760000	6670000					
RD	1	4											
RS	3	2590000	3760000	6670000									
RQ	3	500	1000	2000									
CP	2	380											
ID RES2													
RT	2	4											
DR	2												
DD	12	0	0	0	8.5	18	28	21	7	0			
DD	0	0											
RL	3	1417000	970000	1110000	1325000	1540000	1540000	2440000					
RD	1	4											
RS	3	970000	1540000	2440000									
RQ	3	400	600	900									
CP	3	255											
ID RES3													
RT	3	4											
DR	3												
DD	12	0	0	0	6	7	9	7	2	0			
DD	0	0											
CP	4	765											
ID C.P. 4													
RT	4												
DR	4												
DD	12	0	0	0	8.5	18	28	21	7	0			
DD	0	0											
DM	113	113	127	127	142	142	127	85	85	85			
DM	85	85											
ED													
BF	1	14											
IN	153	268	230	211	20	20.5	6.5	3.5	4	4	6	17	15
IN	154	47	59										
IN	253	134	115	106	10	10	3	2	2	2	3	8	7.5
IN	254	24	30										
IN	353	100	78	66	26	18.5	12	11	10	11	11	19.5	24
IN	354	34	30.5										
IN	453	349	183	246	44	21	18.5	9.5	18	22	21	59	66
IN	454	58	71										
EJ													
ER													

APPENDIX A

OPTIMIZATION OF CONSERVATION STORAGE

APPENDIX A  
OPTIMIZATION OF CONSERVATION STORAGE (RUN 18)

This example illustrates the method used by HEC-5 for automatically determining conservation storage for a single reservoir operating for minimum monthly desired flow. The input and output data follows on Tables A-1 through A-5.

The J7 Card is used to request the optimization routine to determine the minimum conservation storage at reservoir 4 (J7.1 = 4.0) needed to meet desired flow requirements during the low-flow period (input in Table A-1).

Conservation storage optimization is based upon the storage volume above top of buffer pool. For each trial the assumed conservation storage is computed by a program determined multiplier times the previous trial's conservation storage (a monthly variation may be input on RL Cards). The trials are repeated until the drawdown storage is within the error limit specified (J7.10). (The HEC-5 optimization routine adds 500,000 acre-ft of storage to all input storage values to avoid working with negative values). Table A-2 shows the optimization routing cycle 1, trial 1.

Error =  $\frac{\text{target minimum storage minus minimum storage from simulation}}{\text{assumed maximum top-of-construction storage minus target minimum storage}}$

$$\text{Error} = \frac{(502,000) - (426,228)}{(571,500) - (502,000)} = 1.09 \text{ for trial 1}$$

The allowable error is specified on J7.10 ( $\pm 0.05$  in this example.)

The output, Table A-3, provides a listing of minimum runoff volumes plus starting and ending periods of drought durations from 1 to 38 months based on the given inflow data on IN cards since J7.8 = 2. The estimated critical drawdown period of 13 months from period 34 (July 1930) to period 46 (July 1931) is based on 70 times 0.173. The value 0.173 is the ratio of conservation storage to mean annual flow computed by the program (J7.8 = 2). The program extends that period to start at the beginning of a water year (Oct. 1929, period 25) and adds five periods to the end (Dec. 1931, period 51) to increase the chance for including the true critical period. The initial number of periods of inflow used for the critical period simulation is now reduced from 120 monthly values to the estimated 27 months from periods 25 (Oct. 1929) to 51 (Dec. 1931). On a scale beginning with 1 the program identifies period 25 as 1 and period 51 as 27. This identification applies throughout each cycle.

The initial estimates of top-of-conservation storage was specified on the input (RL .5 = 71,500 acre-feet), the initial volume of conservation storage is 69,500 acre-feet (71,500 minus 2000). In order to insure that the reservoir does not compute negative reservoir storages, 500,000 acre-feet is added internally by the program to each reservoir storage. The output listing (Table A-5) of storage volumes has this 500,000 acre-feet added to it.

The summary of all trials (Table A-4) contains the location of the reservoir, trial number, ratio of storage error, storage error, starting date of critical period, average reservoir inflow and release, average spill, top-of-conservation storage (excluding the 500,000 acre-feet added during optimization), ratio of conservation storage to mean annual flow, the period which had the minimum end-of-period storage (year, month), the length of critical period used to determine the adjusting multiplier (period 9 to 26), average release during the critical period, the average desired and required flow, and the average diversion.

For the first routing a period of maximum drawdown within the critical period 1 to 27 is identified by the program (Table A-2). This maximum drawdown period extends from period 9 to period 26 with period 1 representing Oct. 1929.

An initial estimate of 71,500 acre-feet is used for simulating this maximum drawdown period (first end-of-period storage below top-of-conservation storage (period 9) to minimum end-of-period storage (period 26)). A storage multiplier 1.206494 (Table A-2) is determined by the program for periods 9 to 26 then applied to estimate the storage for the second trial.

The initial value of 71,500 acre-feet when routed through the 27 monthly periods (1-27) gave an error ratio of 1.0902 (Table A-4). The second estimate of conservation storage of 86,264 acre-feet ( $71,500 \times 1.206494$ ) produced an error ratio of 0.7225.

The same procedure was repeated for each trial until the error was within the limits specified (.05). In this example the error reached is 0.0151 on the seventh trial (TRIAL = 7).

The estimated conservation storage for trial seven, 143,929 acre-feet, is next routed through the entire low-flow period (120 months) to see if the conservation storage is adequate.

A listing (Table A-5) of the final simulation (120 months) shows the final top of conservation storage value is 643,928 ( $143,928 + 500,000$ ) acre-feet. Based upon end-of-period storage for the 120 month simulation maximum drawdown period extends from period 33 to 50, the allowable error was .05 (5%) and the final error was 0.0151 (1.5%).

The user designed output (Table A-5) is printed for each simulation, but is only shown for simulation eight here. The minimum end-of-period storage (EOP STOR) was 499,862 acre-feet which was too low for the target minimum storage 502,000 ( $2,000 + 500,000$ ) acre-feet (error = 1.5%).

TABLE A-1 INPUT DATA FOR OPTIMIZATION OF CONSERVATION STORAGE

SINGLE RESERVOIR WATER SUPPLY SYSTEM OPTIMIZATION OF CONSERVATION STORAGE * RUN 18 MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)											
	1	2	3	4	5	6	7	8	9	10	11
T1											
T2											
T3											
J1											
J2											
J3											
J4											
J5											
J6											
J7											
J8											
RL	4	71500	300	2000	71500	160500	180200				
RS	18	0	150	580	2000	5380	12020	21410	35560	54300	
RQ	18	0	600	1000	9000	10500	12000	13000	14000	15000	
RA	18	0	20	40	80	185	350	587	800	1040	
RE	18	1830	1922	2014	2106	2198	2267	2336	2500		
RF	18	1250	1265	1280	1300	1325	1350	1370	1390	1410	
RG	18	1430	1454	1458	1462	1466	1469	1472	1481		
CP	4	8500	400								
ID RES NO.	4										
RT	4	213									
CP	213	12000									
ID C.P.	213										
RT	213										
ED											
BF	2	120									
IN	4OCT	1927									
IN	1222	1268	497	733	647	1385	999	1365	1308	360	
IN	282	176	193	261	481	431	1130	1230	810	283	
IN	163	150	208	608	614	553	524	475	760	891	
IN	491	575	317	105	94	75	76	102	124	164	
IN	669	878	804	367	420	206	145	80	80	133	
IN	475	433	530	1106	506	513	276	130	77	429	
IN	1205	400	438	526	909	1224	655	348	212	1032	
IN	1237	524	385	354	712	139	459	1195	550	307	
IN	194	171	513	424	620	1219	566	354	1044	763	
IN	545	388	1177	252	187	179	872	697	613	331	
IN	3094	820	354	268	126	65	43	140	172	560	
IN	1004	859	679	1282	793	364	270	319	224	753	

EJ  
ER

TABLE A-2 OPTIMIZATION ROUTING CYCLE 1, TRIAL 1

\*\*\*\*\*

\*OPTRY

ROUTING CYCLE= 1 OPT TRIAL= 1

ALL. PERC NEGATIVE ERROR= 0.050 POSITIVE ERROR= 0.0500 IND FOR ONE MORE TRY= 0

AVG. CRITICAL DRAIN DOWN RESULTS FROM PER 9 TO 26

INFLOW	PON-REL	EL-BTM	DRAW-RAT	DIV-Q	EVAP-P	RELEASE	STORAGE	ELEV	EN-REQ
268.50	0.00	-601.92	16.30	0.00	-7.57	400.00	488408.22	-601.92	0.00

AVG. ROUTING PERIOD RESULTS FROM PER 1 TO 27

INFLOW	PON-REL	HEAD	DRAW-RAT	OSPILL	TAILMATE <sup>9</sup>	RELEASE	H.TOP-C	H-BOT-C
377.44	0.00	0.00	1.00	63.17	0.00	463.17	1424.31	1300.00

OP TRIAL ERROR-RAT ERR-STG TAR-MIN-STG MIN-STG PER-MIN-STG TOP-STG LOC.TYP  
 1 1.090246 -75772. 502000. 426228. 26 571500. 4.00

\*\* \*\*\*\*\*

\*\*\*\*\*

ANN DES Q ANN REQ Q ANN DIV Q INS CAP ANN FIRM E AVG ANN E  
 400.0 0.00 0.00 0.00 0.00 0.00 0.00 0.00

ITYOPT= 0 MULTIPLIER= 1.206494

ASSUMED	NEXT-ASSUM	PTWO	EST3	ER-IMPROVE	EST-BOUND	BNDMAX	BNDMIN	ERR-BN-MAX	ERR-BN-MIN
571500.00	586264.34	0.00	586264.34	1.00	0.00	100000000.00	571500.00	0.00	-75772.07

\*RTCDF

ROUTING COEFFICIENTS FROM RES 4 TO MY  
 MY= 213 1.0000

\*\*\*\*\*



TABLE A-3 STARTING AND ENDING PERIODS FOR LOW-FLOW DURATIONS

DUR	VOL-DUR	PER-START	PER-END	Q-RIVER	Q-WASTOR	EST-ST6	DEP CAP
1.	43.	107.	107.	43.	1194.	21533.	0.
2.	108.	106.	107.	54.	650.	41778.	0.
3.	234.	105.	107.	78.	462.	58320.	0.
4.	347.	35.	38.	87.	375.	75647.	0.
5.	452.	34.	38.	90.	321.	93457.	0.
6.	576.	34.	39.	96.	288.	110120.	0.
7.	740.	34.	40.	106.	270.	124368.	0.
8.	1057.	33.	40.	132.	276.	129379.	0.
9.	1632.	32.	40.	181.	309.	118814.	0.
10.	2123.	31.	40.	212.	327.	113320.	0.
11.	2792.	31.	41.	254.	358.	97079.	0.
12.	3670.	31.	42.	306.	402.	68221.	0.
13.	4084.	34.	46.	314.	403.	67376.	0.
14.	4184.	36.	49.	299.	381.	85488.	0.
15.	4278.	35.	49.	285.	362.	103962.	0.
16.	4383.	34.	49.	274.	346.	121772.	0.
17.	4516.	34.	50.	266.	333.	137891.	0.
18.	4833.	33.	50.	289.	332.	142902.	0.
19.	5308.	33.	51.	279.	340.	138374.	0.
20.	5741.	33.	52.	287.	345.	136382.	0.
21.	6271.	33.	53.	299.	353.	128534.	0.
22.	6807.	31.	52.	309.	362.	120323.	0.
23.	7337.	31.	53.	319.	369.	112474.	0.
24.	8228.	30.	53.	343.	391.	82831.	0.
25.	8457.	35.	59.	338.	384.	93155.	0.
26.	8562.	34.	59.	329.	374.	110965.	0.
27.	8879.	33.	59.	329.	371.	115976.	0.
28.	9308.	33.	60.	332.	374.	114225.	0.
29.	9883.	32.	60.	341.	380.	103660.	0.
30.	10374.	31.	60.	346.	384.	98166.	0.
31.	11128.	20.	50.	359.	396.	76794.	0.
32.	11603.	20.	51.	343.	399.	72266.	0.
33.	12036.	20.	52.	365.	400.	70274.	0.
34.	12566.	20.	53.	370.	403.	62425.	0.
35.	13376.	19.	53.	382.	415.	57673.	0.
36.	14178.	20.	53.	394.	424.	13403.	0.
37.	14578.	23.	59.	394.	423.	13403.	0.
38.	14728.	22.	59.	388.	418.	28496.	0.
13.	4084.	34.	46.	314.	403.	67376.	0.

START-PER 25      END-PER 51      DATE 29100100.

COM-ST6 69500.      QMEAN 554.      RAT-ST6/Q 0.173      DRAIN-DUR 13.      APPROX. DEP CAP. 0.

TABLE A-4 OPTIMIZATION SUMMARY

LOCATION	TRIAL	ERROR RATIO	ERROR (STG)	NUM. PERIODS	ROUTING ST PER	AVG INF.	AVG REL	AVG SPILL	AVG TOP. CON. STOR.	RATIO STG/D	ST PER LENGTH	AVG REL LOC=	ANNUAL DES Q	ANNUAL REG Q	ANNUAL DIV
SINGLE RES	1	1.0902	-75772.	27	1929.10	377.	463.	63.	71500.	0.1731	1930.06	400.	400.	0.	0.
SINGLE RES	2	0.7225	-60883.	27	1929.10	377.	463.	63.	86264.	0.2099	1930.06	400.	400.	0.	0.
SINGLE RES	3	0.4790	-46955.	27	1929.10	377.	463.	63.	100019.	0.2442	1930.06	400.	400.	0.	0.
SINGLE RES	4	0.3173	-34863.	27	1929.10	377.	464.	64.	111886.	0.2737	1930.06	400.	400.	0.	0.
SINGLE RES	5	0.3573	79242.	27	1929.10	377.	464.	64.	223772.	0.5525	1930.06	400.	400.	0.	0.
SINGLE RES	6	0.0642	-8707.	27	1929.10	377.	464.	64.	137525.	0.3376	1930.06	400.	400.	0.	0.
SINGLE RES	7	0.0151	-2138.	27	1929.10	377.	464.	64.	143929.	0.3536	1930.06	400.	400.	0.	0.
SINGLE RES	1	0.0151	-2138.	120	1927.10	554.	556.	156.	143929.	0.3536	1930.06	400.	400.	0.	0.

\*OPSUM

SINGLE RESERVOIR WATER SUPPLY SYSTEM  
 \*OPTIMIZATION OF CONSERVATION STORAGE \* RUN 18  
 MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)

J7 4.00 0.00 0.00 0.00 0.00 0.00 2.00 6.00 0.05

TABLE A-5 SIMULATION SUMMARY FOR ALL PERIODS

LOC NO= CODE=	PER DY MD YR DW	RES NO. 4 EQP STOR	SUMMARY BY PERIOD FLOOD= 8								RES NO. 4 MIN DESI	RES NO. 4 DEB-SHOR	C.P. 213 FLOW REG
			4.110	4.130	4.120	4.090	4.100	4.050	4.060	213.			
			RES NO. 4 LEVEL	RES NO. 4 CASE	RES NO. 4 INFLOW	RES NO. 4 OUTFLOW	RES NO. 4 MIN DESI	RES NO. 4 DEB-SHOR	213.040	0.000			
1	1 10 27	1	643928.69	3.00	0.03	1222.00	1220.44	400.00	0.00	1220.44	0.00	1220.44	
2	1 11 27	1	643928.69	3.00	0.03	1268.00	1276.14	400.00	0.00	1276.14	0.00	1276.14	
3	1 12 27	1	643928.69	3.00	0.03	497.00	504.13	400.00	0.00	504.13	0.00	504.13	
4	1 1 28	1	643928.69	3.00	0.03	733.00	737.76	400.00	0.00	737.76	0.00	737.76	
5	1 2 28	1	643928.69	3.00	0.03	647.00	651.93	400.00	0.00	651.93	0.00	651.93	
6	1 3 28	1	643928.69	3.00	0.03	1385.00	1391.08	400.00	0.00	1391.08	0.00	1391.08	
7	1 4 28	1	643928.69	3.00	0.03	999.00	1006.39	400.00	0.00	1006.39	0.00	1006.39	
8	1 5 28	1	643928.69	3.00	0.03	1365.00	1366.56	400.00	0.00	1366.56	0.00	1366.56	
9	1 6 28	1	643928.69	3.00	0.03	1308.00	1309.11	400.00	0.00	1309.11	0.00	1309.11	
10	1 7 28	1	641568.04	3.00	0.00	360.00	400.00	400.00	0.00	400.00	0.00	400.00	
11	1 8 28	1	643383.94	2.99	0.00	282.00	400.00	400.00	0.00	400.00	0.00	400.00	
12	1 9 28	1	621051.43	2.96	0.00	176.00	400.00	400.00	0.00	400.00	0.00	400.00	
13	1 10 28	1	608241.89	2.94	0.00	193.00	400.00	400.00	0.00	400.00	0.00	400.00	
14	1 11 28	1	600352.72	2.93	0.00	261.00	400.00	400.00	0.00	400.00	0.00	400.00	
15	1 12 28	1	605675.33	2.94	0.00	481.00	400.00	400.00	0.00	400.00	0.00	400.00	
16	1 1 29	1	607817.04	2.94	0.00	431.00	400.00	400.00	0.00	400.00	0.00	400.00	
17	1 2 29	1	643928.69	3.00	0.03	1130.00	484.44	400.00	0.00	484.44	0.00	484.44	
18	1 3 29	1	643928.69	3.00	0.03	1230.00	1236.08	400.00	0.00	1236.08	0.00	1236.08	
19	1 4 29	1	643928.69	3.00	0.03	810.00	817.39	400.00	0.00	817.39	0.00	817.39	
20	1 5 29	1	636828.66	2.99	0.00	283.00	400.00	400.00	0.00	400.00	0.00	400.00	
21	1 6 29	1	62287.68	2.97	0.00	163.00	400.00	400.00	0.00	400.00	0.00	400.00	
22	1 7 29	1	607500.38	2.94	0.00	150.00	400.00	400.00	0.00	400.00	0.00	400.00	
23	1 8 29	1	595731.48	2.93	0.00	208.00	400.00	400.00	0.00	400.00	0.00	400.00	
24	1 9 29	1	608175.66	2.94	0.00	608.00	400.00	400.00	0.00	400.00	0.00	400.00	
25	1 10 29	1	621202.78	2.96	0.00	618.00	400.00	400.00	0.00	400.00	0.00	400.00	
26	1 11 29	1	630748.38	2.98	0.00	553.00	400.00	400.00	0.00	400.00	0.00	400.00	
27	1 12 29	1	638791.85	2.99	0.00	528.00	400.00	400.00	0.00	400.00	0.00	400.00	
28	1 1 30	1	643692.52	3.00	0.00	475.00	400.00	400.00	0.00	400.00	0.00	400.00	
29	1 2 30	1	643928.69	3.00	0.03	760.00	760.85	400.00	0.00	760.85	0.00	760.85	
30	1 3 30	1	643928.69	3.00	0.03	891.00	897.08	400.00	0.00	897.08	0.00	897.08	
31	1 4 30	1	643928.69	3.00	0.03	491.00	498.39	400.00	0.00	498.39	0.00	498.39	
32	1 5 30	1	643928.69	3.00	0.03	575.00	576.56	400.00	0.00	576.56	0.00	576.56	
33	1 6 30	1	639055.30	2.99	0.00	317.00	400.00	400.00	0.00	400.00	0.00	400.00	
34	1 7 30	1	621008.85	2.96	0.00	105.00	400.00	400.00	0.00	400.00	0.00	400.00	
35	1 8 30	1	602254.76	2.94	0.00	94.00	400.00	400.00	0.00	400.00	0.00	400.00	
36	1 9 30	1	582913.00	2.91	0.00	75.00	400.00	400.00	0.00	400.00	0.00	400.00	
37	1 10 30	1	562433.91	2.87	0.00	76.00	400.00	400.00	0.00	400.00	0.00	400.00	
38	1 11 30	1	545429.02	2.85	0.00	102.00	400.00	400.00	0.00	400.00	0.00	400.00	
39	1 12 30	1	528620.38	2.82	0.00	124.00	400.00	400.00	0.00	400.00	0.00	400.00	
40	1 1 31	1	514187.05	2.80	0.00	164.00	400.00	400.00	0.00	400.00	0.00	400.00	
41	1 2 31	1	529202.65	2.82	0.00	669.00	400.00	400.00	0.00	400.00	0.00	400.00	
42	1 3 31	1	538747.72	2.87	0.00	878.00	400.00	400.00	0.00	400.00	0.00	400.00	
43	1 4 31	1	583042.99	2.91	0.00	804.00	400.00	400.00	0.00	400.00	0.00	400.00	
44	1 5 31	1	581076.30	2.90	0.00	367.00	400.00	400.00	0.00	400.00	0.00	400.00	
45	1 6 31	1	582309.47	2.90	0.00	420.00	400.00	400.00	0.00	400.00	0.00	400.00	

TABLE A-5 (CONTINUED)

LOC NO=	PER DY	NO	YR	DW	RES NO.4 EDP STOR	RES NO.4 LEVEL	RES NO.4 CASE	RES NO.4 INFLOW	RES NO.4 OUTFLOW	RES NO.4 MIN DESI	RES NO.4 DEB-SHOR	C.P. 213 FLOW REG
46	1	7	31	1	570441.96	2.89	0.00	206.00	400.00	400.00	0.00	400.00
47	1	8	31	1	554801.10	2.86	0.00	145.00	400.00	400.00	0.00	400.00
48	1	9	31	1	535400.93	2.83	0.00	74.00	400.00	400.00	0.00	400.00
49	1	10	31	1	515696.48	2.80	0.00	80.00	400.00	400.00	0.00	400.00
50	1	11	31	1	499862.25	2.78	0.00	133.00	400.00	400.00	0.00	400.00
51	1	12	31	1	504490.85	2.78	0.00	475.00	400.00	400.00	0.00	400.00
52	1	1	32	1	506544.93	2.79	0.00	433.00	400.00	400.00	0.00	400.00
53	1	2	32	1	514062.17	2.80	0.00	530.00	400.00	400.00	0.00	400.00
54	1	3	32	1	557608.98	2.87	0.00	1106.00	400.00	400.00	0.00	400.00
55	1	4	32	1	564142.71	2.88	0.00	506.00	400.00	400.00	0.00	400.00
56	1	5	32	1	571144.40	2.89	0.00	513.00	400.00	400.00	0.00	400.00
57	1	6	32	1	563802.73	2.88	0.00	276.00	400.00	400.00	0.00	400.00
58	1	7	32	1	547248.44	2.85	0.00	130.00	400.00	400.00	0.00	400.00
59	1	8	32	1	527415.08	2.82	0.00	77.00	400.00	400.00	0.00	400.00
60	1	9	32	1	529139.57	2.82	0.00	429.00	400.00	400.00	0.00	400.00
61	1	10	32	1	578592.99	2.90	0.00	1205.00	400.00	400.00	0.00	400.00
62	1	11	32	1	578898.84	2.90	0.00	400.00	400.00	400.00	0.00	400.00
63	1	12	32	1	581516.13	2.90	0.00	438.00	400.00	400.00	0.00	400.00
64	1	1	33	1	589460.73	2.92	0.00	526.00	400.00	400.00	0.00	400.00
65	1	2	33	1	617952.24	2.96	0.00	909.00	400.00	400.00	0.00	400.00
66	1	3	33	1	64328.69	3.00	0.03	1224.00	807.23	400.00	0.00	807.23
67	1	4	33	1	64328.69	3.00	0.03	655.00	662.39	400.00	0.00	662.39
68	1	5	33	1	640826.34	3.00	0.00	348.00	400.00	400.00	0.00	400.00
69	1	6	33	1	629702.92	2.98	0.00	212.00	400.00	400.00	0.00	400.00
70	1	7	33	1	64328.69	3.00	0.03	1032.00	807.21	400.00	0.00	807.21
71	1	8	33	1	64328.69	3.00	0.03	1237.00	1238.20	400.00	0.00	1238.20
72	1	9	33	1	64328.69	3.00	0.03	524.00	523.94	400.00	0.00	523.94
73	1	10	33	1	642910.85	3.00	0.00	385.00	400.00	400.00	0.00	400.00
74	1	11	33	1	640652.96	2.99	0.00	354.00	400.00	400.00	0.00	400.00
75	1	12	33	1	64328.69	3.00	0.03	712.00	665.80	400.00	0.00	665.80
76	1	1	34	1	628161.85	2.98	0.00	139.00	400.00	400.00	0.00	400.00
77	1	2	34	1	631702.72	2.98	0.00	459.00	400.00	400.00	0.00	400.00
78	1	3	34	1	64328.69	3.00	0.03	1195.00	1002.07	400.00	0.00	1002.07
79	1	4	34	1	64328.69	3.00	0.03	550.00	557.39	400.00	0.00	557.39
80	1	5	34	1	638304.73	2.99	0.00	307.00	400.00	400.00	0.00	400.00
81	1	6	34	1	626109.21	2.97	0.00	194.00	400.00	400.00	0.00	400.00
82	1	7	34	1	612115.34	2.95	0.00	171.00	400.00	400.00	0.00	400.00
83	1	8	34	1	619126.57	2.96	0.00	513.00	400.00	400.00	0.00	400.00
84	1	9	34	1	620551.45	2.96	0.00	424.00	400.00	400.00	0.00	400.00
85	1	10	34	1	633991.03	2.98	0.00	620.00	400.00	400.00	0.00	400.00
86	1	11	34	1	64328.69	3.00	0.03	1219.00	1059.94	400.00	0.00	1059.94
87	1	12	34	1	64328.69	3.00	0.03	566.00	573.13	400.00	0.00	573.13
88	1	1	35	1	641391.26	3.00	0.00	354.00	400.00	400.00	0.00	400.00
89	1	2	35	1	64328.69	3.00	0.03	1044.00	1003.39	400.00	0.00	1003.39
90	1	3	35	1	64328.69	3.00	0.03	763.00	769.08	400.00	0.00	769.08
91	1	4	35	1	64328.69	3.00	0.03	545.00	552.39	400.00	0.00	552.39
92	1	5	35	1	643286.42	3.00	0.00	388.00	400.00	400.00	0.00	400.00

TABLE A-5 (CONTINUED)

LOC NO=	PER	DI	MO	YR	DM	RES NO.4 EQP STOR	RES NO.4 LEVEL	RES NO.4 CASE	RES NO.4 INFLOW	RES NO.4 OUTFLOW	RES NO.4 MIN DESI	RES NO.4 DEQ-SHOR	C.P. 213 FLOW RES
93	1	6	35	1	643928.69	3.00	0.03	1177.00	1167.32	400.00	0.00	1167.32	
94	1	7	35	1	634925.68	2.99	0.00	252.00	400.00	400.00	0.00	400.00	
95	1	8	35	1	621896.66	2.97	0.00	187.00	400.00	400.00	0.00	400.00	
96	1	9	35	1	608742.91	2.95	0.00	179.00	400.00	400.00	0.00	400.00	
97	1	10	35	1	637679.63	2.99	0.00	872.00	400.00	400.00	0.00	400.00	
98	1	11	35	1	643928.69	3.00	0.03	697.00	600.00	400.00	0.00	600.00	
99	1	12	35	1	643928.69	3.00	0.03	613.00	620.13	400.00	0.00	620.13	
100	1	1	36	1	639976.02	2.99	0.00	331.00	400.00	400.00	0.00	400.00	
101	1	2	36	1	643928.69	3.00	0.03	3094.00	3030.17	400.00	0.00	3030.17	
102	1	3	36	1	643928.69	3.00	0.03	820.00	826.08	400.00	0.00	826.08	
103	1	4	36	1	641629.18	3.00	0.00	354.00	400.00	400.00	0.00	400.00	
104	1	5	36	1	633605.55	2.98	0.00	288.00	400.00	400.00	0.00	400.00	
105	1	6	36	1	617361.41	2.96	0.00	126.00	400.00	400.00	0.00	400.00	
106	1	7	36	1	596842.92	2.93	0.00	65.00	400.00	400.00	0.00	400.00	
107	1	8	36	1	574941.28	2.89	0.00	43.00	400.00	400.00	0.00	400.00	
108	1	9	36	1	559467.94	2.87	0.00	140.00	400.00	400.00	0.00	400.00	
109	1	10	36	1	545404.53	2.85	0.00	172.00	400.00	400.00	0.00	400.00	
110	1	11	36	1	555141.96	2.86	0.00	560.00	400.00	400.00	0.00	400.00	
111	1	12	36	1	592543.71	2.92	0.00	1004.00	400.00	400.00	0.00	400.00	
112	1	1	37	1	621002.35	2.96	0.00	899.00	400.00	400.00	0.00	400.00	
113	1	2	37	1	636760.06	2.99	0.00	679.00	400.00	400.00	0.00	400.00	
114	1	3	37	1	643928.69	3.00	0.03	1282.00	1171.39	400.00	0.00	1171.39	
115	1	4	37	1	643928.69	3.00	0.03	793.00	800.39	400.00	0.00	800.39	
116	1	5	37	1	641810.38	3.00	0.00	364.00	400.00	400.00	0.00	400.00	
117	1	6	37	1	634139.12	2.98	0.00	270.00	400.00	400.00	0.00	400.00	
118	1	7	37	1	629252.06	2.98	0.00	319.00	400.00	400.00	0.00	400.00	
119	1	8	37	1	618496.39	2.96	0.00	224.00	400.00	400.00	0.00	400.00	
120	1	9	37	1	639498.24	2.99	0.00	753.00	400.00	400.00	0.00	400.00	
SUM = 73274909.54							353.79	1.08	66490.00	66766.96	48000.00	0.00	66766.96
MAX = 643928.69							3.00	0.03	3094.00	3030.17	400.00	0.00	3030.17
MIN = 499862.25							2.78	0.00	43.00	400.00	400.00	0.00	400.00
PMAX = 4.00							4.00	1.00	101.00	101.00	1.00	1.00	101.00
AVG = 610624.25							2.95	0.01	554.08	556.39	400.00	0.00	556.39
PMIN = 50.00							50.00	10.00	107.00	10.00	1.00	1.00	10.00

APPENDIX B

SELECTED OUTPUT FOR RUNS 1-24

RUN1 - SUMMARY OUTPUT

LOC NO= CODE=	SUMMARY BY PERIOD FLOOD=										C.P. 213 REQ-SHOR	C.P. 213 MIN REQU	C.P. 213 REQ-SHOR	C.P. 213 FLOW REG
	4. 4.110	4. 4.220	4. 4.130	4. 4.120	4. 4.100	213. 213.050	213. 213.060	213. 213.070	213. 213.080	213. 213.040				
PER DY	MO	YR	DN	RES NO. 4 EDP STOR	RES NO. 4 EDP ELEV	RES NO. 4 LEVEL	RES NO. 4 CASE	RES NO. 4 OUTFLOW	C.P. 213 MIN DEST	C.P. 213 REQ-SHOR	C.P. 213 MIN REQU	C.P. 213 REQ-SHOR	C.P. 213 FLOW REG	
1	10	27	1	71500.00	1424.31	3.00	0.03	1221.09	400.00	0.00	100.00	0.00	1221.09	
2	11	27	1	71500.00	1424.31	3.00	0.03	1272.75	400.00	0.00	100.00	0.00	1272.75	
3	12	27	1	71500.00	1424.31	3.00	0.03	501.16	400.00	0.00	100.00	0.00	501.16	
4	1	28	1	71500.00	1424.31	3.00	0.03	735.78	400.00	0.00	100.00	0.00	735.78	
5	2	28	1	71500.00	1424.31	3.00	0.03	649.88	400.00	0.00	100.00	0.00	649.88	
6	3	28	1	71500.00	1424.31	3.00	0.03	1388.55	400.00	0.00	100.00	0.00	1388.55	
7	4	28	1	71500.00	1424.31	3.00	0.03	1003.32	400.00	0.00	100.00	0.00	1003.32	
8	5	28	1	71500.00	1424.31	3.00	0.03	1365.91	400.00	0.00	100.00	0.00	1365.91	
9	6	28	1	71500.00	1424.31	3.00	0.03	1308.65	400.00	0.00	100.00	0.00	1308.65	
10	7	28	1	69097.74	1422.31	2.97	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
11	8	28	1	61882.20	1416.31	2.86	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
12	9	28	1	48551.32	1403.86	2.67	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
13	10	28	1	35784.87	1390.24	2.49	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
14	11	28	1	27676.37	1378.86	2.37	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
15	12	28	1	32799.72	1386.10	2.44	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
16	1	29	1	34808.36	1388.94	2.47	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
17	1	29	1	71500.00	1424.31	3.00	0.03	471.71	400.00	0.00	100.00	0.00	471.71	
18	1	29	1	71500.00	1424.31	3.00	0.03	1233.55	400.00	0.00	100.00	0.00	1233.55	
19	1	29	1	71500.00	1424.31	3.00	0.03	814.32	400.00	0.00	100.00	0.00	814.32	
20	1	29	1	64359.51	1418.37	2.90	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
21	1	29	1	50289.35	1405.72	2.69	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
22	1	29	1	34957.29	1389.15	2.47	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
23	1	29	1	23174.91	1372.49	2.30	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
24	1	29	1	35550.77	1389.99	2.48	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
25	1	29	1	48671.01	1403.99	2.67	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
26	1	29	1	58000.50	1413.08	2.81	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
27	1	29	1	65853.36	1419.61	2.92	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
28	1	30	1	70629.70	1423.59	2.99	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
29	1	30	1	71500.00	1424.31	3.00	0.03	747.30	400.00	0.00	100.00	0.00	747.30	
30	1	30	1	71500.00	1424.31	3.00	0.03	894.55	400.00	0.00	100.00	0.00	894.55	
31	1	30	1	71500.00	1424.31	3.00	0.03	495.32	400.00	0.00	100.00	0.00	495.32	
32	1	30	1	71500.00	1424.31	3.00	0.03	575.91	400.00	0.00	100.00	0.00	575.91	
33	1	30	1	66598.73	1420.23	2.93	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
34	1	30	1	48508.55	1403.82	2.67	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
35	1	30	1	29721.25	1381.75	2.40	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
36	1	30	1	10381.21	1343.83	2.12	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
37	1	30	1	2000.00	1300.00	2.00	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
38	1	30	1	2000.00	1300.00	2.00	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
39	1	30	1	2000.00	1300.00	2.00	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
40	1	31	1	2000.00	1300.00	2.00	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
41	1	31	1	16976.57	1360.56	2.22	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
42	1	31	1	46493.66	1401.67	2.64	213.00	400.00	400.00	0.00	100.00	0.00	400.00	





RUN1 (CONTINUED)

LOC NO=	PER	BY	MO	YR	DN	4.	4.	4.	4.	4.	213.	213.	213.	213.	213.	213.
						RES NO. 4 EDP STOR	RES NO. 4 EDP ELEV	RES NO. 4 LEVEL	RES NO. 4 CASE	RES NO. 4 OUTFLOW	C.P. 213 MIN DESI	C.P. 213 DEP-SHOR	C.P. 213 MIN REQU	C.P. 213 RED-SHOR	C.P. 213 FLDN REB	
91	1	4	35	1	1	71500.00	1424.31	3.00	0.03	549.32	400.00	0.00	100.00	0.00	549.32	
92	1	5	35	1	1	70817.84	1423.74	2.99	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
93	1	6	35	1	1	71500.00	1424.31	3.00	0.03	1166.18	400.00	0.00	100.00	0.00	1166.18	
94	1	7	35	1	1	62434.81	1416.78	2.87	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
95	1	8	35	1	1	49393.21	1404.76	2.88	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
96	1	9	35	1	1	36241.12	1390.73	2.99	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
97	1	10	35	1	1	65220.60	1419.09	2.91	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
98	1	11	35	1	1	71500.00	1424.31	3.00	0.03	596.06	400.00	0.00	100.00	0.00	596.06	
99	1	12	35	1	1	71500.00	1424.31	3.00	0.03	617.16	400.00	0.00	100.00	0.00	617.16	
100	1	1	36	1	1	67424.34	1420.92	2.94	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
101	1	2	36	1	1	71500.00	1424.31	3.00	0.03	3025.96	400.00	0.00	100.00	0.00	3025.96	
102	1	3	36	1	1	71500.00	1424.31	3.00	0.03	823.55	400.00	0.00	100.00	0.00	823.55	
103	1	4	36	1	1	69016.18	1422.24	2.96	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
104	1	5	36	1	1	60951.50	1415.53	2.85	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
105	1	6	36	1	1	44677.76	1399.73	2.61	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
106	1	7	36	1	1	24114.33	1373.82	2.32	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
107	1	8	36	1	1	2175.54	1301.30	2.00	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
108	1	9	36	1	1	2000.00	1300.00	2.00	213.00	142.95	400.00	257.05	100.00	0.00	142.95	
109	1	10	36	1	1	2000.00	1300.00	2.00	213.00	171.94	400.00	228.06	100.00	0.00	171.94	
110	1	11	36	1	1	11568.99	1348.30	2.14	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
111	1	12	36	1	1	48850.74	1404.18	2.67	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
112	1	1	37	1	1	71500.00	1424.31	3.00	0.03	493.08	400.00	0.00	100.00	0.00	493.08	
113	1	2	37	1	1	71500.00	1424.31	3.00	0.03	681.98	400.00	0.00	100.00	0.00	681.98	
114	1	3	37	1	1	71500.00	1424.31	3.00	0.03	1285.55	400.00	0.00	100.00	0.00	1285.55	
115	1	4	37	1	1	71500.00	1424.31	3.00	0.03	797.32	400.00	0.00	100.00	0.00	797.32	
116	1	5	37	1	1	69341.65	1422.51	2.97	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
117	1	6	37	1	1	61642.09	1416.11	2.86	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
118	1	7	37	1	1	56711.52	1412.01	2.79	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
119	1	8	37	1	1	45922.93	1401.06	2.63	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
120	1	9	37	1	1	66926.41	1420.50	2.93	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
						SUM = 6480173.11	168291.95	329.79	16189.32	66678.20	48000.00	1725.45	12000.00	0.00	66678.20	
						MAX = 71500.00	1424.31	3.00	213.00	3025.96	400.00	297.71	100.00	0.00	3025.96	
						MIN = 2000.00	1300.00	2.00	0.03	102.29	400.00	0.00	100.00	0.00	102.29	
						PHMAX = 2.00	1.00	1.00	10.00	101.00	1.00	38.00	1.00	1.00	101.00	
						AVG = 54001.44	1402.43	2.75	134.91	555.65	400.00	14.38	100.00	0.00	555.65	
						PHMIN = 109.00	37.00	37.00	1.00	38.00	1.00	1.00	1.00	1.00	38.00	

RUN2 - SUMMARY OUTPUT

LOC NO- CODE	SUMMARY BY PERIOD							FLOOD=		1		213.		213.		213.		C.P. 213 FLOW REG
	PER DY	NO	YR	DN	RES NO. 4 EDP STOR	RES NO. 4 EOP ELEV	RES NO. 4 LEVEL	RES NO. 4 CASE	RES NO. 4 OUTFLOW	C.P. 213 MIN DESI	C.P. 213 DEG-SHOR	C.P. 213 MIN REGU	C.P. 213 REG-SHOR	213.040				
1	1	1	10	27	1	71500.00	1424.31	3.00	0.03	1221.09	400.00	100.00	0.00	1221.09				
2	1	11	27	1	71500.00	1424.31	3.00	0.03	1272.75	400.00	0.00	100.00	0.00	1272.75				
3	1	12	27	1	71500.00	1424.31	3.00	0.03	501.16	400.00	0.00	100.00	0.00	501.16				
4	1	1	28	1	71500.00	1424.31	3.00	0.03	735.78	400.00	0.00	100.00	0.00	735.78				
5	1	2	28	1	71500.00	1424.31	3.00	0.03	649.88	400.00	0.00	100.00	0.00	649.88				
6	1	3	28	1	71500.00	1424.31	3.00	0.03	1388.55	400.00	0.00	100.00	0.00	1388.55				
7	1	4	28	1	71500.00	1424.31	3.00	0.03	1003.32	400.00	0.00	100.00	0.00	1003.32				
8	1	5	28	1	71500.00	1424.31	3.00	0.03	1365.91	400.00	0.00	100.00	0.00	1365.91				
9	1	6	28	1	71500.00	1424.31	3.00	0.03	1308.65	400.00	0.00	100.00	0.00	1308.65				
10	1	7	28	1	69097.74	1422.31	2.97	213.00	400.00	400.00	100.00	0.00	400.00					
11	1	8	28	1	61982.20	1416.31	2.86	213.00	400.00	400.00	100.00	0.00	400.00					
12	1	9	28	1	48531.32	1403.86	2.67	213.00	400.00	400.00	100.00	0.00	400.00					
13	1	10	28	1	35784.87	1390.24	2.49	213.00	400.00	400.00	100.00	0.00	400.00					
14	1	11	28	1	27676.37	1378.86	2.37	213.00	400.00	400.00	100.00	0.00	400.00					
15	1	12	28	1	32799.72	1384.10	2.44	213.00	400.00	400.00	100.00	0.00	400.00					
16	1	1	29	1	34808.36	1388.94	2.47	213.00	400.00	400.00	100.00	0.00	400.00					
17	1	2	29	1	71500.00	1424.31	3.00	0.03	471.71	400.00	0.00	100.00	0.00	471.71				
18	1	3	29	1	71500.00	1424.31	3.00	0.03	1233.55	400.00	0.00	100.00	0.00	1233.55				
19	1	4	29	1	71500.00	1424.31	3.00	0.03	814.32	400.00	0.00	100.00	0.00	814.32				
20	1	5	29	1	64359.51	1418.37	2.90	213.00	400.00	400.00	100.00	0.00	400.00					
21	1	6	29	1	50289.35	1405.72	2.69	213.00	400.00	400.00	100.00	0.00	400.00					
22	1	7	29	1	34957.29	1389.15	2.47	213.00	400.00	400.00	100.00	0.00	400.00					
23	1	8	29	1	23174.91	1372.49	2.30	213.00	400.00	400.00	100.00	0.00	400.00					
24	1	9	29	1	35350.77	1389.99	2.48	213.00	400.00	400.00	100.00	0.00	400.00					
25	1	10	29	1	48671.01	1403.99	2.67	213.00	400.00	400.00	100.00	0.00	400.00					
26	1	11	29	1	58000.50	1413.08	2.81	213.00	400.00	400.00	100.00	0.00	400.00					
27	1	12	29	1	65853.36	1419.61	2.92	213.00	400.00	400.00	100.00	0.00	400.00					
28	1	1	30	1	70629.70	1423.59	2.99	213.00	400.00	400.00	100.00	0.00	400.00					
29	1	2	30	1	71500.00	1424.31	3.00	0.03	747.30	400.00	0.00	100.00	0.00	747.30				
30	1	3	30	1	71500.00	1424.31	3.00	0.03	894.55	400.00	0.00	100.00	0.00	894.55				
31	1	4	30	1	71500.00	1424.31	3.00	0.03	495.32	400.00	0.00	100.00	0.00	495.32				
32	1	5	30	1	71500.00	1424.31	3.00	0.03	575.91	400.00	0.00	100.00	0.00	575.91				
33	1	6	30	1	66598.73	1420.23	2.93	213.00	400.00	400.00	100.00	0.00	400.00					
34	1	7	30	1	48508.55	1403.82	2.67	213.00	400.00	400.00	100.00	0.00	400.00					
35	1	8	30	1	29721.25	1381.75	2.40	213.00	400.00	400.00	100.00	0.00	400.00					
36	1	9	30	1	10381.21	1343.83	2.12	213.00	400.00	400.00	100.00	0.00	400.00					
37	1	10	30	1	2000.00	1300.00	2.00	213.00	212.16	400.00	100.00	0.00	400.00					
38	1	11	30	1	2000.00	1300.00	2.00	213.00	102.29	400.00	100.00	0.00	400.00					
39	1	12	30	1	2000.00	1300.00	2.00	213.00	124.26	400.00	100.00	0.00	400.00					
40	1	1	31	1	2000.00	1300.00	2.00	213.00	164.17	400.00	100.00	0.00	400.00					
41	1	2	31	1	16976.57	1360.56	2.22	213.00	235.83	400.00	100.00	0.00	400.00					
42	1	3	31	1	46493.66	1401.67	2.64	213.00	0.00	400.00	100.00	0.00	400.00					

RUNZ (CONTINUED)

LOC NO=	PER DY	NO	VR	DW	4.	4.	4.	4.	4.	213.	213.	213.	213.	213.	213.
					RES NO.4 EDP STOR	RES NO.4 EDP ELEV	RES NO.4 LEVEL	RES NO.4 CASE	RES NO.4 OUTFLOW	C.P. 213 MIN DESI	C.P. 213 DEQ-SHOR	C.P. 213 MIN REGU	C.P. 213 REQ-SHOR	C.P. 213 FLOW REG	
43	1	4	31	1	70753.35	1423.69	2.99	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
44	1	5	31	1	68779.06	1422.05	2.96	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
45	1	6	31	1	70006.95	1423.07	2.98	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
46	1	7	31	1	58131.38	1413.19	2.81	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
47	1	8	31	1	42484.77	1372.37	2.58	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
48	1	9	31	1	23084.80	1372.37	2.30	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
49	1	10	31	1	3392.06	1310.30	2.02	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
50	1	11	31	1	2000.00	1300.00	2.00	213.00	156.77	400.00	243.23	100.00	0.00	156.77	
51	1	12	31	1	6641.80	1329.75	2.07	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
52	1	1	32	1	8702.98	1337.51	2.10	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
53	1	2	32	1	16227.14	1398.96	2.20	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
54	1	3	32	1	59778.64	1414.56	2.83	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
55	1	4	32	1	66318.68	1420.00	2.93	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
56	1	5	32	1	71500.00	1424.31	3.00	0.03	429.62	400.00	0.00	100.00	0.00	429.62	
57	1	6	32	1	64158.49	1418.20	2.89	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
58	1	7	32	1	47604.43	1402.85	2.66	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
59	1	8	32	1	27771.22	1378.99	2.37	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
60	1	9	32	1	29495.71	1381.43	2.40	213.00	400.00	400.00	0.00	100.00	0.00	400.00	
					SUM = 2869598.48	83652.02	159.56	9159.51	31069.02	24000.00	1240.35	6000.00	0.00	31069.02	
					MAX = 71500.00	1424.31	3.00	213.00	1388.55	400.00	297.71	100.00	0.00	1388.55	
					MIN = 2000.00	1300.00	2.00	0.03	102.29	400.00	0.00	100.00	0.00	102.29	
					PMAX= 2.00	1.00	1.00	10.00	6.00	1.00	38.00	1.00	1.00	6.00	
					AVG = 47826.64	1394.20	2.66	152.66	517.82	400.00	20.67	100.00	0.00	517.82	
					PMIN= 39.00	37.00	37.00	1.00	38.00	1.00	1.00	1.00	1.00	38.00	



RUN3 (CONTINUED)

SUM =	2226098.48	70833.23	132.56	9159.24	21621.93	20400.00	1240.35	5100.00	0.00	21621.93
MAX =	71500.00	1424.31	3.00	213.00	1233.55	400.00	297.71	100.00	0.00	1233.55
MIN =	2000.00	1300.00	2.00	0.03	102.29	400.00	0.00	100.00	0.00	102.29
PMAX=	8.00	8.00	8.00	1.00	9.00	1.00	29.00	1.00	1.00	9.00
AVG =	43648.99	1388.89	2.60	179.59	423.96	400.00	24.32	100.00	0.00	423.96
PRIN=	30.00	28.00	28.00	8.00	29.00	1.00	1.00	1.00	1.00	29.00





RUN4 (CONTINUED)

LOC NO=

PER	BY	MO	YR	DN	4.	4.	4.	4.	4.	4.	213.	213.	213.	213.	213.	213.
					RES NO.4	RES NO.4	RES NO.4	RES NO.4	RES NO.4	RES NO.4	C.P. 213	C.P. 213	C.P. 213	C.P. 213	C.P. 213	C.P. 213
					EDP STOR	EDP ELEV	LEVEL	CASE	OUTFLOW	MIN DEBT	DEQ-SHOR	MIN REQU	REB-SHOR	FLOW REG		
91	1	4	35	1	71500.00	1424.31	3.00	0.03	549.32	500.00	0.00	100.00	0.00	0.00	549.32	549.32
92	1	5	35	1	63436.89	1417.60	2.88	213.00	520.00	520.00	0.00	100.00	0.00	0.00	520.00	520.00
93	1	6	35	1	71500.00	1424.31	3.00	0.03	1042.12	540.00	0.00	100.00	0.00	0.00	1042.12	1042.12
94	1	7	35	1	53228.51	1408.86	2.74	213.00	550.00	550.00	0.00	100.00	0.00	0.00	550.00	550.00
95	1	8	35	1	32167.67	1385.21	2.43	213.00	530.00	530.00	0.00	100.00	0.00	0.00	530.00	530.00
96	1	9	35	1	13660.60	1353.49	2.17	213.00	490.00	490.00	0.00	100.00	0.00	0.00	490.00	490.00
97	1	10	35	1	40194.39	1394.95	2.55	213.00	440.00	440.00	0.00	100.00	0.00	0.00	440.00	440.00
98	1	11	35	1	57485.14	1412.65	2.80	213.00	410.00	410.00	0.00	100.00	0.00	0.00	410.00	410.00
99	1	12	35	1	70816.90	1423.74	2.99	213.00	400.00	400.00	0.00	100.00	0.00	0.00	400.00	400.00
100	1	1	36	1	65508.97	1419.33	2.91	213.00	420.00	420.00	0.00	100.00	0.00	0.00	420.00	420.00
101	1	2	36	1	71500.00	1424.31	3.00	0.03	2992.63	440.00	0.00	100.00	0.00	0.00	2992.63	2992.63
102	1	3	36	1	71500.00	1424.31	3.00	0.03	823.55	480.00	0.00	100.00	0.00	0.00	823.55	823.55
103	1	4	36	1	63057.04	1417.29	2.88	213.00	500.00	500.00	0.00	100.00	0.00	0.00	500.00	500.00
104	1	5	36	1	47607.65	1402.86	2.66	213.00	520.00	520.00	0.00	100.00	0.00	0.00	520.00	520.00
105	1	6	36	1	22996.47	1372.24	2.50	213.00	540.00	540.00	0.00	100.00	0.00	0.00	540.00	540.00
106	1	7	36	1	20000.00	1300.00	2.00	213.00	406.73	550.00	143.27	100.00	0.00	0.00	406.73	406.73
107	1	8	36	1	300.00	1270.23	1.00	0.07	70.68	530.00	459.32	100.00	29.32	70.68	70.68	70.68
108	1	9	36	1	20000.00	1300.00	2.00	213.00	111.43	490.00	378.57	100.00	0.00	0.00	111.43	111.43
109	1	10	36	1	20000.00	1300.00	2.00	213.00	171.94	440.00	268.06	100.00	0.00	0.00	171.94	171.94
110	1	11	36	1	10972.32	1346.06	2.13	213.00	410.00	410.00	0.00	100.00	0.00	0.00	410.00	410.00
111	1	12	36	1	48252.28	1403.55	2.67	213.00	400.00	400.00	0.00	100.00	0.00	0.00	400.00	400.00
112	1	1	37	1	71500.00	1424.31	3.00	0.03	483.33	420.00	0.00	100.00	0.00	0.00	483.33	483.33
113	1	2	37	1	71500.00	1424.31	3.00	0.03	681.98	440.00	0.00	100.00	0.00	0.00	681.98	681.98
114	1	3	37	1	71500.00	1424.31	3.00	0.03	1285.55	480.00	0.00	100.00	0.00	0.00	1285.55	1285.55
115	1	4	37	1	71500.00	1424.31	3.00	0.03	797.32	500.00	0.00	100.00	0.00	0.00	797.32	797.32
116	1	5	37	1	61960.70	1416.37	2.86	213.00	520.00	520.00	0.00	100.00	0.00	0.00	520.00	520.00
117	1	6	37	1	45925.42	1401.06	2.63	213.00	540.00	540.00	0.00	100.00	0.00	0.00	540.00	540.00
118	1	7	37	1	31759.46	1384.63	2.43	213.00	550.00	550.00	0.00	100.00	0.00	0.00	550.00	550.00
119	1	8	37	1	12944.03	1352.01	2.16	213.00	530.00	530.00	0.00	100.00	0.00	0.00	530.00	530.00
120	1	9	37	1	28612.89	1380.18	2.58	213.00	490.00	490.00	0.00	100.00	0.00	0.00	490.00	490.00
SUM =					5106616.44	166099.80	305.56	18319.10	67238.86	57200.00	4552.82	12000.00	46.86	67238.86		
MAX =					71500.00	1424.31	3.00	213.00	2992.63	550.00	459.32	100.00	29.32	2992.63		
MIN =					300.00	1270.23	1.00	0.03	70.68	400.00	0.00	100.00	0.00	70.68		
PMAX =					2.00	1.00	1.00	10.00	101.00	10.00	107.00	1.00	107.00	101.00		
AVG =					42555.14	1384.16	2.55	152.66	560.32	476.67	37.94	100.00	0.39	560.32		
PRIN =					49.00	49.00	49.00	1.00	107.00	3.00	1.00	1.00	1.00	107.00		



RUNS - SUMMARY OUTPUT

LOC NO= CODE=	PER DY MD YR DN	SUMMARY BY PERIOD FLOOD=					C.P. 212 MIN DESI	C.P. 212 DEQ-SHOR	C.P. 213 MIN REGU	C.P. 213 REQ-SHOR	213. 213.040
		4. 4.110	4. 4.220	4. 4.130	4. 4.120	4. 4.100					
		RES NO.4 EDP STOR	RES NO.4 EDP ELEV	RES NO.4 LEVEL	RES NO.4 CASE	RES NO.4 OUTFLOW	400.00	400.00	400.00	213. 213.080	
1	1 10 27 1	71500.00	1424.31	3.00	0.03	1221.09	400.00	110.00	0.00	213. 213.040	
2	1 11 27 1	71500.00	1424.31	3.00	0.03	1272.75	400.00	100.00	0.00	213. 213.080	
3	1 12 27 1	71500.00	1424.31	3.00	0.03	501.16	400.00	100.00	0.00	213. 213.080	
4	1 1 28 1	71500.00	1424.31	3.00	0.03	735.78	400.00	100.00	0.00	213. 213.080	
5	1 2 28 1	71500.00	1424.31	3.00	0.03	649.88	400.00	120.00	0.00	213. 213.080	
6	1 3 28 1	71500.00	1424.31	3.00	0.03	1388.55	400.00	130.00	0.00	213. 213.080	
7	1 4 28 1	71500.00	1424.31	3.00	0.03	1093.32	400.00	140.00	0.00	213. 213.080	
8	1 5 28 1	71500.00	1424.31	3.00	0.03	1385.91	400.00	150.00	0.00	213. 213.080	
9	1 6 28 1	71500.00	1424.31	3.00	0.03	1308.65	400.00	150.00	0.00	213. 213.080	
10	1 7 28 1	69097.74	1422.31	2.97	212.00	400.00	400.00	140.00	0.00	213. 213.080	
11	1 8 28 1	61882.20	1416.31	2.86	212.00	400.00	400.00	130.00	0.00	213. 213.080	
12	1 9 28 1	48551.32	1403.86	2.67	212.00	400.00	400.00	120.00	0.00	213. 213.080	
13	1 10 28 1	35784.87	1390.24	2.49	212.00	400.00	400.00	110.00	0.00	213. 213.080	
14	1 11 28 1	27676.37	1378.86	2.37	212.00	400.00	400.00	100.00	0.00	213. 213.080	
15	1 12 28 1	32799.72	1386.10	2.44	212.00	400.00	400.00	100.00	0.00	213. 213.080	
16	1 1 29 1	34808.36	1388.94	2.47	212.00	400.00	400.00	100.00	0.00	213. 213.080	
17	1 2 29 1	71500.00	1424.31	3.00	0.03	471.71	400.00	120.00	0.00	213. 213.080	
18	1 3 29 1	71500.00	1424.31	3.00	0.03	1233.55	400.00	130.00	0.00	213. 213.080	
19	1 4 29 1	71500.00	1424.31	3.00	0.03	814.32	400.00	140.00	0.00	213. 213.080	
20	1 5 29 1	64359.51	1418.37	2.90	212.00	400.00	400.00	150.00	0.00	213. 213.080	
21	1 6 29 1	50289.35	1405.72	2.69	212.00	400.00	400.00	150.00	0.00	213. 213.080	
22	1 7 29 1	34957.29	1389.15	2.47	212.00	400.00	400.00	140.00	0.00	213. 213.080	
23	1 8 29 1	23174.91	1372.49	2.30	212.00	400.00	400.00	130.00	0.00	213. 213.080	
24	1 9 29 1	35550.77	1389.99	2.48	212.00	400.00	400.00	120.00	0.00	213. 213.080	
25	1 10 29 1	48671.01	1403.99	2.67	212.00	400.00	400.00	110.00	0.00	213. 213.080	
26	1 11 29 1	58000.50	1413.08	2.81	212.00	400.00	400.00	100.00	0.00	213. 213.080	
27	1 12 29 1	65853.36	1419.61	2.92	212.00	400.00	400.00	100.00	0.00	213. 213.080	
28	1 1 30 1	70629.70	1423.59	2.99	212.00	400.00	400.00	100.00	0.00	213. 213.080	
29	1 2 30 1	71500.00	1424.31	3.00	0.03	747.30	400.00	120.00	0.00	213. 213.080	
30	1 3 30 1	71500.00	1424.31	3.00	0.03	894.55	400.00	130.00	0.00	213. 213.080	
31	1 4 30 1	71500.00	1424.31	3.00	0.03	495.32	400.00	140.00	0.00	213. 213.080	
32	1 5 30 1	71500.00	1424.31	3.00	0.03	575.91	400.00	150.00	0.00	213. 213.080	
33	1 6 30 1	64598.73	1420.23	2.93	212.00	400.00	400.00	150.00	0.00	213. 213.080	
34	1 7 30 1	48508.55	1403.82	2.67	212.00	400.00	400.00	140.00	0.00	213. 213.080	
35	1 8 30 1	29721.25	1381.75	2.40	212.00	400.00	400.00	130.00	0.00	213. 213.080	
36	1 9 30 1	10381.21	1343.83	2.12	212.00	400.00	400.00	120.00	0.00	213. 213.080	
37	1 10 30 1	2000.00	1300.00	2.00	212.00	400.00	400.00	110.00	0.00	213. 213.080	
38	1 11 30 1	2000.00	1300.00	2.00	212.00	400.00	400.00	100.00	0.00	213. 213.080	
39	1 12 30 1	2000.00	1300.00	2.00	212.00	400.00	400.00	100.00	0.00	213. 213.080	
40	1 1 31 1	2000.00	1300.00	2.00	212.00	400.00	400.00	100.00	0.00	213. 213.080	
41	1 2 31 1	1876.57	1360.56	2.22	212.00	400.00	400.00	120.00	0.00	213. 213.080	
42	1 3 31 1	46493.66	1401.67	2.64	212.00	400.00	400.00	130.00	0.00	213. 213.080	



RUNS (CONTINUED)

LOC NO=	PER DY	MO	YR	DW	RES NO.4 EDP STOR	RES NO.4 EDP ELEV	RES NO.4 LEVEL	RES NO.4 CASE	RES NO.4 OUTFLOW	C.P. 212 MIN DESI	C.P. 212 DEQ-SHOR	C.P. 213 MIN REMU	C.P. 213 REQ-SHOR	C.P. 213 FLOW RES
91	1	4	35	1	71500.00	1424.31	3.00	0.03	549.32	400.00	0.00	140.00	0.00	549.32
92	1	5	35	1	70817.84	1423.74	2.99	212.00	400.00	400.00	0.00	150.00	0.00	400.00
93	1	6	35	1	71500.00	1424.31	3.00	0.03	1166.18	400.00	0.00	150.00	0.00	1166.18
94	1	7	35	1	62454.81	1416.78	2.87	212.00	400.00	400.00	0.00	140.00	0.00	400.00
95	1	8	35	1	49393.21	1404.76	2.68	212.00	400.00	400.00	0.00	130.00	0.00	400.00
96	1	9	35	1	36241.12	1390.73	2.49	212.00	400.00	400.00	0.00	120.00	0.00	400.00
97	1	10	35	1	65220.60	1419.09	2.91	212.00	400.00	400.00	0.00	110.00	0.00	400.00
98	1	11	35	1	71500.00	1424.31	3.00	0.03	576.06	400.00	0.00	100.00	0.00	576.06
99	1	12	35	1	71500.00	1424.31	3.00	0.03	617.16	400.00	0.00	100.00	0.00	617.16
100	1	1	36	1	67424.34	1420.92	2.94	212.00	400.00	400.00	0.00	100.00	0.00	400.00
101	1	2	36	1	71500.00	1424.31	3.00	0.03	3025.96	400.00	0.00	120.00	0.00	3025.96
102	1	3	36	1	71500.00	1424.31	3.00	0.03	823.55	400.00	0.00	130.00	0.00	823.55
103	1	4	36	1	69016.18	1422.24	2.96	212.00	400.00	400.00	0.00	140.00	0.00	400.00
104	1	5	36	1	60951.50	1415.53	2.85	212.00	400.00	400.00	0.00	150.00	0.00	400.00
105	1	6	36	1	44677.76	1399.73	2.61	212.00	400.00	400.00	0.00	150.00	0.00	400.00
106	1	7	36	1	24114.33	1373.82	2.32	212.00	400.00	400.00	0.00	140.00	0.00	400.00
107	1	8	36	1	2175.54	1301.30	2.00	212.00	400.00	400.00	0.00	130.00	0.00	400.00
108	1	9	36	1	2000.00	1300.00	2.00	212.00	400.00	400.00	257.05	120.00	0.00	142.95
109	1	10	36	1	2000.00	1300.00	2.00	212.00	400.00	400.00	228.06	110.00	0.00	171.94
110	1	11	36	1	11568.99	1348.30	2.14	212.00	400.00	400.00	0.00	100.00	0.00	400.00
111	1	12	36	1	48850.74	1404.18	2.67	212.00	400.00	400.00	0.00	100.00	0.00	400.00
112	1	1	37	1	71500.00	1424.31	3.00	0.03	493.08	400.00	0.00	100.00	0.00	493.08
113	1	2	37	1	71500.00	1424.31	3.00	0.03	681.98	400.00	0.00	120.00	0.00	681.98
114	1	3	37	1	71500.00	1424.31	3.00	0.03	1285.55	400.00	0.00	130.00	0.00	1285.55
115	1	4	37	1	71500.00	1424.31	3.00	0.03	777.32	400.00	0.00	140.00	0.00	777.32
116	1	5	37	1	69341.65	1422.51	2.97	212.00	400.00	400.00	0.00	150.00	0.00	400.00
117	1	6	37	1	61642.09	1416.11	2.86	212.00	400.00	400.00	0.00	150.00	0.00	400.00
118	1	7	37	1	56711.52	1412.01	2.79	212.00	400.00	400.00	0.00	140.00	0.00	400.00
119	1	8	37	1	45922.93	1401.06	2.63	212.00	400.00	400.00	0.00	130.00	0.00	400.00
120	1	9	37	1	66926.41	1420.50	2.93	212.00	400.00	400.00	0.00	120.00	0.00	400.00
SUM =					6480173.11	168291.95	329.79	16113.32	66678.20	48000.00	1725.45	14900.00	0.00	66678.20
MAX =					71500.00	1424.31	3.00	212.00	3025.96	400.00	297.71	150.00	0.00	3025.96
MIN =					2000.00	1300.00	2.00	0.03	102.29	400.00	0.00	100.00	0.00	102.29
PMAX=					2.00	1.00	1.00	10.00	101.00	1.00	38.00	8.00	1.00	101.00
AVG =					54001.44	1402.43	2.75	134.28	555.65	400.00	14.38	124.17	0.00	555.65
PMIN=					109.00	37.00	37.00	1.00	38.00	1.00	1.00	2.00	1.00	38.00

RUN6 - SUMMARY OUTPUT

LOC NO= CODE=	SUMMARY BY PERIOD FLOOD=				RES NO. 4 CASE	RES NO. 4 OUTFLOW	DURRY CP MIN DESI	DURRY CP DEP-SHOR	C.P. 213 MIN REBU	C.P. 213 REG-SHOR	213. 213.080	213. 213.040
	4. 4.110	4. 4.220	4. 4.130	4. 4.100								
PER BY NO YR DW	RES NO. 4 EDP STOR	RES NO. 4 EDP ELEV	RES NO. 4 LEVEL	RES NO. 4 CASE	RES NO. 4 OUTFLOW	DURRY CP MIN DESI	DURRY CP DEP-SHOR	C.P. 213 MIN REBU	C.P. 213 REG-SHOR	C.P. 213 FLOW REG		
1	71500.00	1424.31	3.00	0.03	1221.09	440.00	0.00	110.00	0.00	1221.09		
1	71500.00	1424.31	3.00	0.03	1272.75	410.00	0.00	100.00	0.00	1272.75		
2	71500.00	1424.31	3.00	0.03	501.16	400.00	0.00	100.00	0.00	501.16		
3	71500.00	1424.31	3.00	0.03	735.78	420.00	0.00	100.00	0.00	735.78		
4	71500.00	1424.31	3.00	0.03	649.88	440.00	0.00	120.00	0.00	649.88		
5	71500.00	1424.31	3.00	0.03	1388.55	480.00	0.00	130.00	0.00	1388.55		
6	71500.00	1424.31	3.00	0.03	1003.32	500.00	0.00	140.00	0.00	1003.32		
7	71500.00	1424.31	3.00	0.03	1345.91	520.00	0.00	150.00	0.00	1345.91		
8	71500.00	1424.31	3.00	0.03	1308.65	540.00	0.00	150.00	0.00	1308.65		
9	59871.44	1414.64	2.83	212.00	550.00	550.00	0.00	140.00	0.00	550.00		
10	44656.09	1399.71	2.61	212.00	530.00	530.00	0.00	130.00	0.00	530.00		
11	25970.20	1376.45	2.34	212.00	490.00	490.00	0.00	120.00	0.00	490.00		
12	10760.43	1345.26	2.13	212.00	440.00	440.00	0.00	110.00	0.00	440.00		
13	2000.00	1300.00	2.00	212.00	408.99	410.00	1.01	100.00	0.00	408.99		
14	7011.87	1331.14	2.07	212.00	400.00	400.00	0.00	100.00	0.00	400.00		
15	7719.30	1333.81	2.08	212.00	420.00	420.00	0.00	100.00	0.00	420.00		
16	46126.50	1401.28	2.63	212.00	440.00	440.00	0.00	120.00	0.00	440.00		
17	71500.00	1424.31	3.00	0.03	820.39	480.00	0.00	130.00	0.00	820.39		
18	71500.00	1424.31	3.00	0.03	814.32	500.00	0.00	140.00	0.00	814.32		
19	56978.56	1412.23	2.79	212.00	520.00	520.00	0.00	150.00	0.00	520.00		
20	34573.10	1388.61	2.47	212.00	540.00	540.00	0.00	150.00	0.00	540.00		
21	10004.71	1342.41	2.12	212.00	550.00	550.00	0.00	140.00	0.00	550.00		
22	2000.00	1300.00	2.00	212.00	338.29	330.00	191.71	130.00	0.00	338.29		
23	9021.28	1338.71	2.10	212.00	490.00	490.00	0.00	120.00	0.00	490.00		
24	19702.55	1366.36	2.25	212.00	440.00	440.00	0.00	110.00	0.00	440.00		
25	28349.04	1379.81	2.38	212.00	410.00	410.00	0.00	100.00	0.00	410.00		
26	36122.36	1390.60	2.49	212.00	400.00	400.00	0.00	100.00	0.00	400.00		
27	39614.14	1394.33	2.54	212.00	420.00	420.00	0.00	100.00	0.00	420.00		
28	57510.34	1412.67	2.80	212.00	440.00	440.00	0.00	120.00	0.00	440.00		
29	71500.00	1424.31	3.00	0.03	666.75	480.00	0.00	130.00	0.00	666.75		
30	71221.06	1424.31	3.00	0.03	500.00	500.00	0.00	140.00	0.00	500.00		
31	71500.00	1424.31	3.00	0.03	571.37	520.00	0.00	150.00	0.00	571.37		
32	58266.21	1413.30	2.81	212.00	540.00	540.00	0.00	150.00	0.00	540.00		
33	30945.04	1383.48	2.42	212.00	550.00	550.00	0.00	140.00	0.00	550.00		
34	4152.37	1315.92	2.03	212.00	530.00	530.00	0.00	130.00	0.00	530.00		
35	1474.47	1292.60	1.69	213.00	120.00	490.00	370.00	120.00	0.00	120.00		
36	300.00	1270.23	1.00	0.07	95.07	440.00	344.93	110.00	14.93	95.07		
37	425.56	1274.61	1.07	213.00	100.00	410.00	310.00	100.00	0.00	100.00		
38	1912.51	1298.77	1.95	213.00	100.00	400.00	300.00	100.00	0.00	100.00		
39	2600.00	1300.00	2.00	212.00	162.75	420.00	257.25	100.00	0.00	162.75		
40	14751.50	1355.82	2.18	212.00	440.00	440.00	0.00	120.00	0.00	440.00		
41	39537.57	1394.03	2.54	212.00	480.00	480.00	0.00	130.00	0.00	480.00		



RUN6 (CONTINUED)

LOC NO=	PER	BY	NO	YR	DN	RES NO.4 EDP STOR	RES NO.4 EDP ELEV	RES NO.4 LEVEL	RES NO.4 CASE	RES NO.4 OUTFLOW	DUMMY CP MIN DESI	DUMMY CP DEP-SHOR	C.P. 213 MIN REQU	C.P. 213 REQ-SHOR	C.P. 213 FLOW RES
91	1	4	35	1	1	71500.00	1424.31	3.00	0.03	549.32	500.00	0.00	140.00	0.00	549.32
92	1	5	35	1	1	63436.89	1417.60	2.88	212.00	520.00	520.00	0.00	150.00	0.00	520.00
93	1	6	35	1	1	71500.00	1424.31	3.00	0.03	1042.12	540.00	0.00	150.00	0.00	1042.12
94	1	7	35	1	1	53228.51	1408.86	2.74	212.00	550.00	550.00	0.00	140.00	0.00	550.00
95	1	8	35	1	1	32167.67	1385.21	2.43	212.00	530.00	530.00	0.00	130.00	0.00	530.00
96	1	9	35	1	1	13660.60	1353.49	2.17	212.00	490.00	490.00	0.00	120.00	0.00	490.00
97	1	10	35	1	1	40194.59	1394.95	2.55	212.00	440.00	440.00	0.00	110.00	0.00	440.00
98	1	11	35	1	1	57485.14	1412.65	2.80	212.00	410.00	410.00	0.00	100.00	0.00	410.00
99	1	12	35	1	1	70816.90	1423.74	2.99	212.00	400.00	400.00	0.00	100.00	0.00	400.00
100	1	1	36	1	1	65508.97	1419.33	2.91	212.00	420.00	420.00	0.00	100.00	0.00	420.00
101	1	2	36	1	1	71500.00	1424.31	3.00	0.03	2992.63	440.00	0.00	120.00	0.00	2992.63
102	1	3	36	1	1	71500.00	1424.31	3.00	0.03	823.55	480.00	0.00	130.00	0.00	823.55
103	1	4	36	1	1	63057.04	1417.29	2.88	212.00	500.00	500.00	0.00	140.00	0.00	500.00
104	1	5	36	1	1	47607.65	1402.86	2.66	212.00	520.00	520.00	0.00	150.00	0.00	520.00
105	1	6	36	1	1	22996.47	1372.24	2.30	212.00	540.00	540.00	0.00	150.00	0.00	540.00
106	1	7	36	1	1	2000.00	1300.00	2.00	212.00	406.73	550.00	143.27	140.00	0.00	406.73
107	1	8	36	1	1	300.00	1270.23	1.00	0.07	70.68	530.00	459.32	130.00	59.32	70.68
108	1	9	36	1	1	1490.02	1292.82	1.70	213.00	120.00	490.00	370.00	120.00	0.00	120.00
109	1	10	36	1	1	2000.00	1300.00	2.00	212.00	163.65	440.00	276.35	110.00	0.00	163.65
110	1	11	36	1	1	10972.32	1346.06	2.13	212.00	410.00	410.00	0.00	100.00	0.00	410.00
111	1	12	36	1	1	48252.28	1403.55	2.67	212.00	400.00	400.00	0.00	100.00	0.00	400.00
112	1	1	37	1	1	71500.00	1424.31	3.00	0.03	483.33	420.00	0.00	100.00	0.00	483.33
113	1	2	37	1	1	71500.00	1424.31	3.00	0.03	681.98	440.00	0.00	120.00	0.00	681.98
114	1	3	37	1	1	71500.00	1424.31	3.00	0.03	1285.55	480.00	0.00	130.00	0.00	1285.55
115	1	4	37	1	1	71500.00	1424.31	3.00	0.03	797.32	500.00	0.00	140.00	0.00	797.32
116	1	5	37	1	1	61960.70	1416.37	2.86	212.00	520.00	520.00	0.00	150.00	0.00	520.00
117	1	6	37	1	1	45925.42	1401.06	2.63	212.00	540.00	540.00	0.00	150.00	0.00	540.00
118	1	7	37	1	1	31759.46	1384.63	2.43	212.00	550.00	550.00	0.00	140.00	0.00	550.00
119	1	8	37	1	1	12964.03	1352.01	2.16	212.00	530.00	530.00	0.00	130.00	0.00	530.00
120	1	9	37	1	1	28612.89	1380.18	2.38	212.00	490.00	490.00	0.00	120.00	0.00	490.00
SUM =						5104894.99	166064.55	304.55	17813.24	67239.47	57200.00	4552.22	14900.00	121.71	67239.47
MAX =						71500.00	1424.31	3.00	213.00	2992.63	550.00	459.32	150.00	59.32	2992.63
MIN =						300.00	1270.23	1.00	0.03	70.68	400.00	0.00	100.00	0.00	70.68
PMAX =						2.00	1.00	1.00	36.00	101.00	10.00	107.00	8.00	107.00	101.00
AVG =						42540.79	1383.87	2.54	148.44	560.33	476.67	37.94	124.17	1.01	560.33
PMIN =						37.00	37.00	37.00	1.00	107.00	3.00	1.00	2.00	1.00	107.00







RUN7 (CONTINUED)

LOC NO=	PER	BY	MD	YR	DN	RES NO. 4 EDP STOR	RES NO. 4 EDP ELEV	RES NO. 4 LEVEL	RES NO. 4 CASE	RES NO. 4 OUTFLOW	C.P. 213 MIN DESI	C.P. 213 DEB-SHOR	C.P. 213 MIN REQU	C.P. 213 REG-SHOR	C.P. 213 FLOW REG				
91	1	4	35	1	71500.00	1424.31	3.00	0.03	549.32	110.00	0.00	100.00	0.00	549.32					
92	1	5	35	1	71500.00	1424.31	3.00	0.03	388.91	115.00	0.00	100.00	0.00	388.91					
93	1	6	35	1	71500.00	1424.31	3.00	0.03	1177.65	140.00	0.00	100.00	0.00	1177.65					
94	1	7	35	1	71500.00	1424.31	3.00	0.03	252.94	145.00	0.00	100.00	0.00	252.94					
95	1	8	35	1	71500.00	1424.31	3.00	0.03	187.70	120.00	0.00	100.00	0.00	187.70					
96	1	9	35	1	71500.00	1424.31	3.00	0.03	178.96	115.00	0.00	100.00	0.00	178.96					
97	1	10	35	1	71500.00	1424.31	3.00	0.03	871.09	100.00	0.00	100.00	0.00	871.09					
98	1	11	35	1	71500.00	1424.31	3.00	0.03	701.75	110.00	0.00	100.00	0.00	701.75					
99	1	12	35	1	71500.00	1424.31	3.00	0.03	617.16	105.00	0.00	100.00	0.00	617.16					
100	1	1	36	1	71500.00	1424.31	3.00	0.03	333.78	110.00	0.00	100.00	0.00	333.78					
101	1	2	36	1	71500.00	1424.31	3.00	0.03	3096.88	120.00	0.00	100.00	0.00	3096.88					
102	1	3	36	1	71500.00	1424.31	3.00	0.03	823.55	125.00	0.00	100.00	0.00	823.55					
103	1	4	36	1	71500.00	1424.31	3.00	0.03	358.32	120.00	0.00	100.00	0.00	358.32					
104	1	5	36	1	71500.00	1424.31	3.00	0.03	268.91	225.00	0.00	100.00	0.00	268.91					
105	1	6	36	1	65646.44	1419.44	2.92	213.00	245.00	225.00	0.00	100.00	0.00	245.00					
106	1	7	36	1	54629.13	1410.27	2.76	213.00	245.00	245.00	0.00	100.00	0.00	245.00					
107	1	8	36	1	42548.13	1397.46	2.58	213.00	240.00	240.00	0.00	100.00	0.00	240.00					
108	1	9	36	1	35703.64	1390.15	2.48	213.00	255.00	255.00	0.00	100.00	0.00	255.00					
109	1	10	36	1	30239.67	1382.51	2.41	213.00	260.00	260.00	0.00	100.00	0.00	260.00					
110	1	11	36	1	47701.05	1402.96	2.66	213.00	270.00	270.00	0.00	100.00	0.00	270.00					
111	1	12	36	1	71500.00	1424.31	3.00	0.03	620.56	110.00	0.00	100.00	0.00	620.56					
112	1	1	37	1	71500.00	1424.31	3.00	0.03	861.78	125.00	0.00	100.00	0.00	861.78					
113	1	2	37	1	71500.00	1424.31	3.00	0.03	681.98	240.00	0.00	100.00	0.00	681.98					
114	1	3	37	1	71500.00	1424.31	3.00	0.03	1285.55	260.00	0.00	100.00	0.00	1285.55					
115	1	4	37	1	71500.00	1424.31	3.00	0.03	797.32	265.00	0.00	100.00	0.00	797.32					
116	1	5	37	1	71500.00	1424.31	3.00	0.03	364.91	255.00	0.00	100.00	0.00	364.91					
117	1	6	37	1	71500.00	1424.31	3.00	0.03	270.65	265.00	0.00	100.00	0.00	270.65					
118	1	7	37	1	71500.00	1424.31	3.00	0.03	319.94	270.00	0.00	100.00	0.00	319.94					
119	1	8	37	1	69328.90	1422.50	2.97	213.00	260.00	260.00	0.00	100.00	0.00	260.00					
120	1	9	37	1	71500.00	1424.31	3.00	0.03	716.48	255.00	0.00	100.00	0.00	716.48					
SUM =										8149221.44	170504.49	353.80	4475.97	66671.84	20295.00	0.00	12000.00	0.00	66671.84
MAX =										71500.00	1424.31	3.00	213.00	3096.88	400.00	0.00	100.00	0.00	3096.88
MIN =										26190.22	1376.76	2.35	0.03	105.00	100.00	0.00	100.00	0.00	105.00
PMAX =										101.00	1.00	1.00	34.00	101.00	35.00	1.00	1.00	1.00	101.00
AVG =										67910.18	1420.87	2.95	37.30	555.60	169.13	0.00	100.00	0.00	555.60
PMIN =										39.00	39.00	39.00	1.00	59.00	57.00	1.00	1.00	1.00	59.00

RUNB - SUMMARY OUTPUT

LOC NO= CODE=	PER DY MD YR DW	SUMMARY BY PERIOD FLOOD= 1										C.P. 213 MIN REGU	C.P. 213 REQ-SHOR	C.P. 213 FLOW REG
		4.110	4.220	4.130	4.120	4.100	212.050	212.060	213.070	213.080	213.040			
		RES NO.4 EDP STOR	RES NO.4 EDP ELEV	RES NO.4 LEVEL	RES NO.4 CASE	RES NO.4 OUTFLOW	DUMMY CP MTN DESI	DUMMY CP DEB-SHOR	C.P. 213 MIN REGU	C.P. 213 REQ-SHOR	C.P. 213 FLOW REG			
1	1 10 27	1	1424.31	3.00	0.03	1221.09	400.00	0.00	100.00	0.00	1221.09			
2	1 11 27	1	1424.31	3.00	0.03	1272.75	400.00	0.00	190.00	0.00	1272.75			
3	1 12 27	1	1424.31	3.00	0.03	501.16	400.00	0.00	180.00	0.00	501.16			
4	1 1 28	1	1424.31	3.00	0.03	735.78	400.00	0.00	170.00	0.00	735.78			
5	1 2 28	1	1424.31	3.00	0.03	649.88	400.00	0.00	160.00	0.00	649.88			
6	1 3 28	1	1424.31	3.00	0.03	1388.55	400.00	0.00	170.00	0.00	1388.55			
7	1 4 28	1	1424.31	3.00	0.03	1003.32	400.00	0.00	160.00	0.00	1003.32			
8	1 5 28	1	1424.31	3.00	0.03	1365.91	400.00	0.00	150.00	0.00	1365.91			
9	1 6 28	1	1424.31	3.00	0.03	1308.65	400.00	0.00	155.00	0.00	1308.65			
10	1 7 28	1	1422.31	2.97	212.00	400.00	400.00	0.00	140.00	0.00	400.00			
11	1 8 28	1	1416.31	2.86	212.00	400.00	400.00	0.00	110.00	0.00	400.00			
12	1 9 28	1	1403.86	2.67	212.00	400.00	400.00	0.00	110.00	0.00	400.00			
13	1 10 28	1	1390.24	2.49	212.00	400.00	400.00	0.00	115.00	0.00	400.00			
14	1 11 28	1	1378.86	2.37	212.00	400.00	400.00	0.00	145.00	0.00	400.00			
15	1 12 28	1	1386.10	2.44	212.00	400.00	400.00	0.00	155.00	0.00	400.00			
16	1 1 29	1	1388.94	2.47	212.00	400.00	400.00	0.00	110.00	0.00	400.00			
17	1 2 29	1	1424.31	3.00	0.03	471.71	400.00	0.00	110.00	0.00	471.71			
18	1 3 29	1	1424.31	3.00	0.03	1233.55	400.00	0.00	140.00	0.00	1233.55			
19	1 4 29	1	1424.31	3.00	0.03	814.32	400.00	0.00	110.00	0.00	814.32			
20	1 5 29	1	1418.37	2.90	212.00	400.00	400.00	0.00	115.00	0.00	400.00			
21	1 6 29	1	1405.72	2.69	212.00	400.00	400.00	0.00	110.00	0.00	400.00			
22	1 7 29	1	1389.15	2.47	212.00	400.00	400.00	0.00	140.00	0.00	400.00			
23	1 8 29	1	1372.49	2.30	212.00	400.00	400.00	0.00	160.00	0.00	400.00			
24	1 9 29	1	1389.99	2.48	212.00	400.00	400.00	0.00	180.00	0.00	400.00			
25	1 10 29	1	1403.99	2.67	212.00	400.00	400.00	0.00	175.00	0.00	400.00			
26	1 11 29	1	1413.08	2.81	212.00	400.00	400.00	0.00	165.00	0.00	400.00			
27	1 12 29	1	1419.61	2.92	212.00	400.00	400.00	0.00	150.00	0.00	400.00			
28	1 1 30	1	1423.59	2.99	212.00	400.00	400.00	0.00	140.00	0.00	400.00			
29	1 2 30	1	1424.31	3.00	0.03	747.30	400.00	0.00	145.00	0.00	747.30			
30	1 3 30	1	1424.31	3.00	0.03	894.55	400.00	0.00	153.00	0.00	894.55			
31	1 4 30	1	1424.31	3.00	0.03	495.32	400.00	0.00	170.00	0.00	495.32			
32	1 5 30	1	1424.31	3.00	0.03	575.91	400.00	0.00	180.00	0.00	575.91			
33	1 6 30	1	1420.23	2.93	212.00	400.00	400.00	0.00	190.00	0.00	400.00			
34	1 7 30	1	1403.82	2.67	212.00	400.00	400.00	0.00	195.00	0.00	400.00			
35	1 8 30	1	1381.75	2.40	212.00	400.00	400.00	0.00	400.00	0.00	400.00			
36	1 9 30	1	1343.83	2.12	212.00	400.00	400.00	0.00	190.00	0.00	400.00			
37	1 10 30	1	1300.00	2.00	212.00	400.00	400.00	0.00	190.00	0.00	400.00			
38	1 11 30	1	1270.23	1.00	0.07	130.78	400.00	187.84	187.84	0.00	212.16			
39	1 12 30	1	1270.23	1.00	0.07	124.09	400.00	269.22	269.22	54.22	130.78			
40	1 1 31	1	1270.23	1.00	0.07	164.06	400.00	275.91	275.91	50.91	124.09			
41	1 2 31	1	1356.92	2.19	212.00	400.00	400.00	235.94	165.00	0.94	164.06			
42	1 3 31	1	1399.84	2.62	212.00	400.00	400.00	0.00	160.00	0.00	400.00			



RUNB (CONTINUED)

LOC NO=	PER DY	NO YR	DN	RES NO.4 EDP STOR	RES NO.4 EDP ELEV	RES NO.4 LEVEL	RES NO.4 CASE	RES NO.4 OUTFLOW	DUMMY CP MIN DESI	DUMMY CP DEB-SHOR	C.P. 213 MIN REGU	C.P. 213 REP-SHOR	C.P. 213 FLOW RES
91	1	4	35	1	71500.00	1424.31	3.00	0.03	400.00	0.00	170.00	0.00	549.32
92	1	5	35	1	70817.84	1423.74	2.99	212.00	400.00	0.00	180.00	0.00	400.00
93	1	6	35	1	71500.00	1424.31	3.00	0.03	400.00	0.00	190.00	0.00	1166.18
94	1	7	35	1	62454.81	1416.78	2.87	212.00	400.00	0.00	195.00	0.00	400.00
95	1	8	35	1	49393.21	1404.76	2.68	212.00	400.00	0.00	400.00	0.00	400.00
96	1	9	35	1	36241.12	1390.73	2.49	212.00	400.00	0.00	190.00	0.00	400.00
97	1	10	35	1	65220.60	1419.09	2.91	212.00	400.00	0.00	180.00	0.00	400.00
98	1	11	35	1	71500.00	1424.31	3.00	0.03	400.00	0.00	185.00	0.00	596.06
99	1	12	35	1	71500.00	1424.31	3.00	0.03	400.00	0.00	175.00	0.00	617.16
100	1	1	36	1	67424.34	1420.92	2.94	212.00	400.00	0.00	165.00	0.00	400.00
101	1	2	36	1	71500.00	1424.31	3.00	0.03	400.00	0.00	160.00	0.00	400.00
102	1	3	36	1	71500.00	1424.31	3.00	0.03	400.00	0.00	145.00	0.00	823.55
103	1	4	36	1	69016.18	1422.24	2.96	212.00	400.00	0.00	150.00	0.00	400.00
104	1	5	36	1	60951.50	1415.53	2.85	212.00	400.00	0.00	110.00	0.00	400.00
105	1	6	36	1	44677.76	1399.73	2.61	212.00	400.00	0.00	110.00	0.00	400.00
106	1	7	36	1	24114.33	1373.82	2.32	212.00	400.00	0.00	110.00	0.00	400.00
107	1	8	36	1	2175.54	1301.30	2.00	212.00	400.00	0.00	145.00	0.00	400.00
108	1	9	36	1	2000.00	1300.00	2.00	212.00	400.00	257.05	110.00	0.00	142.95
109	1	10	36	1	2000.00	1300.00	2.00	212.00	400.00	228.06	140.00	0.00	171.94
110	1	11	36	1	11568.99	1348.30	2.14	212.00	400.00	0.00	150.00	0.00	400.00
111	1	12	36	1	48850.74	1404.18	2.67	212.00	400.00	0.00	110.00	0.00	400.00
112	1	1	37	1	71500.00	1424.31	3.00	0.03	400.00	0.00	115.00	0.00	493.08
113	1	2	37	1	71500.00	1424.31	3.00	0.03	400.00	0.00	140.00	0.00	681.98
114	1	3	37	1	71500.00	1424.31	3.00	0.03	400.00	0.00	145.00	0.00	1285.55
115	1	4	37	1	71500.00	1424.31	3.00	0.03	400.00	0.06	110.00	0.00	797.32
116	1	5	37	1	69341.65	1422.31	2.97	212.00	400.00	0.00	115.00	0.00	400.00
117	1	6	37	1	61642.09	1416.11	2.86	212.00	400.00	0.00	100.00	0.00	400.00
118	1	7	37	1	56711.52	1412.01	2.79	212.00	400.00	0.00	110.00	0.00	400.00
119	1	8	37	1	45922.93	1401.06	2.63	212.00	400.00	0.00	105.00	0.00	400.00
120	1	9	37	1	66926.41	1420.50	2.93	212.00	400.00	0.00	110.00	0.00	400.00
SUM = 6453920.31 168151.44 325.91 15478.53 66677.84 48000.00 1709.31 17760.00 106.08 66677.84													
MAX = 71500.00 1424.31 3.00 213.00 3025.96 400.00 275.91 400.00 54.22 3025.96													
MIN = 300.00 1270.23 1.00 0.03 124.09 400.00 0.00 100.00 0.00 124.09													
PHAX = 2.00 1.00 1.00 50.00 101.00 1.00 39.00 35.00 38.00 101.00													
AVG = 53782.67 1401.26 2.72 128.99 555.65 400.00 14.24 148.00 0.88 555.65													
PHIN = 38.00 38.00 38.00 1.00 39.00 1.00 1.00 1.00 1.00 39.00													





RUN9 (CONTINUED)

LOC NO=	PER	BY	NO	VR	DN	RES NO.4 EDP STOR	RES NO.4 EDP ELEV	RES NO.4 LEVEL	RES NO.4 CASE	RES NO.4 OUTFLOW	DUMMY CP MIN DESI	DUMMY CP DEQ-SHOR	C.P. 213 MIN REGU	C.P. 213 REQ-SHOR	C.P. 213 FLOW REG
91	1	4	35	1	71500.00	1424.31	3.00	0.03	549.32	220.00	0.00	170.00	0.00	549.32	
92	1	5	35	1	71500.00	1424.31	3.00	0.03	388.91	220.00	0.00	180.00	0.00	388.91	
93	1	6	35	1	71500.00	1424.31	3.00	0.03	1177.65	225.00	0.00	190.00	0.00	1177.65	
94	1	7	35	1	71500.00	1424.31	3.00	0.03	252.94	245.00	0.00	195.00	0.00	252.94	
95	1	8	35	1	58442.80	1413.45	2.81	213.00	400.00	255.00	0.00	400.00	0.00	400.00	
96	1	9	35	1	56001.29	1411.42	2.78	212.00	220.00	220.00	0.00	190.00	0.00	220.00	
97	1	10	35	1	71500.00	1424.31	3.00	0.03	619.11	220.00	0.00	180.00	0.00	619.11	
98	1	11	35	1	71500.00	1424.31	3.00	0.03	701.75	240.00	0.00	185.00	0.00	701.75	
99	1	12	35	1	71500.00	1424.31	3.00	0.03	617.16	220.00	0.00	175.00	0.00	617.16	
100	1	1	36	1	71500.00	1424.31	3.00	0.03	333.78	225.00	0.00	165.00	0.00	333.78	
101	1	2	36	1	71500.00	1424.31	3.00	0.03	3096.88	220.00	0.00	160.00	0.00	3096.88	
102	1	3	36	1	71500.00	1424.31	3.00	0.03	823.55	240.00	0.00	145.00	0.00	823.55	
103	1	4	36	1	71500.00	1424.31	3.00	0.03	358.32	260.00	0.00	150.00	0.00	358.32	
104	1	5	36	1	70817.84	1423.74	2.86	212.00	280.00	280.00	0.00	110.00	0.00	280.00	
105	1	6	36	1	61988.08	1416.40	2.86	212.00	275.00	275.00	0.00	110.00	0.00	275.00	
106	1	7	36	1	49738.21	1405.13	2.69	212.00	265.00	265.00	0.00	110.00	0.00	265.00	
107	1	8	36	1	37040.10	1391.58	2.50	212.00	250.00	250.00	0.00	145.00	0.00	250.00	
108	1	9	36	1	31088.30	1383.68	2.42	212.00	240.00	240.00	0.00	110.00	0.00	240.00	
109	1	10	36	1	26549.36	1377.29	2.35	212.00	245.00	245.00	0.00	140.00	0.00	245.00	
110	1	11	36	1	44894.20	1399.96	2.62	212.00	255.00	255.00	0.00	150.00	0.00	255.00	
111	1	12	36	1	71500.00	1424.31	3.00	0.03	574.84	270.00	0.00	110.00	0.00	574.84	
112	1	1	37	1	71500.00	1424.31	3.00	0.03	861.78	280.00	0.00	115.00	0.00	861.78	
113	1	2	37	1	71500.00	1424.31	3.00	0.03	681.98	290.00	0.00	140.00	0.00	681.98	
114	1	3	37	1	71500.00	1424.31	3.00	0.03	1285.55	295.00	0.00	145.00	0.00	1285.55	
115	1	4	37	1	71500.00	1424.31	3.00	0.03	797.32	400.00	0.00	110.00	0.00	797.32	
116	1	5	37	1	71500.00	1424.31	3.00	0.03	364.91	290.00	0.00	115.00	0.00	364.91	
117	1	6	37	1	70943.54	1423.85	2.99	212.00	280.00	280.00	0.00	100.00	0.00	280.00	
118	1	7	37	1	71500.00	1424.31	3.00	0.03	310.89	285.00	0.00	110.00	0.00	310.89	
119	1	8	37	1	68406.35	1421.74	2.96	212.00	275.00	275.00	0.00	105.00	0.00	275.00	
120	1	9	37	1	71500.00	1424.31	3.00	0.03	700.97	265.00	0.00	110.00	0.00	700.97	
SUM = 7794348.64 170004.79 348.43 8485.40 66668.95 30140.00 200.00 17760.00 0.00 66668.95															
MAX = 71500.00 1424.31 3.00 213.00 3096.88 400.00 100.00 400.00 0.00 3096.88															
MIN = 1739.12 1296.33 1.85 0.03 165.00 200.00 0.00 100.00 0.00 165.00															
PMAX= 101.00 1.00 39.00 101.00 35.00 39.00 1.00 101.00															
AVG = 64952.91 1416.71 2.90 70.71 555.57 251.17 1.67 148.00 0.00 555.57															
PMIN= 40.00 40.00 40.00 1.00 1.00 1.00 1.00 40.00															









RUN10 (CONTINUED)

LOC NO=	PER DY	NO YR	DM	RES 4 INFLOW	RES 4 TOP COM.	RES 4 EOP STOR	RES 4 LEVEL	RES 4 EOP ELEV	C P 213 MIN DESI	C P 213 DEQ-SHOR	C P 213 MIN REQU	C P 213 REQ-SHOR	C P 213 FLOW REG
139	19	5	29	6	88.00	153170.32	69477.59	2.42	1422.63	400.00	100.00	0.00	400.00
140	20	5	29	7	87.00	155406.13	68858.57	2.41	1422.11	400.00	100.00	0.00	400.00
141	21	5	29	1	75.00	157641.94	68215.73	2.40	1421.58	400.00	100.00	0.00	400.00
142	22	5	29	2	75.00	159877.74	67572.88	2.39	1421.04	400.00	100.00	0.00	400.00
143	23	5	29	3	74.00	162113.55	66928.03	2.38	1420.51	400.00	100.00	0.00	400.00
144	24	5	29	4	75.00	164349.35	66285.16	2.37	1419.97	400.00	100.00	0.00	400.00
145	25	5	29	5	73.00	166585.16	65638.30	2.36	1419.43	400.00	100.00	0.00	400.00
146	26	5	29	6	71.00	168820.97	64987.46	2.34	1418.89	400.00	100.00	0.00	400.00
147	27	5	29	7	70.00	171056.77	64334.63	2.33	1418.35	400.00	100.00	0.00	400.00
148	28	5	29	1	60.00	173292.58	63681.94	2.32	1417.79	400.00	100.00	0.00	400.00
149	29	5	29	2	60.00	175528.39	62989.25	2.31	1417.23	400.00	100.00	0.00	400.00
150	30	5	29	3	50.00	177764.19	62296.70	2.30	1416.65	400.00	100.00	0.00	400.00
151	31	5	29	4	56.00	180000.00	61616.04	2.30	1416.09	400.00	100.00	0.00	400.00
152	1	6	29	5	53.00	180000.00	60928.90	2.29	1415.51	400.00	100.00	0.00	400.00
153	2	6	29	6	50.00	180000.00	60235.81	2.29	1414.94	400.00	100.00	0.00	400.00
154	3	6	29	7	50.00	180000.00	59542.71	2.28	1414.36	400.00	100.00	0.00	400.00
155	4	6	29	1	51.00	180000.00	58851.58	2.28	1413.79	400.00	100.00	0.00	400.00
156	5	6	29	2	51.00	180000.00	58160.44	2.27	1413.21	400.00	100.00	0.00	400.00
157	6	6	29	3	53.00	180000.00	57473.25	2.27	1412.64	400.00	100.00	0.00	400.00
158	7	6	29	4	52.00	180000.00	56784.08	2.27	1412.07	400.00	100.00	0.00	400.00
159	8	6	29	5	53.00	180000.00	56096.87	2.26	1411.49	400.00	100.00	0.00	400.00
160	9	6	29	6	56.00	180000.00	55415.61	2.26	1410.93	400.00	100.00	0.00	400.00
161	10	6	29	7	55.00	180000.00	54732.35	2.25	1410.36	400.00	100.00	0.00	400.00
162	11	6	29	1	59.00	180000.00	54057.02	2.25	1409.74	400.00	100.00	0.00	400.00
163	12	6	29	2	50.00	180000.00	53363.83	2.25	1409.00	400.00	100.00	0.00	400.00
164	13	6	29	3	50.00	180000.00	52670.63	2.24	1408.26	400.00	100.00	0.00	400.00
165	14	6	29	4	54.00	180000.00	51985.35	2.24	1407.53	400.00	100.00	0.00	400.00
166	15	6	29	5	53.00	180000.00	51298.08	2.23	1406.80	400.00	100.00	0.00	400.00
167	16	6	29	6	55.00	180000.00	50614.77	2.23	1406.07	400.00	100.00	0.00	400.00
168	17	6	29	7	55.00	180000.00	49931.45	2.23	1405.34	400.00	100.00	0.00	400.00
169	18	6	29	1	58.00	180000.00	49248.07	2.22	1404.61	400.00	100.00	0.00	400.00
170	19	6	29	2	50.00	180000.00	48560.82	2.22	1403.87	400.00	100.00	0.00	400.00
171	20	6	29	3	45.00	180000.00	47857.64	2.21	1403.12	400.00	100.00	0.00	400.00
172	21	6	29	4	46.00	180000.00	47156.43	2.21	1402.38	400.00	100.00	0.00	400.00
173	22	6	29	5	47.00	180000.00	46457.20	2.21	1401.63	400.00	100.00	0.00	400.00
174	23	6	29	6	43.00	180000.00	45750.03	2.20	1400.88	400.00	100.00	0.00	400.00
175	24	6	29	7	43.00	180000.00	45042.84	2.20	1400.12	400.00	100.00	0.00	400.00
176	25	6	29	1	43.00	180000.00	44335.65	2.19	1399.37	400.00	100.00	0.00	400.00
177	26	6	29	2	43.00	180000.00	43628.45	2.19	1398.61	400.00	100.00	0.00	400.00
178	27	6	29	3	43.00	180000.00	42921.24	2.18	1397.86	400.00	100.00	0.00	400.00
179	28	6	29	4	43.00	180000.00	42214.02	2.18	1397.10	400.00	100.00	0.00	400.00
180	29	6	29	5	43.00	180000.00	41506.79	2.18	1396.35	400.00	100.00	0.00	400.00
181	30	6	29	6	43.00	180000.00	40799.55	2.17	1395.59	400.00	100.00	0.00	400.00
182	1	7	29	7	43.00	180000.00	40092.74	2.17	1394.84	400.00	100.00	0.00	400.00
183	2	7	29	1	40.00	180000.00	39379.96	2.16	1394.08	400.00	100.00	0.00	400.00
184	3	7	29	2	40.00	180000.00	38667.16	2.16	1393.32	400.00	100.00	0.00	400.00
185	4	7	29	3	40.00	180000.00	37954.36	2.15	1392.56	400.00	100.00	0.00	400.00
186	5	7	29	4	40.00	180000.00	37241.53	2.15	1391.79	400.00	100.00	0.00	400.00







RUNIO (CONTINUED)

LOC NO=	PER DY MD YR DW	RES 4 INFLOW	RES 4 TOP CON.	RES 4 EDP STOR	RES 4 LEVEL	RES 4 EDP ELEV	C P 213 MIN DESI	C P 213 DEP-SHOR	C P 213 MIN REDU	C P 213 REQ-SHOR	C P 213 FLOW REG
332	28 11 29 3	611.00	110690.00	13772.04	2.11	1353.73	400.00	0.00	100.00	0.00	400.00
333	29 11 29 4	612.00	110690.00	14195.46	2.11	1354.63	400.00	0.00	100.00	0.00	400.00
334	30 11 29 5	612.00	110690.00	14618.96	2.12	1355.54	400.00	0.00	100.00	0.00	400.00
335	1 12 29 6	612.00	110690.00	15042.25	2.12	1356.44	400.00	0.00	100.00	0.00	400.00
336	2 12 29 7	612.00	110690.00	15465.60	2.12	1357.34	400.00	0.00	100.00	0.00	400.00
337	3 12 29 1	612.00	110690.00	15889.03	2.13	1358.24	400.00	0.00	100.00	0.00	400.00
338	4 12 29 2	613.00	110690.00	16314.50	2.13	1359.15	400.00	0.00	100.00	0.00	400.00
339	5 12 29 3	613.00	110690.00	16740.05	2.14	1360.05	400.00	0.00	100.00	0.00	400.00
340	6 12 29 4	613.00	110690.00	17165.68	2.14	1360.96	400.00	0.00	100.00	0.00	400.00
341	7 12 29 5	613.00	110690.00	17591.37	2.14	1361.87	400.00	0.00	100.00	0.00	400.00
342	8 12 29 6	614.00	110690.00	18019.12	2.15	1362.78	400.00	0.00	100.00	0.00	400.00
343	9 12 29 7	611.00	110690.00	18440.98	2.15	1363.68	400.00	0.00	100.00	0.00	400.00
344	10 12 29 1	609.00	110690.00	18858.95	2.16	1364.57	400.00	0.00	100.00	0.00	400.00
345	11 12 29 2	607.00	110690.00	19273.03	2.16	1365.45	400.00	0.00	100.00	0.00	400.00
346	12 12 29 3	605.00	110690.00	19683.20	2.16	1366.32	400.00	0.00	100.00	0.00	400.00
347	13 12 29 4	603.00	110690.00	20089.48	2.17	1367.19	400.00	0.00	100.00	0.00	400.00
348	14 12 29 5	601.00	110690.00	20491.85	2.17	1368.04	400.00	0.00	100.00	0.00	400.00
349	15 12 29 6	599.00	110690.00	20890.33	2.17	1368.89	400.00	0.00	100.00	0.00	400.00
350	16 12 29 7	597.00	110690.00	21284.90	2.18	1369.73	400.00	0.00	100.00	0.00	400.00
351	17 12 29 1	595.00	110690.00	21675.57	2.18	1370.58	400.00	0.00	100.00	0.00	400.00
352	18 12 29 2	593.00	110690.00	22062.31	2.18	1370.92	400.00	0.00	100.00	0.00	400.00
353	19 12 29 3	591.00	110690.00	22445.13	2.19	1371.46	400.00	0.00	100.00	0.00	400.00
354	20 12 29 4	589.00	110690.00	22824.01	2.19	1372.00	400.00	0.00	100.00	0.00	400.00
355	21 12 29 5	587.00	110690.00	23198.96	2.20	1372.53	400.00	0.00	100.00	0.00	400.00
356	22 12 29 6	585.00	110690.00	23569.99	2.20	1373.05	400.00	0.00	100.00	0.00	400.00
357	23 12 29 7	583.00	110690.00	23937.08	2.20	1373.57	400.00	0.00	100.00	0.00	400.00
358	24 12 29 1	581.00	110690.00	24300.24	2.21	1374.09	400.00	0.00	100.00	0.00	400.00
359	25 12 29 2	579.00	110690.00	24659.47	2.21	1374.59	400.00	0.00	100.00	0.00	400.00
360	26 12 29 3	577.00	110690.00	25014.77	2.21	1375.10	400.00	0.00	100.00	0.00	400.00
361	27 12 29 4	575.00	110690.00	25366.14	2.21	1375.59	400.00	0.00	100.00	0.00	400.00
362	28 12 29 5	573.00	110690.00	25713.58	2.22	1376.08	400.00	0.00	100.00	0.00	400.00
363	29 12 29 6	571.00	110690.00	26057.08	2.22	1376.57	400.00	0.00	100.00	0.00	400.00
364	30 12 29 7	569.00	110690.00	26396.65	2.22	1377.05	400.00	0.00	100.00	0.00	400.00
365	31 12 29 1	567.00	110690.00	26732.29	2.23	1377.52	400.00	0.00	100.00	0.00	400.00
SUM =		108465.004851120.0018504089.79		873.40	506801.49	146000.00	11519.24	36500.00	0.00	151486.39	
MAX =		1104.00	180000.00	110690.00	3.00	1450.00	400.00	300.00	100.00	0.00	1108.07
MIN =		29.00	110690.00	2000.00	1.98	1300.00	400.00	0.00	100.00	0.00	100.00
PHAX =		1.00	151.00	1.00	1.00	1.00	1.00	223.00	1.00	1.00	1.00
AVG =		297.16	132907.18	50696.14	2.39	1388.50	400.00	31.56	100.00	0.00	415.03
PHIN =		193.00	1.00	266.00	236.00	265.00	1.00	1.00	1.00	1.00	223.00





RUN11 (CONTINUED)

LOC NO=	PER DY	MO	YR	DM	RES 4 INFLOW	RES 4 TDP CON.	RES 4 EDP STOR	RES 4 LEVEL	RES 4 EDP ELEV	C P 213 MIN DESI	C P 213 DEB-SHOR	C P 213 MIN REQU	C P 213 REQ-SHOR	C P 213 FLOW REG
43	12	2	29	1	441.00	110690.00	101042.90	2.91	1444.04	450.00	0.00	100.00	0.00	450.00
44	13	2	29	2	423.00	110690.00	100996.61	2.91	1444.01	450.00	0.00	100.00	0.00	450.00
45	14	2	29	3	405.00	110690.00	100914.62	2.91	1443.96	450.00	0.00	100.00	0.00	450.00
46	15	2	29	4	388.00	110690.00	100798.89	2.91	1443.88	450.00	0.00	100.00	0.00	450.00
47	16	2	29	5	370.00	110690.00	100647.46	2.91	1443.79	450.00	0.00	100.00	0.00	450.00
48	17	2	29	6	353.00	110690.00	100462.30	2.91	1443.68	450.00	0.00	100.00	0.00	450.00
49	18	2	29	7	335.00	110690.00	100241.42	2.90	1443.54	450.00	0.00	100.00	0.00	450.00
50	19	2	29	1	318.00	110690.00	99986.81	2.90	1443.38	450.00	0.00	100.00	0.00	450.00
51	20	2	29	2	300.00	110690.00	99696.49	2.90	1443.20	450.00	0.00	100.00	0.00	450.00
52	21	2	29	3	283.00	110690.00	99372.42	2.90	1443.00	450.00	0.00	100.00	0.00	450.00
53	22	2	29	4	279.00	110690.00	99040.40	2.89	1442.80	450.00	0.00	100.00	0.00	450.00
54	23	2	29	5	275.00	110690.00	98700.43	2.89	1442.59	450.00	0.00	100.00	0.00	450.00
55	24	2	29	6	271.00	110690.00	98352.50	2.89	1442.37	450.00	0.00	100.00	0.00	450.00
56	25	2	29	7	267.00	110690.00	97996.62	2.88	1442.15	450.00	0.00	100.00	0.00	450.00
57	26	2	29	1	263.00	110690.00	97632.79	2.88	1441.93	450.00	0.00	100.00	0.00	450.00
58	27	2	29	2	259.00	110690.00	97260.99	2.88	1441.70	450.00	0.00	100.00	0.00	450.00
59	28	2	29	3	255.00	110690.00	96881.25	2.87	1441.46	450.00	0.00	100.00	0.00	450.00
60	1	3	29	4	251.00	110690.00	96495.78	2.87	1441.22	450.00	0.00	100.00	0.00	450.00
61	2	3	29	5	247.00	110690.00	96102.34	2.87	1440.98	450.00	0.00	100.00	0.00	450.00
62	3	3	29	6	243.00	110690.00	95700.94	2.86	1440.73	450.00	0.00	100.00	0.00	450.00
63	4	3	29	7	239.00	110690.00	95291.58	2.86	1440.48	450.00	0.00	100.00	0.00	450.00
64	5	3	29	1	235.00	110690.00	94874.24	2.85	1440.22	450.00	0.00	100.00	0.00	450.00
65	6	3	29	2	231.00	110690.00	94448.95	2.85	1439.96	450.00	0.00	100.00	0.00	450.00
66	7	3	29	3	227.00	110690.00	94015.68	2.85	1439.69	450.00	0.00	100.00	0.00	450.00
67	8	3	29	4	223.00	110690.00	93574.45	2.84	1439.42	450.00	0.00	100.00	0.00	450.00
68	9	3	29	5	219.00	110690.00	93125.25	2.84	1439.14	450.00	0.00	100.00	0.00	450.00
69	10	3	29	6	215.00	110690.00	92668.08	2.83	1438.86	450.00	0.00	100.00	0.00	450.00
70	11	3	29	7	211.00	110690.00	92202.95	2.83	1438.57	450.00	0.00	100.00	0.00	450.00
71	12	3	29	1	207.00	110690.00	91729.84	2.83	1438.28	450.00	0.00	100.00	0.00	450.00
72	13	3	29	2	203.00	110690.00	91248.76	2.82	1437.98	450.00	0.00	100.00	0.00	450.00
73	14	3	29	3	199.00	110690.00	90759.71	2.82	1437.68	450.00	0.00	100.00	0.00	450.00
74	15	3	29	4	195.00	110690.00	90262.69	2.81	1437.37	450.00	0.00	100.00	0.00	450.00
75	16	3	29	5	191.00	110690.00	89757.70	2.81	1437.06	450.00	0.00	100.00	0.00	450.00
76	17	3	29	6	187.00	110690.00	89244.73	2.80	1436.74	450.00	0.00	100.00	0.00	450.00
77	18	3	29	7	183.00	110690.00	88723.79	2.80	1436.42	450.00	0.00	100.00	0.00	450.00
78	19	3	29	1	179.00	110690.00	88194.87	2.79	1436.09	450.00	0.00	100.00	0.00	450.00
79	20	3	29	2	175.00	110690.00	87657.98	2.79	1435.76	450.00	0.00	100.00	0.00	450.00
80	21	3	29	3	171.00	110690.00	87113.12	2.78	1435.42	450.00	0.00	100.00	0.00	450.00
81	22	3	29	4	167.00	110690.00	86560.28	2.78	1435.08	450.00	0.00	100.00	0.00	450.00
82	23	3	29	5	163.00	110690.00	85999.46	2.77	1434.74	450.00	0.00	100.00	0.00	450.00
83	24	3	29	6	162.00	110690.00	85436.62	2.77	1434.39	450.00	0.00	100.00	0.00	450.00
84	25	3	29	7	162.00	110690.00	84873.73	2.76	1434.04	450.00	0.00	100.00	0.00	450.00
85	26	3	29	1	161.00	110690.00	84308.81	2.76	1433.69	450.00	0.00	100.00	0.00	450.00
86	27	3	29	2	161.00	110690.00	83743.86	2.75	1433.34	450.00	0.00	100.00	0.00	450.00
87	28	3	29	3	160.00	110690.00	83176.87	2.75	1432.99	450.00	0.00	100.00	0.00	450.00
88	29	3	29	4	160.00	110690.00	82609.84	2.74	1432.64	450.00	0.00	100.00	0.00	450.00
89	30	3	29	5	159.00	110690.00	82040.79	2.74	1432.29	450.00	0.00	100.00	0.00	450.00
90	31	3	29	6	159.00	110690.00	81471.69	2.73	1431.94	450.00	0.00	100.00	0.00	450.00

RUN11 (CONTINUED)

LOC NO=	PER	DY	MO	YR	DM	RES 4 INFLOW	RES 4 TOP CON.	RES 4 EDP STOR	RES 4 LEVEL	RES 4 EOP ELEV	C P 213 MIN DESI	C P 213 DEQ-SHOR	C P 213 MIN REQU	C P 213 REQ-SHOR	C P 213 FLOW RES
91	1	4	29	7		159.00	110690.00	80903.98	2.73	1431.59	450.00	0.00	100.00	0.00	450.00
92	2	4	29	1		158.00	110690.00	80334.23	2.72	1431.23	450.00	0.00	100.00	0.00	450.00
93	3	4	29	2		158.00	110690.00	79764.43	2.72	1430.88	450.00	0.00	100.00	0.00	450.00
94	4	4	29	3		157.00	110690.00	79192.59	2.71	1430.53	450.00	0.00	100.00	0.00	450.00
95	5	4	29	4		157.00	110690.00	78620.71	2.70	1430.17	450.00	0.00	100.00	0.00	450.00
96	6	4	29	5		156.00	110690.00	78046.78	2.70	1429.76	450.00	0.00	100.00	0.00	450.00
97	7	4	29	6		156.00	110690.00	77472.81	2.69	1429.28	450.00	0.00	100.00	0.00	450.00
98	8	4	29	7		156.00	110690.00	76898.77	2.69	1428.80	450.00	0.00	100.00	0.00	450.00
99	9	4	29	1		155.00	110690.00	76322.70	2.68	1428.32	450.00	0.00	100.00	0.00	450.00
100	10	4	29	2		155.00	110690.00	75746.57	2.68	1427.84	450.00	0.00	100.00	0.00	450.00
101	11	4	29	3		154.00	110690.00	75168.41	2.67	1427.36	450.00	0.00	100.00	0.00	450.00
102	12	4	29	4		154.00	110690.00	74590.18	2.67	1426.88	450.00	0.00	100.00	0.00	450.00
103	13	4	29	5		153.00	110690.00	74009.92	2.66	1426.40	450.00	0.00	100.00	0.00	450.00
104	14	4	29	6		153.00	110690.00	73429.60	2.66	1425.91	450.00	0.00	100.00	0.00	450.00
105	15	4	29	7		153.00	110690.00	72849.23	2.65	1425.43	450.00	0.00	100.00	0.00	450.00
106	16	4	29	1		152.00	110690.00	72266.82	2.65	1424.95	450.00	0.00	100.00	0.00	450.00
107	17	4	29	2		152.00	110690.00	71684.35	2.64	1424.46	450.00	0.00	100.00	0.00	450.00
108	18	4	29	3		151.00	110690.00	71199.01	2.64	1424.06	400.00	0.00	100.00	0.00	400.00
109	19	4	29	4		151.00	110690.00	70713.64	2.63	1423.66	400.00	0.00	100.00	0.00	400.00
110	20	4	29	5		150.00	110690.00	70226.23	2.63	1423.25	400.00	0.00	100.00	0.00	400.00
111	21	4	29	6		150.00	110690.00	69738.77	2.62	1422.84	400.00	0.00	100.00	0.00	400.00
112	22	4	29	7		148.00	110690.00	69247.30	2.62	1422.44	400.00	0.00	100.00	0.00	400.00
113	23	4	29	1		145.00	110690.00	68749.84	2.61	1422.02	400.00	0.00	100.00	0.00	400.00
114	24	4	29	2		142.00	110690.00	68246.37	2.61	1421.60	400.00	0.00	100.00	0.00	400.00
115	25	4	29	3		135.00	110690.00	67728.97	2.60	1421.17	400.00	0.00	100.00	0.00	400.00
116	26	4	29	4		130.00	110690.00	67201.60	2.60	1420.73	400.00	0.00	100.00	0.00	400.00
117	27	4	29	5		125.00	110690.00	66664.26	2.59	1420.29	400.00	0.00	100.00	0.00	400.00
118	28	4	29	6		119.00	110690.00	66114.97	2.59	1419.83	400.00	0.00	100.00	0.00	400.00
119	29	4	29	7		117.00	110690.00	65561.66	2.58	1419.37	400.00	0.00	100.00	0.00	400.00
120	30	4	29	1		113.00	110690.00	65000.36	2.58	1418.90	400.00	0.00	100.00	0.00	400.00
121	1	5	29	2		112.00	112925.81	64430.84	2.56	1418.43	400.00	0.00	100.00	0.00	400.00
122	2	5	29	3		109.00	115161.61	63855.35	2.55	1417.95	400.00	0.00	100.00	0.00	400.00
123	3	5	29	4		99.00	117397.42	63260.01	2.53	1417.45	400.00	0.00	100.00	0.00	400.00
124	4	5	29	5		99.00	119633.23	62664.66	2.52	1416.96	400.00	0.00	100.00	0.00	400.00
125	5	5	29	6		98.00	121869.03	62067.32	2.50	1416.46	400.00	0.00	100.00	0.00	400.00
126	6	5	29	7		96.00	124104.84	61465.99	2.49	1415.96	400.00	0.00	100.00	0.00	400.00
127	7	5	29	1		94.00	126340.65	60860.69	2.47	1415.46	400.00	0.00	100.00	0.00	400.00
128	8	5	29	2		94.00	128576.45	60255.37	2.46	1414.95	400.00	0.00	100.00	0.00	400.00
129	9	5	29	3		92.00	130812.26	59646.07	2.45	1414.45	400.00	0.00	100.00	0.00	400.00
130	10	5	29	4		91.00	133048.06	59034.78	2.44	1413.94	400.00	0.00	100.00	0.00	400.00
131	11	5	29	5		90.00	135283.87	58421.49	2.42	1413.43	400.00	0.00	100.00	0.00	400.00
132	12	5	29	6		91.00	137519.68	57810.17	2.41	1412.92	400.00	0.00	100.00	0.00	400.00
133	13	5	29	7		86.00	139755.48	57188.92	2.40	1412.40	400.00	0.00	100.00	0.00	400.00
134	14	5	29	1		85.00	141991.29	56565.67	2.39	1411.88	400.00	0.00	100.00	0.00	400.00
135	15	5	29	2		86.00	144227.10	55944.40	2.38	1411.37	400.00	0.00	100.00	0.00	400.00
136	16	5	29	3		86.00	146462.90	55323.11	2.37	1410.85	400.00	0.00	100.00	0.00	400.00
137	17	5	29	4		86.00	148698.71	54701.81	2.36	1410.33	400.00	0.00	100.00	0.00	400.00
138	18	5	29	5		87.00	150934.52	54082.48	2.35	1409.77	400.00	0.00	100.00	0.00	400.00

AD-R158 888

WATER SUPPLY SIMULATION USING HEC-5(U) HYDROLOGIC  
ENGINEERING CENTER DAVIS CA AUG 85 HEC-TRAINING-20

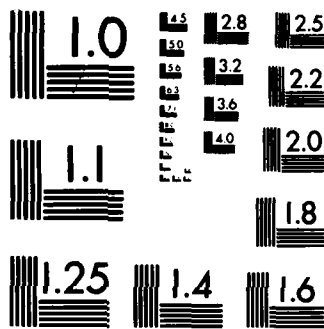
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MICROCOPY RESOLUTION TEST CHART  
NBS-1963-A

RUN11 (CONTINUED)

LOC NO=	PER DY	NO	VR	DW	RES 4 INFLW	RES 4 TOP COM.	RES 4 EDP STOR	RES 4 LEVEL	RES 4 EDP ELEV	C P 213 MIN DESI	C P 213 DEQ-SHOR	C P 213 MIN REBU	C P 213 REQ-SHOR	C P 213 FLOW REG
139	19	5	29	6	88.00	153170.32	53465.12	2.34	1409.11	400.00	0.00	100.00	0.00	400.00
140	20	5	29	7	87.00	155406.13	52845.76	2.33	1408.45	400.00	0.00	100.00	0.00	400.00
141	21	5	29	1	75.00	157641.94	52702.59	2.32	1407.76	400.00	0.00	100.00	0.00	400.00
142	22	5	29	2	75.00	159877.74	51559.41	2.31	1407.08	400.00	0.00	100.00	0.00	400.00
143	23	5	29	3	74.00	162113.55	50914.24	2.31	1406.39	400.00	0.00	100.00	0.00	400.00
144	24	5	29	4	75.00	164349.35	50271.03	2.30	1405.70	400.00	0.00	100.00	0.00	400.00
145	25	5	29	5	73.00	166585.16	49623.85	2.29	1405.01	400.00	0.00	100.00	0.00	400.00
146	26	5	29	6	71.00	168820.97	48972.69	2.28	1404.31	400.00	0.00	100.00	0.00	400.00
147	27	5	29	7	70.00	171056.77	48319.53	2.27	1403.62	400.00	0.00	100.00	0.00	400.00
148	28	5	29	1	60.00	173292.58	47646.53	2.27	1402.90	400.00	0.00	100.00	0.00	400.00
149	29	5	29	2	60.00	175528.39	46973.51	2.26	1402.18	400.00	0.00	100.00	0.00	400.00
150	30	5	29	3	50.00	177764.19	46280.64	2.25	1401.44	400.00	0.00	100.00	0.00	400.00
151	31	5	29	4	56.00	180000.00	45599.67	2.24	1400.71	400.00	0.00	100.00	0.00	400.00
152	1	6	29	5	53.00	180000.00	44912.32	2.24	1399.98	400.00	0.00	100.00	0.00	400.00
153	2	6	29	6	50.00	180000.00	44219.01	2.24	1399.24	400.00	0.00	100.00	0.00	400.00
154	3	6	29	7	50.00	180000.00	43525.69	2.23	1398.50	400.00	0.00	100.00	0.00	400.00
155	4	6	29	1	51.00	180000.00	42834.34	2.23	1397.76	400.00	0.00	100.00	0.00	400.00
156	5	6	29	2	51.00	180000.00	42142.99	2.23	1397.03	400.00	0.00	100.00	0.00	400.00
157	6	6	29	3	53.00	180000.00	41455.60	2.22	1396.29	400.00	0.00	100.00	0.00	400.00
158	7	6	29	4	52.00	180000.00	40766.21	2.22	1395.56	400.00	0.00	100.00	0.00	400.00
159	8	6	29	5	53.00	180000.00	40078.80	2.21	1394.82	400.00	0.00	100.00	0.00	400.00
160	9	6	29	6	56.00	180000.00	39397.33	2.21	1394.10	400.00	0.00	100.00	0.00	400.00
161	10	6	29	7	55.00	180000.00	38713.86	2.21	1393.37	400.00	0.00	100.00	0.00	400.00
162	11	6	29	1	59.00	180000.00	38038.33	2.20	1392.64	400.00	0.00	100.00	0.00	400.00
163	12	6	29	2	50.00	180000.00	37344.93	2.20	1391.90	400.00	0.00	100.00	0.00	400.00
164	13	6	29	3	50.00	180000.00	36651.52	2.19	1391.16	400.00	0.00	100.00	0.00	400.00
165	14	6	29	4	54.00	180000.00	35966.04	2.19	1390.43	400.00	0.00	100.00	0.00	400.00
166	15	6	29	5	53.00	180000.00	35278.57	2.19	1389.69	400.00	0.00	100.00	0.00	400.00
167	16	6	29	6	55.00	180000.00	34595.05	2.18	1388.94	400.00	0.00	100.00	0.00	400.00
168	17	6	29	7	55.00	180000.00	33911.52	2.18	1388.19	400.00	0.00	100.00	0.00	400.00
169	18	6	29	1	58.00	180000.00	33233.94	2.18	1387.44	400.00	0.00	100.00	0.00	400.00
170	19	6	29	2	50.00	180000.00	32540.47	2.17	1386.69	400.00	0.00	100.00	0.00	400.00
171	20	6	29	3	45.00	180000.00	31857.08	2.17	1385.94	400.00	0.00	100.00	0.00	400.00
172	21	6	29	4	46.00	180000.00	31173.66	2.16	1385.19	400.00	0.00	100.00	0.00	400.00
173	22	6	29	5	47.00	180000.00	30490.21	2.16	1384.44	400.00	0.00	100.00	0.00	400.00
174	23	6	29	6	43.00	180000.00	29728.82	2.16	1383.69	400.00	0.00	100.00	0.00	400.00
175	24	6	29	7	43.00	180000.00	29021.41	2.15	1382.94	400.00	0.00	100.00	0.00	400.00
176	25	6	29	1	43.00	180000.00	28314.00	2.15	1382.19	400.00	0.00	100.00	0.00	400.00
177	26	6	29	2	43.00	180000.00	27606.58	2.14	1381.44	400.00	0.00	100.00	0.00	400.00
178	27	6	29	3	43.00	180000.00	26899.14	2.14	1380.69	400.00	0.00	100.00	0.00	400.00
179	28	6	29	4	43.00	180000.00	26191.70	2.14	1379.94	400.00	0.00	100.00	0.00	400.00
180	29	6	29	5	43.00	180000.00	25484.24	2.13	1379.19	400.00	0.00	100.00	0.00	400.00
181	30	6	29	6	43.00	180000.00	24776.77	2.13	1378.44	400.00	0.00	100.00	0.00	400.00
182	1	7	29	7	43.00	180000.00	24069.61	2.12	1377.69	400.00	0.00	100.00	0.00	400.00
183	2	7	29	1	40.00	180000.00	23356.49	2.12	1376.94	400.00	0.00	100.00	0.00	400.00
184	3	7	29	2	40.00	180000.00	22643.34	2.12	1376.19	400.00	0.00	100.00	0.00	400.00
185	4	7	29	3	40.00	180000.00	21930.18	2.11	1375.44	400.00	0.00	100.00	0.00	400.00
186	5	7	29	4	40.00	180000.00	21217.01	2.11	1374.69	400.00	0.00	100.00	0.00	400.00

RUN11 (CONTINUED)

LOC NO=	PER	DI	MD	VR	DM	RES 4 INFLOW	RES 4 TOP COM.	RES 4 EDP STOR	RES 4 LEVEL	RES 4 EDP ELEV	C P 213 MIN DESI	C P 213 DEG-SHOR	C P 213 MIN REQU	C P 213 RED-SHOR	C P 213 FLOW RES
187	6	7	29	5		38.00	180000.00	20499.84	2.10	1368.06	400.00	0.00	100.00	0.00	400.00
188	7	7	29	6		38.00	180000.00	19782.64	2.10	1366.53	400.00	0.00	100.00	0.00	400.00
189	8	7	29	7		38.00	180000.00	19065.42	2.10	1365.01	400.00	0.00	100.00	0.00	400.00
190	9	7	29	1		37.00	180000.00	18346.19	2.09	1363.47	400.00	0.00	100.00	0.00	400.00
191	10	7	29	2		30.00	180000.00	17613.05	2.09	1361.91	400.00	0.00	100.00	0.00	400.00
192	11	7	29	3		30.00	180000.00	16879.87	2.08	1360.35	400.00	0.00	100.00	0.00	400.00
193	12	7	29	4		29.00	180000.00	16144.69	2.08	1358.79	400.00	0.00	100.00	0.00	400.00
194	13	7	29	5		30.00	180000.00	15411.46	2.08	1357.22	400.00	0.00	100.00	0.00	400.00
195	14	7	29	6		34.00	180000.00	14686.14	2.07	1355.68	400.00	0.00	100.00	0.00	400.00
196	15	7	29	7		34.00	180000.00	13960.79	2.07	1354.13	400.00	0.00	100.00	0.00	400.00
197	16	7	29	1		33.00	180000.00	13233.43	2.06	1352.58	400.00	0.00	100.00	0.00	400.00
198	17	7	29	2		35.00	180000.00	12510.01	2.06	1351.04	400.00	0.00	100.00	0.00	400.00
199	18	7	29	3		36.00	180000.00	11788.55	2.06	1349.13	400.00	0.00	100.00	0.00	400.00
200	19	7	29	4		35.00	180000.00	11065.07	2.05	1346.40	400.00	0.00	100.00	0.00	400.00
201	20	7	29	5		34.00	180000.00	10339.57	2.05	1343.67	400.00	0.00	100.00	0.00	400.00
202	21	7	29	6		35.00	180000.00	9616.06	2.04	1340.95	400.00	0.00	100.00	0.00	400.00
203	22	7	29	7		37.00	180000.00	8896.47	2.04	1338.24	400.00	0.00	100.00	0.00	400.00
204	23	7	29	1		37.00	180000.00	8176.86	2.03	1335.53	400.00	0.00	100.00	0.00	400.00
205	24	7	29	2		38.00	180000.00	7459.20	2.03	1332.83	400.00	0.00	100.00	0.00	400.00
206	25	7	29	3		39.00	180000.00	6743.49	2.03	1330.13	400.00	0.00	100.00	0.00	400.00
207	26	7	29	4		39.00	180000.00	6027.77	2.02	1327.44	400.00	0.00	100.00	0.00	400.00
208	27	7	29	5		39.00	180000.00	5312.01	2.02	1324.50	400.00	0.00	100.00	0.00	400.00
209	28	7	29	6		39.00	180000.00	4596.22	2.01	1319.20	400.00	0.00	100.00	0.00	400.00
210	29	7	29	7		38.00	180000.00	3878.42	2.01	1313.89	400.00	0.00	100.00	0.00	400.00
211	30	7	29	1		45.00	180000.00	3174.47	2.01	1308.69	400.00	0.00	100.00	0.00	400.00
212	31	7	29	2		45.00	180000.00	2470.49	2.00	1303.48	400.00	0.00	100.00	0.00	400.00
213	1	8	29	3		48.00	180000.00	2000.00	2.00	1300.00	400.00	0.00	100.00	0.00	285.25
214	2	8	29	4		49.00	180000.00	1898.93	1.94	1298.58	400.00	114.75	100.00	0.00	100.00
215	3	8	29	5		49.00	180000.00	1797.85	1.88	1297.15	400.00	300.00	100.00	0.00	100.00
216	4	8	29	6		50.00	180000.00	1698.76	1.82	1295.76	400.00	300.00	100.00	0.00	100.00
217	5	8	29	7		50.00	180000.00	1599.66	1.76	1294.36	400.00	300.00	100.00	0.00	100.00
218	6	8	29	1		51.00	180000.00	1502.55	1.71	1292.99	400.00	300.00	100.00	0.00	100.00
219	7	8	29	2		52.00	180000.00	1407.41	1.65	1291.65	400.00	300.00	100.00	0.00	100.00
220	8	8	29	3		52.00	180000.00	1312.27	1.60	1290.31	400.00	300.00	100.00	0.00	100.00
221	9	8	29	4		88.00	180000.00	1288.54	1.58	1289.98	400.00	300.00	100.00	0.00	100.00
222	10	8	29	5		88.00	180000.00	1284.80	1.57	1289.65	400.00	300.00	100.00	0.00	100.00
223	11	8	29	6		89.00	180000.00	1243.05	1.55	1289.34	400.00	300.00	100.00	0.00	100.00
224	12	8	29	7		89.00	180000.00	1221.29	1.54	1289.03	400.00	300.00	100.00	0.00	100.00
225	13	8	29	1		90.00	180000.00	1201.52	1.53	1288.75	400.00	300.00	100.00	0.00	100.00
226	14	8	29	2		91.00	180000.00	1185.72	1.52	1288.53	400.00	300.00	100.00	0.00	100.00
227	15	8	29	3		91.00	180000.00	1167.93	1.51	1288.28	400.00	300.00	100.00	0.00	100.00
228	16	8	29	4		92.00	180000.00	1152.12	1.50	1288.06	400.00	300.00	100.00	0.00	100.00
229	17	8	29	5		93.00	180000.00	1138.30	1.49	1287.86	400.00	300.00	100.00	0.00	100.00
230	18	8	29	6		95.00	180000.00	1128.44	1.49	1287.72	400.00	300.00	100.00	0.00	100.00
231	19	8	29	7		98.00	180000.00	1124.54	1.49	1287.67	400.00	300.00	100.00	0.00	100.00
232	20	8	29	1		90.00	180000.00	1104.76	1.47	1287.59	400.00	300.00	100.00	0.00	100.00
233	21	8	29	2		96.00	180000.00	1096.89	1.47	1287.28	400.00	300.00	100.00	0.00	100.00
234	22	8	29	3		99.00	180000.00	1094.97	1.47	1287.25	400.00	300.00	100.00	0.00	100.00
235	23	8	29	4		91.00	180000.00	1077.18	1.46	1287.00	400.00	300.00	100.00	0.00	100.00

RUN11 (CONTINUED)

LOC NO=	PER DY	MO	YR	DM	RES 4 INFLOW	RES 4 TOP COM.	RES 4 EDP STOR	RES 4 LEVEL	RES 4 EDP ELEV	C P 213 MIN DESI	C P 213 DEB-SHOR	C P 213 MIN REQU	C P 213 REB-SHOR	C P 213 FLOW RES
236	24	8	29	5	98.00	180000.00	1073.27	1.45	1286.95	400.00	300.00	100.00	0.00	100.00
237	25	8	29	6	100.00	180000.00	1073.33	1.45	1286.95	400.00	300.00	100.00	0.00	100.00
238	26	8	29	7	101.00	180000.00	1075.37	1.46	1286.98	400.00	300.00	100.00	0.00	100.00
239	27	8	29	1	105.00	180000.00	1085.35	1.46	1287.12	400.00	300.00	100.00	0.00	100.00
240	28	8	29	2	107.00	180000.00	1099.29	1.47	1287.31	400.00	300.00	100.00	0.00	100.00
241	29	8	29	3	128.00	177227.60	1154.89	1.50	1288.10	400.00	300.00	100.00	0.00	100.00
242	30	8	29	4	135.00	174455.20	1224.38	1.54	1289.08	400.00	300.00	100.00	0.00	100.00
243	31	8	29	5	140.00	171682.80	1303.79	1.59	1290.19	400.00	300.00	100.00	0.00	100.00
244	1	9	29	6	144.00	168910.40	1391.06	1.64	1291.42	400.00	300.00	100.00	0.00	100.00
245	2	9	29	7	147.00	166138.00	1484.28	1.70	1292.74	400.00	300.00	100.00	0.00	100.00
246	3	9	29	1	150.00	163365.60	1583.45	1.75	1294.13	400.00	300.00	100.00	0.00	100.00
247	4	9	29	2	151.00	160593.20	1684.60	1.81	1295.56	400.00	300.00	100.00	0.00	100.00
248	5	9	29	3	157.00	157820.80	1797.66	1.88	1297.15	400.00	300.00	100.00	0.00	100.00
249	6	9	29	4	159.00	155048.40	1914.68	1.95	1298.80	400.00	300.00	100.00	0.00	100.00
250	7	9	29	5	161.00	152276.00	2000.00	2.00	1300.00	400.00	282.02	100.00	0.00	117.98
251	8	9	29	6	150.00	149503.60	2000.00	2.00	1300.00	400.00	250.00	100.00	0.00	150.00
252	9	9	29	7	150.00	146731.20	2000.00	2.00	1300.00	400.00	250.00	100.00	0.00	150.00
253	10	9	29	1	151.00	143958.80	2000.00	2.00	1300.00	400.00	249.00	100.00	0.00	151.00
254	11	9	29	2	153.00	141186.40	2000.00	2.00	1300.00	400.00	247.00	100.00	0.00	153.00
255	12	9	29	3	155.00	138414.00	2000.00	2.00	1300.00	400.00	245.00	100.00	0.00	155.00
256	13	9	29	4	157.00	135641.60	2000.00	2.00	1300.00	400.00	243.00	100.00	0.00	157.00
257	14	9	29	5	159.00	132869.20	2000.00	2.00	1300.00	400.00	241.00	100.00	0.00	159.00
258	15	9	29	6	161.00	130096.80	2000.00	2.00	1300.00	400.00	239.00	100.00	0.00	161.00
259	16	9	29	7	163.00	127324.40	2000.00	2.00	1300.00	400.00	237.00	100.00	0.00	163.00
260	17	9	29	1	165.00	124552.00	2000.00	2.00	1300.00	400.00	235.00	100.00	0.00	165.00
261	18	9	29	2	167.00	121779.60	2000.00	2.00	1300.00	400.00	233.00	100.00	0.00	167.00
262	19	9	29	3	169.00	119007.20	2000.00	2.00	1300.00	400.00	231.00	100.00	0.00	169.00
263	20	9	29	4	171.00	116234.80	2000.00	2.00	1300.00	400.00	229.00	100.00	0.00	171.00
264	21	9	29	5	173.00	113462.40	2000.00	2.00	1300.00	400.00	227.00	100.00	0.00	173.00
265	22	9	29	6	175.00	110690.00	2000.00	2.00	1300.00	400.00	225.00	100.00	0.00	175.00
266	23	9	29	7	177.00	108900.00	2000.00	2.00	1300.00	400.00	223.00	100.00	0.00	177.00
267	24	9	29	1	179.00	106900.00	2000.00	2.00	1300.00	400.00	221.00	100.00	0.00	179.00
268	25	9	29	2	180.00	106900.00	2000.00	2.00	1300.00	400.00	220.00	100.00	0.00	180.00
269	26	9	29	3	182.00	106900.00	2000.00	2.00	1300.00	400.00	218.00	100.00	0.00	182.00
270	27	9	29	4	184.00	106900.00	2000.00	2.00	1300.00	400.00	216.00	100.00	0.00	184.00
271	28	9	29	5	186.00	106900.00	2000.00	2.00	1300.00	400.00	214.00	100.00	0.00	186.00
272	29	9	29	6	188.00	106900.00	2000.00	2.00	1300.00	400.00	212.00	100.00	0.00	188.00
273	30	9	29	7	190.00	106900.00	2000.00	2.00	1300.00	400.00	210.00	100.00	0.00	190.00
274	1	10	29	1	192.00	106900.00	2000.00	2.00	1300.00	400.00	208.06	100.00	0.00	191.94
275	2	10	29	2	194.00	106900.00	2000.00	2.00	1300.00	400.00	206.04	100.00	0.00	193.94
276	3	10	29	3	196.00	106900.00	2000.00	2.00	1300.00	400.00	204.06	100.00	0.00	195.94
277	4	10	29	4	198.00	106900.00	2000.00	2.00	1300.00	400.00	202.06	100.00	0.00	197.94
278	5	10	29	5	200.00	106900.00	2000.00	2.00	1300.00	400.00	200.06	100.00	0.00	199.94
279	6	10	29	6	202.00	106900.00	2000.00	2.00	1300.00	400.00	198.04	100.00	0.00	201.94
280	7	10	29	7	204.00	106900.00	2000.00	2.00	1300.00	400.00	196.06	100.00	0.00	203.94
281	8	10	29	1	206.00	106900.00	2000.00	2.00	1300.00	400.00	194.06	100.00	0.00	205.94
282	9	10	29	2	208.00	106900.00	2000.00	2.00	1300.00	400.00	192.06	100.00	0.00	207.94
283	10	10	29	3	221.00	106900.00	2000.00	2.00	1300.00	400.00	179.06	100.00	0.00	220.94

RUN11 (CONTINUED)

LOC NO=	PER	DY	MO	YR	DH	RES 4 INFLOW	RES 4 TOP CON.	RES 4 EDP STOR	RES 4 LEVEL	RES 4 EDP ELEV	C P 213 MIN DESI	C P 213 DEF-SHOR	C P 213 MIN REDU	C P 213 REQ-SHOR	C P 213 FLOW REG
284	11	10	29	4	4	234.00	110690.00	2000.00	2.00	1300.00	400.00	166.06	100.00	0.00	233.94
285	12	10	29	5	4	247.00	110690.00	2000.00	2.00	1300.00	400.00	153.06	100.00	0.00	246.94
286	13	10	29	6	4	261.00	110690.00	2000.00	2.00	1300.00	400.00	139.06	100.00	0.00	260.94
287	14	10	29	7	4	274.00	110690.00	2000.00	2.00	1300.00	400.00	126.06	100.00	0.00	273.94
288	15	10	29	1	4	287.00	110690.00	2000.00	2.00	1300.00	400.00	113.06	100.00	0.00	286.94
289	16	10	29	2	4	301.00	110690.00	2000.00	2.00	1300.00	400.00	99.06	100.00	0.00	300.94
290	17	10	29	3	4	314.00	110690.00	2000.00	2.00	1300.00	400.00	86.06	100.00	0.00	313.94
291	18	10	29	4	4	327.00	110690.00	2000.00	2.00	1300.00	400.00	73.06	100.00	0.00	326.94
292	19	10	29	5	4	341.00	110690.00	2000.00	2.00	1300.00	400.00	59.06	100.00	0.00	340.94
293	20	10	29	6	4	354.00	110690.00	2000.00	2.00	1300.00	400.00	46.06	100.00	0.00	353.94
294	21	10	29	7	4	367.00	110690.00	2000.00	2.00	1300.00	400.00	33.06	100.00	0.00	366.94
295	22	10	29	1	4	381.00	110690.00	2000.00	2.00	1300.00	400.00	19.06	100.00	0.00	380.94
296	23	10	29	2	4	394.00	110690.00	2000.00	2.00	1300.00	400.00	6.06	100.00	0.00	393.94
297	24	10	29	3	4	408.00	110690.00	2015.76	2.00	1300.12	400.00	0.00	100.00	0.00	400.00
298	25	10	29	4	4	421.00	110690.00	2057.30	2.00	1300.42	400.00	0.00	100.00	0.00	400.00
299	26	10	29	5	4	434.00	110690.00	2124.62	2.00	1300.92	400.00	0.00	100.00	0.00	400.00
300	27	10	29	6	4	447.00	110690.00	2217.72	2.00	1301.61	400.00	0.00	100.00	0.00	400.00
302	29	10	29	1	4	474.00	110690.00	2338.59	2.00	1302.59	400.00	0.00	100.00	0.00	400.00
303	30	10	29	2	4	487.00	110690.00	2485.24	2.00	1303.59	400.00	0.00	100.00	0.00	400.00
304	31	10	29	3	4	501.00	110690.00	2657.67	2.01	1304.86	400.00	0.00	100.00	0.00	400.00
305	1	11	29	4	4	514.00	110690.00	2857.86	2.01	1306.35	400.00	0.00	100.00	0.00	400.00
306	2	11	29	5	4	527.00	110690.00	3084.78	2.01	1308.02	400.00	0.00	100.00	0.00	400.00
307	3	11	29	6	4	541.00	110690.00	3337.54	2.01	1309.89	400.00	0.00	100.00	0.00	400.00
308	4	11	29	7	4	554.00	110690.00	3618.14	2.02	1311.97	400.00	0.00	100.00	0.00	400.00
309	5	11	29	1	4	567.00	110690.00	3924.58	2.02	1314.24	400.00	0.00	100.00	0.00	400.00
310	6	11	29	2	4	581.00	110690.00	4256.88	2.02	1316.69	400.00	0.00	100.00	0.00	400.00
311	7	11	29	3	4	594.00	110690.00	4617.03	2.03	1319.36	400.00	0.00	100.00	0.00	400.00
312	8	11	29	4	4	608.00	110690.00	5003.05	2.03	1322.21	400.00	0.00	100.00	0.00	400.00
313	9	11	29	5	4	608.00	110690.00	5416.93	2.03	1325.14	400.00	0.00	100.00	0.00	400.00
314	10	11	29	6	4	608.00	110690.00	5830.90	2.04	1326.70	400.00	0.00	100.00	0.00	400.00
315	11	11	29	7	4	608.00	110690.00	6244.93	2.04	1328.26	400.00	0.00	100.00	0.00	400.00
316	12	11	29	1	4	608.00	110690.00	6659.05	2.04	1329.82	400.00	0.00	100.00	0.00	400.00
317	13	11	29	2	4	608.00	110690.00	7073.23	2.05	1331.38	400.00	0.00	100.00	0.00	400.00
318	14	11	29	3	4	609.00	110690.00	7487.50	2.05	1332.93	400.00	0.00	100.00	0.00	400.00
319	15	11	29	4	4	609.00	110690.00	7903.82	2.05	1334.50	400.00	0.00	100.00	0.00	400.00
320	16	11	29	5	4	609.00	110690.00	8320.22	2.06	1336.07	400.00	0.00	100.00	0.00	400.00
321	17	11	29	6	4	609.00	110690.00	8736.69	2.06	1337.64	400.00	0.00	100.00	0.00	400.00
322	18	11	29	7	4	609.00	110690.00	9153.24	2.07	1339.21	400.00	0.00	100.00	0.00	400.00
323	19	11	29	1	4	610.00	110690.00	9569.86	2.07	1340.78	400.00	0.00	100.00	0.00	400.00
324	20	11	29	2	4	610.00	110690.00	9988.55	2.07	1342.35	400.00	0.00	100.00	0.00	400.00
325	21	11	29	3	4	610.00	110690.00	10407.31	2.08	1343.93	400.00	0.00	100.00	0.00	400.00
326	22	11	29	4	4	610.00	110690.00	10826.14	2.08	1345.51	400.00	0.00	100.00	0.00	400.00
327	23	11	29	5	4	611.00	110690.00	11245.06	2.09	1347.08	400.00	0.00	100.00	0.00	400.00
328	24	11	29	6	4	611.00	110690.00	11666.03	2.09	1348.67	400.00	0.00	100.00	0.00	400.00
329	25	11	29	7	4	611.00	110690.00	12087.08	2.09	1350.14	400.00	0.00	100.00	0.00	400.00
330	26	11	29	1	4	611.00	110690.00	12508.20	2.10	1351.04	400.00	0.00	100.00	0.00	400.00
331	27	11	29	2	4	611.00	110690.00	12929.41	2.10	1351.94	400.00	0.00	100.00	0.00	400.00
								13350.69	2.10	1352.83	400.00	0.00	100.00	0.00	400.00









RUN12 (CONTINUED)

LDC NO=	PER	DY	MD	YR	DM	RES NO.4 EOP STOR	RES NO.4 EOP ELEV	RES NO.4 LEVEL	RES NO.4 CASE	RES NO.4 OUTFLOW	RES NO.4 DIV REQ	RES NO.4 DIVERSIO	RES NO.4 DIV SHOR	C.P. 213 DIVERSIO	C.P. 213 FLOW RES
91	1	4	35	1	71500.00	1424.31	3.00	0.03	150.00	399.32	150.00	150.00	0.00	-30.00	429.32
92	1	5	35	1	63436.89	1417.60	2.88	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
93	1	6	35	1	71500.00	1424.31	3.00	0.03	150.00	892.12	150.00	150.00	0.00	-30.00	922.12
94	1	7	35	1	55073.77	1410.64	2.76	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
95	1	8	35	1	34628.73	1388.68	2.47	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
96	1	9	35	1	14336.47	1354.93	2.18	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
97	1	10	35	1	35952.55	1390.42	2.49	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
98	1	11	35	1	44676.42	1401.86	2.64	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
99	1	12	35	1	52589.28	1408.17	2.73	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
100	1	1	36	1	41093.08	1395.91	2.56	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
101	1	2	36	1	71500.00	1424.31	3.00	0.03	150.00	2417.77	150.00	150.00	0.00	-30.00	2447.77
102	1	3	36	1	71500.00	1424.31	3.00	0.03	150.00	673.55	150.00	150.00	0.00	-30.00	703.55
103	1	4	36	1	61865.21	1416.29	2.86	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
104	1	5	36	1	44415.08	1401.58	2.64	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
105	1	6	36	1	22993.73	1372.24	2.30	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
106	1	7	36	1	2000.00	1300.00	2.00	213.00	150.00	256.69	150.00	150.00	0.00	-30.00	286.69
107	1	8	36	1	300.00	1270.23	1.00	0.07	150.00	27.63	43.04	106.96	106.96	-8.61	36.24
108	1	9	36	1	300.00	1270.23	1.00	0.07	150.00	28.57	111.43	38.57	38.57	-22.29	50.86
109	1	10	36	1	300.00	1270.23	1.00	0.07	150.00	27.67	144.31	144.31	5.69	-28.86	56.53
110	1	11	36	1	2694.63	1305.14	2.01	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
111	1	12	36	1	32552.53	1385.75	2.44	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
112	1	1	37	1	53515.82	1409.16	2.74	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
113	1	2	37	1	62486.74	1416.81	2.87	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
114	1	3	37	1	71500.00	1424.31	3.00	0.03	150.00	988.79	150.00	150.00	0.00	-30.00	1018.79
115	1	4	37	1	71500.00	1424.31	3.00	0.03	150.00	647.32	150.00	150.00	0.00	-30.00	677.32
116	1	5	37	1	61960.70	1416.37	2.86	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
117	1	6	37	1	47115.76	1402.33	2.65	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
118	1	7	37	1	34795.68	1388.92	2.47	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
119	1	8	37	1	16616.80	1359.79	2.21	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
120	1	9	37	1	30480.44	1382.82	2.41	213.00	150.00	370.00	150.00	150.00	0.00	-30.00	400.00
SUM = 4488520.41 164966.24 289.42 17680.59 49924.78 18000.00 17236.73 763.27 -3447.35 53372.12															
MAX = 71500.00 1424.31 3.00 213.00 2417.77 150.00 150.00 106.96 -8.61 2447.77															
MIN = 300.00 1270.23 1.00 0.03 27.55 150.00 43.04 0.00 -30.00 36.24															
PMAX= 2.00 1.00 1.00 3.00 101.00 1.00 1.00 107.00 107.00 101.00															
AVG = 37404.34 1374.72 2.41 147.34 416.04 150.00 143.64 6.36 -28.73 444.77															
PMIN= 38.00 36.00 38.00 1.00 39.00 1.00 107.00 1.00 1.00 107.00															





RUN13 (CONTINUED)

LOC NO=	PER DY	MO	YR	DW	4.	4.	4.	4.	4.	4.	213.	213.	213.	213.	213.	213.	213.
					RES NO.4	RES NO.4	RES NO.4	RES NO.4	RES NO.4	RES NO.4	C.P. 213	C.P. 213	C.P. 213	C.P. 213	C.P. 213	C.P. 213	C.P. 213
					EDP STOR	EDP ELEV	LEVEL	CASE	OUTFLOW	MIN DESI	DEQ-SHOR	DIV REQU	DIVERSIO	FLOW REG			
91	1	4	35	1	71500.00	1424.31	3.00	0.03	549.32	400.00	0.00	100.00	100.00	449.32			
92	1	5	35	1	64667.05	1418.62	2.90	213.00	500.00	400.00	0.00	100.00	100.00	400.00			
93	1	6	35	1	71500.00	1424.31	3.00	0.03	1062.80	400.00	0.00	100.00	100.00	962.80			
94	1	7	35	1	56303.94	1411.67	2.78	213.00	500.00	400.00	0.00	100.00	100.00	400.00			
95	1	8	35	1	37089.46	1391.63	2.50	213.00	500.00	400.00	0.00	100.00	100.00	400.00			
96	1	9	35	1	17987.23	1362.71	2.23	213.00	500.00	400.00	0.00	100.00	100.00	400.00			
97	1	10	35	1	40830.29	1395.62	2.36	213.00	500.00	400.00	0.00	100.00	100.00	400.00			
98	1	11	35	1	50376.10	1405.81	2.70	213.00	500.00	400.00	0.00	100.00	100.00	400.00			
99	1	12	35	1	54451.35	1410.13	2.75	213.00	550.00	400.00	0.00	150.00	150.00	400.00			
100	1	1	36	1	41112.11	1395.93	2.56	213.00	550.00	400.00	0.00	150.00	150.00	400.00			
101	1	2	36	1	71500.00	1424.31	3.00	0.03	2588.10	400.00	0.00	140.00	140.00	400.00			
102	1	3	36	1	71500.00	1424.31	3.00	0.03	823.55	400.00	0.00	120.00	120.00	703.55			
103	1	4	36	1	63057.04	1417.29	2.88	213.00	500.00	400.00	0.00	100.00	100.00	400.00			
104	1	5	36	1	48837.81	1404.17	2.67	213.00	500.00	400.00	0.00	100.00	100.00	400.00			
105	1	6	36	1	26607.77	1377.35	2.35	213.00	500.00	400.00	0.00	100.00	100.00	400.00			
106	1	7	36	1	300.00	1270.23	1.00	0.07	493.13	400.00	6.87	100.00	100.00	393.13			
107	1	8	36	1	300.00	1270.23	1.00	0.07	43.01	400.00	400.00	100.00	43.01	0.00			
108	1	9	36	1	300.00	1270.23	1.00	0.07	140.00	400.00	360.00	100.00	100.00	40.00			
109	1	10	36	1	300.00	1270.23	1.00	0.07	171.98	400.00	328.02	100.00	100.00	71.98			
110	1	11	36	1	1500.84	1292.97	1.71	213.00	540.00	400.00	0.00	140.00	140.00	400.00			
111	1	12	36	1	29503.47	1381.44	2.40	213.00	550.00	400.00	0.00	150.00	150.00	400.00			
112	1	1	37	1	48615.36	1403.93	2.67	213.00	550.00	400.00	0.00	150.00	150.00	400.00			
113	1	2	37	1	56465.71	1411.80	2.78	213.00	540.00	400.00	0.00	140.00	140.00	400.00			
114	1	3	37	1	71500.00	1424.31	3.00	0.03	1040.74	400.00	0.00	120.00	120.00	920.74			
115	1	4	37	1	71500.00	1424.31	3.00	0.03	797.32	400.00	0.00	100.00	100.00	697.32			
116	1	5	37	1	63190.86	1417.40	2.88	213.00	500.00	400.00	0.00	100.00	100.00	400.00			
117	1	6	37	1	49536.81	1404.92	2.68	213.00	500.00	400.00	0.00	100.00	100.00	400.00			
118	1	7	37	1	38448.25	1393.08	2.52	213.00	500.00	400.00	0.00	100.00	100.00	400.00			
119	1	8	37	1	21501.29	1370.13	2.28	213.00	500.00	400.00	0.00	100.00	100.00	400.00			
120	1	9	37	1	36554.89	1391.06	2.50	213.00	500.00	400.00	0.00	100.00	100.00	400.00			
SUM =					450553.95	164687.67	278.50	15338.36	67073.20	48000.00	5544.13	14000.00	13777.26	53295.94			
MAX =					71500.00	1424.31	3.00	213.00	2588.10	400.00	400.00	150.00	150.00	2428.10			
MIN =					300.00	1270.23	1.00	0.03	43.01	400.00	0.00	100.00	43.01	0.00			
PMAX=					101.00	1.00	1.00	3.00	101.00	1.00	36.00	3.00	3.00	101.00			
AVG =					37546.28	1372.40	2.32	127.82	558.94	400.00	46.20	116.67	116.81	444.13			
PRIN=					37.00	14.00	36.00	1.00	107.00	1.00	1.00	1.00	107.00	36.00			







RUN14 (CONTINUED)

LOC NO=	PER DY	NO YR	DM	RES NO.4 EDP STOR	RES NO.4 EDP ELEV	RES NO.4 LEVEL	RES NO.4 CASE	RES NO.4 OUTFLOW	C.P. 213 MIN DESI	C.P. 213 DEQ-SHOR	C.P. 213 DIV REMU	C.P. 213 DIVERSIO	C.P. 213 FLOW REG	
91	1	4	35	71500.00	1424.31	3.00	0.03	549.32	400.00	0.00	110.00	110.00	439.32	
92	1	5	35	63744.43	1417.86	2.89	213.00	515.00	400.00	0.00	115.00	115.00	400.00	
93	1	6	35	71500.00	1424.31	3.00	0.03	1047.29	400.00	0.00	140.00	140.00	907.29	
94	1	7	35	53536.05	1409.18	2.74	213.00	545.00	400.00	0.00	145.00	145.00	400.00	
95	1	8	35	33090.36	1386.51	2.45	213.00	520.00	400.00	0.00	120.00	120.00	400.00	
96	1	9	35	13095.66	1352.29	2.16	213.00	515.00	400.00	0.00	115.00	115.00	400.00	
97	1	10	35	35941.92	1390.41	2.49	213.00	500.00	400.00	0.00	100.00	100.00	400.00	
98	1	11	35	47261.64	1402.49	2.65	213.00	510.00	400.00	0.00	110.00	110.00	400.00	
99	1	12	35	54099.47	1409.79	2.75	213.00	505.00	400.00	0.00	105.00	105.00	400.00	
100	1	1	36	43221.26	1398.18	2.59	213.00	510.00	400.00	0.00	110.00	110.00	400.00	
101	1	2	36	71500.00	1424.31	3.00	0.03	2604.80	400.00	0.00	120.00	120.00	2484.80	
102	1	3	36	71500.00	1424.31	3.00	0.03	823.55	400.00	0.00	125.00	125.00	698.55	
103	1	4	36	61865.21	1416.29	2.86	213.00	520.00	400.00	0.00	120.00	120.00	400.00	
104	1	5	36	39957.00	1394.69	2.55	213.00	625.00	400.00	0.00	225.00	225.00	400.00	
105	1	6	36	10283.29	1343.46	2.12	213.00	625.00	400.00	0.00	225.00	225.00	400.00	
106	1	7	36	300.00	1270.23	1.00	0.07	227.49	400.00	400.00	245.00	227.49	0.00	
107	1	8	36	300.00	1270.23	1.00	0.07	43.01	400.00	400.00	240.00	43.01	0.00	
108	1	9	36	300.00	1270.23	1.00	0.07	140.00	400.00	400.00	255.00	140.00	0.00	
109	1	10	36	300.00	1270.23	1.00	0.07	171.98	400.00	400.00	260.00	171.98	0.00	
110	1	11	36	300.00	1270.23	1.00	0.07	360.10	400.00	109.90	270.00	270.00	290.10	
111	1	12	36	30762.31	1383.22	2.41	213.00	510.00	400.00	0.00	110.00	110.00	400.00	
112	1	1	37	51414.85	1406.92	2.71	213.00	525.00	400.00	0.00	125.00	125.00	400.00	
113	1	2	37	53711.45	1409.37	2.74	213.00	640.00	400.00	0.00	240.00	240.00	400.00	
114	1	3	37	71500.00	1424.31	3.00	0.03	995.90	400.00	0.00	260.00	260.00	735.90	
115	1	4	37	71500.00	1424.31	3.00	0.03	797.32	400.00	0.00	265.00	265.00	532.32	
116	1	5	37	53657.14	1409.31	2.74	213.00	655.00	400.00	0.00	255.00	255.00	400.00	
117	1	6	37	30179.10	1382.39	2.41	213.00	665.00	400.00	0.00	265.00	265.00	400.00	
118	1	7	37	8620.77	1337.20	2.10	213.00	670.00	400.00	0.00	270.00	270.00	400.00	
119	1	8	37	300.00	1270.23	1.00	0.07	359.41	400.00	300.59	260.00	260.00	99.41	
120	1	9	37	6131.29	1327.83	2.06	213.00	655.00	400.00	0.00	255.00	255.00	400.00	
SUM =				3462980.86	162810.35	257.04	14273.91	67582.21	48000.00	8201.25	20095.00	19066.82	48515.38	
MAX =				71500.00	1424.31	3.00	213.00	2604.80	400.00	400.00	400.00	270.00	270.00	2484.80
MIN =				300.00	1270.23	1.00	0.03	43.01	400.00	400.00	100.00	43.01	43.01	0.00
PMAX =				2.00	1.00	1.00	3.00	101.00	1.00	35.00	70.00	70.00	101.00	
AVG =				30524.84	1356.75	2.14	118.95	563.19	400.00	68.34	167.46	158.89	404.29	
PHIN =				35.00	14.00	34.00	1.00	107.00	1.00	1.00	57.00	107.00	35.00	











RUN16 (CONTINUED)

LOC NO=	PER	DY	MD	YR	DN	RES NO.4 EOP STOR	RES NO.4 EOP ELEV	RES NO.4 LEVEL	RES NO.4 CASE	RES NO.4 OUTFLOW	RES NO.4 DIVERSIO	C.P. 213 DIVERSIO	RES NO.4 MIN DESI	RES NO.4 DEQ-SHOR	C.P. 213 FLOW RES
91	0	4	35	1	1	71500.00	1424.31	3.00	0.03	400.00	149.32	-29.86	400.00	0.00	429.86
92	0	5	35	1	1	70817.84	1423.74	2.99	0.00	400.00	0.00	0.00	400.00	0.00	400.00
93	0	6	35	1	1	71500.00	1424.31	3.00	0.03	400.00	766.18	-153.24	400.00	0.00	553.24
94	0	7	35	1	1	62454.81	1416.78	2.87	0.00	400.00	0.00	0.00	400.00	0.00	400.00
95	0	8	35	1	1	49393.21	1404.76	2.68	0.00	400.00	0.00	0.00	400.00	0.00	400.00
96	0	9	35	1	1	36241.12	1390.73	2.49	0.00	400.00	0.00	0.00	400.00	0.00	400.00
97	0	10	35	1	1	65220.60	1419.09	2.91	0.00	400.00	0.00	0.00	400.00	0.00	400.00
98	0	11	35	1	1	71500.00	1424.31	3.00	0.03	400.00	196.06	-39.21	400.00	0.00	400.00
99	0	12	35	1	1	71500.00	1424.31	3.00	0.03	400.00	217.16	-43.43	400.00	0.00	443.43
100	0	1	36	1	1	67424.34	1420.92	2.94	0.00	400.00	0.00	0.00	400.00	0.00	400.00
101	0	2	36	1	1	71500.00	1424.31	3.00	0.03	2071.36	954.59	-190.92	400.00	0.00	2262.28
102	0	3	36	1	1	71500.00	1424.31	3.00	0.03	400.00	423.55	-84.71	400.00	0.00	484.71
103	0	4	36	1	1	69016.18	1422.24	2.96	0.00	400.00	0.00	0.00	400.00	0.00	400.00
104	0	5	36	1	1	60951.50	1415.53	2.85	0.00	400.00	0.00	0.00	400.00	0.00	400.00
105	0	6	36	1	1	44677.76	1399.73	2.61	0.00	400.00	0.00	0.00	400.00	0.00	400.00
106	0	7	36	1	1	24114.33	1373.82	2.32	0.00	400.00	0.00	0.00	400.00	0.00	400.00
107	0	8	36	1	1	2175.54	1301.30	2.00	0.00	400.00	0.00	0.00	400.00	0.00	400.00
108	0	9	36	1	1	2000.00	1300.00	2.00	0.09	142.95	0.00	0.00	400.00	257.05	142.95
109	0	10	36	1	1	2000.00	1300.00	2.00	0.09	171.94	0.00	0.00	400.00	228.06	171.94
110	0	11	36	1	1	11568.99	1348.30	2.14	0.00	400.00	0.00	0.00	400.00	0.00	400.00
111	0	12	36	1	1	48850.74	1404.18	2.67	0.00	400.00	0.00	0.00	400.00	0.00	400.00
112	0	1	37	1	1	71500.00	1424.31	3.00	0.03	400.00	93.08	-18.62	400.00	0.00	418.62
113	0	2	37	1	1	71500.00	1424.31	3.00	0.03	400.00	281.98	-56.40	400.00	0.00	456.40
114	0	3	37	1	1	71500.00	1424.31	3.00	0.03	400.00	885.55	-177.11	400.00	0.00	577.11
115	0	4	37	1	1	71500.00	1424.31	3.00	0.03	400.00	397.32	-79.46	400.00	0.00	479.46
116	0	5	37	1	1	69341.65	1422.51	2.97	0.00	400.00	0.00	0.00	400.00	0.00	400.00
117	0	6	37	1	1	61642.09	1416.11	2.86	0.00	400.00	0.00	0.00	400.00	0.00	400.00
118	0	7	37	1	1	56711.52	1412.01	2.79	0.00	400.00	0.00	0.00	400.00	0.00	400.00
119	0	8	37	1	1	45922.93	1401.06	2.63	0.00	400.00	0.00	0.00	400.00	0.00	400.00
120	0	9	37	1	1	66926.41	1420.50	2.93	0.00	400.00	0.00	0.00	400.00	0.00	400.00
SUM = 6480173.11 168291.95 329.79 1.95 47962.91 18715.29 -3743.06 48000.00 1725.45 51705.97															
MAX = 71500.00 1424.31 3.00 0.09 2071.36 971.55 0.00 2262.28															
MIN = 2000.00 1300.00 2.00 0.00 102.29 0.00 -194.31 400.00 102.29															
PMAX= 8.00 1.00 1.00 37.00 101.00 6.00 10.00 101.00															
AVG = 54001.44 1402.43 2.75 0.02 399.69 155.96 -31.19 400.00 14.38 430.88															
PMIN= 39.00 37.00 37.00 10.00 38.00 10.00 6.00 1.00 38.00															



RUN17 - SUMMARY OUTPUT

LOC NO= CODE=	SUMMARY BY PERIOD FLOOD=										C.P. 213 DIVERSIO	C.P. 213 DEP-SHOR	C.P. 213 FLDW REB	
	4. 4.240	4. 4.110	4. 4.220	4. 4.130	4. 4.120	4. 4.100	4. 4.030	213. 213.030	213. 213.060	213. 213.040				
PER DY MD YR DW	RES NO. 4 LOCAL IN	RES NO. 4 EDP STOR	RES NO. 4 EDP ELEV	RES NO. 4 LEVEL	RES NO. 4 CASE	RES NO. 4 OUTFLOW	RES NO. 4 DIVERSIO	RES NO. 4 DIVERSIO	RES NO. 4 DIVERSIO	RES NO. 4 DIVERSIO	RES NO. 4 DIVERSIO	RES NO. 4 DIVERSIO	RES NO. 4 DIVERSIO	RES NO. 4 DIVERSIO
1	1	10	27	1	1222.00	71500.00	1424.31	3.00	0.03	1061.09	160.00	-32.00	0.00	1093.09
2	1	11	27	1	1268.00	71500.00	1424.31	3.00	0.03	1112.75	160.00	-32.00	0.00	1144.75
3	1	12	27	1	497.00	69847.40	1422.93	2.98	213.00	368.00	160.00	-32.00	0.00	400.00
4	1	1	28	1	733.00	71500.00	1424.31	3.00	0.03	548.88	160.00	-32.00	0.00	580.88
5	1	2	28	1	647.00	71500.00	1424.31	3.00	0.03	489.88	160.00	-32.00	0.00	521.88
6	1	3	28	1	1385.00	71500.00	1424.31	3.00	0.03	1228.55	160.00	-32.00	0.00	1260.55
7	1	4	28	1	999.00	71500.00	1424.31	3.00	0.03	843.32	160.00	-32.00	0.00	875.32
8	1	5	28	1	1345.00	71500.00	1424.31	3.00	0.03	1205.91	160.00	-32.00	0.00	1237.91
9	1	6	28	1	1308.00	71500.00	1424.31	3.00	0.03	1148.65	160.00	-32.00	0.00	1180.65
10	1	7	28	1	340.00	62011.95	1416.42	2.86	213.00	371.20	144.00	-28.80	0.00	400.00
11	1	8	28	1	282.00	49242.89	1404.60	2.68	213.00	377.44	112.80	-22.56	0.00	400.00
12	1	9	28	1	176.00	33018.00	1386.41	2.45	213.00	387.84	60.80	-12.16	0.00	400.00
13	1	10	28	1	193.00	16602.43	1359.76	2.21	213.00	385.12	74.40	-14.88	0.00	400.00
14	1	11	28	1	281.00	3427.16	1310.56	2.02	213.00	378.12	104.40	-20.88	0.00	400.00
15	1	12	28	1	481.00	2000.00	1300.00	2.00	213.00	344.54	160.00	-32.00	23.46	376.54
16	1	1	29	1	431.00	2000.00	1300.00	2.00	213.00	271.17	160.00	-32.00	96.83	303.17
17	1	2	29	1	1130.00	35500.59	1389.92	2.48	213.00	368.00	160.00	-32.00	0.00	400.00
18	1	3	29	1	1230.00	71500.00	1424.31	3.00	0.03	487.37	160.00	-32.00	0.00	519.37
19	1	4	29	1	810.00	71500.00	1424.31	3.00	0.03	654.32	160.00	-32.00	0.00	686.32
20	1	5	29	1	283.00	58789.36	1413.73	2.82	213.00	377.36	113.20	-22.64	0.00	400.00
21	1	6	29	1	163.00	42317.19	1397.21	2.58	213.00	389.92	50.40	-10.08	0.00	400.00
22	1	7	29	1	150.00	25012.15	1375.09	2.33	213.00	392.00	40.00	-8.00	0.00	400.00
23	1	8	29	1	208.00	9129.60	1339.12	2.10	213.00	383.36	83.20	-16.64	0.00	400.00
24	1	9	29	1	608.00	13889.44	1353.98	2.17	213.00	368.00	160.00	-32.00	0.00	400.00
25	1	10	29	1	614.00	19157.35	1345.20	2.25	213.00	368.00	160.00	-32.00	0.00	400.00
26	1	11	29	1	553.00	20765.62	1348.63	2.27	213.00	368.00	160.00	-32.00	0.00	400.00
27	1	12	29	1	524.00	20432.53	1348.54	2.27	213.00	368.00	160.00	-32.00	0.00	400.00
28	1	1	30	1	475.00	17443.48	1341.55	2.22	213.00	368.00	160.00	-32.00	0.00	400.00
29	1	2	30	1	740.00	30408.49	1382.72	2.41	213.00	368.00	160.00	-32.00	0.00	400.00
30	1	3	30	1	891.00	52877.33	1408.48	2.73	213.00	368.00	160.00	-32.00	0.00	400.00
31	1	4	30	1	491.00	50876.59	1406.35	2.70	213.00	368.00	160.00	-32.00	0.00	400.00
32	1	5	30	1	575.00	53810.53	1409.48	2.75	213.00	368.00	160.00	-32.00	0.00	400.00
33	1	6	30	1	317.00	42864.34	1377.80	2.59	213.00	374.64	126.80	-25.36	0.00	400.00
34	1	7	30	1	105.00	24563.22	1374.46	2.32	213.00	399.20	4.00	-0.80	0.00	400.00
35	1	8	30	1	94.00	5762.05	1326.44	2.05	213.00	400.00	0.00	0.00	0.00	400.00
36	1	9	30	1	75.00	2000.00	1300.00	2.00	213.00	38.22	0.00	0.00	261.78	138.22
37	1	10	30	1	76.00	521.71	1277.97	1.13	213.00	100.00	0.00	0.00	300.00	100.00
38	1	11	30	1	102.00	572.99	1279.76	1.16	213.00	99.68	1.60	-0.32	300.00	100.00
39	1	12	30	1	124.00	1113.65	1287.52	1.48	213.00	19.20	19.20	-3.84	300.00	100.00
40	1	1	31	1	144.00	2000.00	1300.00	2.00	213.00	98.53	51.20	-10.24	291.23	108.77
41	1	2	31	1	669.00	9856.35	1341.85	2.11	213.00	368.00	160.00	-32.00	0.00	400.00
42	1	3	31	1	878.00	31473.44	1384.22	2.42	213.00	368.00	160.00	-32.00	0.00	400.00



RUN17 (CONTINUED)

LDC NO=	PER	DY	MO	YR	DW	RES NO.4 LOCAL IN	RES NO.4 EDP STOR	RES NO.4 EDP ELEV	RES NO.4 LEVEL	RES NO.4 CASE	RES NO.4 OUTFLOW	RES NO.4 DIVERSIO	C.P. 213 DIVERSIO	C.P. 213 DED-SHOR	C.P. 213 FLOW REG
91	1	4	35	1	1	545.00	71500.00	1424.31	3.00	0.03	389.32	160.00	-32.00	0.00	421.32
92	1	5	35	1	1	388.00	63181.02	1417.39	2.88	213.00	368.96	155.20	-31.04	0.00	400.00
93	1	6	35	1	1	1177.00	71500.00	1424.31	3.00	0.03	877.82	160.00	-32.00	0.00	909.82
94	1	7	35	1	1	252.00	57494.75	1412.66	2.80	213.00	379.84	100.80	-20.16	0.00	400.00
95	1	8	35	1	1	187.00	41006.53	1395.81	2.56	213.00	386.08	69.60	-13.92	0.00	400.00
96	1	9	35	1	1	179.00	24846.09	1374.86	2.33	213.00	387.36	63.20	-12.64	0.00	400.00
97	1	10	35	1	1	872.00	45963.56	1401.10	2.63	213.00	368.00	160.00	-32.00	0.00	400.00
98	1	11	35	1	1	697.00	56238.86	1411.61	2.78	213.00	368.00	160.00	-32.00	0.00	400.00
99	1	12	35	1	1	613.00	61685.12	1416.14	2.86	213.00	368.00	160.00	-32.00	0.00	400.00
100	1	1	36	1	1	331.00	51071.36	1406.55	2.71	213.00	373.52	132.40	-26.48	0.00	400.00
101	1	2	36	1	1	3094.00	71500.00	1424.31	3.00	0.03	2581.40	160.00	-32.00	0.00	2613.40
102	1	3	36	1	1	820.00	71500.00	1424.31	3.00	0.03	663.55	160.00	-32.00	0.00	695.55
103	1	4	36	1	1	354.00	62265.66	1416.63	2.87	213.00	371.68	141.60	-28.32	0.00	400.00
104	1	5	36	1	1	268.00	48921.81	1404.26	2.68	213.00	378.56	107.20	-21.44	0.00	400.00
105	1	6	36	1	1	126.00	31653.09	1384.48	2.43	213.00	395.84	20.80	-4.16	0.00	400.00
106	1	7	36	1	1	65.00	11080.81	1346.46	2.13	213.00	400.00	0.00	0.00	0.00	400.00
107	1	8	36	1	1	43.00	2000.00	1300.00	2.00	213.00	190.80	0.00	0.00	209.20	190.80
108	1	9	36	1	1	140.00	2000.00	1300.00	2.00	213.00	108.00	32.00	-6.40	285.60	114.40
109	1	10	36	1	1	172.00	2000.00	1300.00	2.00	213.00	114.34	57.60	-11.52	274.14	125.86
110	1	11	36	1	1	560.00	3928.26	1314.26	2.03	213.00	368.00	160.00	-32.00	0.00	400.00
111	1	12	36	1	1	1004.00	33299.21	1386.80	2.45	213.00	368.00	160.00	-32.00	0.00	400.00
112	1	1	37	1	1	859.00	53771.43	1409.44	2.74	213.00	368.00	160.00	-32.00	0.00	400.00
113	1	2	37	1	1	679.00	62298.12	1416.65	2.87	213.00	368.00	160.00	-32.00	0.00	400.00
114	1	3	37	1	1	1282.00	71500.00	1424.31	3.00	0.03	975.71	160.00	-32.00	0.00	1007.71
115	1	4	37	1	1	793.00	71500.00	1424.31	3.00	0.03	637.32	160.00	-32.00	0.00	669.32
116	1	5	37	1	1	364.00	62177.21	1416.55	2.87	213.00	370.88	145.60	-29.12	0.00	400.00
117	1	6	37	1	1	270.00	49332.16	1404.70	2.68	213.00	378.40	108.00	-21.60	0.00	400.00
118	1	7	37	1	1	319.00	38115.55	1392.73	2.52	213.00	374.48	127.60	-25.52	0.00	400.00
119	1	8	37	1	1	224.00	22910.22	1372.12	2.30	213.00	382.08	89.60	-17.92	0.00	400.00
120	1	9	37	1	1	753.00	36297.66	1390.79	2.49	213.00	368.00	160.00	-32.00	0.00	400.00
SUM =						66490.00	4781885.80	165752.86	300.75	20235.79	52344.11	14750.40	-2950.08	3838.70	55294.19
MAX =						3094.00	71500.00	1424.31	3.00	213.00	2581.40	160.00	0.00	317.54	2613.40
MIN =						43.00	300.00	1270.23	1.00	0.03	82.46	0.00	-32.00	0.00	82.46
PMAX=						101.00	2.00	1.00	1.00	3.00	101.00	1.00	35.00	49.00	101.00
AVG =						554.08	39849.05	1381.27	2.51	168.63	436.20	122.92	-24.58	31.99	460.78
PMIN=						107.00	49.00	49.00	49.00	1.00	49.00	35.00	1.00	1.00	49.00

RUN18 - SUMMARY OUTPUT

LDC NO= CODE=	PER DY	MO	YR	DM	RES NO.4 EDP STOR	SUMMARY BY PERIOD FLOOD=				RES NO.4 MIN DESI	RES NO.4 DEQ-SHOR	C.P. 213 FLOW REG
						4.110	4.130	4.120	4.090			
					RES NO.4 LEVEL	RES NO.4 CASE	RES NO.4 INFLOW	RES NO.4 OUTFLOW	RES NO.4 MIN DESI	RES NO.4 DEQ-SHOR		
1	1	10	27	1	643928.69	3.00	0.03	1222.00	1220.44	400.00	0.00	1220.44
2	1	11	27	1	643928.69	3.00	0.03	1268.00	1276.14	400.00	0.00	1276.14
3	1	12	27	1	643928.69	3.00	0.03	497.00	504.13	400.00	0.00	504.13
4	1	1	28	1	643928.69	3.00	0.03	733.00	737.76	400.00	0.00	737.76
5	1	2	28	1	643928.69	3.00	0.03	647.00	651.93	400.00	0.00	651.93
6	1	3	28	1	643928.69	3.00	0.03	1385.00	1391.08	400.00	0.00	1391.08
7	1	4	28	1	643928.69	3.00	0.03	999.00	1006.39	400.00	0.00	1006.39
8	1	5	28	1	643928.69	3.00	0.03	1365.00	1366.56	400.00	0.00	1366.56
9	1	6	28	1	643928.69	3.00	0.03	1308.00	1309.11	400.00	0.00	1309.11
10	1	7	28	1	641568.04	3.00	0.00	360.00	400.00	400.00	0.00	400.00
11	1	8	28	1	634383.94	2.99	0.00	282.00	400.00	400.00	0.00	400.00
12	1	9	28	1	621051.43	2.96	0.00	176.00	400.00	400.00	0.00	400.00
13	1	10	28	1	608241.89	2.94	0.00	193.00	400.00	400.00	0.00	400.00
14	1	11	28	1	600352.72	2.93	0.00	261.00	400.00	400.00	0.00	400.00
15	1	12	28	1	605675.53	2.94	0.00	481.00	400.00	400.00	0.00	400.00
16	1	1	29	1	607817.04	2.94	0.00	431.00	400.00	400.00	0.00	400.00
17	1	2	29	1	643928.69	3.00	0.03	1130.00	484.44	400.00	0.00	484.44
18	1	3	29	1	643928.69	3.00	0.03	1230.00	1236.08	400.00	0.00	1236.08
19	1	4	29	1	643928.69	3.00	0.03	810.00	817.39	400.00	0.00	817.39
20	1	5	29	1	636828.66	2.97	0.00	283.00	400.00	400.00	0.00	400.00
21	1	6	29	1	622787.68	2.99	0.00	163.00	400.00	400.00	0.00	400.00
22	1	7	29	1	607500.38	2.94	0.00	150.00	400.00	400.00	0.00	400.00
23	1	8	29	1	595751.48	2.93	0.00	208.00	400.00	400.00	0.00	400.00
24	1	9	29	1	608125.66	2.94	0.00	608.00	400.00	400.00	0.00	400.00
25	1	10	29	1	621202.78	2.96	0.00	614.00	400.00	400.00	0.00	400.00
26	1	11	29	1	630748.38	2.98	0.00	553.00	400.00	400.00	0.00	400.00
27	1	12	29	1	638791.85	2.99	0.00	524.00	400.00	400.00	0.00	400.00
28	1	1	30	1	643692.52	3.00	0.00	475.00	400.00	400.00	0.00	400.00
29	1	2	30	1	643928.69	3.00	0.03	760.00	760.85	400.00	0.00	760.85
30	1	3	30	1	643928.69	3.00	0.03	891.00	897.08	400.00	0.00	897.08
31	1	4	30	1	643928.69	3.00	0.03	491.00	498.39	400.00	0.00	498.39
32	1	5	30	1	643928.69	3.00	0.03	575.00	576.56	400.00	0.00	576.56
33	1	6	30	1	639055.30	2.96	0.00	317.00	400.00	400.00	0.00	400.00
34	1	7	30	1	621008.85	2.94	0.00	105.00	400.00	400.00	0.00	400.00
35	1	8	30	1	602254.76	2.94	0.00	94.00	400.00	400.00	0.00	400.00
36	1	9	30	1	582913.00	2.91	0.00	75.00	400.00	400.00	0.00	400.00
37	1	10	30	1	562933.91	2.87	0.00	76.00	400.00	400.00	0.00	400.00
38	1	11	30	1	545429.02	2.85	0.00	102.00	400.00	400.00	0.00	400.00
39	1	12	30	1	528620.58	2.82	0.00	124.00	400.00	400.00	0.00	400.00
40	1	1	31	1	514187.05	2.80	0.00	164.00	400.00	400.00	0.00	400.00
41	1	2	31	1	529202.65	2.82	0.00	669.00	400.00	400.00	0.00	400.00
42	1	3	31	1	558747.72	2.87	0.00	878.00	400.00	400.00	0.00	400.00

RUN18 (CONTINUED)

LOC NO=	PER	DY	MD	YR	DM	RES NO.4 EOP STOR	RES NO.4 LEVEL	RES NO.4 CASE	RES NO.4 INFLW	RES NO.4 OUTFLOW	RES NO.4 MTN DESI	RES NO.4 DEQ-SHOR	C.P. 213 FLOW REG
43	1	4	31	1	583042.99	2.91	0.00	804.00	400.00	400.00	400.00	0.00	400.00
44	1	5	31	1	581076.30	2.90	0.00	367.00	400.00	400.00	400.00	0.00	400.00
45	1	6	31	1	582309.47	2.90	0.00	420.00	400.00	400.00	400.00	0.00	400.00
46	1	7	31	1	570441.96	2.89	0.00	206.00	400.00	400.00	400.00	0.00	400.00
47	1	8	31	1	554801.10	2.86	0.00	145.00	400.00	400.00	400.00	0.00	400.00
48	1	9	31	1	535400.93	2.83	0.00	74.00	400.00	400.00	400.00	0.00	400.00
49	1	10	31	1	515896.48	2.80	0.00	80.00	400.00	400.00	400.00	0.00	400.00
50	1	11	31	1	499862.25	2.78	0.00	133.00	400.00	400.00	400.00	0.00	400.00
51	1	12	31	1	50490.85	2.78	0.00	475.00	400.00	400.00	400.00	0.00	400.00
52	1	1	32	1	506344.93	2.79	0.00	433.00	400.00	400.00	400.00	0.00	400.00
53	1	2	32	1	51462.17	2.80	0.00	530.00	400.00	400.00	400.00	0.00	400.00
54	1	3	32	1	557608.98	2.87	0.00	1106.00	400.00	400.00	400.00	0.00	400.00
55	1	4	32	1	564142.71	2.88	0.00	506.00	400.00	400.00	400.00	0.00	400.00
56	1	5	32	1	571144.40	2.89	0.00	513.00	400.00	400.00	400.00	0.00	400.00
57	1	6	32	1	563802.73	2.88	0.00	276.00	400.00	400.00	400.00	0.00	400.00
58	1	7	32	1	547248.44	2.85	0.00	130.00	400.00	400.00	400.00	0.00	400.00
59	1	8	32	1	527415.08	2.82	0.00	77.00	400.00	400.00	400.00	0.00	400.00
60	1	9	32	1	529139.57	2.82	0.00	429.00	400.00	400.00	400.00	0.00	400.00
61	1	10	32	1	578592.99	2.90	0.00	1205.00	400.00	400.00	400.00	0.00	400.00
62	1	11	32	1	578898.84	2.90	0.00	438.00	400.00	400.00	400.00	0.00	400.00
63	1	12	32	1	581516.13	2.90	0.00	526.00	400.00	400.00	400.00	0.00	400.00
64	1	1	33	1	589460.73	2.92	0.00	909.00	400.00	400.00	400.00	0.00	400.00
65	1	2	33	1	617952.24	2.96	0.00	1224.00	400.00	400.00	400.00	0.00	400.00
66	1	3	33	1	643928.69	3.00	0.03	928.00	807.23	400.00	400.00	0.00	807.23
67	1	4	33	1	643928.69	3.00	0.03	655.00	662.39	400.00	400.00	0.00	662.39
68	1	5	33	1	640826.34	3.00	0.00	348.00	400.00	400.00	400.00	0.00	400.00
69	1	6	33	1	629702.92	2.98	0.00	212.00	400.00	400.00	400.00	0.00	400.00
70	1	7	33	1	643928.69	3.00	0.03	1032.00	802.21	400.00	400.00	0.00	802.21
71	1	8	33	1	643928.69	3.00	0.03	1237.00	1238.20	400.00	400.00	0.00	1238.20
72	1	9	33	1	643928.69	3.00	0.03	524.00	523.94	400.00	400.00	0.00	523.94
73	1	10	33	1	642910.85	3.00	0.00	385.00	400.00	400.00	400.00	0.00	400.00
74	1	11	33	1	64052.96	2.99	0.00	354.00	400.00	400.00	400.00	0.00	400.00
75	1	12	33	1	643928.69	3.00	0.03	712.00	665.80	400.00	400.00	0.00	665.80
76	1	1	34	1	628161.85	2.98	0.00	139.00	400.00	400.00	400.00	0.00	400.00
77	1	2	34	1	631702.72	2.98	0.00	459.00	400.00	400.00	400.00	0.00	400.00
78	1	3	34	1	643928.69	3.00	0.03	1195.00	1002.07	400.00	400.00	0.00	1002.07
79	1	4	34	1	643928.69	3.00	0.03	550.00	557.39	400.00	400.00	0.00	557.39
80	1	5	34	1	638304.73	2.99	0.00	307.00	400.00	400.00	400.00	0.00	400.00
81	1	6	34	1	626109.21	2.97	0.00	194.00	400.00	400.00	400.00	0.00	400.00
82	1	7	34	1	612115.34	2.95	0.00	171.00	400.00	400.00	400.00	0.00	400.00
83	1	8	34	1	619126.57	2.96	0.00	513.00	400.00	400.00	400.00	0.00	400.00
84	1	9	34	1	620551.45	2.96	0.00	424.00	400.00	400.00	400.00	0.00	400.00
85	1	10	34	1	633991.03	2.98	0.00	620.00	400.00	400.00	400.00	0.00	400.00
86	1	11	34	1	643928.69	3.00	0.03	1219.00	1039.94	400.00	400.00	0.00	1039.94
87	1	12	34	1	643928.69	3.00	0.03	566.00	573.13	400.00	400.00	0.00	573.13
88	1	1	35	1	641391.26	3.00	0.00	354.00	400.00	400.00	400.00	0.00	400.00

RUN18 (CONTINUED)

LOC NO=	PER	BY	MO	YR	DM	RES NO.4 EOP STOR	RES NO.4 LEVEL	RES NO.4 CASE	RES NO.4 INFLOW	RES NO.4 OUTFLOW	RES NO.4 MIN DESI	RES NO.4 DEB-SHOR	C.P. 213 FLOW REG
89	1	2	35	1	643928.69	3.00	0.03	1044.00	1003.39	400.00	0.00	1003.39	
90	1	3	35	1	643928.69	3.00	0.03	763.00	769.08	400.00	0.00	769.08	
91	1	4	35	1	643928.69	3.00	0.03	545.00	552.39	400.00	0.00	552.39	
92	1	5	35	1	643286.42	3.00	0.00	388.00	400.00	400.00	0.00	400.00	
93	1	6	35	1	643928.69	3.00	0.03	1177.00	1167.32	400.00	0.00	1167.32	
94	1	7	35	1	634925.68	2.99	0.00	252.00	400.00	400.00	0.00	400.00	
95	1	8	35	1	621896.66	2.97	0.00	187.00	400.00	400.00	0.00	400.00	
96	1	9	35	1	608742.91	2.95	0.00	179.00	400.00	400.00	0.00	400.00	
97	1	10	35	1	637679.63	2.99	0.00	872.00	400.00	400.00	0.00	400.00	
98	1	11	35	1	643928.69	3.00	0.03	697.00	600.00	400.00	0.00	600.00	
99	1	12	35	1	643928.69	3.00	0.03	613.00	620.13	400.00	0.00	620.13	
100	1	1	36	1	639976.02	2.99	0.00	331.00	400.00	400.00	0.00	400.00	
101	1	2	36	1	643928.69	3.00	0.03	3094.00	3030.17	400.00	0.00	3030.17	
102	1	3	36	1	643928.69	3.00	0.03	820.00	826.08	400.00	0.00	826.08	
103	1	4	36	1	641629.18	3.00	0.00	354.00	400.00	400.00	0.00	400.00	
104	1	5	36	1	633605.55	2.98	0.00	268.00	400.00	400.00	0.00	400.00	
105	1	6	36	1	617361.41	2.96	0.00	126.00	400.00	400.00	0.00	400.00	
106	1	7	36	1	596842.92	2.93	0.00	65.00	400.00	400.00	0.00	400.00	
107	1	8	36	1	574941.28	2.89	0.00	43.00	400.00	400.00	0.00	400.00	
108	1	9	36	1	559467.94	2.87	0.00	140.00	400.00	400.00	0.00	400.00	
109	1	10	36	1	545404.53	2.85	0.00	172.00	400.00	400.00	0.00	400.00	
110	1	11	36	1	555141.96	2.86	0.00	560.00	400.00	400.00	0.00	400.00	
111	1	12	36	1	592543.71	2.92	0.00	1004.00	400.00	400.00	0.00	400.00	
112	1	1	37	1	621002.35	2.96	0.00	859.00	400.00	400.00	0.00	400.00	
113	1	2	37	1	636760.06	2.99	0.00	679.00	400.00	400.00	0.00	400.00	
114	1	3	37	1	643928.69	3.00	0.03	1282.00	1171.39	400.00	0.00	1171.39	
115	1	4	37	1	643928.69	3.00	0.03	793.00	800.39	400.00	0.00	800.39	
116	1	5	37	1	641810.38	3.00	0.00	364.00	400.00	400.00	0.00	400.00	
117	1	6	37	1	634139.12	2.98	0.00	270.00	400.00	400.00	0.00	400.00	
118	1	7	37	1	629252.06	2.98	0.00	319.00	400.00	400.00	0.00	400.00	
119	1	8	37	1	618496.39	2.96	0.00	224.00	400.00	400.00	0.00	400.00	
120	1	9	37	1	639498.24	2.99	0.00	753.00	400.00	400.00	0.00	400.00	
SUM = 73274909.54							353.79	1.08	66490.00	66766.96	48000.00	0.00	66766.96
MAX = 643928.69							3.00	0.03	3094.00	3030.17	400.00	0.00	3030.17
MIN = 499862.25							2.78	0.00	43.00	400.00	400.00	0.00	400.00
PMAX = 4.00							4.00	1.00	101.00	101.00	1.00	1.00	101.00
AVG = 610624.25							2.95	0.01	554.08	556.39	400.00	0.00	556.39
PMIN = 50.00							50.00	10.00	107.00	10.00	1.00	1.00	10.00

RUN19 - SUMMARY OUTPUT

YIELD DETERMINED BY OPTIMIZATION  
 RES-LOC TYPE-OPT OPT. VALUES  
 4 257. 239. 245. 257. 280.  
 2 292. 303. 315. 309. 286.  
 NEW CRITICAL PERIOD= -33.046 0.050 0.004

\*OPSUM  
 T1 SINGLE RESERVOIR WATER SUPPLY SYSTEM  
 T2 \* OPTIMIZATION OF MONTHLY DESIRED FLOW \* RUN 19  
 T3 MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)  
 J7 4.20 0.00 0.00 0.00 0.00 2.00 6.00 0.05

LOCATION	TRIAL	ERROR RATIO	ERROR (ST6)	NUM. PERIODS	ROUTING ST PER	AVG INF.	AVG REL	AVG SPILL	AVG TOP. CON. STOR.	RATIO STG/B	DRAM PER LENGTH	DRAM AV REL LOC=	ANNUAL DES Q	ANNUAL RED Q	ANNUAL DIV	
SINGLE RES	1	2.3803	-165430.	27	1929.10	377.	518.	48.	71500.	0.1731	1930.06	18.	482.	477.	100.	0.
SINGLE RES	2	0.3568	-24798.	27	1929.10	377.	414.	89.	71500.	0.1731	1930.06	8.	326.	329.	100.	0.
SINGLE RES	3	0.0041	-283.	27	1929.10	377.	397.	123.	71500.	0.1731	1930.07	7.	270.	278.	100.	0.
SINGLE RES	1	0.0041	-283.	120	1927.10	554.	556.	277.	71500.	0.1731	1930.07	7.	270.	278.	100.	0.

RUN19 (CONTINUED)

LOC NO- CODE=	SUMMARY BY PERIOD FLOOD= 4										RES NO.4 REP-SHOR	RES NO.4 REP-SHOR	C.P. 213 FLOW REG
	PER DY	NO	VR	DN	RES NO.4 EDP STOR	RES NO.4 CASE	RES NO.4 INFLOW	RES NO.4 OUTFLOW	RES NO.4 MIN DEST	RES NO.4 DEQ-SHOR			
1	1	10	27	1	571500.00	0.03	1222.00	1221.09	256.67	0.00	100.00	0.00	213.
2	1	11	27	1	571500.00	0.03	1268.00	1272.75	239.17	0.00	100.00	0.00	213.040
3	1	12	27	1	571500.00	0.03	497.00	501.16	233.34	0.00	100.00	0.00	501.16
4	1	1	28	1	571500.00	0.03	733.00	735.78	245.01	0.00	100.00	0.00	735.78
5	1	2	28	1	571500.00	0.03	647.00	649.88	256.67	0.00	100.00	0.00	649.88
6	1	3	28	1	571500.00	0.03	1385.00	1388.55	280.01	0.00	100.00	0.00	1388.55
7	1	4	28	1	571500.00	0.03	999.00	1003.32	291.68	0.00	100.00	0.00	1003.32
8	1	5	28	1	571500.00	0.03	1365.00	1365.91	303.34	0.00	100.00	0.00	1365.91
9	1	6	28	1	571500.00	0.03	1308.00	1308.65	315.01	0.00	100.00	0.00	1308.65
10	1	7	28	1	571500.00	0.03	360.00	360.94	320.84	0.00	100.00	0.00	360.94
11	1	8	28	1	569871.59	0.00	282.00	309.18	309.18	0.00	100.00	0.00	309.18
12	1	9	28	1	563333.39	0.00	176.00	285.84	285.84	0.00	100.00	0.00	285.84
13	1	10	28	1	559368.61	0.00	193.00	256.67	256.67	0.00	100.00	0.00	256.67
14	1	11	28	1	560913.93	0.00	261.00	239.17	239.17	0.00	100.00	0.00	239.17
15	1	12	28	1	571500.00	0.03	481.00	312.75	233.34	0.00	100.00	0.00	312.75
16	1	1	29	1	571500.00	0.03	431.00	433.78	245.01	0.00	100.00	0.00	433.78
17	1	2	29	1	571500.00	0.03	1130.00	1132.98	256.67	0.00	100.00	0.00	1132.98
18	1	3	29	1	571500.00	0.03	1230.00	1233.55	280.01	0.00	100.00	0.00	1233.55
19	1	4	29	1	571500.00	0.03	810.00	814.32	291.68	0.00	100.00	0.00	814.32
20	1	5	29	1	570304.69	0.00	283.00	303.34	303.34	0.00	100.00	0.00	303.34
21	1	6	29	1	561295.57	0.00	163.00	315.01	315.01	0.00	100.00	0.00	315.01
22	1	7	29	1	550838.62	0.00	150.00	320.84	320.84	0.00	100.00	0.00	320.84
23	1	8	29	1	544649.31	0.00	208.00	309.18	309.18	0.00	100.00	0.00	309.18
24	1	9	29	1	563817.57	0.00	608.00	285.84	285.84	0.00	100.00	0.00	285.84
25	1	10	29	1	571500.00	0.03	614.00	488.19	256.67	0.00	100.00	0.00	488.19
26	1	11	29	1	571500.00	0.03	553.00	557.75	239.17	0.00	100.00	0.00	557.75
27	1	12	29	1	571500.00	0.03	524.00	528.16	233.34	0.00	100.00	0.00	528.16
28	1	1	30	1	571500.00	0.03	475.00	477.78	245.01	0.00	100.00	0.00	477.78
29	1	2	30	1	571500.00	0.03	760.00	762.98	256.67	0.00	100.00	0.00	762.98
30	1	3	30	1	571500.00	0.03	891.00	894.55	280.01	0.00	100.00	0.00	894.55
31	1	4	30	1	571500.00	0.03	491.00	495.32	291.68	0.00	100.00	0.00	495.32
32	1	5	30	1	571500.00	0.03	575.00	575.91	303.34	0.00	100.00	0.00	575.91
33	1	6	30	1	571500.00	0.03	317.00	317.65	315.01	0.00	100.00	0.00	317.65
34	1	7	30	1	558281.85	0.00	105.00	320.84	320.84	0.00	100.00	0.00	320.84
35	1	8	30	1	545084.53	0.00	94.00	309.18	309.18	0.00	100.00	0.00	309.18
36	1	9	30	1	532536.96	0.00	75.00	285.84	285.84	0.00	100.00	0.00	285.84
37	1	10	30	1	521398.48	0.00	76.00	256.67	256.67	0.00	100.00	0.00	256.67
38	1	11	30	1	513342.24	0.00	102.00	239.17	239.17	0.00	100.00	0.00	239.17
39	1	12	30	1	506678.56	0.00	124.00	233.34	233.34	0.00	100.00	0.00	233.34
40	1	1	31	1	501717.17	0.00	164.00	245.01	245.01	0.00	100.00	0.00	245.01
41	1	2	31	1	524665.60	0.00	669.00	256.67	256.67	0.00	100.00	0.00	256.67
42	1	3	31	1	561586.91	0.00	878.00	280.01	280.01	0.00	100.00	0.00	280.01







RUN20 - SUMMARY OUTPUT

YIELD DETERMINED BY OPTIMIZATION  
 RES-LOC TYPE-OPT OPT. VALUES  
 4 287. 280. 266. 258. 266.  
 2 258. 251. 244. 237. 230.  
 NEW CRITICAL PERIOD= -33.046 0.050 0.039

\*OPSUM  
 T1 SINGLE RESERVOIR WATER SUPPLY SYSTEM RUN 20  
 T2 \*OPTIMIZATION OF PERIOD VARYING DESIRED FLOWS+  
 T3 MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)  
 J7 4.20 0.00 0.00 0.00 0.00 2.00 6.00 0.05

LOCATION	TRIAL	ERROR RATIO	ERROR (ST6)	NUM. PERIODS	ROUTING ST PER	AVG INF.	AVG REL	AVG SPILL	TOP. CON. STOR.	RATIO ST6/Q	ST PER LENGTH	DRAM AV REL	DRAM LENGTH	ANNUAL DES Q	ANNUAL REP Q	ANNUAL DIV
SINGLE RES	1	0.7691	-53450.	27	1929.10	377.	434.	75.	71500.	0.1731	1930.06	8.	385.	371.	100.	0.
SINGLE RES	2	0.0392	-2725.	27	1929.10	377.	390.	133.	71500.	0.1731	1930.07	7.	276.	266.	100.	0.
SINGLE RES	1	0.0392	-2725.	120	1927.10	554.	556.	308.	71500.	0.1731	1930.07	7.	276.	259.	100.	0.





RUN20 (CONTINUED)

LOC NO=	PER DY	MO	YR	DW	RES NO. 4 EDP STOR	RES NO. 4 CASE	RES NO. 4 INFLOW	RES NO. 4 OUTFLOW	RES NO. 4 MIN DESI	RES NO. 4 DEQ-SHOR	RES NO. 4 MTN REQU	RES NO. 4 REQ-SHOR	C.P. 213 FLOW RES
91	1	4	35	1	571500.00	0.03	545.00	549.32	236.86	0.00	100.00	0.00	549.32
92	1	5	35	1	571500.00	0.03	388.00	388.91	240.45	0.00	100.00	0.00	388.91
93	1	6	35	1	571500.00	0.03	1177.00	1177.65	244.04	0.00	100.00	0.00	1177.65
94	1	7	35	1	571500.00	0.03	252.00	252.94	247.63	0.00	100.00	0.00	252.94
95	1	8	35	1	568917.63	0.00	187.00	229.69	229.69	0.00	100.00	0.00	229.69
96	1	9	35	1	566113.01	0.00	179.00	226.10	226.10	0.00	100.00	0.00	226.10
97	1	10	35	1	571500.00	0.03	872.00	783.51	215.33	0.00	100.00	0.00	783.51
98	1	11	35	1	571500.00	0.03	697.00	701.75	222.51	0.00	100.00	0.00	701.75
99	1	12	35	1	571500.00	0.03	613.00	617.16	218.92	0.00	100.00	0.00	617.16
100	1	1	36	1	571500.00	0.03	331.00	333.78	222.51	0.00	100.00	0.00	333.78
101	1	2	36	1	571500.00	0.03	3094.00	3096.88	229.69	0.00	100.00	0.00	3096.88
102	1	3	36	1	571500.00	0.03	820.00	823.55	233.28	0.00	100.00	0.00	823.55
103	1	4	36	1	571500.00	0.03	354.00	358.32	236.86	0.00	100.00	0.00	358.32
104	1	5	36	1	571500.00	0.03	268.00	268.91	233.28	0.00	100.00	0.00	268.91
105	1	6	36	1	564726.68	0.00	126.00	240.45	240.45	0.00	100.00	0.00	240.45
106	1	7	36	1	553546.93	0.00	65.00	247.63	247.63	0.00	100.00	0.00	247.63
107	1	8	36	1	541216.85	0.00	43.00	244.04	244.04	0.00	100.00	0.00	244.04
108	1	9	36	1	534383.76	0.00	140.00	254.81	254.81	0.00	100.00	0.00	254.81
109	1	10	36	1	529039.13	0.00	172.00	258.40	258.40	0.00	100.00	0.00	258.40
110	1	11	36	1	546740.73	0.00	560.00	265.58	265.58	0.00	100.00	0.00	265.58
111	1	12	36	1	571500.00	0.03	1004.00	604.92	236.86	0.00	100.00	0.00	604.92
112	1	1	37	1	571500.00	0.03	859.00	861.78	240.45	0.00	100.00	0.00	861.78
113	1	2	37	1	571500.00	0.03	679.00	681.98	244.04	0.00	100.00	0.00	681.98
114	1	3	37	1	571500.00	0.03	1282.00	1285.55	258.40	0.00	100.00	0.00	1285.55
115	1	4	37	1	571500.00	0.03	793.00	797.32	261.99	0.00	100.00	0.00	797.32
116	1	5	37	1	571500.00	0.03	344.00	344.91	254.81	0.00	100.00	0.00	344.91
117	1	6	37	1	571500.00	0.03	270.00	270.65	261.99	0.00	100.00	0.00	270.65
118	1	7	37	1	571500.00	0.03	319.00	319.94	265.58	0.00	100.00	0.00	319.94
119	1	8	37	1	569427.44	0.00	224.00	258.40	258.40	0.00	100.00	0.00	258.40
120	1	9	37	1	571500.00	0.03	753.00	718.13	254.81	0.00	100.00	0.00	718.13
					SUM = 67837021.32	2.46	66490.00	66665.64	29740.87	0.00	12000.00	0.00	66665.64
					MAX = 571500.00	0.03	3094.00	3096.88	287.11	0.00	100.00	0.00	3096.88
					MIN = 499274.66	0.00	43.00	218.92	215.33	0.00	100.00	0.00	218.92
					PMAX = 70.00	1.00	101.00	101.00	1.00	1.00	1.00	1.00	101.00
					AVG = 565308.51	0.02	554.08	555.55	247.84	0.00	100.00	0.00	555.55
					PMIN = 40.00	12.00	107.00	59.00	57.00	1.00	1.00	1.00	59.00

RUN21 - SUMMARY OUTPUT

YIELD DETERMINED BY OPTIMIZATION  
 RES-LOC TYPE-OPT OPT. VALUES  
 4 3 200.  
 NEW CRITICAL PERIOD= -102.115 0.050 0.024

\*DPSUM  
 T1 SINGLE RESERVOIR WATER SUPPLY SYSTEM  
 T2 \*OPTIMIZATION OF REQUIRED FLOWS\* RUN 21  
 T3 MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)

J7 4.30 0.00 0.00 0.00 0.00 0.00 2.00 6.00 0.05

LOCATION	TRIAL	ERROR RATIO	ERROR (ST6)	NUM. PERIODS	ROUTING ST PER	AVS INF.	AVS REL SPILL	AVS TOP. CON STOR.	RATIO ST6/Q	DRAM LENGTH	DRAM AV REL	DRAM LOG=	ANNUAL DES Q	ANNUAL REG Q	ANNUAL DIV	
SINGLE RES	1	0.0239	1700.	27	1929.10	377.	417.	63.	71500.	0.1774	1930.06	18.	331.	400.	200.	0.
SINGLE RES	1	0.0239	1700.	120	1927.10	554.	556.	164.	71500.	0.1774	1936.04	7.	331.	400.	200.	0.









RUN22 - SUMMARY OUTPUT

YIELD DETERMINED BY OPTIMIZATION  
 RES-LOC TYPE-OPT OPT. VALUES  
 4 144. 144. 180. 173. 158.  
 144. 144. 144. 144.  
 NEW CRITICAL PERIOD= -33.046 0.050 0.043

\*OPSUM  
 T1 SINGLE RESERVOIR WATER SUPPLY SYSTEM RUN 22  
 T2 \*OPTIMIZATION OF MONTHLY DIVERSION\*  
 T3 MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)

J7 4.40 0.00 0.00 0.00 0.00 0.00 2.00 6.00 0.05

LOCATION	TRIAL	ERROR RATIO	ERROR (STG)	NUM. PERIODS	ROUTING ST PER	AVG INF.	AVG REL	SPILL	AVG TDP.COM	STOR.	RATIO	STG/ST	DRAM PER LENGTH	DRAM AV REL	DRAM LOC=	ANNUAL DES Q	ANNUAL REC Q	ANNUAL DIV
SINGLE RES	1	0.3489	-24247.	27	1929.10	159.	191.	191.	71500.	0.1731	1930.07	7.	106.	0.	0.	0.	217.	
SINGLE RES	2	0.1611	-11197.	27	1929.10	197.	221.	221.	71500.	0.1731	1930.07	7.	114.	0.	0.	0.	179.	
SINGLE RES	3	0.0819	-5891.	27	1929.10	213.	234.	234.	71500.	0.1731	1930.07	7.	117.	0.	0.	0.	163.	
SINGLE RES	4	0.0434	-3018.	27	1929.10	221.	240.	240.	71500.	0.1731	1930.07	7.	118.	0.	0.	0.	158.	
SINGLE RES	1	0.0434	-3018.	120	1927.10	398.	400.	391.	71500.	0.1731	1930.07	7.	118.	0.	0.	0.	156.	







RUN23 - SUMMARY OUTPUT

YIELD DETERMINED BY OPTIMIZATION  
 RES-LOC TYPE-OPT OPT. VALUES  
 NEW CRITICAL PERIOD= -33.046 0.050 0.024

\*OPSUM  
 T1 SINGLE RESERVOIR WATER SUPPLY SYSTEM  
 T2 OPTIMIZATION OF ALL YIELDS\* RUN 23  
 T3 MONTHLY FLOW 1927-1937 RECORD (120 PERIODS)

J7 4.90 0.00 0.00 0.00 0.00 2.00 6.00 0.05

LOCATION	TRIAL	ERROR RATIO	ERROR (ST6)	NUM. PERIODS	ROUTING ST PER	AVG INF.	AVG REL	AVG SPILL	AVG TOP.COM	RATIO ST6/Q	DRAM PER LENGTH	DRAM AV	DRAM REL	ANNUAL DES Q	ANNUAL REQ Q	ANNUAL DIV
SINGLE RES	1	0.2303	-16399.	27	1929.10	159.	190.	190.	71500.	0.1774	1930.07	7.	92.	0.	0.	217.
SINGLE RES	2	0.1006	-7164.	27	1929.10	186.	212.	212.	71500.	0.1774	1930.07	7.	97.	0.	0.	190.
SINGLE RES	3	0.0638	-4540.	27	1929.10	197.	221.	221.	71500.	0.1774	1930.07	7.	102.	0.	0.	179.
SINGLE RES	4	0.0578	-4119.	27	1929.10	204.	226.	226.	71500.	0.1774	1930.07	7.	108.	0.	0.	173.
SINGLE RES	5	0.6599	46982.	27	1929.10	360.	361.	361.	71500.	0.1774	1930.07	6.	147.	0.	0.	17.
SINGLE RES	6	0.1357	9663.	27	1929.10	252.	267.	267.	71500.	0.1774	1930.07	7.	125.	0.	0.	124.
SINGLE RES	7	0.0239	1700.	27	1929.10	227.	245.	245.	71500.	0.1774	1930.07	7.	118.	0.	0.	150.
SINGLE RES	1	0.0239	1700.	120	1927.10	404.	406.	397.	71500.	0.1774	1930.07	7.	118.	0.	0.	150.









RUN24 - SUMMARY OUTPUT

RESERVOIR OPERATION BY PERIOD

CUM TIME= 1

\*ROPER 1

RES NO=	1	2	3
TITLE=	RES1	RES2	RES3
DIV Q	0.	0.	0.
INFLOW	268.	305.	100.
OUTFLOW	171.	193.	54.
EDP STOR	3330000.	3760000.	1540000.
CASE=	0.03	0.03	0.03
LEVEL	5.000	5.000	5.000
PCT FC	0.00	0.00	0.00
EQ LEVEL	5.000	5.000	5.000

CUM TIME= 5

\*ROPER 5

RES NO=	1	2	3
TITLE=	RES1	RES2	RES3
DIV Q	0.	18.	7.
INFLOW	21.	13.	12.
OUTFLOW	21.	127.	12.
EDP STOR	3330000.	3322384.	1540000.
CASE=	0.03	4.00	0.03
LEVEL	5.000	4.005	5.000
PCT FC	0.00	0.00	0.00
EQ LEVEL	5.000	4.005	5.000

CUM TIME= 2

\*ROPER 2

RES NO=	1	2	3
TITLE=	RES1	RES2	RES3
DIV Q	0.	0.	0.
INFLOW	230.	345.	78.
OUTFLOW	230.	345.	78.
EDP STOR	3330000.	3760000.	1540000.
CASE=	0.03	0.03	0.03
LEVEL	5.000	5.000	5.000
PCT FC	0.00	0.00	0.00
EQ LEVEL	5.000	5.000	5.000

CUM TIME= 6

\*ROPER 6

RES NO=	1	2	3
TITLE=	RES1	RES2	RES3
DIV Q	0.	28.	9.
INFLOW	7.	-19.	3.
OUTFLOW	7.	94.	58.
EDP STOR	3330000.	3021130.	1393961.
CASE=	0.03	4.00	4.00
LEVEL	5.000	3.321	3.321
PCT FC	0.00	0.00	0.00
EQ LEVEL	5.000	3.833	3.321

CUM TIME= 3

\*ROPER 3

RES NO=	1	2	3
TITLE=	RES1	RES2	RES3
DIV Q	0.	0.	0.
INFLOW	211.	317.	66.
OUTFLOW	211.	317.	66.
EDP STOR	3330000.	3760000.	1540000.
CASE=	0.03	0.03	0.03
LEVEL	5.000	5.000	5.000
PCT FC	0.00	0.00	0.00
EQ LEVEL	5.000	5.000	5.000

CUM TIME= 7

\*ROPER 7

RES NO=	1	2	3
TITLE=	RES1	RES2	RES3
DIV Q	0.	21.	7.
INFLOW	4.	71.	4.
OUTFLOW	90.	114.	25.
EDP STOR	3104595.	2911368.	1340328.
CASE=	0.05	4.00	4.00
LEVEL	3.833	3.071	3.071
PCT FC	0.00	0.00	0.00
EQ LEVEL	3.833	3.646	3.071

CUM TIME= 4

\*ROPER 4

RES NO=	1	2	3
TITLE=	RES1	RES2	RES3
DIV Q	0.	9.	6.
INFLOW	20.	22.	20.
OUTFLOW	20.	71.	20.
EDP STOR	3330000.	3630400.	1540000.
CASE=	0.03	4.00	0.03
LEVEL	5.000	4.705	5.000
PCT FC	0.00	0.00	0.00
EQ LEVEL	5.000	4.705	5.000

CUM TIME= 8

\*ROPER 8

RES NO=	1	2	3
TITLE=	RES1	RES2	RES3
DIV Q	0.	7.	2.
INFLOW	4.	93.	8.
OUTFLOW	98.	63.	11.
EDP STOR	2851816.	2992730.	1332292.
CASE=	0.05	4.00	0.00
LEVEL	3.646	3.256	3.034
PCT FC	0.00	0.00	0.00
EQ LEVEL	3.646	3.550	3.034

RUN24 (CONTINUED)

CUM TIME= 9

\*ROPER 9

RES NO=	1	2	3
TITLE=	RES1	RES2	RES3
DIV Q	0.	0.	0.
INFLOW	4.	56.	11.
OUTFLOW	54.	52.	11.
EOP STOR	2722535.3002779.	1332292.	
CASE=	0.05	4.00	0.00
LEVEL	3.550	3.279	3.034
PCT FC	0.00	0.00	0.00
EQ LEVEL	3.550	3.483	3.034

CUM TIME= 10

\*ROPER 10

RES NO=	1	2	3
TITLE=	RES1	RES2	RES3
DIV Q	0.	0.	0.
INFLOW	6.	43.	11.
OUTFLOW	40.	53.	11.
EOP STOR	2632611.2974853.	1332292.	
CASE=	0.05	4.00	0.00
LEVEL	3.483	3.216	3.034
PCT FC	0.00	0.00	0.00
EQ LEVEL	3.483	3.418	3.034

CUM TIME= 11

\*ROPER 11

RES NO=	1	2	3
TITLE=	RES1	RES2	RES3
DIV Q	0.	0.	0.
INFLOW	17.	58.	20.
OUTFLOW	50.	15.	11.
EOP STOR	2543730.3090518.	1355059.	
CASE=	0.05	4.00	0.00
LEVEL	3.418	3.478	3.140
PCT FC	0.00	0.00	0.00
EQ LEVEL	3.418	3.433	3.140

CUM TIME= 12

\*ROPER 12

RES NO=	1	2	3
TITLE=	RES1	RES2	RES3
DIV Q	0.	0.	0.
INFLOW	15.	8.	24.
OUTFLOW	0.	14.	11.
EOP STOR	2580018.3074793.	1386508.	
CASE=	0.00	0.00	0.00
LEVEL	3.444	3.443	3.286
PCT FC	0.00	0.00	0.00
EQ LEVEL	3.444	3.444	3.286

CUM TIME= 13

\*ROPER 13

RES NO=	1	2	3
TITLE=	RES1	RES2	RES3
DIV Q	0.	0.	0.
INFLOW	47.	71.	34.
OUTFLOW	47.	44.	11.
EOP STOR	2579439.3147689.	1448112.	
CASE=	0.05	4.00	0.00
LEVEL	3.444	3.608	3.573
PCT FC	0.00	0.00	0.00
EQ LEVEL	3.444	3.484	3.573

CUM TIME= 14

\*ROPER 14

RES NO=	1	2	3
TITLE=	RES1	RES2	RES3
DIV Q	0.	0.	0.
INFLOW	59.	30.	31.
OUTFLOW	0.	20.	22.
EOP STOR	2732367.3174735.	1469018.	
CASE=	0.00	4.00	4.00
LEVEL	3.557	3.670	3.670
PCT FC	0.00	0.00	0.00
EQ LEVEL	3.557	3.585	3.670

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER Training Document No. 20	2. GOVT ACCESSION NO. AD-A158 888	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Water Supply Simulation Using HEC-5	5. TYPE OF REPORT & PERIOD COVERED	
	6. PERFORMING ORG. REPORT NUMBER	
7. AUTHOR(s)	8. CONTRACT OR GRANT NUMBER(s)	
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Corps of Engineers Hydrologic Engineering Center 609 Second Street, Davis, California 95616	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS	
11. CONTROLLING OFFICE NAME AND ADDRESS	12. REPORT DATE August 1985	
	13. NUMBER OF PAGES 144	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)	15. SECURITY CLASS. (of this report)  UNCLASSIFIED	
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE	
16. DISTRIBUTION STATEMENT (of this Report)  Approved for Public Release. Distribution Unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)  Water supply, reservoir, reservoir simulation, computer model, reservoir system analysis, optimization.		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  This document is intended to assist users of computer program HEC-5 who are engaged in modeling surface water systems for water supply. Using a single reservoir operation for illustration, the document describes the input data needed to utilize a variety of analysis capabilities available in HEC-5. Input data for multiple reservoir systems are similar to those for single reservoirs but include certain data which specify the system linkages and operation. A description of this information is also included. Two Appendices are part of the document. One describes HEC-5 automatic (Continued)		

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20. Abstract (Continued)

reservoir sizing and the other provides program output for the examples used in the text.

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