TEMPORARY WATER STORAGE CAPABILITIES STUDY

Task 21
of the
Zero-Offsite Water-Discharge Study

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EXECUTIVE SUMMARY

This report is one of several studies being conducted for, and in the development of, a Zero-Offsite Water-Discharge Plan for Rocky Flats Plant (RFP) in response to Item C.7 of the Agreement in Principle between the Colorado Department of Health (CDH) and the U.S. Department of Energy (DOE)(DOE and State of Colorado, 1989). The CDH/DOE Agreement Item C.7 states "Source Reduction and Zero Discharges Study: Conduct a study of all available methods to eliminate Rocky Flats discharges to the environment including surface waters and ground water. This review should include a source reduction review."

Specifically, this report addresses important issues related to the collection and temporary storage of surface-water runoff and ground water that is within the boundaries of the RFP site. Currently, there are ten on-channel ponds and two off-channel ponds that collect RFP surface-water runoff from approximately 2.25 mi^2 of the 10 mi^2 RFP site. Three terminal ponds (A-4, B-5, and C-2) are not adequately sized to retain the amount of water that is expected to runoff as a result of the 100-year, 72-hour storm as determined from the previous Task 6 study (ASI, 1991a) and this study. Ponds A-4 and B-5 are on-channel which means the water in these ponds may be subject to Colorado Department of Health (CDH) water-quality stream standards since these waters would be considered U.S. waters. This study examines the feasibility of temporarily storing ground water, surface water, and sanitary treatment plant (STP) effluent in off-channel and on-channel ponds. Off-channel ponds would not be considered U.S. waters and would not be subject to CDH water-quality standards. The feasibility of storing surface-water runoff in Great Western Reservoir also was examined.

Operational studies were performed for sizing temporary water-storage reservoirs to store selected combinations of STP effluent for various RFP personnel populations, surface-water runoff from areas of suspected contamination, ground-water discharge, and precipitation falling directly on the reservoir. The reservoir sizing was done for combinations of water-use demands consisting of complete STP effluent reuse, makeup water from surface-water runoff, downstream release of treated surface-water runoff for water rights, evaporation from the reservoir and enhanced spray evaporation.

Sixty-seven operational-study alternatives were examined. Seven alternatives for off-channel storage of STP effluent separate from surface-water runoff were assessed. Twelve alternatives for off-channel storage of surface-water runoff were assessed. Two of these 12 alternatives assumed that the STP effluent would be mixed with the surface-water runoff in a single off-channel reservoir. Fourteen alternatives for storage of surface-water runoff in Great Western Reservoir were assessed. These 14 alternatives assumed that an off-channel reservoir for STP effluent would be constructed and that STP effluent would not be discharged into Great Western Reservoir. Thirty-four alternatives (12 each for Ponds A-4 and B-5 and 10 for Pond C-2) for storage of surface-water runoff in the Terminal Ponds were assessed. Four of these 34 alternatives assumed that STP effluent would be mixed with the surface-water runoff in either or both Ponds A-4 and B-5. In general the 100-yr, 72-hr storm runoff was not included in all the alternatives. However, this storm runoff was included in 13 of the 67 alternatives.

Results of the reservoir operational studies are presented in the report. A preferred alternative was selected for each of the four generalistic alternatives: (1) Off-channel storage of STP effluent; (2) Off-channel storage using the existing terminal ponds for collection of surface-water runoff, and pumping this surface water to an off-channel temporary water-storage reservoir; (3) Storage in Great Western Reservoir; and (4) Storage in the three terminal ponds themselves. Additionally, a preferred alternative was selected for each of three sub-alternatives within the four generalistic alternatives. These three sub-alternatives were for two RFP population scenarios (3000 and 9000 personnel) and the plant shutdown case where no recycle water would be needed. The table below summarizes the nine preferred alternatives depending upon future conditions at the RFP. Because off-channel storage of STP effluent is part of all the preferred alternatives, it has been included within each preferred alternative to give a set of nine preferred alternatives. In addition to the alternative description, the summary table also includes the estimated construction and annual OM & R costs for each of the nine preferred alternatives.

SUMMARY OF PREFERRED ALTERNATIVES

GENERALIZED ALTERNATIVE	RFP PERSONNEL	ALT. NOS.	PREFERRED ALTERNATIVE DESCRIPTION	CONSTR. COSTS (Million $)	OM & R COSTS (Million $/Yr)
NEW	3,000	0b and 1a	Off-channel storage of STP effluent (114 ac-ft/yr) with 108 ac-ft/yr reuse, off-channel storage of surface-water (125.3 ac-ft/yr) and ground water (10 ac-ft/yr), annual makeup water demand (4.73 ac-ft/yr). STP reservoir = 135 ac-ft, Runoff reservoir = 3200 ac-ft.	8.2	1.3
OFF-CHANNEL	9,000	0f and 1d	Off-channel storage of STP effluent (340 ac-ft/yr) with 325 ac-ft/yr reuse, off-channel storage of surface-water (125.3 ac-ft/yr) and ground water (10 ac-ft/yr), annual makeup water demand (140 ac-ft/yr). STP reservoir = 410 ac-ft, Runoff reservoir = 325 ac-ft.	17.5	2.7
RESERVOIR	Shutdown	0a and 1j	Off-channel storage of STP effluent (114 ac-ft/yr) with no reuse, off-channel storage of surface-water (125.3 ac-ft/yr) and ground water (10 ac-ft/yr), no makeup water and spray evaporation (246.2 ac-ft/yr). STP reservoir = 1730 ac-ft, Runoff reservoir = 1900 ac-ft.	11.5	1.7
GREAT	3,000	0b and 2h	Off-channel storage of STP effluent (114 ac-ft/yr) with 108 ac-ft/yr reuse, off-channel storage of surface-water (139.8 ac-ft/yr) and ground water (10 ac-ft/yr), annual makeup water demand (4.73 ac-ft/yr). STP reservoir = 135 ac-ft, Diversion channel around Great Western Reservoir.	77.7	11.7
WESTERN	9,000	0f and 2k	Off-channel storage of STP effluent (340 ac-ft/yr) with 325 ac-ft/yr reuse, off-channel storage of surface-water (139.8 ac-ft/yr) and ground water (10 ac-ft/yr), annual makeup water demand (140 ac-ft/yr) with downstream releases for water rights (111.6 ac-ft/yr). STP reservoir = 410 ac-ft, Diversion channel around Great Western Reservoir.	104.5	15.7
RESERVOIR	Shutdown	0a and 2l	Off-channel storage of STP effluent (114 ac-ft/yr) with no reuse, off-channel storage of surface-water (139.8 ac-ft/yr) and ground water (10 ac-ft/yr), no makeup water. STP reservoir = 1730 ac-ft, Diversion channel around Great Western Reservoir.	76.3	11.4
TERMINAL	3,000	0b and 3c	Off-channel storage of STP effluent (114 ac-ft/yr) with 108 ac-ft/yr reuse, terminal pond storage of surface-water (125.3 ac-ft/yr) and ground water (10 ac-ft/yr), annual makeup water demand (4.73 ac-ft/yr) and downstream releases for water rights (99.8 ac-ft/yr). STP reservoir = 135 ac-ft, Raise Pond A-4 by 31 ft, Pond B-5 by 16 ft and Pond C-2 by 10 ft.	18.6	2.8
PONDS	9,000	0f and 3d	Off-channel storage of STP effluent (340 ac-ft/yr) with 325 ac-ft/yr reuse, terminal pond storage of surface-water (125.3 ac-ft/yr) and ground water (10 ac-ft/yr), annual makeup water demand (140 ac-ft/yr). STP reservoir = 410 ac-ft, No increase in pond sizes.	13.9	2.1
	Shutdown	0a and 3f	Off-channel storage of STP effluent (114 ac-ft/yr) with no reuse, terminal pond storage of surface-water (125.3 ac-ft/yr) and ground water (10 ac-ft/yr), no makeup water and downstream releases for water rights (99.8 ac-ft/yr). STP reservoir = 1730 ac-ft, raise Pond A-4 by 17 ft, Pond B-5 by 16 ft and Pond C-2 by 10 ft.	19.6	2.9

The nine preferred alternatives are not ranked among themselves because they are dependent upon the RFP population. A decision related to the RFP population could result in selection of one of the preferred alternatives. There is a strong possibility that other alternatives also could be selected based upon other criteria, such as the purchase of additional water for water rights or supplemental makeup water. The costs of these two possibilities have not been included in this report.

Additionally, the possibilities of combining parts of alternatives, especially the terminal ponds alternatives, have not been evaluated in this study. The possible combinations of such alternatives is very large. Decisions about RFP personnel population would be helpful in reducing the number of possible combinations.

Studies that are subordinate to the Zero-Offsite Water-Discharge Plan that will be effected by or will affect this temporary water storage study are: Confirmation of Rainfall/Runoff (Task 5), Storm Runoff Quantity for Various Design Events (Task 6), Design Recurrence Intervals (Task 9), Process/Treated Wastewater Recycle (Tasks 11 and 13), Water Rights (Task 14), Surface-Water Evaporation (Task 15), Alternatives to Zero Discharge (Task 17), Water Resource Management (Task 23), Bypass Upstream Flows Around Rocky Flats Plant (Task 24), Ground-Water Cutoff/Diversion (Task 26), Waste Generation/Treatment (Task 27), Augmentation Plan (Task 28), and Consolidation and Zero Discharge Plan (Task 30).

1.0 INTRODUCTION

1.1 BACKGROUND

The Zero-Offsite Water-Discharge Study is required by the Agreement in Principle signed by the Governor of the State of Colorado and by the Secretary of the U.S. Department of Energy (DOE) on June 28, 1989 (DOE and State of Colorado, 1989). The CDH/DOE Agreement Item C.7 states "Source Reduction and Zero Discharges Study: Conduct a study of all available methods to eliminate Rocky Flats discharges to the environment including surface waters and ground water. This review should include a source reduction review." This report is one subordinate study of the Zero-Offsite Water-Discharge Study (ASI, 1990a). This subordinate study, in conjunction with Task 6 (Storm Runoff Quantity for Various Design Events, ASI, 1991a), analyzes the existing Rocky Flats Plant (RFP) surface-water storage system, a proposed off-channel storage system, Great Western Reservoir, and an on-channel collection and storage system to temporarily store and reuse surface-water runoff, intercepted ground water, and sanitary treatment plant (STP) effluent from the RFP site.

The concept of Zero-Offsite Water-Discharge at the RFP should include capture and storage/reuse of surface-water runoff. The capture of surface-water runoff is proposed for areas which have been shown to have contamination above background concentrations, particularly during storm-runoff events. For purposes of this study, it has been assumed that such areas would include the drainage basins discharging to the so-called "terminal ponds" at the RFP. These ponds include Pond A-4 on North Walnut Creek, Pond B-5 on South Walnut Creek, and Pond C-2, an off-channel pond adjacent to Woman Creek. The locations of these terminal ponds are shown on Figure 1.

In addition to the drainage basins discharging to the terminal ponds, other areas may be considered candidates for collection of contaminated storm runoff, even though these areas have not been shown to contribute contaminants. These areas include the West Spray Field [Solid

Waste Management Unit (SWMU) 168] and adjacent areas including the T130 trailers, the present Landfill area (SWMU's 114, 166.1 through 166.3, 167.2, 167.3 and 203), and the old landfill area (SWMU's 115 and 133.1 through 133.6). This study will address collection of surface-water runoff from these and other areas of possible contamination. Based upon the SWMU map provided by EG&G, it appears that all but five of the identified SWMU's at the RFP would be included in the runoff collection system by a combination of the terminal collection ponds and the proposed off-channel water storage. These five SWMU's are identified on Figure 2 and consist of 142.10, 142.12, 167.1, 198, and 209.

The existing surface-water collection system was designed to store runoff resulting from the 100-year, 72-hour storm event (McCall-Ellingson & Morrill, Inc., 1978) for conditions at the RFP as they were in 1978. The surface-water storage system currently consists of Ponds A-1 through A-4, B-1 through B-5, C-1 and C-2, and the Landfill Pond (Figure 1). As a result of a previous study (Task 6, ASI, 1991a) and an analysis undertaken within this study, the terminal ponds were found to be of insufficient capacity. This study provides a resizing of the existing terminal ponds (A-4, B-5, and C-2); estimated sizes for an off-channel water-storage facility, and for the existing Great Western Reservoir capable of retaining surface-water runoff based on a 50 year sequence of monthly streamflows, Sanitary Treatment Plant (STP) effluent volume (as determined from 1986 through 1990 records), assumed intercepted ground-water volumes, runoff resulting from the 100-year, 72-hour storm, monthly precipitation and evaporation rates, treat and release scenarios, and water reuse.

This study provides sizing for an assumed off-channel storage pond used solely to retain STP effluent, with additional storage ponds or the existing terminal ponds and Great Western Reservoir used to store surface-water runoff and intercepted ground water. In addition, this study provides sizing for an off-channel storage pond and the existing terminal ponds used to store surface-water runoff, intercepted ground water, and STP effluent.

1.2 PURPOSE AND SCOPE

The purpose of this study is to assess the capabilities of the existing RFP terminal ponds to collect storm runoff, estimate water-inflow sources, and estimate the size of water-storage facilities which would be used to temporarily contain water resulting from these sources. In addition, the impacts of high and low demand water-reuse scenarios are examined in reference to their effect on the water-storage facilities. The proposed collection and storage facilities were conceptually sized to minimize the amount of water to be released from RFP property. The conceptual sizing of facilities presented in this report is intended to provide a more complete and effective temporary water-storage and reuse system than currently exists. The conceptual sizing of these structures is based on data acquired from other Zero-Offsite Water-Discharge Tasks, such as Task 6 (ASI, 1991a), Task 9 (ASI, 1990b), Task 10 (ASI, 1991b), Tasks 11 and 13 (ASI, 1991c), and Task 16 (ASI, 1990c).

This study assumes that the volume of flow that is collected by each of the terminal ponds (A-4, B-5, and C-2) can be removed from those terminal ponds to off-channel temporary water storage within a reasonable time. Further, it is assumed that the volume of flow is influenced by the construction of the preferred bypass structures (McKay Bypass Alternative 3-A and Woman Creek Alternative 2 of the Bypass Upstream Flows around Rocky Flats Plant Study) (ASI, 1991d). An assessment of the time required to empty the terminal ponds of runoff from a 100-year, 72-hour storm for various pumping rates was undertaken.

Four generalistic alternatives are assessed for the proposed sizing of the temporary water-storage facilities. Each of these alternatives includes high and low water reuse demand scenarios based on assumed RFP personnel populations (3,000 and 9,000 personnel). The four generalistic temporary water-storage alternatives to be assessed will include:

(1) Off-channel storage for STP effluent;

(2) Off-channel storage using the existing terminal ponds (A-4, B-5, and C-2) to collect surface-water runoff, and pumping this surface water to an off-channel temporary water-storage reservoir;

(3) Storage in Great Western Reservoir; and

(4) Storage in the three terminal ponds themselves.

Each of the above four generalistic alternatives will be assessed for many specific sub-alternatives which will be discussed as they are used.

Each of the four temporary water-storage generalistic alternatives will be assessed as to their ability to minimize downstream spills as well as provide a dependable supply of makeup water. However, if shortages occur from the proposed reservoirs, makeup water could be purchased from outside sources. The quantity of water analyzed had three possible compositions: (a) STP effluent is stored separately and reused; (b) additional makeup water from surface-water runoff and ground water; and (c) STP effluent is mixed with surface-water runoff and ground water and reused.

One possible Great Western Reservoir alternative that was analyzed was making the reservoir off-channel by constructing a diversion channel around the reservoir. This diversion channel would divert surface-water runoff that flows between the RFP and reservoir away from the reservoir. Such a diversion would require that the existing terminal ponds remain as surface-water runoff collectors, with the collected water being transported to Great Western Reservoir in a separate conveyance system. Alternatively, the possibility of Great Western Reservoir remaining as an on-channel storage structure and becoming the collector of all upstream runoff. This latter specific alternative would result in more water being stored in the reservoir at any single time because of the increased drainage basin area providing runoff to the reservoir.

Other sub-alternatives for each of the four alternatives might include enhanced evaporation of surface-water runoff and STP effluent by spraying, or treatment and release of water for downstream augmentation/replacement of existing water rights. These two additional features were used in selected alternatives. Irrigation of crops and maintenance/creation of wetlands also are possible water-use scenarios, but probably are not within the spirit of zero discharge unless the water is treated prior to release.

2.0 SURFACE-WATER STORAGE AND REUSE EVALUATION

2.1 EXISTING STORAGE FACILITIES EVALUATION

2.1.1 General

The surface-water storage system in place at the RFP facility was completed in 1980 with the system terminal ponds designed to completely store runoff from the 100-year 72-hour flood event (McCall-Ellingson & Morrill, Inc., 1980). Figure 1 shows the surface-water storage structures that are present. Ponds A-1 through A-4 are located on North Walnut Creek, Ponds B-1 through B-5 are located on South Walnut Creek, Ponds C-1 and C-2 are located on Woman Creek and the Landfill Pond is located on the eastern edge of the Rocky Flats Landfill. Table 1 provides capacity and dam height information for the A, B, and C series ponds and the Landfill Pond.

The reach of North Walnut Creek downstream of the Walnut Creek Diversion Dam collects runoff from the northern areas of the RFP site and from portions of the north Buffer Zone, which contain the present landfill, firing range, electrical substation, and miscellaneous storage areas. Storm water in this reach flows downstream and normally flows around spill control Ponds A-1 and A-2 to collect in Pond A-3. If contamination should reach this portion of North Walnut Creek, water would be diverted to Ponds A-1 and A-2, which are to be used exclusively for spill control. Pond A-4 is the terminal pond on North Walnut Creek and receives water released from Pond A-3. Water is currently discharged from Pond A-4 into Walnut Creek in accordance with National Pollutant Discharge Elimination System (NPDES) permit CO 0001333 discharge point number 005. The existing drainage area contributing to Pond A-4 is about 400 acres (ac) as shown on Figure 2.

South Walnut Creek begins within the central portion of the Controlled Area of the Rocky Flats Plant site and receives the majority of stormwater runoff from the controlled area. Flow in South

Table 1

RFP Reservoir Information[1)]

Drainage Basin	Reservoir Name	Dam Height (ft)	Maximum Pool Capacity (ac-ft)	Spillway Crest Capacity (ac-ft)
N. Walnut Creek	A-1	17	12.3	4.9
	A-2	29	31.4	19.0
	A-3	37.5	76.0	43.0
	A-4	46	153.5	94.0
S. Walnut Creek	B-1	16	8.0	3.1
	B-2	26	14.9	7.5
	B-3	18	6.0	2.2
	B-4	19	5.7	1.8
	B-5	54	120.0	79.3
Woman Creek	C-1	15	17.1	5.9
	C-2	35.5	173.5	70.7
Walnut Creek Tributary	Landfill	40.5	43.5	28.0

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1) Sources: COE, (1989); Colorado State Engineer, (1990).

Walnut Creek passes water directly to Pond B-5. Runoff from the central portion of the Controlled Area is passed directly to ponds B-4 and B-5 (Figure 2). The water is then transferred to Pond A-4 where it is treated and discharged to Walnut Creek in accordance with NPDES permit CO 0001333 discharge point number 005. Water levels in Ponds B-1 and B-2 have been controlled by transfer of excess water to Ponds A-1 and A-2 because of their larger capacity. Thus, water from South Walnut Creek can be transferred to North Walnut Creek.

STP effluent is discharged to Pond B-3. As Pond B-3 becomes full, it is discharged in accordance with provisions of the NPDES permit to Pond B-4, and then to Pond B-5. The NPDES discharge point number for Pond B-3 is 001. Pond B-5 is the terminal pond on South Walnut Creek. Water from Pond B-5 is currently discharged to Walnut Creek in accordance with NPDES permit CO 0001333 point number 006. The existing drainage area contributing to Pond B-5 is about 265 ac (Figure 2).

Woman Creek receives runoff from areas west of the RFP, and from portions of the southern and eastern Buffer Zone. Runoff from the southern portion of the plant site flows south towards Woman Creek and is collected by the South Interceptor Canal prior to reaching Woman Creek. This water flows east in the South Interceptor Canal and discharges to Pond C-2, which is located off-channel from Woman Creek. Pond C-2, like Ponds A-4 and B-5, is a NPDES discharge point (number 007), and has historically discharged to Woman Creek. However, water in Pond C-2 currently is not being discharged. Plans are underway to route the water from Pond C-2 through a pipeline to be discharged into Ponds B-5 and A-4. Pond C-1 is located on Woman Creek upstream from Pond C-2. The drainage area contributing to Pond C-2, via the South Interceptor Canal and surface-water runoff, is about 227 ac (Figure 2).

The Landfill Pond is designed to contain runoff and leachate from the Landfill without downstream discharge. Water levels are controlled through spray evaporation during favorable weather. The drainage area contributing to this pond is about 28 ac.

2.1.2 Evaluation of the Terminal Ponds

The terminal ponds (Ponds A-4, B-5 and C-2), shown on Figures 1 and 2, were evaluated on their performance on completely storing the runoff from the 100-year, 72-hour storm. This storm has traditionally been used as the design storm for the terminal ponds (McCall-Ellingson & Morrill, Inc., 1978; ASI, 1990b; 1991a). The original design precipitation (McCall-Ellingson & Morrill, Inc., 1978) for the 100-year, 72-hour storm was 6.16 inches. This precipitation has been revised by governmental agencies (DOE, 1986). The revised precipitation for the 100-year, 72-hour storm is about 6.3 inches (ASI, 1990b; 1991a). This precipitation will be used to assess the ability of the terminal ponds to completely store runoff from that storm.

The original design criteria related to drainage basin areas, percents imperviousness and U.S. Soil Conservation Service (SCS) runoff curve numbers (CN's) are shown in Table 2. Because of changes in the drainage basin imperviousness due to new construction of buildings and parking lots, routing of storm runoff within the Controlled Area through culverts and open channels, and inclusion of new drainage basins (such as the West Spray Field, the Old Landfill area, and the Present Landfill) for this study, the values related to the original design variables have changed. These new design values for drainage area, percent imperviousness and runoff CN's also are shown in Table 2 for comparison.

Analysis of Table 2 indicates that the drainage area contributing to Pond A-4 is about 402 ac. A previous estimate of the Pond A-4 Drainage area by Lee Wan and Associates (1987) was about 401 ac. The U.S. Army Corps of Engineers (COE, 1989) and the Colorado State Engineer's files (1990) estimated that the drainage area contributing runoff to Pond A-4 for the 100-year flood, and lesser floods, was about 384 ac (0.6 mi^2). The COE and Colorado State Engineer did not base the drainage area upon the routing of flow across drainage divides by the RFP storm-drain system (Lee Wan and Associates, 1987; ASI, 1990b).

Table 2

RFP Drainage Basin Areas, Imperviousness, and Runoff Curve Numbers

Site	Original Design[2]			This Study[3]		
	Drainage Area (ac)	Imperviousness (%)	Runoff CN	Drainage Area (ac)	Imperviousness (%)	Runoff CN
Pond A-4[1]	384	10	74	402	27	81
Pond B-5[1]	320	25	81	265	52	87
Pond C-2[1]	205	5	73	227	3	77
West Spray Field Area[1]	--[5]	--	--	198	--	88
Present Landfill Area[1]	--	--	--	84	--	75
Old Landfill Area[1]	--	--	--	17	--	77
Combined RFP Watersheds	909	15	76	1,193	30	82
Big Dry Creek Tributary At Littleton[4]	--	--	--	608	25	--

1) See Figure 2 for locations.

2) McCall-Ellingson & Morrill (1978).

3) ASI, 1991a.

4) Mustard and others (1987).

5) -- means not estimated.

Similarly, the drainage area contributing to Pond B-5 was estimated for this study to be about 265 ac. Lee Wan and Associates (1987) estimated the drainage area to be 273 ac, while the Corps and the Colorado State Engineer estimated the drainage area at B-5 to be about 320 ac (0.5 mi^2). Again the difference in the drainage areas is related to the storm-drain system at the RFP.

At Pond C-2, it is estimated that the drainage area contributing to the pond is about 227 ac assuming that the Woman Creek flood for the 100-year, 72-hour storm is bypassed around Pond C-2 as would be the case for this study. Lee Wan & Associates (1987) estimated that the drainage area contributing to Pond C-2 was about 218 ac. The COE and Colorado State Engineer estimated the drainage area contributing to Pond C-2 to be about 205 ac (0.32 mi^2) assuming that the Woman Creek flood for the same storm is bypassed around Pond C-2.

All of the above drainage areas estimated for this study are within 4 percent of those estimated by Lee Wan & Associates (1987). Thus, the drainage areas estimated for this study were used for calculating runoff from the 100-year, 72-hour precipitation at the terminal ponds.

In addition to the drainage areas contributing directly to the terminal ponds, other areas which may contribute storm runoff from suspected or known contaminated areas also will be collected in the terminal ponds. These areas include: (1) the West Spray Field area including the T130 trailer area (198 ac); (2) the Present Landfill area (84 ac); and (3) the Old Landfill area (17 ac) as shown on Figure 2. Table 2 summarizes the drainage areas and runoff CN's for these three additional areas which are proposed to be collected by the terminal ponds. Storm runoff from the West Spray Field and the Present Landfill would be routed to Pond A-4 making the total drainage basin area at Pond A-4 about 684 ac (Table 2). Storm runoff from the Old Landfill area would be routed to Pond C-2, via an extension of the South Interceptor Canal, making the total drainage basin area at Pond C-2 about 244 ac (Table 2). The drainage area at Pond B-5 would remain at about 265 ac.

As indicated in Table 2, the percent imperviousness for the original design of the terminal ponds was about 15 percent. Based upon data provided in ASI (1991a), this imperviousness has increased to about 30 percent because of new construction. The weighted CN for areas draining to the terminal ponds has increased from about 76 in 1978 to about 82 for current conditions (Table 2). Runoff to the terminal ponds for the new conditions and including the West Spray Field area and the Present and Old Landfill areas for the 100-year, 72-hour storm of 6.3 inches is given in Table 3.

Sediment yields from the RFP drainage basins have been deposited in the terminal ponds over the last 10 years. The amount of sediment which has accumulated in each of the terminal ponds is unknown, but studies are underway by others (Merrick & Company) to quantify the amount of accumulated sediment. For purposes of this study, the quantity of sediment which has accumulated in the terminal ponds was assumed to be about 0.4 ac-ft/mi^2/yr. This estimate was obtained by doubling the natural sediment yield rate of 0.2 ac-ft/mi^2/yr for this area of Colorado estimated by the Colorado Land Use Commission (1974). For developed areas, the natural sediment rates may double based upon engineering judgment. Using an estimated sediment yield of 0.4 ac-ft/mi^2/yr, would subtract only about 2 percent of the spillway-crest storage from the terminal ponds. After consultation with EG&G, it was assumed that each of the terminal ponds had 10 percent of its original-design spillway-crest capacity occupied by sediment which had been trapped over the last 10 years. Using a 10 percent capacity displacement by sediment, Pond A-4 storage was decreased by about 9 ac-ft, Pond B-5 storage was decreased by about 8 ac-ft, and Pond C-2 storage was decreased by about 7 ac-ft.

The new spillway-crest and dam-crest elevations to completely store the runoff from the 100-year, 72-hour storm (Table 3) were estimated using independently-calculated elevation-area-capacity curves (Figures 3 through 5) for each of the terminal ponds. These curves were estimated by digitizing the contours upstream of each dam embankment from topographic maps having a horizontal scale of 1-inch equal to 100-feet, a contour interval of either 5 feet for Ponds A-4 and B-5, and a contour interval of 2 feet for Pond C-2. The resulting elevation-area-capacity

Table 3

Runoff Associated With The 100-Year, 72-Hour Storm[1)]

Pond	Area (ac)	Weighted CN	Runoff (in)	Runoff (ac-ft)
A-4[2)]	684	82	4.26	243
B-5	265	87	4.81	106
C-2[3)]	244	77	3.74	76

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1) Using current basin conditions.

2) Including the West Spray Field and Present Landfill drainage-basin areas.

3) Including the Old Landfill drainage basin area.

curves were within about two percent of those used during the original design of the terminal ponds (McCall-Ellingson & Morrill, Inc., 1980).

As shown on Figure 3, the Pond A-4 spillway crest would have to be increased in elevation from its existing 5757.5 ft mean sea level (MSL) to about 5773.0 ft MSL to completely store the 243 ac-ft of runoff associated with the 100-year, 72-hour rainfall plus about nine ac-ft of sediment. This is an increase in spillway-crest elevation of about 15.5 ft. It was assumed that the existing dam crest elevation would be increased by a similar amount from its existing 5764.0 ft MSL to 5779.5 MSL. Table 4 summarizes the increase in spillway-crest and dam-crest elevations for Pond A-4 as well as the other terminal ponds.

Figure 4 indicates that the Pond B-5 spillway-crest elevation should be increased by about 5.0 ft, from 5804.0 ft MSL to 5809.0 ft MSL. The corresponding dam-crest elevation would increase from 5810.0 ft MSL to 5815.0 ft MSL (Table 4). Figure 5 shows that the spillway-crest elevation for Pond C-2 should increase from 5765.0 ft MSL to 5766.0 ft MSL, with a corresponding dam-crest increase from 5774.5 ft MSL to 5775.5 ft MSL (Table 4). For Pond C-2 these increased elevations are considered to be trivial and need not be undertaken for Pond C-2. The new spillway-crest elevations assume that the ponds were empty prior to the 100-year, 72-hour flood. As is presented below, this assumption is generally valid because empty terminal ponds will be maintained for purposes of the off-channel pond operational study.

The proposed spillway-crest and dam-crest elevations for the terminal ponds were used in this study. The time required to evacuate 90 percent of the runoff from the 100-year, 72-hour storm was estimated for various pumping rates. The purpose of these evacuation-time estimates for the terminal ponds was to demonstrate the physical feasibility of emptying the ponds in a reasonable time. In this way, it was felt that the water in the ponds would not have to meet stream standards, because no water would be permanently stored in the terminal ponds. The relationships between evacuation time and pumping rate for each of the three terminal ponds are shown on Figures 6 through 8. Analyses of those data presented on these figures suggest that

Table 4

Original Design and New Spillway-Crest and Dam-Crest Elevations for Ponds A-4, B-5 and C-2

Pond	Current Elevations Spillway Crest (Ft. MSL)	Current Elevations Dam Crest (Ft. MSL)	Elevation Increase (Ft.)	New Elevations Spillway Crest (Ft. MSL)[1) 2)]	New Elevations Dam Crest (Ft. MSL)
A-4	5757.5	5764.0	15.5	5773.0	5779.5
B-5	5804.0	5810.0	5.0	5809.0	5815.0
C-2	5765.0	5774.5	1.0	5766.0	5775.5

1) To store the runoff from the 100-year, 72-hour storm plus 10 percent of original-design spillway-crest storage for sediment.

2) As shown on Figures 3 through 5.

the terminal ponds can be emptied in 60 days or less for pumping rates less than 1,000 gallons per minute (gpm). Pumping rates less than about 1,000 gpm are assumed to be reasonable for evacuating the terminal ponds. Using these same pumping rates runoff related to small storms and snowmelt runoff could be evacuated in 10 and 30 days. A volume of one ac-ft could be pumped from the terminal ponds in about five and one-half hours at a rate of 1,000 gpm. Higher pumping rates would evacuate the terminal ponds more quickly if needed. Also, additional portable pumps could be used if the need to draw down the pond water levels was urgent.

If the terminal ponds are used as temporary water-storage reservoirs, as proposed by the Alternative 3 above, the spillway crest elevations may further increase to reduce the potential of downstream spills. The structures would still have the capability to completely store the runoff from the 100-year, 72-hour storm.

2.2 PROPOSED TEMPORARY SURFACE-WATER STORAGE FACILITIES

In an effort to determine an adequate size for proposed temporary water storage facilities, inflow and outflow water sources were identified. When the estimates of RFP site runoff and various items of water use, water demand and water loss are assembled, the storage capacity is usually estimated by an operational study (Linsley and others, 1958). This is a simulation of reservoir operation which would have taken place during a critical or other period if specified operating rules had been followed. ASI used an in-house computer model to perform the water accounting for the proposed reservoir, the subject of the operational study.

There are four basic components which were used by the program to model the reservoir. These components are hydrologic characteristics, reservoir characteristics, control point characteristics and diversions (COE, 1981). To preserve the essence of the real reservoir system, it is necessary to describe each component quantitatively or mathematically, in sufficient detail. The following sections discuss each of the four components and their interrelationships.

2.2.1 Hydrologic Characteristics

Hydrologic characteristics include system inflows, whether from runoff, STP inflows, ground-water inflows, precipitation falling directly on the reservoir, or evaporation from the reservoir. Seepage losses may also be included here. For purposes of this study, seepage losses have been assumed to be negligible in order to correctly size the temporary water storage facilities.

Inflows to the system are the primary hydrologic component of the system. These inflows were assumed to be pumped to the off-channel reservoir from the three terminal ponds (Ponds A-4, B-5 and C-2) as discussed above. To describe the inflow it is necessary to have a time series of flows which represent a likely sequence of inflows. In most cases the time interval for the inflows is taken to be one month, thus the simulation used to size the temporary water storage was performed using a monthly operational routing of flows.

Other flows considered during this study included monthly contributions from the STP and other inflows such as runoff resulting from a 100-year, 72-hour storm event and those which might come from selected pumping of ground water for either plume control or soil washing as part of site clean up. In the case of wastewater treatment plant inflows, three possible inflow alternatives for RFP personnel populations of 3,000, 6,300 and 9,000 were used as discussed below.

Precipitation falling on the reservoir and evaporation from the reservoir water surface also are important parts of the reservoir water balance. Data for these meteorological variables were input to the model monthly, based upon nearby data (see Sections 2.2.6.4 and 2.2.7.1 for details). Both of these variables' impacts on the reservoir water balance were assumed to be a function of the reservoir water-surface area in each month.

2.2.2 Reservoir Characteristics

The reservoir water-surface elevation, storage capacity, water-surface area and outlet capacity describe important physical features for the temporary water storage facility. For a hypothetical off-channel site, the reservoir water-surface elevation has a unique monotonic relationship to water-surface area and storage capacity. Because the reservoir was assumed to be off channel, the relationship between the physical reservoir characteristics was assumed to be nearly linear. The reservoir elevation-area-capacity was assumed to be decreased over time by sediment inflow to the reservoir. The outlet capacity also is related to these other reservoir variables. Releases from the reservoir for various alternative reuse or downstream demands were assumed to be physically possible without specifically sizing an outlet capacity. These characteristics are defined in more detail below.

The reservoir is operated to meet pre-specified target demands or downstream releases for water rights or other demands. To simulate the operation of the reservoir, the operating criteria must be expressed in quantitative or mathematical terms. The mechanism for doing this is to divide the reservoir into imaginary horizontal levels. The differences between levels are zones of potential storage volume. The lowest reservoir level corresponds to the bottom of the conservation pool (top of inactive storage used to store sediment). The highest level is the full pool level. Additional levels can be established for individual reservoir operating criteria.

Other reservoir-operating criteria specified in the model are initial reservoir storage and other storage limits such as maximum storage. An initial storage should be specified to begin the simulation. For this study the initial storage was assumed to be a full reservoir. This assumption provides the highest likelihood of uncontrolled releases downstream.

The hydrologic balance of the reservoir, as computed in the model, is based upon the principle of continuity as expressed by the equation:

$$S_{i,j} = S_{i-1,j} + I_{i,j} + P_{i,j} - E_{i,j} - D_{i,j} \pm q_{i,j} \qquad (1)$$

where:

$S_{i,j}$	=	Reservoir storage volume at the end of month i and year j,
$S_{i-1,j}$	=	Reservoir storage volume at the end of the previous month, i-1 and year j,
$I_{i,j}$	=	Inflow volume to the reservoir in month i and year j,
$P_{i,j}$	=	Precipitation volume entering the reservoir in month i and year j,
$E_{i,j}$	=	Evaporation volume leaving the reservoir in month i and year j,
$D_{i,j}$	=	Demand volume on the reservoir in month i and year j, and
$q_{i,j}$	=	Other releases, inflows, seepage or demand volumes on the reservoir in month i and year j.

The above recursive equation (1), when I, P, E, D, and q are properly defined, is appropriate for storage accounting where the length of the period i,j is long compared to the travel time through the reservoir. It should be noted that the proper definitions of all variables must be used. For this kind of simulation, it is judged that operational sequences of inflows should include a broad range of possible monthly values such as those found in a sequence of about 50 to 100 years of streamflow record. Because this length of record is not available at the RFP, the streamflows used for the inflow values to the operational model were synthesized using a statistical technique discussed below.

2.2.3 Control Point Characteristics

Control points, which are not storage reservoirs, are used to regulate system operation by establishing constraints and targets on streamflow. There are three types of control which may be specified for the system: (1) maximum permissible flow, (2) minimum desired flow, and (3) minimum required flow. Maximum permissible flow places an upper limit on the desired magnitude of the streamflow which each of the terminal storage ponds can divert to the off-channel storage reservoir. This upper limit is the pumping capacity of the terminal storage pond pumps. This limit is maintained unless the runoff to the terminal ponds exceeds that from the

100-year, 72-hour storm and the terminal pond storages are exceeded and water is spilled over the pond spillways. Minimum desired flow is a target flow for recycle, downstream demands or other demands which is sought while the reservoir is operating in the full pool above the top of the inactive zone. When the reservoir storage volume goes into the inactive zone, the minimum required flow becomes the target. The minimum required flow may be related to zero discharge of water or to satisfying the downstream demand of senior water rights. Each of these three flow requirements may be constant, or vary for each monthly time period of the simulation.

2.2.4 Diversions

Pumped diversions may exist at each of the terminal pond control points (Ponds A-4, B-5 and C-2). The actual diversions from the terminal ponds to an off-channel temporary water-storage reservoir is a function of the monthly basin runoff or the maximum pumping capacity whichever is less. STP flows and other inputs also are diversions which may vary for each monthly period or varied each year.

2.2.5 System Operation

The reservoir operational model considers the water requirement at each pertinent control point in the system. Results of the successive application of the recursive equation (Equation 1) are recorded for the inflows to and outflows from the reservoir. As the results are calculated, they are stored and finally printed out, on an annual basis, to produce a continuous record of the inflow, storage, outflow, and other pertinent data for each alternative operation scenario. These results may be used in many ways to serve various needs in analysis or evaluation of the reservoir system operation. A sample output from the reservoir operational model is shown in Appendix A.

The following sections assess various water inflow and outflow sources and attempts to quantify each source with the available information and data.

2.2.6 Inflow Sources and Methods of Determination

The primary sources of water inflow to be stored include surface-water runoff, treated STP effluent, intercepted ground water, and precipitation. In addition, storage of surface-water runoff that would result from a 100-year, 72-hour storm is also included in various scenarios. In order to account for the volume of surface-water runoff that will need to be stored, water yields determined from monthly and annual rainfall-runoff relationships have been developed based upon data from a drainage basin similar to a typical RFP basin.

2.2.6.1 Surface-Water Runoff

In an effort to estimate water-storage requirements at the RFP, it is necessary to estimate quantities of runoff that would be expected on a monthly and annual basis. However, insufficient long-term runoff data exist at the RFP to permit direct calculation or estimation of average annual or average monthly runoff. In a previous study (Water-Yield and Water-Quality Study of Walnut Creek and Woman Creek Watersheds, ASI, 1990c), average annual and average monthly runoff was estimated for RFP basins for natural conditions with no site development in the form of buildings, roads and other impervious areas. In order to estimate average annual and average monthly runoff for the RFP basins considering existing levels of development, the following analysis was conducted.

The U.S. Geological Survey (USGS) conducted an urban rainfall-runoff data-collection program from approximately 1968 through 1980 at several sites in the Denver metropolitan area. Rainfall and runoff data were collected from April through October for each year of the study. Precipitation and runoff which may have occurred during November through March were not monitored. Data collected during that study were reported in Ducret and Hodges (1972 and 1975), Cochran and others (1979 and 1983). One site from the USGS study - 06710200, Big Dry Creek Tributary at Littleton - was selected for analysis because of similarities in drainage area and percent of impervious area (Table 2).

Fifty-three rainfall-runoff events were recorded and reported by the USGS from October 1968 through September 1980. Additionally, five storm events occurred during the study period for which no incremental rainfall and runoff data were collected because of recorder malfunction. Peak flow values were calculated for these events using indirect methods. The 53 recorded rainfall-runoff events for Big Dry Creek Tributary at Littleton are summarized in Table 5.

Runoff volumes given on Table 5 were calculated from hydrograph discharge values recorded at five-minute intervals. Using least-squares regression techniques, the logarithms of the runoff volumes were related to the logarithms of the peak discharge values, resulting in the following relationship:

$$V = 0.2\ Qp^{0.83} \qquad (2)$$

where: V = runoff volume, in acre-feet (ac-ft), and

Qp = peak discharge, in cubic feet per second (cfs).

The correlation coefficient for the above relationship was 0.7 and the standard error of estimate was +130% to -57%. Using this relationship, runoff volumes were estimated for the five runoff events for which only peak-discharge values were reported (Table 6).

Runoff-event volumes, both from the 53 events with hydrographs and those estimated using the previously described regression equation, were compiled by month and year, and are presented in Table 7.

For those months in which there was no runoff data being collected at Littleton (November through March), monthly volumes were "filled-in" by approximating runoff based on 24 years of RFP site-specific precipitation data. One result of this fill-in of monthly data is that there is no rational method for assuming if a given month had zero streamflow. Thus, it was assumed that no month had zero streamflow, although some months out of the 12 years probably had zero streamflow. This assumption generally would tend to overpredict the monthly streamflows. The

Table 5

Rainfall-Runoff Events for Big Dry Creek Tributary at Littleton

Date	Total Precip (in)	Storm Duration (hours)	Maximum 5-Min Intensity (in/hr)	Peak Discharge (cfs)	Runoff Volume (ac-ft)
03-Jul-69	0.65	50	0.96	74	34.5
18-Jul-69	0.35	2	1.44	66	13.0
21-Aug-69	0.85	5	2.04	90	19.2
09-Sep-69	0.83	2	3.72	93	16.4
11-Jun-70	2.08	23	0.60	76	43.7
06-Jun-72	0.68	10	0.84	53	11.6
16-Jun-72	0.51	2	1.92	28	1.9
15-Jul-74	0.18	1	0.48	42	3.3
21-Jul-74	0.90	4	2.28	70	6.6
12-Sep-74	0.20	2	0.36	34	2.8
11-Oct-74	1.33	25	0.36	52	16.3
30-Oct-74	0.11	5	0.36	41	3.0
22-May-75	0.45	7	0.24	25	4.3
08-Jun-75	0.78	24	0.48	63	8.5
08-Jul-75	0.62	25	1.20	73	6.7
13-Aug-75	2.88	7	2.52	258	34.2
21-Aug-75	0.28	3	0.96	54	2.3
03-Aug-76	0.19	0	1.32	156	6.5
07-Sep-76	0.23	1	0.60	73	5.8
15-Apr-77	0.21	5	0.36	31	7.1
11-Jun-77	0.36	1	0.84	81	4.8
05-Jul-77	0.43	2	1.20	70	3.5
23-Jul-77	1.52	36	2.64	303	35.5
21-Aug-77	0.23	2	0.72	36	1.5
23-Aug-77	0.13	0	0.72	44	1.9
01-Sep-77	0.41	1	2.16	174	4.5
28-May-78	0.32	5	0.36	12	1.4
01-Jun-78	0.22	5	0.24	6	0.7
04-Jun-78	0.58	27	0.60	10	2.9
07-Jun-78	0.43	0	2.40	111	4.1
29-Jun-78	0.19	2	0.36	9	0.7
29-Jul-78	0.15	0	1.08	12	0.4
21-Oct-78	1.00	11	0.48	26	9.3

Table 5 (Continued)

Rainfall-Runoff Events for Big Dry Creek Tributary at Littleton

Date	Total Precip (in)	Storm Duration (hours)	Maximum 5-Min Intensity (in/hr)	Peak Discharge (cfs)	Runoff Volume (ac-ft)
10-Apr-79	0.83	36	0.48	14	5.3
20-Apr-79	0.10	1	0.12	11	0.7
01-May-79	2.05	23	0.60	72	24.7
20-May-79	0.92	4	1.80	71	9.1
29-May-79	0.34	28	0.72	25	1.7
07-Jun-79	2.20	46	0.36	37	21.1
19-Jun-79	0.12	0	0.72	38	1.1
23-Jun-79	0.12	1	0.48	16	0.6
04-Jul-79	0.71	21	1.68	107	5.5
10-Aug-79	0.50	2	2.04	95	3.8
14-Aug-79	0.69	7	0.48	52	8.1
16-Aug-79	0.58	1	3.36	158	5.2
19-Aug-79	0.36	1	0.96	58	3.6
26-Aug-79	0.54	3	1.56	98	4.8
13-Sep-79	0.18	2	0.12	8	1.1
01-Jul-80	0.25	6	0.24	12	1.5
10-Jul-80	0.46	46	0.60	45	4.0
14-Aug-80	1.03	1	2.04	121	9.9
25-Aug-80	0.16	1	0.24	26	1.6
08-Sep-80	0.50	10	0.12	9	4.0

Table 6

Runoff Volumes Estimated From Peak Discharges[1)]

Peak Date	Estimated Discharge (cfs)	Runoff Volume (ac-ft)
08-Jun-69	185	15.0
23-Jul-70	153	12.8
30-Aug-71	479	33.0
04-Jun-72	176	14.4
21-Aug-72	55	5.5

1) The equation $V = 0.2\ Qp^{0.83}$ was used for these estimates.

Table 7

Monthly and Annual Runoff Volumes from Big Dry Creek Tributary at Littleton[1)2)3)] (Ac-Ft)

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1969	0						0	0	15.2	47.5	19.2	16.4	98.3
1970	0						0	0	43.7	13	0	0	56.7
1971	0						0	0	0	0	33.6	0	33.6
1972	0						0	0	28.1	0	0	0	28.1
1973	0						0	0	0	0	5.6	0	5.6
1974	0						0	0	0	9.9	0	2.8	12.7
1975	19.3						0	4.3	8.5	6.7	36.5	0	75.3
1976	0						0	0	0	0	6.5	5.8	12.3
1977	0						7.1	0	4.8	39	3.4	4.5	58.8
1978	0						0	1.4	8.4	0.4	0	0	10.2
1979	9.3						6	35.5	22.8	5.5	25.5	1.1	105.7
1980	0						0	0	0	5.5	11.5	4	21
Avg:	2.4						1.1	3.4	11.0	10.6	11.8	2.9	43.2

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1) Source: Ducret and Hodges, 1972; Ducret and Hodges, 1975; Cochran and others, 1979; and Cochran and others, 1983.

2) Drainage Area = 0.95 mi^2.

3) Imperviousness = 25 percent.

new runoff values were then adjusted for the difference in impervious area between the representative study area and the impervious area at RFP. As shown in Table 2, the Big Dry Creek Tributary at Littleton drainage basin consisted of 25 percent impervious area and RFP consists of 30 percent impervious area. Thus, the runoff values were multiplied by the ratio of the percent of impervious areas of the RFP watershed and Big Dry Creek Tributary watershed (30 percent/25 percent). In addition, the runoff volumes were adjusted for a RFP drainage area of one mi^2 based upon the regional regression relationship derived as a result of Task 4 (Water-Yield and Water-Quality Study of Walnut Creek and Woman Creek Watersheds, ASI, 1990c). This regional relationship showed that the annual runoff was related to the ratio of the drainage areas to the 0.7574 power. Therefore, the monthly runoff, adjusted for drainage area, was multiplied by the ratio of the area of the typical RFP basin (1.0 mi^2) to the original basin (0.95 mi^2) to the 0.7574 power, or 1.04. These adjusted monthly and annual runoff values for a typical one mi^2, 30 percent imperviousness drainage basin at the RFP are given in Table 8.

As indicated above, operational studies of reservoirs are usually performed with at least 50 years of monthly runoff data. Because this long-term period of record is not available for small, developed drainage basins in the Denver metropolitan area, a method of generating a 50-year sequence of monthly flow volumes was needed. Fiering and Jackson (1971) suggest using a lag-one Markov model to generate synthetic streamflows from a given period of streamflow record while preserving selected statistical characteristics of the original streamflow record. For purposes of this study, the following generation equation was used:

$$q_i = \mu + p(q_{i-1} - \mu) + t_i \sigma[1-p^2]^{1/2} \qquad (3)$$

where:
- q_i = streamflow in month i,
- μ = mean of the streamflow values,
- σ = standard deviation of the streamflow values,
- p = lag-one serial correlation coefficient of the streamflow values, and
- t_i = independent normal sampling deviates with mean 0 and standard deviation 1.

Table 8

Monthly and Annual Runoff from a Typical RFP Basin
(30 Percent Imperviousness, 1 mi^2 Area)[1)]
(Ac-Ft)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1969	1.59	1.86	2.13	0	0	19.2	60.0	24.3	20.7	0	2.39	1.33	133.5
1970	0.92	1.07	1.23	0	0	55.2	16.4	0	0	0	1.38	0.77	76.2
1971	0.54	0.64	0.73	0	0	0	0	42.4	0	0	0.82	0.45	45.6
1972	0.45	0.53	0.61	0	0	35.5	0	0	0	0	0.68	0.38	38.2
1973	0.09	0.11	0.12	0	0	0	0	7.07	0	0	0.14	0.08	7.61
1974	0.21	0.24	0.27	0	0	0	12.5	0	3.54	0	0.31	0.17	17.2
1975	1.22	1.42	1.63	0	5.43	10.7	8.46	46.1	0	24.4	1.83	1.02	102.2
1976	0.20	0.23	0.27	0	0	0	0	8.21	7.33	0	0.30	0.17	16.7
1977	0.95	1.11	1.27	8.97	0	6.06	49.3	4.29	5.68	0	1.43	0.79	79.8
1978	0.17	0.19	0.22	0	1.77	10.6	0.51	0	0	0	0.25	0.14	13.8
1979	1.71	2.00	2.29	7.58	44.8	28.8	6.94	32.2	1.39	11.7	2.57	1.43	143.4
1980	0.34	0.40	0.45	0	0	0	6.94	14.5	5.05	0	0.51	0.28	28.5
Avg:	0.70	0.82	0.94	1.38	4.33	13.8	13.4	14.9	3.64	3.01	1.05	0.58	58.6
% of Annual	1.2	1.4	1.6	2.4	7.4	23.5	22.5	25.4	6.2	5.6	1.8	1.0	100.0

1) Based upon Big Dry Creek at Littleton, Imperviousness = 25%, Area = 0.95 mi^2; data for Apr-Oct (Ducret and Hodges, 1972; 1975; Cochran and others, 1970; 1983).

Equation (3) gives streamflows following a normal distribution that preserves the mean, variance, and first order correlation coefficient of the historical streamflow record. If logarithms of the historical streamflow record are used instead of the actual streamflows, Equation (3) gives streamflows following a log-normal distribution that preserves the mean, variance and first order correlation coefficient of the historical record. Streamflows following a gamma distribution also can be generated using a modified sampling deviate (Wilson and Hilferty, 1931). Details of the theory behind the streamflow generation technique used are not given here, but are available in several references (Fiering and Jackson, 1971; Yevjevich, 1972; Kunkel, 1974; Shen, 1976).

The underlying distribution of the original adjusted streamflows is not known with certainty. Determining the underlying distribution of the original streamflows would be helpful in deciding which type of generating distribution to use for the streamflow generation. The monthly streamflows for the 12 years given in Table 8 (144 values) were plotted on both normal probability and log-normal probability paper (Figures 9 and 10, respectively) along with the theoretical probability distributions of the original monthly streamflows. The original monthly streamflow data do not appear to fit either a normal distribution (Figure 9) or a log-normal distribution very well. This may be because of the numerous zero-flow values which account for 48 of the 144 monthly values. Because zero streamflows cannot be plotted for the log-normal probability distribution, the probabilities of the non-zero streamflows were calculated and then adjusted by multiplying each probability by the ratio of the number of months with non-zero streamflow to the total number of months (96 months/144 months). The resulting probabilities were plotted on Figure 10 along with the theoretical two-parameter (mean and variance) log-normal probability distribution for the original streamflows.

From the 12 years of adjusted streamflow data (Table 8), 10 equally likely sequences of monthly streamflows having sequences of 50 years each were generated using techniques presented by Fiering and Jackson (1971). The generated streamflows are not intended to duplicate the past nor predict the future, but rather to provide a series of flow sequences to study the effects of many possible flow combinations. Two different probability distributions were used to generate synthetic streamflows using the above described runoff data (Table 8). The statistics of the generated synthetic streamflows for the normal and log-normal distributions are given in Table 9. A gamma distribution also was used, but the numerous large values generated rendered the statistics and generated streamflows useless. Therefore, only the normal and log-normal distributions are presented in this report. A summary of monthly and annual streamflow values of the generated sequences is presented in Table 10. The results of the normal and log normal generated sequences are given in Appendix B.

The results of the generated sequences presented in Tables 9 and 10 suggest that the normal distribution appears to preserve the mean within 35 percent of the original streamflow data mean, and to preserve the variance within less than one percent of the original streamflow data variance. The results of the generated sequences presented (Tables 9 and 10) also suggest that the log-normal distribution preserves the mean within 51 percent of the original streamflow data mean and the variance within 163 percent of the original streamflow data variance. Thus, the normal distribution appears to preserve the mean and standard deviation of the original streamflows better than the log-normal distribution. Therefore, the 10 sequences of 50 years each generated from a normal distribution were selected for use in the operational studies of temporary water storage at the RFP. Sequence Number 3 (Appendix B), with a mean monthly flow of 6.4 ac-ft and a standard deviation of 10.3 ac-ft, was chosen at random from the 10 sequences for use in the reservoir operational studies for this report.

2.2.6.2 Sewage Treatment Plant Effluent

The amount of STP effluent that will need to be stored and/or reused has been determined from the 1986 through 1990 data. Table 11 lists the monthly, annual, monthly average, and annual average effluent volumes. The months of October, November, and December of 1990 are not actual recorded volumes. At the time of this report, these values were not available, and the individual monthly averages were used to estimate the monthly totals. Using the data for these five years, the average annual effluent flow is approximately 240 ac-ft. The five years of

Table 9

Statistics of Generated Synthetic Streamflow Sequences for a Typical RFP Basin

	Normal		Log Normal	
Sequence (50 Years)	Monthly Mean (ac-ft)	Monthly Std. Dev. (ac-ft)	Monthly Mean (ac-ft)	Monthly Std. Dev. (ac-ft)
1	7.024	11.986	8.873	34.585
2	5.834	10.235	5.363	16.126
3	6.404	10.254	5.515	17.891
4	6.399	10.624	6.555	23.084
5	6.682	11.201	6.959	23.667
6	6.856	11.895	9.685	68.488
7	7.045	12.089	8.636	29.869
8	7.099	11.936	8.294	32.574
9	6.647	11.475	7.968	31.427
10	6.038	10.648	6.081	20.915

	Monthly Mean (ac-ft)	Monthly Std. Dev. (ac-ft)
Original Data (1969-1980)	4.886	11.338

Table 10

Summary of Monthly and Annual Statistics of the Generated Synthetic Streamflow Sequences (6,000 Months [10 Sequences of 50-Years Each] of Generated Values) (Ac-Ft)

	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Value
Normal	Mean	0.78	0.91	1.05	2.13	9.14	17.71	19.81	15.96	5.51	4.33	1.22	0.68	79.23
	Std. Dev.	0.56	0.65	0.75	2.54	9.76	16.20	16.82	15.24	4.69	5.48	0.87	0.49	34.09
	Minimum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.09
	Maximum	2.38	2.71	3.19	10.26	42.11	66.88	79.89	71.61	18.00	27.05	3.49	1.82	175.85
Log Normal	Mean	0.93	1.08	1.25	2.13	3.77	24.91	21.03	24.16	4.38	2.98	1.35	0.74	88.72
	Std. Dev.	1.06	1.23	1.42	2.26	5.66	53.10	38.34	62.79	4.43	4.34	1.58	0.87	104.19
	Minimum	0.0	0.0	0.0	0.12	0.0	0.0	0.0	0.0	0.19	0.0	0.0	0.0	6.38
	Maximum	8.73	10.30	12.02	14.79	64.78	591.43	442.94	1593.67	40.43	36.70	11.49	6.21	1697.47
Original Data 1969-1980	Mean	0.70	0.82	0.93	1.38	4.33	13.84	13.42	14.92	3.64	3.01	1.05	0.58	58.63
	Std. Dev.	0.57	0.66	0.76	3.23	12.84	17.76	20.14	17.12	6.00	7.53	0.85	0.48	47.73
	Minimum	0.09	0.11	0.12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.14	0.14	7.61
	Maximum	1.59	2.00	2.29	8.97	44.8	55.2	60.0	42.4	7.33	24.4	2.57	1.43	143.4

Table 11

Sewage Treatment Plant Effluent Volume
(Ac-Ft)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1986	15.04	16.27	18.26	23.02	22.10	23.32	23.02	19.95	18.57	18.72	16.57	18.72	233.55
1987	15.04	16.27	23.48	25.17	25.47	24.55	24.86	23.02	20.56	18.72	17.95	19.33	254.42
1988	20.87	21.64	24.09	23.85	24.80	22.99	24.98	27.62	23.88	15.93	12.74	13.07	256.44
1989	15.19	19.03	20.41	19.33	22.40	23.02	20.87[1)]	20.87	20.87	18.11	15.04	11.97	227.10
1990	15.10	13.07	17.80	20.99	18.97	17.80	21.42	21.97	19.55	17.86	15.59	15.77	215.90
Avg:	16.25	17.25	20.81	22.47	22.75	22.34	23.03	22.69	20.68	17.87	15.58	15.77	237.48

1) Based upon an RFP population of 6,298.

monthly STP flow volumes shown in Table 11 were used as input to selected operational scenarios. In order to obtain 50 years of STP monthly inflows, the five years were repeated as needed.

2.2.6.3 Ground Water

The amount of ground water that may be intercepted and stored on-site is estimated to be about 10 ac-ft per year. This estimate was taken from the Surface-Water Management Plan (DOE, 1990, Draft). Task 26 (Feasibility of Ground-Water Cutoff and Diversion Study) will better define this ground-water component. Because Task 26 has not advanced far enough for input to this capabilities study, the 10 ac-ft per year will be used as an initial estimate. The 10 ac-ft per year value is generally small compared to the drainage basin runoff and STP components used in this study. The 10 ac-ft per year of ground water was uniformly distributed over the year and assumed to be invariant from year to year.

2.2.6.4 Precipitation

The amount of precipitation that will fall directly on the proposed water storage facility(ies) has been estimated using nearby data. RFP on-site monthly precipitation data are not generally available. Table 12 summarizes these data available for this study. Average RFP precipitation as shown in Table 12 is about 15.2 inches/year based upon two record lengths. Because the monthly precipitation at the RFP was not adequate, the 43 year (1948 through 1990) record of precipitation data collected at the Cherry Creek Dam were used as input to the various operational studies analyzed for this report. Table 13 presents the monthly and annual precipitation values at Cherry Creek Dam. The 43 years of data have an average of about 15.3 inches/year. Because the operational studies analyzed 50 years of reservoir operation, the precipitation data for years 1948 through 1954 were repeated in the data file to represent 50 years of precipitation. The monthly and annual precipitation averages from the 24-year period from 1953 through 1976 at the RFP is given in Table 14 as a comparison to the Cherry Creek data and

Table 12

Monthly and Annual Precipitation at RFP (Inches)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1971	--	--	--	--	--	.22	1.11	.35	3.17	.55	.15	.40	--
1972	.93	.08	.83	1.58	.97	.95	1.59	2.47	1.42	.91	2.00	1.05	14.78
1973	1.05	.15	2.04	4.73	4.71	.66	1.53	.54	2.74	.65	1.30	1.48	21.58
1974	1.12	1.11	.89	3.05	.08	1.99	1.00	.22	1.41	1.91	1.15	.38	13.20
1975	.38	.84	1.42	1.31	3.73	1.11	.83	1.22	.80	.68	.85	.21	13.38
1976	.13	.04	.34	2.16	1.93	.90	1.53	1.46	4.49	.66	.21	.10E	13.95E
1977	.06	.47	.08	1.80	.46	1.13	2.73	1.04	.12	.40	.34	.09	8.72
1978	.35	.33	--	--	--	--	--	--	--	--	--	--	--
1979	--	--	--	--	--	--	--	--	--	--	--	--	--
1980	--	--	--	--	--	--	--	--	--	--	--	--	--
1981	--	--	--	--	--	--	--	--	--	--	--	--	--
1982	--	--	--	--	--	--	--	--	--	--	--	--	--
1983	.02	.19	4.64	2.21	3.97	2.76	2.10	3.46	.01	.34	2.47	.42	22.59
1984	.36	.65	.84	1.42	.56	.91	.77	1.69	.16	3.68	.00	.28	11.32
1985	.41	.77	.64	1.69	2.92	1.73	3.38	.11	1.24	.00	1.26	.08	14.23
1986	.06	.93	.00	2.68	2.23	2.03	1.46	1.58	.84	.98	.98	1.26	15.03
1987	.43	1.19	1.35	.91	2.40	5.72	.57	2.09	.64	1.06	1.10	.71	18.17
1988	.27	.55	1.10	1.22	2.20	.95	1.66	1.60	1.36	.09	.40	.54	11.94
1989	.53	.11	.21	.51	2.20	.02	.55	1.96	6.03	.11	.11	.32	12.66
1990	.21	.17	1.64	1.32	1.43	.12	3.02	1.41	2.00	1.11	.64	--	--
Avg:	.42	.51	1.18	1.91	2.17	1.50	1.67	1.35	1.46	1.00	1.00	.54	15.18
1953-1976 Avg:	.50	.65	1.22	1.71	2.88	1.69	1.38	1.19	1.61	.99	.81	.53	15.16

Notes: -- means no data available.
E means estimated.

Source: EG&G Rocky Flats, Inc.

Table 13

Monthly and Annual Precipitation at Cherry Creek Dam (Inches)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1948	.97	.28	1.32	1.90	1.76	3.07	.84	2.13	.23	.21	.59	.27	13.57
1949	.67	.11	1.27	1.17	3.36	3.11	1.90	.56	.17	.86	.20	.13	13.51
1950	.43	.57	.35	2.69	1.82	1.45	3.08	.24	.58	.13	.81	.20	12.35
1951	.56	.55	1.30	1.66	2.34	1.40	.76	3.46	.53	1.26	.77	.21	14.80
1952	.00	.28	1.04	2.11	2.21	.08	.51	1.71	.37	.07	.76	.23	9.37
1953	.41	.55	.53	1.74	2.12	1.79	1.50	2.03	.08	.27	.20	.67	11.89
1954	.15	.08	.25	.70	.37	.50	2.31	1.05	.55	.11	.42	.50	6.99
1955	.05	.11	.21	.32	2.88	1.18	1.80	3.07	1.00	.16	.30	.05	11.13
1956	.17	.22	.35	.37	.82	.37	2.59	1.84	.00	.48	.31	.30	7.82
1957	.24	.55	.55	2.83	5.75	1.26	2.71	2.19	.78	2.24	.25	.07	19.42
1958	.35	.88	.74	1.77	4.86	1.12	1.88	1.17	1.73	.58	.50	.36	15.94
1959	.84	.62	1.70	.97	2.74	1.68	.70	.13	1.00	1.50	.77	.12	12.77
1960	.47	1.05	.51	1.17	2.15	.22	2.20	.20	.33	2.13	.09	.56	11.08
1961	.00	.46	1.76	.99	2.26	2.29	1.07	1.37	3.91	.63	.50	.10	15.34
1962	.40	.39	.28	1.11	.57	2.89	1.54	.76	.36	.30	.67	.17	9.44
1963	.85	.21	1.78	.02	.94	2.43	.70	4.70	2.32	.54	.73	.57	15.79
1964	.75	1.72	1.30	.61	2.49	1.06	1.76	.99	.76	.03	1.01	.54	13.02
1965	.75	1.26	1.29	2.53	2.12	10.07	5.08	3.11	2.99	.65	.20	.34	30.32
1966	.46	1.07	.50	.98	.66	1.12	2.90	.98	1.14	1.06	.45	.08	11.40
1967	.85	.29	.51	3.02	4.08	3.19	4.15	1.41	.81	1.31	.61	.97	21.20
1968	.46	.92	.70	1.80	1.09	.38	2.24	1.93	1.09	1.00	.99	.40	13.00
1969	.14	.19	1.15	.89	7.48	3.06	2.60	2.23	.22	4.37	.86	.62	23.81
1970	.13	.17	1.69	.57	1.74	1.74	2.20	.94	2.44	1.18	1.31	.02	14.13
1971	.25	1.06	.52	1.86	2.00	.08	1.40	1.35	2.61	1.09	.00	.61	12.83
1972	.53	.41	.67	1.39	.42	2.86	1.48	2.16	1.17	.52	2.22	.60	14.43
1973	.68	.12	1.05	1.75	7.32	.59	2.20	.89	2.93	1.50	.55	2.08	21.66
1974	.86	1.02	1.64	1.44	.08	2.78	2.54	.71	.73	2.01	.84	.65	15.30
1975	.38	.20	.55	1.13	3.03	2.52	3.30	2.15	.24	.09	1.50	.07	15.16
1976	.50	.17	.63	1.38	1.17	.88	3.11	1.25	2.55	1.69	.29	.44	14.06
1977	.16	.39	2.05	1.81	.28	1.58	3.22	2.84	.19	.44	1.15	.46	14.57
1978	.47	.66	.82	2.06	3.32	1.90	1.24	.27	.22	1.69	.51	1.11	14.27
1979	.40	.55	2.38	1.59	1.98	1.99	.44	1.30	.42	1.01	.95	2.34	15.35
1980	.70	.85	1.32	.92	2.38	.00	3.93	.65	.73	.10	.75	.02	12.35
1981	.50	.36	3.68	.57	3.95	.65	3.07	1.69	.46	1.21	.50	1.00	17.64
1982	.27	.45	.50	.42	4.15	2.48	2.71	2.23	2.37	2.18	.27	.51	18.54
1983	.05	.00	1.64	2.40	4.09	3.10	4.82	2.14	.24	.11	1.48	.21	20.28
1984	.07	.81	1.21	3.53	2.83	1.62	3.15	3.28	.55	3.84	.14	.33	21.36
1985	.48	1.01	.70	2.25	2.72	2.29	4.77	.31	3.13	.37	1.47	.30	19.80
1986	.25	.25	*1.11*	2.38	1.97	2.02	3.53	.37	.19	1.87	*.71*	*.53*	15.18
1987	*.45*	*.53*	*1.11*	*1.47*	6.53	2.90	.82	.20	.96	1.53	2.50	2.41	21.41
1988	.32	.99	1.19	.99	4.46	2.95	1.28	3.59	1.09	.06	.50	.86	18.28
1989	1.13	.27	.70	.74	1.67	1.61	2.70	1.46	1.34	.49	.37	.33	12.81
1990	.87	.00	3.14	1.32	1.82	.41	2.53	2.44	1.52	*1.02*	*.71*	*.53*	16.31
Avg:	.45	.53	1.11	1.47	2.62	1.88	2.31	1.62	1.09	1.02	.71	.53	15.34

Source: National Weather Service Annual Climatological Summaries.
Values in *italics* are average monthly values.

Table 14

Comparison of Average Monthly and Annual Evaporation Data
From Various Locations
(Inches)

	Precipitation			Evaporation	
	Average Values from Cherry Creek[1)5)]	Average Values from RFP[2)]	Average Values from the Climatic Atlas[3)]	Average Values from Cherry Creek Dam[1)]	Average Values from Fort Collins[4)5)]
January	0.45	0.50	0.5	0.50	0.50[6)]
February	0.53	0.65	0.5	0.62	0.62[6)]
March	1.11	1.22	1.5	1.06	1.06[6)]
April	1.47	1.71	2.8	2.90	3.43
May	2.62	2.88	3.0	4.71	3.96
June	1.88	1.69	2.0	5.77	4.53
July	2.31	1.38	2.0	6.48	5.07
August	1.62	1.19	2.0	5.69	4.41
September	1.09	1.61	1.0	4.57	3.43
October	1.02	0.99	1.0	3.52	2.29
November	0.71	0.81	1.0	1.61	1.26
December	0.53	0.53	1.0	0.70	0.70[6)]
ANNUAL	15.34	15.16	16.0	38.13	31.26

1) Periods of Record 1948 through 1990 (Precipitation) and 1948 through 1983 (Evaporation) (With 10 missing months).

2) Periods of Record 1953 through 1976.

3) Climatic Atlas of the United States, ESSA (1983).

4) Periods of Record 1953 through 1990 (with 236 missing months).

5) These values were used to perform the reservoir operational studies.

6) Data from Cherry Creek Dam.

regional precipitation values. As can be seen from this table the average monthly and annual precipitation amounts do not vary greatly within this region.

2.2.6.5 Floods

The 100-year, 72-hour storm of 6.3 inches has traditionally been used as the design storm at the RFP (ASI, 1991b; DOE, 1986). Table 3 shows the runoff associated with the 100-year, 72-hour storm for drainage basins contributing runoff to the three terminal ponds (Pond A-4, Pond B-5, and Pond C-2) at the RFP. A detailed discussion of the existing terminal ponds and their ability to completely store the runoff from the 100-year, 72-hour storm is given in Section 2.1.2 above. The total runoff from the 100-year, 72-hour storm was estimated to be about 425 acre-feet (ac-ft) from the RFP Controlled Area, the West Spray Field and T130 complex area, the Old Landfill area, and the Present Landfill area as well as the areas upgradient from the terminal ponds (Table 3). For drainage areas in the Buffer Zone, the U.S. Soil Conservation Service (SCS) runoff curve number (CN) was assumed to be about 77. Therefore, about 3.74 inches of the 6.3 inches of rainfall from the 100-year, 72-hour storm would run off. This runoff was used to estimate runoff from additional drainage areas, such as the area between the terminal ponds and Great Western Reservoir, which might contribute flood flows as input to the reservoir operational studies.

The time of occurrence of the 100-year, 72-hour storm is uncertain. For purposes of this study, it was assumed that the storm would occur during the month of July. The probability that at least one 100-year, 72-hour storm would occur during the assumed 50-year flow sequence is about 30 percent if the storms are assumed to follow a series of trials similar to the tossing of a fair coin. Therefore, one runoff event from the 100-year, 72-hour storm was randomly placed within the 50-year runoff sequence. The randomly located storm was assumed to occur in July 1970 within the 50-year sequence of flows occurring between January 1948 and December 1997.

In the cases where the terminal ponds are used to capture runoff which is conveyed to either an off-channel storage facility or to Great Western Reservoir, it was assumed that the 100-year, 72-

hour storm runoff could be evacuated from the terminal ponds in two months. The evacuation rate to achieve this for all three terminal ponds is less than 1,000 gpm (Figures 6, 7 and 8).

2.2.7 Outflow Sources, Water Reuse, Downstream Releases and Methods of Determination

The primary sources of water outflow that this study considers consist of natural net evaporation (precipitation minus evaporation) combined with enhanced evaporation, water reuse for supplementing the water required in the recycle processes described in Tasks 11 and 13 Treated Sewage/Process Wastewater Recycle Study (ASI, 1991c), treatment of storm water and discharge off site to account for downstream water rights or other releases. Maintenance of on-site wetlands is another possible use that has been identified but will not be further discussed because use of treated water to sustain wetlands does not appear to serve the concept of zero discharge.

2.2.7.1 Evaporation

Evaporation of stored water will occur naturally from the temporary water-storage reservoir surface. In addition, the evaporation rate can be increased by installation of an evaporation enhancement system over the water-storage facility. Task 15 (Surface-Water Evaporation Study) will include an in-depth analysis of the atmospheric processes that cause evaporation at the RFP along with a method of predicting pan evaporation at the RFP. However, since this information is not yet available, nearby (Fort Collins and Cherry Creek Dam) monthly pan and reservoir evaporation data were examined as potential data sources for monthly free water-surface evaporation rates at the RFP site. Reservoir evaporation data have been collected by the COE at Cherry Creek Dam since 1948. This reservoir evaporation is estimated by the COE based upon a reservoir water balance, with evaporation and seepage being unknowns. Therefore, these reservoir evaporation values may slightly over-predict the actual reservoir evaporation. For the period 1948 through 1983, the Cherry Creek Dam average monthly reservoir evaporation is given in Table 14 and averages about 38.1 in/yr.

The average annual pan evaporation rate from the Fort Collins data for the period 1953 through 1990 is about 44.7 inches/year. To estimate free water-surface evaporation from pan data requires adjustment of the pan evaporation by multiplying pan evaporation by a pan coefficient. Pan coefficients for the United States are published by the National Weather Service (Kohler and others, 1959; Farnsworth and others, 1982) and also have been published by ESSA (1983). For this part of Colorado, these references indicate an annual pan coefficient of about 0.70. This coefficient was used to convert the monthly and annual Fort Collins pan evaporation data to reservoir evaporation data. The average monthly reservoir evaporation for the period 1953 through 1990, based upon the Fort Collins pan data, are presented in Table 15.

Reservoir evaporation at Fort Collins for the period 1953 through 1990 averages about 31.3 in/yr. Because no pan data were available for the months of January through March and December, Cherry Creek Dam reservoir evaporation data were used for these months to fill-in the Fort Collins evaporation data. Because the adjusted Fort Collins data are judged to be more representative of actual reservoir evaporation at the RFP, they were used in the reservoir operational model described by Equation (1). Monthly and annual reservoir evaporation, based upon the Fort Collins pan evaporation data and the Cherry Creek Dam reservoir evaporation data, are shown in Table 15 for the 1953 through 1990 period of record (38 years). This period of record was extended to 50 years by repeating the 1953 through 1957 evaporation data (5 years) at the beginning of the record and by repeating the 1953 through 1959 evaporation data (7 years) at the end of the record to obtain a 50-year record (1948 through 1997) parallel to the precipitation and runoff records.

National Weather Service (NWS) publications (Kohler and others, 1959; Farnsworth and others, 1982; and ESSA, 1983) summarize regional pan and free water-surface evaporation for this part of Colorado. These publications indicate that annual pan evaporation at the RFP should be about 55 in/yr, whereas annual free water-surface evaporation should be between 36 and 38 in/yr. Using the Fort Collins annual free water-surface evaporation value of about 31.3 in/yr may slightly under-estimate the actual evaporation at the RFP, but would account for uncertainties in

Table 15

Monthly and Annual Reservoir Evaporation at Fort Collins (Inches)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1953	*.50*	*.62*	*1.06*	2.22	3.87	4.71	4.87	4.68	4.63	2.74	*1.26*	*.70*	31.86
1954	*.50*	*.62*	*1.06*	4.54	3.98	5.85	6.27	5.04	3.94	2.51	*1.26*	*.70*	36.27
1955	*.50*	*.62*	*1.06*	4.84	5.38	3.70	6.10	4.31	3.81	2.49	*1.26*	*.70*	34.77
1956	*.50*	*.62*	*1.06*	2.95	3.63	5.57	5.36	4.24	4.35	2.86	*1.26*	*.70*	33.10
1957	*.50*	*.62*	*1.06*	1.90	2.95	4.43	4.99	4.30	3.54	1.58	*1.26*	*.70*	27.83
1958	*.50*	*.62*	*1.06*	3.00	3.56	4.56	4.30	4.98	3.82	2.61	*1.26*	*.70*	30.97
1959	*.50*	*.62*	*1.06*	3.30	3.44	4.30	5.08	4.50	3.48	1.58	*1.26*	*.70*	29.82
1960	*.50*	*.62*	*1.06*	3.77	3.62	5.01	5.36	5.71	4.15	2.26	*1.26*	*.70*	34.02
1961	*.50*	*.62*	*1.06*	2.98	3.19	3.35	3.82	3.55	2.23	2.16	*1.26*	*.70*	25.42
1962	*.50*	*.62*	*1.06*	*3.43*	3.76	3.46	3.93	3.73	3.12	2.21	*1.26*	*.70*	27.78
1963	*.50*	*.62*	*1.06*	*3.43*	3.62	4.31	4.89	3.09	3.15	2.09	*1.26*	*.70*	28.72
1964	*.50*	*.62*	*1.06*	*3.43*	4.10	3.60	4.44	4.19	3.12	2.28	*1.26*	*.70*	29.30
1965	*.50*	*.62*	*1.06*	*3.43*	2.91	3.07	3.89	3.84	2.63	*2.28*	1.26	*.70*	26.19
1966	*.50*	*.62*	*1.06*	*3.43*	4.28	4.23	4.98	4.51	3.29	2.45	*1.26*	*.70*	31.31
1967	*.50*	*.62*	*1.06*	3.87	2.78	1.97	2.96	3.60	2.48	1.98	*1.26*	*.70*	23.78
1968	*.50*	*.62*	*1.06*	*3.43*	*3.98*	4.56	4.41	4.03	3.20	2.14	*1.26*	*.70*	29.89
1969	*.50*	*.62*	*1.06*	*3.43*	*3.98*	3.28	4.62	4.62	3.50	*2.27*	*1.26*	*.70*	29.84
1970	*.50*	*.62*	*1.06*	*3.43*	*3.98*	3.98	4.73	4.05	3.29	1.87	*1.26*	*.70*	29.47
1971	*.50*	*.62*	*1.06*	*3.43*	*3.98*	4.02	4.45	4.58	3.33	2.07	*1.26*	*.70*	30.00
1972	*.50*	*.62*	*1.06*	*3.43*	3.59	4.38	4.34	3.97	3.26	2.14	*1.26*	*.70*	29.25
1973	*.50*	*.62*	*1.06*	*3.43*	*3.98*	4.53	4.56	4.78	3.13	2.33	*1.26*	*.70*	30.88
1974	*.50*	*.62*	*1.06*	*3.43*	5.54	5.01	5.49	4.72	3.27	2.65	*1.26*	*.70*	34.25
1975	*.50*	*.62*	*1.06*	*3.43*	*3.98*	4.87	5.40	5.18	3.43	*2.27*	*1.26*	*.70*	32.70
1976	*.50*	*.62*	*1.06*	*3.43*	*3.98*	5.29	5.57	4.26	2.95	*2.27*	*1.26*	*.70*	31.89
1977	*.50*	*.62*	*1.06*	*3.43*	*3.98*	5.97	6.54	4.24	4.37	*2.27*	*1.26*	*.70*	34.94
1978	*.50*	*.62*	*1.06*	3.85	4.73	5.31	5.34	4.92	4.25	2.67	*1.26*	*.70*	35.21
1979	*.50*	*.62*	*1.06*	*3.43*	3.70	3.85	4.52	3.68	3.69	2.74	*1.26*	*.70*	29.75
1980	*.50*	*.62*	*1.06*	*3.43*	*3.98*	*4.54*	*5.08*	*4.40*	*3.40*	*2.27*	*1.26*	*.70*	31.24
1981	*.50*	*.62*	*1.06*	*3.43*	*3.98*	5.85	6.23	4.37	3.84	*2.27*	*1.26*	*.70*	34.11
1982	*.50*	*.62*	*1.06*	*3.43*	*3.98*	5.45	6.37	5.29	2.79	*2.27*	*1.26*	*.70*	33.72
1983	*.50*	*.62*	*1.06*	*3.43*	*3.98*	4.64	5.47	4.76	3.79	2.28	*1.26*	*.70*	32.49
1984	*.50*	*.62*	*1.06*	3.37	4.79	4.26	5.58	4.49	3.27	*2.27*	*1.26*	*.70*	32.17
1985	*.50*	*.62*	*1.06*	3.77	4.65	5.24	4.46	4.78	3.29	2.23	*1.26*	*.70*	32.56
1986	*.50*	*.62*	*1.06*	2.98	3.90	5.22	5.35	4.47	2.82	1.86	*1.26*	*.70*	30.74
1987	*.50*	*.62*	*1.06*	3.88	3.74	5.34	6.80	4.55	3.17	*2.27*	*1.26*	*.70*	33.89
1988	*.50*	*.62*	*1.06*	3.60	*3.98*	5.77	5.12	4.43	3.93	2.53	*1.26*	*.70*	33.50
1989	*.50*	*.62*	*1.06*	4.04	4.89	4.33	5.91	4.35	3.31	2.53	*1.26*	*.70*	33.50
1990	*.50*	*.62*	*1.06*	2.85	*3.98*	*4.54*	*5.08*	*4.40*	*3.40*	*2.27*	*1.26*	*.70*	30.66
Avg:	.50	.62	1.06	3.43	3.96	4.53	5.07	4.41	3.43	2.29	1.26	.70	31.26

Source: National Weather Service Annual Climatological Summaries.
Values in *italics* are average monthly values.

the evaporation data. The 31.3 in/yr is within about one standard deviation of the annual free water-surface evaporation for this part of Colorado (Kohler and others, 1959). The average Fort Collins free water-surface evaporation for the May-through-October months is about 23.7 in, which is closer to the NWS May-through-October RFP free water-surface evaporation of 25 in than the Cherry Creek Dam May-through-October free water-surface evaporation of about 30.7 in. Thus, the decision to use the Fort Collins evaporation data appears to be satisfactory. The monthly and annual evaporation averages from Fort Collins are given in Table 14 as a comparison to the Cherry Creek data.

Because annual and monthly free water-surface evaporation volume is proportional to free water-surface area, maximizing the water-surface area will allow for the greatest total evaporation. This option requires no investment in operation or maintenance, because it relies on natural processes to function.

Enhanced evaporation by direct aerosol spray to the atmosphere can be accomplished through mechanical methods. Spray evaporation rates are a function of the size of the water droplets, wind speed, and relative humidity and temperature of the air into which the droplet is sprayed.

The spray evaporation rates will be higher than the free water-surface evaporation rates. This will require a water distribution system, pump(s), pipe risers with nozzles, a reliable power supply, and a weather monitoring station. The use of this system will be intermittent due to changing weather conditions (wind drift), mechanical breakdown, etc. which will have an impact on the efficiency of the operation. It is estimated that by pumping water at a rate of approximately 500 gallons per minute (gpm), for 250 days per year (providing for adverse weather conditions and mechanical breakdown), for eight hours per day, approximately 178 ac-ft of water could be evaporated annually. Table 16 presents the monthly and annual evaporation rates for pumping at 500 gpm, 1,000 gpm, and 2,000 gpm at ambient average monthly air temperatures and average monthly relative humidity (R.H.). These numbers were derived based on the installation of an evaporation system, similar to the one described by Merrick & Company

Table 16

Enhanced Evaporation By Spraying Water at the Temporary Storage Reservoir[1]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Average R.H.(%)	43	48	50	50	50	45	45	42	44	36	47	44	--
Average Air Temp (°F)	30.0	33.3	36.4	46.5	53.5	65.0	71.0	70.0	61.0	52.0	39.5	35.0	--
% of Pumped Water Evaporated[2]	46.3	46.3	48.5	60.4	66.4	80.9	87.5	90.4	80.6	80.3	55.3	51.5	66.2
Evaporation (Ac-Ft) For Pumping Rate of 2,000 gpm[3]	42.2	38.2	44.2	53.4	60.6	71.4	79.8	82.6	71.2	73.4	49.0	47.0	713.0
Evaporation (Ac-Ft) For Pumping Rate of 1,000 gpm[3]	21.1	19.1	22.1	26.7	30.3	35.7	39.9	41.3	35.6	36.7	24.5	23.5	356.5
Evaporation (Ac-Ft) For Pumping Rate of 500 gpm[3]	10.6	9.5	11.1	13.3	15.1	17.9	20.0	20.7	17.8	18.3	12.2	11.7	178.2

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1) Merrick & Company (1990).

2) Assumes: Droplet radius = 0.0007m, sprinkler height = 1 ft, droplet fall time = 0.25 sec, number of sprinklers = 400, area = 23 ac.

3) Assumes: Pumping rate for 250 days/year, 8 hours/day.

(1990). If the enhanced spray evaporation is operated over a free water surface, the evaporation which would have occurred from the free water surface would be suppressed because the vapor pressure gradient across the water surface would be small due to the high relative humidities at the air-water interface. Therefore, enhanced spray evaporation over an existing or proposed reservoir would include only the spray evaporation and those areas of the free water surface where spraying is not occurring. Thus, for spray evaporation systems, it was assumed that a lined shallow reservoir separate from any temporary water-storage reservoir would be constructed.

2.2.7.2 Water Rights

As discussed above, the RFP is drained by Walnut Creek and Woman Creek, which are part of the Big Dry Creek basin and by Rock Creek, a part of the Coal Creek Basin (Figure 11). The RFP is located in Water Districts 2 and 6 as defined by the Colorado State Engineer (1979). Big Dry Creek and its tributaries are located in Water District 2 and Rock Creek is located in Water District 6. The Clear Creek basin, in Water District 7, is south of the RFP and Water Districts 2 and 6.

A preliminary study of the water rights related to the RFP was done by DOE (1990 Draft). That preliminary study included: (1) an inventory of the existing water rights in the Big Dry Creek basin; (2) preparation of straight line diagrams showing the locations of the water rights; (3) review of the Denver Water Board (DWB) agreement to provide water to the RFP; and (4) an analysis of the Colorado State Engineer's call records from the South Platte River. ASI (1990b) has estimated the monthly and annual historical runoff from the RFP. Senior water rights exist downstream of RFP that are dependent on the runoff from this property. Based upon the historic land use condition, ASI (1990b) estimated that the annual yield of drainage basins near the RFP would be according to the relationship:

$$Q_a = 13.986A^{0.7574} \qquad (4)$$

where: Q_a = annual runoff volume (ac-ft),

A = drainage area (mi^2).

The above Equation (4) estimates the natural historical runoff from the RFP prior to development. As development occurred at the RFP, some of the natural areas were made impervious which resulted in more runoff. Within the Controlled Area at the RFP, the estimated imperviousness is about 30 percent. Based upon this imperviousness and the monthly runoff from the generated synthetic sequences, an estimate of the amount of replacement water which must be released downstream can be made. For purposes of this study, it was assumed that the developed runoff, rather than the historical natural runoff, would be replaced for downstream water rights considerations. This assumption is consistent with our understanding of what the Colorado Courts may rule, and also consistent with assumptions made by DOE (1990, Draft).

Depletion to the stream system is the governing consideration in water rights analyses. Depletion is calculated as the water use minus the return flow, adjusted for any lag time. Only out-of-priority depletions need to be replaced. The out-of-priority depletions were estimated in two ways: (1) release of all developed runoff from the RFP, and (2) release of developed basin runoff based upon South Platte River calls. DOE (1990, Draft) indicated that South Platte River calls on upstream junior water rights in a typical dry year (1963) would require that 100 percent of the runoff from the RFP be permitted to continue unimpeded downstream during the months of July and August (Table 17). Additionally, some of the runoff during the months of April, May, June, September, and October also would have be permitted to flow downstream. Table 17 shows the monthly downstream releases from the RFP to satisfy the South Platte River calls.

There also could be additional releases for downstream senior water rights in Big Dry Creek when the South Platte River calls are not in effect. However, an analysis of the Big Dry Creek water rights (DOE, 1990, Draft) indicates that Big Dry Creek would be out of priority during the

Table 17

Monthly Distribution of Average Dry-Year Downstream Releases for Water Rights Based Upon Developed Area Runoff and South Platte River Calls[1] (Ac-Ft)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
(%) of Monthly Flow Released	0	0	0	57	84	83	100	100	63	26	0	0	--
Pond A-4 (1.07 mi^2)	0	0	0	1.2	7.4	13.4	19.0	17.7	4.4	1.2	0	0	64.3
Pond B-5 (0.41 mi^2)	0	0	0	0.6	3.6	6.6	9.2	8.6	2.1	0.6	0	0	31.3
Pond C-2 (0.35 mi^2)	0	0	0	0.5	3.2	5.8	8.1	7.6	1.9	0.5	0	0	27.6
Terminal Ponds (1.9 mi^2)	0	0	0	1.9	11.5	20.9	29.4	27.4	6.8	1.9	0	0	99.8
Great Western (5.5 mi^2)	0	0	0	4.3	25.6	46.7	65.7	61.3	15.2	4.3	0	0	223.1

1) Based upon Generated Flow Sequence Number 3 (Appendix B).

irrigation season (April thorough October). Therefore, it is not likely that releases over-and-above the South Platte River call releases would be needed from the RFP.

It appears, from Table 17, that about 99.8 ac-ft of the estimated average annual flow of 125.3 ac-ft at the three terminal ponds (drainage area = 1.9 mi^2) must be released downstream for senior water rights in a dry year. The released water was assumed to have an acceptable water quality for the release. Table 17 also shows anticipated releases for dry-year water rights releases, based upon South Platte River calls, for other individual parts of the RFP as well as for the total drainage basin contributing runoff to Great Western Reservoir (about 5.5 mi^2). In the event that surface-water runoff is stored on site with minimal releases, DOE would be required to provide for replacement water through a Plan for Augmentation or Plan of Substitute Supply. For purposes of the operational study alternatives having downstream releases, the actual percentages of monthly inflow shown on Table 17 were released downstream for each month of the 50-year inflow sequence rather than the average monthly release.

The STP effluent discharge is not considered a component of the basin yield (DOE, 1990, Draft; Holland & Hart, 1990). The DWB supplies leased water to the RFP from transmountain diversion of Colorado River basin water. Transmountain water may be reused to extinction. However, the DWB retains dominion and control of the water released to the South Platte River.

2.2.7.3 Wetlands

Maintaining on-site wetlands could be a beneficial use for water stored in ponds. Numerous regulations and Acts have been promulgated for the purpose of protecting water related resources. The relevant acts and laws which protect environmental resources, including wetlands, are:

- o National Environmental Policy Act (NEPA) of 1969;
- o Executive Order 11990 - Protection of Wetlands;
- o Sections 401 and 402 of the Clean Water Act;

- o Fish and Wildlife Act of 1956, plus associated coordinated acts;
- o Regulations promulgated under 10 CFR Part 1022 - Compliance with Floodplain/Wetlands Environmental Review Requirements;
- o 404 Permit - Section 404(b)(1), Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR Part 230); and
- o Permits for Discharge of Dredged and Fill Material into Waters of the United States.

Linear wetlands exist along the alignment of Walnut Creek, South Walnut Creek, and Woman Creek, as well as, the various tributaries to these streams. In addition, each man-made pond along these streams supports a wetland area. A beneficial use of water from the proposed storage facilities may be to maintain the quality of the existing wetlands located in these areas. However, this water would require treatment before being released, and a long term commitment to maintain these wetlands would be created. Because of this long-term commitment, primarily, release of stored water to maintain wetlands may not be a preferred water use.

2.2.7.4 Irrigation

On-site irrigation demands could be met from water stored in on-site ponds. This could include spray or flood irrigation of landscaped areas, crop production, or tree planting projects. Trees may be planted to create wind breaks to aid in minimizing wind erosion or create wind barriers in specified areas, or simply to enhance the aesthetics of the plant site. The feasibility of using water in this manner has been questioned in recent years and may not be consistent with the philosophy of the zero-offsite water-discharge. This is exemplified by the discontinuation of spray irrigation into adjacent landscape areas from Pond B-3 in 1989.

Prior to the spring of 1990, the operation of spray irrigation from Pond B-3 was nearly continuous. In 1989 the North Spray Field was taken out of service (DOE, 1990 Draft). Concerns about the validity of spray irrigation as a water control technique, possible interaction with SWMU's, and uncertainty over the definition of spray irrigation in accordance with "good engineering practices" resulted in cessation of all spray irrigation until these issues are resolved (DOE, 1990 Draft).

2.2.7.5 Recycling

Recycling for non-potable water uses at the RFP will probably be the largest use of temporarily stored water. Tasks 11 and 13 (Treated Sewage/Process Wastewater Recycle Study, ASI, 1991c) discusses the potential for reuse (recycling) of STP effluent and the required treatment process to achieve a level of water quality suitable for selected water-demand centers at the RFP.

One benefit of on-site water reuse is that pollution control costs are predictable for a long period of time, and all internal water users would be dealing with consistent and controllable water quality. Additionally, off-site liabilities such as release of contaminants from a point source discharge would be minimized.

Recycle alternatives would require a source of makeup water to account for evaporative and other losses. This makeup water can be obtained from the proposed temporary water-storage facilities. Stored water must be treated to 100 parts per million (ppm) Total Dissolved Solids (TDS) prior to being used as makeup water in the recycling system (ASI, 1991c). This makeup water will have a 90% recovery rate after passing through the proposed ultrafiltration/reverse osmosis (UF/RO) treatment facility. Water reuse quantities could have three alternatives, low, average, and high demand, based upon the scenarios presented in Tasks 11 and 13 and on the RFP population (ASI, 1991c). For this study, we have assumed "low demand" as a RFP personnel population of 3,000, "average demand" as a population of 6,300, and "high demand" as a population of 9,000. The current population at RFP is approximately 6,300 (ASI, 1991c). Non-potable reuse is tied to RFP population, and implicitly to industrial uses, for ease of prediction and does not imply that the RFP population will be consuming the reuse water. The reuse water would be used in the industrial raw water supply for Tasks 11/13 Alternatives 1 and 2 below.

Tasks 11/13 Alternative 3 below is given for comparison purposes only and is not analyzed in this study.

Raw water for use at the RFP is currently purchased from the DWB. A portion of that water is treated to potable quality and the remainder is bypassed to feed the raw (industrial) water system. Currently, purchased water is the primary source of water for the RFP. Industrial water is used primarily for boiler and cooling tower makeup water and two areas of lawn irrigation during summer months. Potable water is currently used for all direct human uses: fire protection, laundry, film developing, cooling tower makeup, air washers, landscape irrigation, and process water. Process water use includes chemical preparation, machine and instrument cooling and laboratory needs. Three recycle alternatives, analyzed in Tasks 11 and 13 (ASI, 1991c), were investigated to eliminate or minimize discharge of effluent from the RFP and coincidentally to decrease the amount of water purchased from the DWB. The water volumes used in these alternatives were based upon a plant current population of 6,300 employees. Alternative 1 involved a non-potable reuse system; Alternative 2 proposed a potable/non-potable system switch; and Alternative 3 analyzed a potable reuse system.

Tasks 11/13 Alternative 1 utilizes RFP potable and industrial water delivery systems currently in place. High quality treated wastewater would be added to the industrial water supply system only and other industrial water use centers added to the industrial water system. This assumes either pumping of STP effluent from Building 995 to a point near the head of the water system, or siting the effluent treatment facility near the head of the water system. This alternative achieves a balance by providing 3.07 million gallons per year of makeup water for reuse in the system.

Tasks 11/13 Alternative 2 would require that the water treatment plant be disconnected from the existing potable water system and reconnected to the existing industrial water system. Then the existing industrial water system would be connected to the existing water treatment plant, resulting in a switching of the two systems. This, in conjunction with extensive interior and exterior building plumbing modifications, would result in a balanced system that would be self-correcting. Tasks 11/13 Alternative 2 would require that 30.4 million gallons per year of makeup water be added to the industrial system.

Tasks 11/13 Alternative 3 assumes that STP effluent from the treatment train would be stored and returned to the industrial water facilities feeding the domestic (potable) water treatment plant. Highly treated wastewater would be required as raw water inflow to the existing combined potable/industrial water system. This alternative would result in the need for 52.6 million gallons per year of makeup water to achieve a balance. This alternative was not considered in this current temporary water storage study because recycling STP effluent or treated RFP runoff to the potable water supply system is currently unacceptable.

Each of these alternatives will have a different demand of makeup water depending upon population of RFP. Table 18 depicts the amount of water that would be required for each reuse alternative and each population demand assuming all STP effluent was stored separately and makeup water came only from surface-water runoff.

For purposes of the operational studies, the monthly makeup water distribution was assumed to be the average of the monthly water demand at the RFP based upon the years 1986 through 1989. The table below summarizes the monthly distribution of both STP effluent and makeup water recycle based upon that period of record.

ESTIMATED MONTHLY DISTRIBUTION OF STP EFFLUENT
AND MAKEUP WATER RECYCLE
BASED UPON 1986 THROUGH 1989 WATER PURCHASES AT RFP

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
% per Month	6.8	7.1	7.4	7.4	8.0	9.8	12.7	11.6	9.0	7.4	6.6	6.2	100

Table 18

Quantity of Makeup Water Needed From Runoff

On-site Personnel	3,000 (Low)		6,300 (Average)		9,000 (High)	
	(mgy)	(ac-ft/y)	(mgy)	(ac-ft/y)	(mgy)	(ac-ft/y)
Tasks 11/13 Alternative 1 without STP	1.54	4.73	3.07	9.24	4.61	14.1
Tasks 11/13 Alternative 2 without STP	15.20	46.7	30.40	93.3	45.60	140
Tasks 11/13 Alternative 3 without STP	26.30	80.7	52.60	161	78.90	242

The actual monthly distribution of makeup water is unknown. Because the makeup and reuse water will be used primarily for cooling tower makeup at the RFP, the actual monthly distribution shown is probably not correct. The quantities of cooling tower makeup water are probably less than indicated during the months of January through March and November and December and more than indicated during the months of April through October. Therefore, use of the monthly makeup water distribution shown may underestimate the size of proposed storage ponds. A revised monthly makeup water distribution may be helpful for future evaluation of storage reservoir sizes.

2.2.8 Location of Pond(s)/Reservoir(s)

The temporary water-storage reservoir that are proposed for this study will need to be located in an area best suited to collect water from the source(s) and distribute the water for its intended use. Additional items to consider in siting the location of the proposed temporary water storage include topography, geology, land use, hydraulics, economics and maintenance considerations.

The existing on-channel terminal ponds located on North Walnut Creek (Pond A-4), South Walnut Creek (Pond B-5), and the off-channel terminal pond on Woman Creek (Pond C-2) will be used as "collection" ponds for supply of runoff water from RFP to the temporary water storage reservoir. The existing terminal ponds are discussed more fully in Section 2.1 of this report. The water collected by these ponds will be temporarily retained and then pumped to one or more off-channel temporary water-storage reservoir(s). As an alternative to an off-channel reservoir, the existing terminal ponds will be investigated as possible temporary water-storage ponds. Additionally, Great Western Reservoir will be investigated as a possible off-channel or on-channel storage reservoir for RFP runoff water.

It is not within the scope of this document to determine the final location of the proposed temporary water-storage facility. However, based on a preliminary review of the area, it would be reasonable to locate proposed new facilities east or west of the Controlled Area, between

South Walnut Creek and Woman Creek. These locations are centralized and would allow for pumping from the existing terminal ponds with a minimum of piping. By choosing a flat site located along a ridge line, construction can be simplified. The inflow of uncontrolled surface-water runoff will be minimized and, therefore, the need for a dam and spillway will be reduced. A smaller dam height reduces costs and liability.

The temporary water-storage facility can consist of a single large pond or a series of smaller ponds. Multiple ponds would permit segregation of runoff water and ground water which will require treatment, runoff water and ground water which may not require the same degree of treatment, and separate runoff and ground water from STP effluent. The STP effluent is currently being collected in Pond B-3. Ponds A-4, B-5, and C-2 are terminal ponds from which there are releases in accordance with NPDES permit CO 0001333 from discharge points 005, 006, and 007, respectively. The water collected in Pond B-3 could be conveyed to a dedicated pond which would keep STP effluent separated from other sources. The remaining water collected in other ponds could be conveyed to one of the existing ponds for temporary storage prior to treatment or reuse.

A single, off-channel temporary water-storage reservoir would result in mixing all sources of inflow water into one centralized location. This option would mix surface water and ground water with effluent discharges from the STP resulting in a need to treat all water before it is recycled. However, piping and pumping costs would not be duplicated, as would be the case with multiple ponds. This additional operational cost could outweigh the savings from the initial construction costs.

Great Western Reservoir could be used as the temporary water storage reservoir if the single pond alternative is selected. This option, however, would increase the cost of pumping reuse water back to the RFP. In addition, liabilities of accidental discharge of water would be increased unless major repairs/reconstruction were done at the Reservoir (Hydro-Triad, Ltd., 1981).

3.0 OPERATIONAL STUDY RESULTS

3.1 ALTERNATIVE ASSESSMENTS

Reservoir operational studies were performed for both off-channel and on-channel temporary water-storage facilities. These reservoir operational studies analyzed 50 years of reservoir operation considering the above-defined inflow and outflow sources presented in sections 2.2.6 and 2.2.7. About 67 preliminary alternatives, including different combinations of inflow and outflow, were identified as described below. Some of these alternatives examined reservoir operations assuming that STP effluent was collected in a separate proposed water-storage facility and water reuse is applied, as outlined in Tasks 11/13 Alternative 1 and Tasks 11/13 Alternative 2 of the Treated Sewage/Process Wastewater Recycle Study (Tasks 11 and 13, ASI, 1991c). Additionally, other alternatives were examined in which STP effluent was mixed with the runoff and ground water. Only worst and best case alternatives were examined in this preliminary assessment. Worst case alternatives from the standpoint of water-storage facility size would be the lowest makeup water reuse of runoff and ground water. The best case would have the highest makeup water reuse.

Nine alternatives investigated the impacts on temporary water-storage reservoirs of enhanced spray evaporation. These selected alternatives were for low makeup water reuse where large storage volumes would be needed to reduce the potential for downstream releases. Seven alternatives were used to assess a possible range of water-storage reservoir sizes for the STP effluent. Six alternatives were used to assess a possible range of water-storage reservoir sizes for the combination of STP effluent, surface-water runoff, and ground water.

An alternative evaluation system was used to rank the water storage capabilities alternatives. Within the alternative evaluation system are weighting factors that influence the overall zero-discharge study. These factors were selected by a committee consisting of cognizant DOE and EG&G personnel. Following is a discussion of how each of the categories were evaluated.

Controlled Discharge - Each alternative has been sized to a maximum size allowable which, in the case of the terminal ponds, is restricted by the surrounding topography. If an uncontrolled discharge occurs from a storage reservoir, a score of one was given to that alternative. If uncontrolled discharges do not occur within an alternative, a score of five was given to that alternative.

Waste Generation - Alternatives that are designed to treat and reuse water for makeup water or STP effluent recycle, and those that are designed to treat and release water for downstream water rights will generate waste during treatment. Each alternative will be treating various amounts of water and thus creating various amounts of waste. The alternatives are scored based upon the amount of water that will need to be treated on an annual basis. The alternative which generates the greatest amount of waste was given the lowest score.

Risk - Each alternative presents a different level of risk that is associated with the possibility of dam failure. Because each alternative will be designed and constructed using the most up-to-date engineering techniques, the only variable between the alternatives will be whether the reservoir is on-channel or off-channel. A score of one was given to those alternatives that are on-channel, and a score of five was given to those alternatives that are off-channel.

Cost - Each alternative is ranked on the cost of construction of a reservoir, bypass channels, treatment facilities, pumps, piping, and operation, maintenance, and replacement (OM & R) costs. The alternative with the highest construction and OM & R costs received the lowest score.

Design and Construction Schedule - The amount of design and construction required for each alternative is reflective of the cost of each alternative. Thus the score that is given to the design and construction schedule is the same score that is given to the cost of the alternative. The alternative with the least amount of design and construction required received the highest score.

Flexibility - The flexibility of a storage/reuse system depends upon the system's capability to continue operating, without uncontrolled releases, in the event that mechanical failure occurs or a large unpredicted storm event occurs. The use of multiple ponds is more flexible because of the ability to move the water from one pond to another. If mechanical failure occurs with a system in one of the ponds, the other ponds can continue to operate. Most of the alternatives have been evaluated based upon the construction of one pond. The flexibility of the single pond alternatives can be increased by constructing multiple ponds. A score of one was given to the alternatives in which only one pond is considered. A score of five was given to the alternatives in which multiple ponds were considered.

Water Rights - The alternatives are scored in this category based upon whether or not the downstream water rights will be met by downstream release. Those alternatives in which it will be necessary to purchase water to meet downstream water rights were given a score of one.

Air Emissions - None of the alternatives represents an advantage under this category. Air emissions are not an issue, thus each alternative has been given a score of five.

Wetlands/T&E - In the event that wetlands are created, DOE may be obligated to maintain those wetlands throughout the period of reservoir operation and beyond. For this reason, it is not considered to be a positive alternative to create wetlands. The creation of wetlands, also may cause additional long-term costs to maintain the wetlands. For example, during dry years, water may need to be purchased to maintain the newly created wetlands. Thus, the alternative which creates the least, or smallest areal wetlands has received the highest score. The new off-channel alternatives will be lined and as such will not constitute a wetland. A score of five was given to these alternatives.

IHSS/SWMU - The creation of temporary water storage facilities on-site may also create additional SWMU(s). The alternative that creates the largest SWMU was given the lowest score.

Public Acceptability - Public acceptability was based on three of the above categories: (1) controlled discharge; (2) risk; and (3) IHSS/SWMU. These three categories are likely the most critical areas in which the public would be concerned. Thus, the scores that were given to the above three categories for each alternative were averaged to provide the score for public acceptability.

Preliminary conceptual-level cost estimates were performed on the earthwork required for dam construction and/or improvements, advanced water treatment for water-rights releases downstream at the prevailing stream standards, piping and pumping for makeup-water recycle and enhanced evaporation.

The costs developed are planning-level costs only and were derived from several sources. The "average bid price" as presented in "Bids Tabs Database" from the Urban Drainage and Flood Control District (1990), the draft Surface-Water Management Plan (DOE, 1990), and recent scope and estimate reports by Merrick & Company (1990) were used as a basis for these costs. Additionally, engineering judgements related to construction and OM & R costs also were used. Annual OM & R costs were assumed to be about 15 percent of the total estimated preliminary construction costs based upon engineering judgment. Unlike the one-time construction costs, OM & R costs are incurred each year of the project life.

3.2 RESERVOIR SIZING

Preliminary reservoir sizing was conducted for 67 alternatives for temporary storage of surface-water runoff, ground water, and STP effluent in this study. The sizing resulted from performing reservoir operational studies using the data and information presented earlier in this report. The sizing of the temporary water-storage facilities was the size which resulted in no uncontrolled release (zero discharge) while at the same time gave no or few shortages for those alternatives which had reuse as a demand on the storage system. In most cases it was possible to estimate a size to minimize the number of uncontrolled releases, however the number of shortages was

STP Effluent Storage

sometimes large. In these cases, the temporary water-storage facility size was qualified to indicate that water shortages could occur. For the alternatives where downstream releases were made for water rights, it was assumed that the water would be treated to the prevailing stream standard prior to release.

Operational studies performed on the selected alternatives used many implicit and explicit assumptions. These assumptions included: (1) the operational studies were performed monthly for 50 years which is adequate for this planning effort; (2) no seepage inputs or losses occurred from the temporary water-storage facilities; (3) if pumping was required into or out of the temporary water-storage facility, adequate pumping capacity existed to pump all the monthly flow rates presented in this study; and (4) no uncontrolled releases occurred at the RFP which would have prevented the operation of the system.

Additionally, initial conditions were assumed, but were generally specific to the alternative being considered. However, for the new STP effluent, the off-channel, and the terminal pond temporary water-storage facilities, the initial storage was assumed to be full to the maximum capacity. This initial condition was assumed in order to give a worst case to the uncontrolled discharge (zero discharge) end points during the reservoir operation sizing. The exception for the full assumption was for Great Western Reservoir, where the initial assumed storage volume was 3,253 ac-ft which is at the existing spillway crest. However, existing "stop logs" above the spillway crest give a storage volume of 3,569 ac-ft prior to uncontrolled release downstream.

3.2.1 New STP Effluent Reservoir

Based upon discussions with EG&G personnel, it was agreed that reservoir operations would be examined for scenarios in which the STP effluent would be stored in a separate reservoir. This new, separate reservoir may be at the existing site of Pond B-3 where STP effluent is currently stored, or may be a new off-channel storage facility. In either case, it was assumed that no surface-water runoff or ground water would enter the new STP effluent storage facility. The seven alternatives (0a through 0g) related to a new STP effluent, off-channel reservoir are summarized in Table 19.

Based upon the analyses presented in the Tasks 11 and 13 report (Treated Sewage/Process Wastewater Recycle study, ASI, 1990c), the amount of STP effluent which could be recycled depended only upon the amount of effluent available and was independent of the recycle alternative. This was because all alternatives considered in the Tasks 11 and 13 report could recycle all the STP effluent available with varying amounts of additional makeup water required. This makeup water would come from other sources such as recycle of surface-water runoff, ground water, or water purchase from off site.

The amount of STP effluent available, however was highly dependent upon the employee population at the RFP and upon the number of cooling towers discharging to the RFP. As indicated in the Tasks 11 and 13 report, about 30 percent of the STP influent is from cooling tower blowdown. Therefore, if the RFP processes using cooling towers were to cease, the quantity of STP effluent may decrease by about 30 percent even if the employee population stayed constant.

The Tasks 11 and 13 report (ASI, 1990c) estimated the annual STP effluent recycle for RFP employee populations of 3,000, 6,300 (1990 population), and 9,000 employees. These annual effluent recycle quantities were, respectively, 108, 227, and 325 ac-ft/yr for these three employee populations. This section estimates the water-storage reservoir size (1) to completely store the annual STP effluent without uncontrolled release or recycle for each of the three employee populations, and (2) to store annual STP effluent assuming recycle of the above quantities for each of the three employee populations.

The STP effluent discharged at the RFP over the last five years (1986 through 1990) averaged about 237 ac-ft/yr as shown in Table 11. Therefore, some storage would be required because average reuse is only about 227 ac-ft/yr. Table 20 shows the monthly distribution of the recycle

Table 19

Reservoir Operational Alternatives (New STP Off-Channel Reservoir)[1)]

Alternative Number	Description
0a	Off-channel storage of STP effluent from 3,000 RFP personnel (114 ac-ft/yr) with no effluent recycle and no releases.
0b	Off-channel storage of STP effluent from 3,000 RFP personnel (114 ac-ft/yr) with annual effluent recycle of 108 ac-ft/yr and no releases.
0c	Off-channel storage of STP effluent from 6,300 RFP personnel (237 ac-ft/yr) with no effluent recycle and no releases.
0d	Off-channel storage of STP effluent from 6,300 RFP personnel (237 ac-ft/yr) with annual effluent recycle of 227 ac-ft/yr and no releases.
0e	Off-channel storage of STP effluent from 9,000 RFP personnel (340 ac-ft/yr) with no effluent recycle and no releases.
0f	Off-channel storage of STP effluent from 9,000 RFP personnel (340 ac-ft/yr) with annual effluent recycle of 325 ac-ft/yr and no releases.
0g	Off-channel storage of STP effluent from 9,000 RFP personnel (340 ac-ft/yr) with no recycle and enhanced spray evaporation during the months of April thorough October (246.2 ac-ft/yr) and no releases.

1) Annual quantities shown in parentheses are the approximate 50-year averages and may vary from year to year.

Table 20

Estimated Monthly Distribution of STP Effluent Water Recycle (Ac-Ft)[1)2)]

RFP Population	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
3,000 (Low)	7.3	7.7	8.0	8.0	8.6	10.6	13.7	12.6	9.7	8.0	7.1	6.7	108
6,300 (Avg)	15.4	16.1	16.8	16.8	18.2	22.2	28.8	26.4	20.4	16.8	15.0	14.1	227
9,000 (High)	22.1	23.1	24.0	24.1	26.0	31.8	41.3	37.7	29.2	24.1	21.4	20.2	325

1) Distribution based upon RFP water purchases for 1986 through 1989 period.

2) Source: ASI, 1990C.

demands based upon the monthly distribution of water purchases at the RFP for the period 1986 through 1989.

Results of the monthly reservoir operational studies for the STP water-storage reservoir for 50 years of STP inflows (the five years of effluent flows in Table 11 repeated 10 times) and demands ranging from zero (no recycle such as may occur in a plant processes cessation mode) to 340 ac-ft/yr recycle for a plant employee population of 9,000 are shown in Table 21 and in Table 22. The reservoir sizes to temporarily store STP effluent with zero discharge downstream range from 135 ac-ft for a RFP employee population of 3,000 with recycle (Alternative 0b), to 5,430 ac-ft for a RFP employee population of 9,000 without any recycle (all STP inflows to the reservoir would be in balance with precipitation and free water-surface evaporation) (Alternative 0e). Enhanced evaporation by pumping 1,000 gpm through an enhanced evaporation system (Table 16) could reduce this reservoir storage to about 2,960 ac-ft (Alternative 0g). The enhanced evaporation of about 247 ac-ft/yr was assumed to occur during the months of April through October of each year in a separate 23-acre system. The effluent storage reservoir was assumed to have the free water-surface evaporation shown in Table 15.

Analyses of Table 21 and Table 22 indicate that the alternatives without STP effluent recycle (Alternative 0a, 0c, 0e, and 0g), which are intended to portray cases where plant industrial processes at the RFP are stopped but large numbers of on-site personnel are reclaiming the area, result in very large storage reservoirs even if enhanced evaporation is used. These large reservoirs, ranging from about 1,730 ac-ft to 5,430 ac-ft in volume, would cover areas ranging from 90 ac to 280 ac. These large reservoirs may be best sited at the RFP by dividing them into two or more smaller reservoirs. Each reservoir was assumed to be 20-ft deep and to be lined with 60-mil high-density polyethylene (HDPE) plastic.

For the alternatives where STP effluent is reused (Alternatives 0b, 0d, and 0f), much smaller storage reservoirs ranging from about 135 ac-ft to 410 ac-ft in volume were sized. The surface areas associated with these smaller reservoirs would range from about 8 ac to 22 ac. Because

Table 21

RESULTS OF NEW STP OFF-CHANNEL SIZING
RESERVOIR OPERATIONAL ALTERNATIVES

	INPUT ALTERNATIVE — NO RELEASES DOWNSTREAM FOR ANY ALTERNATIVE						OUTPUT RESULT — NO UNCONTROLLED RELEASES								
ALTERNATIVE	EFFLUENT FROM 3000 PERSONNEL (114 AF/YR)	EFFLUENT FROM 6300 PERSONNEL (237 AF/YR)	EFFLUENT FROM 9000 PERSONNEL (340 AF/YR)	EFFLUENT RECYCLE	NO EFFLUENT RECYCLE	ENHANCED EVAPORATION (246.2 AF/YR)	MAKEUP WATER SHORTAGES	RESERVOIR VOLUME 0-150 AF	RESERVOIR VOLUME 200-300 AF	RESERVOIR VOLUME 400-500 AF	RESERVOIR VOLUME 1000-2000 AF	RESERVOIR VOLUME 2000-3000 AF	RESERVOIR VOLUME 3000-4000 AF	RESERVOIR VOLUME >4000 AF	
0a	●				●						▲				
0b	●			●			■ 8 1)	▲							
0c		●			●								▲		
0d		●		●			■ 25 1)		▲						
0e			●		●									▲	
0f			●	●			■ 27 1)			▲					
0g			●		●	●						▲			

▲ = RESERVOIR SIZE
● = INPUT ALTERNATIVE
= OUTPUT RESULT
1) TOTAL NUMBER OF MONTHS OF SHORTAGES DURING 600-MONTH OPERATIONAL PERIOD

Table 22

Reservoir Size for STP Effluent for Selected RFP Personnel Populations and Recycle Options[1)]

Alternative	On-Site Population	STP Effluent (ac-ft/yr)	Effluent Recycle (ac-ft/yr)	Storage Reservoir Volume[2)] (ac-ft)	Storage Reservoir Surface Area[2)] (ac)
0a	3,000 (Low)	114	0	1,730	90
0b			108	135[4)]	8
0c	6,300 (Average)	237	0	3,570	184
0d			227	290[4)]	16
0e	9,000 (High)	340	0	5,430	280
0f			325	410[4)]	23
0g	9,000 (High) With Enhanced Evaporation[3)]	340	0	2,960[3)]	152

1) Assumes only STP effluent inflows to reservoir.

2) Assumes a rectangular reservoir, 20-feet deep.

3) Assumes 1,000 gpm pumping rate for an enhanced evaporation during the months of April through October of about 247 ac-ft/yr. The minimum surface area for such a system is about 23 acres (Merrick & Company, 1990).

4) Makeup-water shortages occurred for this reservoir size indicating supplemental water would be needed.

the future numbers of RFP personnel and the processes which may be operational are not known, it is not possible to recommend an alternative reservoir size.

In general, the construction, operation, maintenance, and replacement costs for the STP effluent reservoirs are directly proportional to the size of the reservoir. The construction costs for the seven new STP effluent reservoir alternatives shown in Table 23 range from about $1.0 million (M) to about $8.6M. The least expensive alternative (0b) is associated with a low RFP personnel population resulting in the smallest reservoir size. The most expensive alternative (0e) is associated with a high RFP personnel population resulting in the largest reservoir size. Annual OM & R costs parallel those of the construction costs and range from $0.2M to about $ 1.3M per year.

Based upon the alternatives evaluation system discussed above, Alternative 0b (annual effluent recycle of 108 ac-ft/yr and no releases) was selected as the best alternative for a plant population of 3,000; Alternative 0d (annual effluent recycle of 227 ac-ft/yr and no releases) was selected as the best alternative for a plant population of 6,300; Alternative 0f (annual effluent recycle of 325 ac-ft/yr and no releases was selected as the best alternative for a plant population of 9,000. Table 24 presents the results of the alternative evaluation. Each of these preferred alternatives has zero discharges.

The environmental consequences related to the selected alternatives will be minimal. Because it is proposed that these facilities be lined, wetlands will not be created. In addition, the location of the pond(s) will likely be such that present wetlands will not be affected by construction of such ponds. Also, because the reservoir(s) will not be located within a channel, the destruction of downstream wetlands will not be a concern due to not releasing water. The main environmental concern related to the selected alternatives will be the creation of solid waste as a result of the treatment of the water for reuse. The water that is treated for reuse will create solid waste that will need to be handled and disposed of in an environmentally safe manner.

Table 23

Preliminary Construction and OM & R Costs For Off-Channel STP Reservoir Operational Alternatives

Alternative	Construction Cost (Million $)					Annual OM & R Costs (15% of Total)
	Earthwork	Piping and Pumping	Pond Liner	Enhanced Evaporation[1)]	Total	
0a	1.7	0.1	1.8	0	3.6	0.5
0b	0.4	0.4	0.2	0	1.0	0.2
0c	2.4	0.1	3.6	0	6.1	0.9
0d	0.7	0.5	0.3	0	1.5	0.2
0e	3.0	0.2	5.4	0	8.6	1.3
0f	0.8	0.6	0.4	0	1.8	0.3
0g	2.2	0.2	3.0	2.6	8.0	1.2

1) Source: Merrick & Company (1990).

TABLE 24

Alternative Evaluation And Ranking New STP Off-Channel Reservoir (Low and Average Population Scenarios)

EVALUATION FACTORS	WEIGHTING FACTOR	ALT 0a[1]		ALT 0b[1]		ALT 0c[2]		ALT 0d[2]	
		S	W	S	W	S	W	S	W
CONTROLLED DISCHARGE	10	5	50	5	50	5	50	5	50
WASTE GENERATION	7	5	35	2	14	5	35	2	14
RISK	8	5	40	5	40	5	40	5	40
COST	6	2	12	4	24	2	12	4	24
DESIGN AND CONST. SCHEDULE	6	2	12	4	24	2	12	4	24
FLEXIBILITY	8	1	8	1	8	1	8	1	8
WATER RIGHTS	5	1	5	1	5	1	5	1	5
AIR EMISSIONS	10	5	50	5	50	5	50	5	50
WETLANDS/T&E	10	5	50	5	50	5	50	5	50
IHSS	10	2	20	5	50	2	20	4	40
PUBLIC ACCEPTABILITY	8	4	32	5	40	4	32	4.7	38
TOTALS			314		355		314		343
RANK			2		1		2		1

S = SCORE
W = WEIGHTED SCORE (SCORE X WEIGHTING FACTOR)
1) Low population
2) Average population

TABLE 24
(Cont.)

Alternative Evaluation And Ranking New STP Off-Channel Reservoir (High Population Scenarios)

EVALUATION FACTORS	WEIGHTING FACTOR	ALT 0e		ALT 0f		ALT 0g	
		S	W	S	W	S	W
CONTROLLED DISCHARGE	10	5	50	5	50	5	50
WASTE GENERATION	7	5	35	1	7	5	35
RISK	8	5	40	5	40	5	40
COST	6	1	10	4	24	2	12
DESIGN AND CONST. SCHEDULE	6	1	10	4	24	2	12
FLEXIBILITY	8	1	8	1	8	1	8
WATER RIGHTS	5	1	5	1	5	1	5
AIR EMISSIONS	10	5	50	5	50	5	50
WETLANDS/T&E	10	5	50	5	50	5	50
IHSS	10	1	10	3	30	2	20
PUBLIC ACCEPTABILITY	8	3.7	30	4.3	34	4	32
TOTALS			298		322		314
RANK			3		1		2

S = SCORE
W = WEIGHTED SCORE (SCORE X WEIGHTING FACTOR)

New Off-Channel Storage

3.2.2 New Off-Channel Reservoir

Table 25 shows the twelve alternatives (1a through 1l) related to a new off-channel reservoir to store surface-water runoff and assumed ground-water contributions, and/or STP effluent, and/or inflow from a 100-year, 72-hour flood at the RFP. Alternatives 1a through 1j in Table 25 assume that the STP effluent is stored in a separate reservoir, and that the inflows to and outflows from the proposed new off-channel temporary water-storage reservoir are as shown. Alternatives 1h through 1j also include inflow resulting from a 100-year, 72-hour flood (425 ac-ft). Alternatives 1k and 1l include STP effluent as inflow to the reservoir for an RFP population of 3,000 (114 ac-ft/yr) and an RFP population of 9,000 (340 ac-ft/yr), respectively. This section estimates the water-storage reservoir size (1) to completely store surface-water runoff, ground-water contributions, STP effluent, and the resultant 100-year, 72-hour storm runoff without uncontrolled releases and without makeup-water demands or downstream controlled releases, (2) to store surface-water runoff and ground-water contributions for selected makeup-water demands and downstream water-rights releases with treatment, and (3) to store surface-water runoff, ground-water contributions, and the resultant 100-year, 72-hour storm runoff for selected makeup water demands and no downstream water-rights releases.

Makeup-water demands were assumed constant in all 50 years of the simulation and were distributed monthly based upon the historical water purchases at the RFP during the 1986 though 1989 period. Downstream releases for water rights assumed a monthly distribution as shown on Table 17.

Results of the monthly reservoir operational studies for the off-channel storage of surface-water runoff using generated Sequence No. 3 (Appendix B) and makeup-water demands ranging from zero to 140 ac-ft/year inflow from the 100-year, 72-hour flood, and STP effluent ranging from 114 ac-ft/yr to 340 ac-ft/year as well as selected downstream releases for water rights are shown in Table 26 and Table 27. Analyses of Table 26 and Table 27 indicate that a reservoir large enough to minimize uncontrolled releases of surface-water runoff and ground water would not

Table 25

Reservoir Operational Alternatives (New Off-Channel Reservoir)[1)]

Alternative Number	Description
1a	Off-channel storage of surface-water runoff from 1.9 mi^2 (125.3 ac-ft/yr) and ground water (10 ac-ft/yr) with Tasks 11/13 Alternative 1 low annual makeup water demand (4.73 ac-ft/yr) and no releases.
1b	Off-channel storage of surface-water runoff from 1.9 mi^2 (125.3 ac-ft/yr) and ground water (10 ac-ft/yr) with Tasks 11/13 Alternative 2 high annual makeup water demand (140 ac-ft/yr) and no releases.
1c	Off-channel storage of surface-water runoff from 1.9 mi^2 (125.3 ac-ft/yr) and ground water (10 ac-ft/yr) with Tasks 11/13 Alternative 1 low annual makeup water demand (4.73 ac-ft/yr) and downstream releases for dry-year water rights (99.8 ac-ft/yr).
1d	Off-channel storage of surface-water runoff from 1.9 mi^2 (125.3 ac-ft/yr) and ground water (10 ac-ft/yr) with Tasks 11/13 Alternative 2 high annual makeup water demand (140 ac-ft/yr) and downstream releases for dry-year water rights (99.8 ac-ft/yr).
1e	Off-channel storage of surface-water runoff from 1.9 mi^2 (125.3 ac-ft/yr) and ground water (10 ac-ft/yr) with no makeup water demand and no releases (Shutdown case).
1f	Off-channel storage of surface-water runoff from 1.9 mi^2 (125.3 ac-ft/yr) and ground water (10 ac-ft/yr) with no makeup water demand and downstream releases for dry-year water rights (99.8 ac-ft/yr) (Shutdown case).
1g	Off-channel storage of surface-water runoff from 1.9 mi^2 (125.3 ac-ft/yr) and ground water (10 ac-ft/yr) with no makeup water demand and enhanced spray evaporation during the months of April through October (246.2 ac-ft/yr) and no releases (Shutdown case).
1h	Off-channel storage of surface-water runoff from 1.9 mi^2 (125.3 ac-ft/yr), ground water (10 ac-ft/yr), and 100-year, 72-hour flood (425 ac-ft) with Tasks 11/13 Alternative 1 low annual makeup water demand (4.73 ac-ft/yr) and no releases.

Table 25 (Continued)

Reservoir Operational Alternatives
(New Off-Channel Reservoir)[1)]

Alternative Number	Description
1i	Off-channel storage of surface-water runoff from 1.9 mi^2 (125.3 ac-ft/yr), ground water (10 ac-ft/yr), and 100-year, 72-hour flood (425 ac-ft) with no makeup water demand and no releases (Shutdown case).
1j	Off-channel storage of surface-water runoff from 1.9 mi^2 (125.3 ac-ft/yr), ground water (10 ac-ft/yr), and 100-year, 72-hour flood (425 ac-ft) with no makeup water demand and enhanced spray evaporation during the months of April through October (246.2 ac-ft/yr) and no releases (Shutdown case).
1k	Off-channel storage of surface-water runoff from 1.9 mi^2 (125.3 ac-ft/yr), ground water (10 ac-ft/yr), and STP effluent from 3,000 RFP personnel (114 ac-ft) with no makeup water demand and no releases (Shutdown case).
1l	Off-channel storage of surface-water runoff from 1.9 mi^2 (125.3 ac-ft/yr), ground water (10 ac-ft/yr), and STP effluent from 9,000 RFP personnel (340 ac-ft) with no makeup water demand and no releases (Shutdown case).

1) Annual quantities shown in parentheses are the approximate 50-year averages and may vary from year to year.

Table 26

RESULTS OF NEW OFF-CHANNEL SIZING RESERVOIR OPERATIONAL ALTERNATIVES

INPUT ALTERNATIVE: ALL ALTERNATIVES INCLUDE 125.3 AF/YR RUNOFF AND 10 AF/Y GROUNDWATER INPUTS

OUTPUT RESULT: NO UNCONTROLLED RELEASES

ALTERNATIVE	NO MAKEUP WATER DEMAND	MAKEUP WATER DEMAND OF 4.73 AF/YR	MAKEUP WATER DEMAND OF 140 AF/YR	NO WATER RIGHTS RELEASES	WATER RIGHTS RELEASES WITH TREATMENT	INFLOW FROM 100-YR, 72-HR FLOOD (425 AF)	EFFLUENT FROM 3000 PERSONNEL (114 AF/YR)	EFFLUENT FROM 9000 PERSONNEL (340 AF/YR)	ENHANCED EVAPORATION	MAKEUP WATER SHORTAGES	RESERVOIR VOLUME 300-400 AF	RESERVOIR VOLUME 1500-2000 AF	RESERVOIR VOLUME 2000-2500 AF	RESERVOIR VOLUME 2500-3000 AF	RESERVOIR VOLUME 3000-3500 AF	RESERVOIR VOLUME 3500-4500 AF	RESERVOIR VOLUME > 4500 AF
1a		●		●						■ 32[1]					▲		
1b			●	●						■ 320[1]				▲			
1c		●			●					■ 126[1]			▲				
1d			●		●					■ 551[1]	▲						
1e	●			●						■ 74[1]						▲	
1f	●				●					■ 122[1]			▲				
1g	●			●					●	■ 83[1]		▲					
1h		●		●		●				■ 48[1]						▲	
1i	●			●		●				■ 66[1]						▲	
1j	●			●		●			●	■ 70[1]		▲					
1k	●			●			●										▲
1l	●			●				●									▲

▲ = RESERVOIR SIZE = INPUT ALTERNATIVE = OUTPUT RESULT

1) TOTAL NUMBER OF MONTHS OF SHORTAGES DURING 600-MONTH OPERATIONAL PERIOD

Table 27

Reservoir Sizes For New Off-Channel Reservoir[1)]

Alternative	Surface-Water Runoff and Ground-Water Inputs (ac-ft/yr)	STP Effluent Inflow (ac-ft/yr)	Makeup Water Demands (ac-ft/yr)	Inflow from 100-Yr, 72-Hr Flood (ac-ft/yr)	Water-Rights Releases With Treatment (ac-ft/yr)	Storage Reservoir Volume (ac-ft)	Storage Reservoir Surface Area (ac)
1a	135.3	0	4.73	0	0	3200[3)]	155
1b	135.3	0	140	0	0	2960[3)]	143
1c	135.3	0	4.73	0	99.8	2300[3)]	119
1d	135.3	0	140	0	99.8	325[3)]	18
1e	135.3	0		0	0	4240[3)]	218
1f	135.3	0	0	0	99.8	2300[3)]	119
1g	135.3	0	0[2)]	0	0	1900	100
1h	135.3	0	4.73	425	0	3700[3)]	190
1i	135.3	0	0	425	0	4240[3)]	218
1j	135.3	0	0[2)]	425	0	1900[3)]	100
1k	135.3	114	0	0	0	4820	250
1l	135.3	340	0	0	0	7500	380

1) Assumes a rectangular reservoir, 20-feet deep.

2) Assumes 1,000 gpm pumping rate for an enhanced evaporation during the months of April through October of about 246.2 ac-ft/yr. The minimum surface area for such a system is about 23 acres (Merrick & Company, 1990).

3) Makeup water shortages occurred for this reservoir size indicating supplemental water would be needed.

be able to also serve as a dependable water supply source except for the alternatives in which STP effluent is included (1k and 1l). This is because of the large surface area of the off-channel structure which permits large amounts of water to evaporate.

For no downstream releases for water rights (Alternatives 1a, 1b, 1e and 1g through 1l) the reservoir volumes ranged from about 1,900 ac-ft to 7,500 ac-ft, with corresponding surface areas of between 100 ac and 380 ac. These large reservoirs may best be sited at the RFP by dividing them into two or more smaller reservoirs. Each reservoir was assumed to be 20-ft deep and to be lined with 60-mil HDPE plastic.

For the alternatives where surface-water runoff and ground water was treated for release to meet downstream water rights (Alternatives 1c, 1d, and 1f), the reservoir sizes are generally smaller. The reservoir volumes ranged from about 325 ac-ft to 2,300 ac-ft, with associated surface areas between 18 ac and 119 ac.

The construction, operation, maintenance and replacement costs of the new off-channel temporary water-storage reservoir are proportional to the size of the reservoir. Table 28 shows the preliminary construction and annual OM & R costs for the twelve new off-channel reservoir alternatives for surface-water runoff, ground water, flood inflows, and STP effluent. These costs range from $7.2M to $18.4M. The lowest cost alternatives (1a and 1b) are associated with the no water-rights release treatment of water for downstream release. The highest cost alternatives (1c and 1f) are associated with relatively large reservoirs and treatment plants for water-rights release downstream at the prevailing stream standards. Annual OM & R costs range from about $1.1M to about $2.8M per year.

Based upon the alternatives evaluation system discussed above, Alternative 1a (108 ac-ft/yr effluent recycle, 4.73 ac-ft/yr makeup water and no releases) was selected as the best alternative for a plant population of 3,000; Alternative 1d (325 ac-ft/yr effluent recycle, 140 ac-ft/yr makeup water and 99.8 ac-ft/yr water rights releases) was selected as the best alternative for a plant

Table 28

Preliminary Construction and OM & R Costs
For New Off-Channel Reservoir Operational Alternatives

	Construction Cost (Million $)						Annual OM & R Costs (15% of Total)
Alternative	Earthwork	Piping and Pumping	Pond Liner	Enhanced Evaporation[1)]	New Advanced Water Treatment Plant	Total	
1a	2.3	1.7	3.2	0	0	7.2	1.1
1b	2.2	2.0	3.0	0	0	7.2	1.1
1c	2.0	1.7	2.3	0	12.5	18.5	2.8
1d	0.7	2.1	0.4	0	12.5	15.7	2.4
1e	2.7	1.6	4.2	0	0	8.5	1.3
1f	2.0	1.6	2.3	0	12.5	18.4	2.8
1g	1.8	1.6	1.9	2.6	0	7.9	1.2
1h	2.5	1.6	3.7	0	0	7.8	1.2
1i	2.7	1.6	4.2	0	0	8.5	1.3
1j	1.8	1.6	1.9	2.6	0	7.9	1.2
1k	2.8	3.2	6.0	0	0	12.0	1.8
1l	3.6	3.2	7.4	0	0	14.2	2.1

1) Source: Merrick & Company (1990).

population of 9,000; and Alternative 1j (246.2 ac-ft/yr enhanced spray evaporation and no releases) was selected as the best alternative for a plant shutdown case. For the high plant population (9,000 personnel), a zero-discharge case would be difficult to obtain. Table 29 presents the results of the alternative evaluation.

As in the case of the Off-channel STP storage facility, the environmental consequences related to the selected alternatives for the New Off-channel reservoir will be minimal. Because it is proposed that these facilities be lined, wetlands will not be created. In addition, the location of the pond(s) will likely be such that present wetlands will not be affected by construction of such ponds. Also, because the reservoir(s) will not be located within a channel, the destruction of downstream wetlands will not be a concern due to not releasing water. The main environmental concern related to the selected alternatives will be the creation of solid waste as a result of the treatment of the water for reuse.. The water that is treated for reuse will create solid waste that will need to be handled and disposed of in an environmentally safe manner.

3.2.3 Great Western Reservoir

Operational studies also were done for Great Western Reservoir. The objective of these operational studies was to evaluate if Great Western Reservoir could provide for zero discharge downstream while still meeting the water demands for selected alternatives. Alternatives 2a through 2n in Table 30 detail the storage and demand alternatives investigated for Great Western Reservoir. For these 14 alternatives, no STP effluent was assumed to be discharged to Great Western Reservoir. STP effluent was assumed to be temporarily stored in a separate off-channel reservoir discussed in Section 3.2.1 above. It is likely that releasing STP effluent to Great Western Reservoir and then pumping it back to the RFP would not be cost effective. Increasing the dam and spillway crest elevations of Great Western Reservoir may improve the estimates given below, however, it was assumed for purposes of this study that no changes would be made to Great Western Reservoir.

TABLE 29

Alternative Evaluation And Ranking New Off-Channel Reservoir (Closure Scenarios)

EVALUATION FACTORS	WEIGHTING FACTOR	ALT 1e		ALT 1f		ALT 1g		ALT 1i		ALT 1j	
		S	W	S	W	S	W	S	W	S	W
CONTROLLED DISCHARGE	10	5	50	5	50	5	50	5	50	5	50
WASTE GENERATION	7	5	35	2	14	4	28	5	35	4	28
RISK	8	5	40	5	40	5	40	5	40	5	40
COST	6	4	24	2	12	5	30	4	24	5	30
DESIGN AND CONST. SCHEDULE	6	4	24	2	12	5	30	4	24	5	30
FLEXIBILITY	8	1	8	1	8	1	8	1	8	1	8
WATER RIGHTS	5	1	5	5	25	1	5	1	5	1	5
AIR EMISSIONS	10	5	50	5	50	5	50	5	50	5	50
WETLANDS/T&E	10	5	50	5	50	5	50	5	50	5	50
IHSS	10	2	20	3	30	4	40	2	20	4	40
PUBLIC ACCEPTABILITY	8	4	32	4.3	35	4.7	38	4	32	4.7	38
TOTALS			338		326		369		338		369
RANK			2		3		1		2		1

S = SCORE
W = WEIGHTED SCORE (SCORE X WEIGHTING FACTOR)

TABLE 29
(Cont.)

Alternative Evaluation And Ranking
New Off-Channel Reservoir
(Low Population Scenarios)

EVALUATION FACTORS	WEIGHTING FACTOR	ALT 1a		ALT 1c		ALT 1h		ALT 1k	
		S	W	S	W	S	W	S	W
CONTROLLED DISCHARGE	10	5	50	5	50	5	50	5	50
WASTE GENERATION	7	4	28	2	14	4	28	5	35
RISK	8	5	40	5	40	5	40	5	40
COST	6	5	30	2	12	4	24	3	18
DESIGN AND CONST. SCHEDULE	6	5	30	2	12	4	24	3	18
FLEXIBILITY	8	1	8	1	8	1	8	1	8
WATER RIGHTS	5	1	5	5	25	1	5	1	5
AIR EMISSIONS	10	5	50	5	50	5	50	5	50
WETLANDS/T&E	10	5	50	5	50	5	50	5	50
IHSS	10	3	30	4	40	2	20	1	10
PUBLIC ACCEPTABILITY	8	4.3	35	4.7	38	4	32	3.7	30
TOTALS			356		339		311		314
RANK			1		2		4		3

S = SCORE
W = WEIGHTED SCORE (SCORE X WEIGHTING FACTOR)

TABLE 29
(Cont.)

Alternative Evaluation And Ranking
New Off-Channel Reservoir
(High Population Scenarios)

EVALUATION FACTORS	WEIGHTING FACTOR	ALT 1b		ALT 1d		ALT 1l	
		S	W	S	W		W
CONTROLLED DISCHARGE	10	5	50	5	50	5	50
WASTE GENERATION	7	2	14	1	7	5	35
RISK	8	5	40	5	40	5	40
COST	6	5	30	2	12	3	18
DESIGN AND CONST. SCHEDULE	6	5	30	2	12	3	18
FLEXIBILITY	8	1	8	1	8	1	8
WATER RIGHTS	5	1	5	5	25	1	5
AIR EMISSIONS	10	5	50	5	50	5	50
WETLANDS/T&E	10	5	50	5	50	5	50
IHSS	10	3	30	5	50	1	10
PUBLIC ACCEPTABILITY	8	4.3	34	5	40	3.7	30
TOTALS			341		344		314
RANK			2		1		3

S = SCORE
W = WEIGHTED SCORE (SCORE X WEIGHTING FACTOR)

Great Western Reservoir

Table 30

Reservoir Operational Alternatives
(Great Western Reservoir)[1)]

Alternative Number	Description
2a	On-channel Great Western Reservoir (GWR) storage of surface-water runoff for 5.5 mi^2 (279.7 ac-ft/yr) and ground water (10 ac-ft/yr) with Tasks 11/13 Alternative 1 low annual makeup water demand (4.73 ac-ft/yr) and no releases.
2b	On-channel GWR storage of surface-water runoff from 5.5 mi^2 (279.7 ac-ft/yr) and ground water (10 ac-ft/yr) with Tasks 11/13 Alternative 2 high annual makeup water demand (140 ac-ft/yr) and no releases.
2c	On-channel GWR storage of surface-water runoff from 5.5 mi^2 (279.7 ac-ft/yr) and ground water (10 ac-ft/yr) with Tasks 11/13 Alternative 1 low annual makeup water demand (4.73 ac-ft/yr) and downstream releases for dry-year water rights (223.1 ac-ft/yr).
2d	On-channel GWR storage of surface-water runoff from 5.5 mi^2 (279.7 ac-ft/yr) and ground water (10 ac-ft/yr) with Tasks 11/13 Alternative 2 high annual makeup water demand (140 ac-ft/yr) and downstream releases for dry-year water rights (223.1 ac-ft/yr).
2e	On-channel GWR storage of surface-water runoff from 5.5 mi^2 (279.7 ac-ft/yr) and ground water (10 ac-ft/yr) with no makeup water demand and no releases (Shutdown case).
2f	On-channel GWR storage of surface-water runoff from 5.5 mi^2 (279.7 ac-ft/yr) and ground water (10 ac-ft/yr) with no makeup water demand and downstream releases for dry-year water rights (223.1 ac-ft/yr).
2g	On-channel GWR storage of surface-water runoff from 5.5 mi^2 (279.7 ac-ft/yr), ground water (10 ac-ft/yr), and 100-yr, 72-hr flood (1140 ac-ft) with no makeup water demand and no releases (Shutdown case).
2h	Off-channel GWR storage of surface-water runoff from 2.2 mi^2 (139.8 ac-ft/yr) and ground water (10 ac-ft/yr) with Tasks 11/13 Alternative 1 low annual makeup water demand (4.73 ac-ft/yr) and no releases.

Table 30 (Continued)

Reservoir Operational Alternatives (Great Western Reservoir)[1)]

Alternative Number	Description
2i	Off-channel GWR storage of surface-water runoff from 2.2 mi^2 (139.8 ac-ft/yr) and ground water (10 ac-ft/yr) with Tasks 11/13 Alternative 2 high annual makeup water demand (140 ac-ft/yr) and no releases.
2j	Off-channel GWR storage of surface-water runoff form 2.2 mi^2 (139.8 ac-ft/yr) and ground water (10 ac-ft/yr) with Tasks 11/13 Alternative 1 low annual makeup water demand (4.73 ac-ft/yr) and downstream releases for dry-year water rights (111.6 ac-ft/yr).
2k	Off-channel GWR storage of surface-water runoff from 2.2 mi^2 (139.8 ac-ft/yr) and ground water (10 ac-ft/yr) with Tasks 11/13 Alternative 2 high annual makeup water demand (140 ac-ft/yr) and downstream releases for dry-year water rights (111.6 ac-ft/yr).
2l	Off-channel GWR storage of surface-water runoff from 2.2 mi^2 (139.8 ac-ft/yr) and ground water (10 ac-ft/yr) with no makeup water demand and no releases (Shutdown case).
2m	Off-channel storage of surface-water runoff from 2.2 mi^2 (139.8 ac-ft/yr) and ground water (10 ac-ft/yr) with no makeup water demand and downstream releases for dry-year water rights (111.6 ac-ft/yr) (Shutdown case).
2n	Off-channel storage of surface-water runoff from 2.2 mi^2 (139.8 ac-ft/yr), ground water (10 ac-ft/yr), and 100-yr, 72-hr flood (485 ac-ft/yr) with no makeup water demand and no releases (Shutdown case).

1) Annual quantities shown in parentheses are the approximate 50-year average and may vary from year to year.

The alternatives investigated at Great Western Reservoir included keeping Great Western Reservoir as an on-channel reservoir or providing a diversion around Great Western Reservoir to pass surface-water runoff from the drainage basin between the terminal ponds and Great Western Reservoir. This diversion was assumed to make Great Western Reservoir an off-channel reservoir.

For the on-channel alternatives (Alternatives 2a through 2g, the drainage basin contributing to Great Western Reservoir was estimated to be about 5.5 mi^2, which includes the 1.9 mi^2 of RFP area shown on Figure 2, as well as an additional 3.6 mi^2 between Ponds A-4 and B-5 and the Great Western Reservoir dam (Figure 12). The existing elevation-area-capacity curves for Great Western Reservoir is shown in Appendix C. These curves were used to perform the operational studies. Great Western Reservoir was assumed to be off-channel for Alternatives 2h through 2n in Table 30. This was accomplished by assuming that a diversion channel could be constructed around Great Western Reservoir as shown on Figure 12.

Because Great Western Reservoir already exists and was assumed to not change for the operational studies conducted, the size of the reservoir storage is fixed. Thus, uncontrolled releases downstream may occur for some of the alternatives. The initial storage volume assumed for all the Great Western Reservoir operational studies was 3,253 ac-ft, which is the storage at the crest of the existing spillway. The City of Broomfield has put wooden "stop logs" along the spillway crest to increase the storage before uncontrolled downstream releases from 3,253 ac-ft to 3,569 ac-ft. It was assumed that these stop logs would remain in place during the operational studies. Therefore, an additional 316 ac-ft of storage was available prior to uncontrolled release from Great Western Reservoir.

Results of the Great Western Reservoir operational studies are summarized in Table 31. Analysis of Table 31 indicates that if no releases could be made from Great Western Reservoir and the Reservoir remained on channel as it currently exists, then uncontrolled releases would occur (Alternatives 2e and 2g). Addition of the 100-year, 72-hour flood from 5.5 mi^2 (1140 ac-ft) in

Table 31

RESULTS OF GREAT WESTERN RESERVOIR OPERATIONAL ALTERNATIVES

ALTERNATIVE	INPUT ALTERNATIVE — ALL ALTERNATIVES INCLUDE 10 AF/YR GROUNDWATER INPUT: INFLOWS FROM 100-YR, 72-HR FLOOD (1140 AF)	INFLOWS FROM 5.5 SQ. MI. (279.7 AF/YR)	INFLOWS FROM 100-YR, 72-HR FLOOD (485 AF)	INFLOWS FROM 2.2 SQ. MI. (139.8 AF/YR)	NO RELEASES	WATER RIGHTS RELEASES WITH TREATMENT	LOW MAKEUP (4.73 AF/YR)	HIGH MAKEUP (140 AF/YR)	OUTPUT RESULT: NO UNCONTROLLED RELEASES	UNCONTROLLED RELEASES	MAKEUP WATER SHORTAGES	
2a		●			●		●			■ 89[1]		
2b		●			●			●	■			
2c		●				●	●		■			
2d		●				●		●	■		■ 315[2]	
2e		●			●					■ 96[1]		
2f		●				●			■			
2g	●	●			●					■ 96[1]		
2h				●	●		●		■			
2i				●	●			●	■		■ 20[2]	
2j				●		●	●		■			
2k				●		●		●	■		■ 414[2]	
2l				●	●				■			
2m				●		●			■			
2n			●	●	●				■			

= INPUT ALTERNATIVE
= OUTPUT RESULT
1) TOTAL NUMBER OF MONTHS OF UNCONTROLLED RELEASES DURING 600-MONTH OPERATIONAL PERIOD
2) TOTAL NUMBER OF MONTHS OF SHORTAGES DURING 600-MONTH OPERATIONAL PERIOD

the month of July 1970 of the simulation (Alternative 2g) does not significantly change the uncontrolled releases. Even with 4.73 ac-ft/yr of makeup-water reuse (Alternative 2a), uncontrolled releases would occur if the Reservoir were maintained on channel. However, for the alternatives where high makeup-water demands are assumed (Alternatives 2b and 2d) or water rights releases with treatment are made (Alternatives 2c, 2d, and 2f), the on-channel Reservoir would be able to store surface-water runoff from the full 5.5 mi^2 drainage basin without an uncontrolled release during the 50 years of simulation. Some water shortages would occur for Alternative 2d, which requires high makeup-water demands (140 ac-ft/yr) as well as downstream water-rights releases with treatment.

If Great Western Reservoir were assumed to be off-channel by constructing a bypass around it, then the contributing drainage area would be reduced from about 5.5 mi^2 to about 2.2 mi^2 as shown on Figure 12. For this case, Great Western Reservoir would be capable of completely storing surface-water runoff without uncontrolled releases over the 50-year simulation period even if the 100-year, 72-hour flood occurred during the 1970 simulation year (Alternative 2n). Some shortages would occur for the alternatives which have high makeup-water demands (Alternatives 2i and 2k).

Table 31 indicates that, of the 14 reservoir operational alternatives assessed for Great Western Reservoir, 11 alternatives could probably provide zero discharge based upon the 50-year operational studies. Zero discharge may, however, cause chemical and biological changes in the reservoir water which could make the water more costly for reuse. Because the reservoir would remain unlined, the potential for uncontrolled seepage would be present.

Preliminary construction and annual OM & R costs for the 14 Great Western Reservoir operation alternatives are summarized in Table 32. The preliminary construction costs for these alternatives range from \$70.7M to \$114.7M. These alternatives are very expensive because of the estimated \$70M to purchase and upgrade the reservoir (DOE, 1990 Draft). The least expensive alternatives (2a and 2e) reflect alternatives which have uncontrolled releases and, therefore, do not meet the

Table 32

Preliminary Construction and OM & R Costs For Great Western Reservoir Operational Alternatives

	Construction Cost (Million $)								
Alternative	Purchase and Upgrade GWR[2]	New Advanced Water Treatment Plant at GWR	500-Yr Flood Diversion Channel Around GWR	C-2 Interceptor Pump and Pipeline to A-4 or B-5[2]	Gravity Flow Conveyance From B-5 to A-4[2]	Gravity Flow Conveyance From A-4 to GWR	Pump Back For Makeup Water	Total	Annual OM&R Cost (15% of Total)
2a	70	0[1]	0	0.3	0.4	0	4	74.7	11.2
2b	70	0[1]	0	0.3	0.4	0	16	86.7	13.0
2c	70	28	0	0.3	0.4	0	4	102.7	15.4
2d	70	28	0	0.3	0.4	0	16	114.7	17.2
2e	70	0[1]	0	0.3	0.4	0	0	70.7	10.6
2f	70	28	0	0.3	0.4	0	0	98.7	14.8
2g	70	0[1]	0	0.3	0.4	0	0	98.7	14.8
2h	70	0[1]	1	0.3	0.4	1.0	4	76.7	11.5
2i	70	0[1]	1	0.3	0.4	1.0	16	88.7	13.3
2j	70	14	1	0.3	0.4	1.0	4	90.7	13.6
2k	70	14	1	0.3	0.4	1.0	16	102.7	15.4
2l	70	0[1]	1	0.3	0.4	1.0	0	72.7	10.9
2m	70	14	1	0.3	0.4	1.0	0	86.7	13.0
2n	70	0[1]	1	0.3	0.4	1.0	0	72.7	10.9

1) Does not include water rights replacement water costs.

2) Source: DOE (1990)

GWR = Great Western Reservoir

criterion of zero discharge of water. The least expensive no uncontrolled release alternative (2l) reflects diversion of surface-water runoff around the Reservoir and no pumping of water for makeup at the RFP. The most expensive alternative (2d) is associated with advanced water treatment for downstream releases to satisfy senior water rights as well as pumping makeup water to the RFP. Annual OM & R costs range from about $10.6M to $17.2M per year.

Based upon the alternatives evaluation system discussed above, Alternative 2h (Off-channel reservoir and 4.73 ac-ft/yr makeup water and no releases) was selected as the best alternative for a plant population of 3,000; Alternative 2k (140 ac-ft/yr makeup water and 111.6 ac-ft/yr downstream releases for water rights) was selected as the best alternative for a plant population of 9,000; and Alternative 2l was selected as the best alternative for a plant shutdown (no makeup water and no releases). Table 33 presents the results of the alternative evaluation.

Environmental consequences related to the alternatives selected for storage in Great Western Reservoir are the generation of solid waste for Alternatives 2h and 2k, and the water quality of Great Western Reservoir due to no downstream releases for Alternatives 2h and 2l. As previously mentioned, if water is to be reused, it must be treated which in turn will generate solid waste. This is an environmental concern in that the waste generated, must be handled and disposed of in an environmentally safe manner. For Alternatives 2h and 2l, if water is not being released yet inflow of nutrients and other chemical constituents that naturally flow into the reservoir continue, the water quality will continually decrease. The consequences of this event are such that Great Western Reservoir water quality may seriously deteriorate over time.

3.2.4 Terminal Ponds Storage

Alternatives 3a through 3l, as described in Table 34, would use the existing three terminal ponds (Ponds A-4, B-5 and C-2) as temporary water-storage facilities. The range of alternatives would include storage of surface-water runoff, groundwater, runoff from a 100-year, 72-hour flood, and

TABLE 33

Alternative Evaluation And Ranking
Great Western Resvoir
(Closure Scenarios)

EVALUATION FACTORS	WEIGHTING FACTOR	ALT 2e		ALT 2f		ALT 2g	
		S	W	S	W	S	W
CONTROLLED DISCHARGE	10	1	10	5	50	1	10
WASTE GENERATION	7	5	35	1	7	5	35
RISK	8	1	8	1	8	1	8
COST	6	5	30	2	12	2	12
DESIGN AND CONST. SCHEDULE	6	5	30	2	12	2	12
FLEXIBILITY	8	1	8	1	8	1	8
WATER RIGHTS	5	1	5	5	25	1	5
AIR EMISSIONS	10	5	50	5	50	5	50
WETLANDS/T&E	10	5	50	5	50	5	50
IHSS	10	1	10	1	10	1	10
PUBLIC ACCEPTABILITY	8	1	8	2.3	18	1	8
TOTALS			244		250		208
RANK			5		4		6

S = SCORE
W = WEIGHTED SCORE (SCORE X WEIGHTING FACTOR)

TABLE 33
(Cont.)

Alternative Evaluation And Ranking
Great Western Reservior
(Closure Scenarios)

EVALUATION FACTORS	WEIGHTING FACTOR	ALT 21		ALT 2m		ALT 2n	
		S	W	S	W	S	W
CONTROLLED DISCHARGE	10	5	50	5	50	5	50
WASTE GENERATION	7	5	35	3	21	1	7
RISK	8	5	40	5	40	5	40
COST	6	4	24	3	18	4	24
DESIGN AND CONST. SCHEDULE	6	4	24	3	18	4	24
FLEXIBILITY	8	1	8	1	8	1	8
WATER RIGHTS	5	1	5	5	25	1	5
AIR EMISSIONS	10	5	50	5	50	5	50
WETLANDS/T&E	10	5	50	5	50	5	50
IHSS	10	1	10	1	10	1	10
PUBLIC ACCEPTABILITY	8	3.7	30	3.7	18	3.7	30
TOTALS			326		308		298
RANK			1		2		3

S = SCORE
W = WEIGHTED SCORE (SCORE X WEIGHTING FACTOR)

TABLE 33
(Cont.)

Alternative Evaluation And Ranking
Great Western Reservoir
(Low Population Scenarios)

EVALUATION FACTORS	WEIGHTING FACTOR	ALT 2a		ALT 2c		ALT 2h		ALT 2j	
		S	W	S	W	S	W	S	W
CONTROLLED DISCHARGE	10	1	10	5	50	5	50	5	50
WASTE GENERATION	7	4	28	1	7	4	28	2	14
RISK	8	1	10	1	10	5	40	5	40
COST	6	5	30	2	12	4	24	3	18
DESIGN AND CONST. SCHEDULE	6	5	30	2	12	4	24	3	18
FLEXIBILITY	8	1	8	1	8	1	8	1	8
WATER RIGHTS	5	1	5	5	25	1	5	5	25
AIR EMISSIONS	10	5	50	5	50	5	50	5	50
WETLANDS/T&E	10	5	50	5	50	5	50	5	50
IHSS	10	1	10	1	10	1	10	1	10
PUBLIC ACCEPTABILITY	8	1	8	2.3	18	3.7	30	3.7	30
TOTALS			239		252		319		313
RANK			4		3		1		2

S = SCORE
W = WEIGHTED SCORE (SCORE X WEIGHTING FACTOR)

TABLE 33
(Cont.)

Alternative Evaluation And Ranking Great Western Reservoir (High Population Scenarios)

EVALUATION FACTORS	WEIGHTING FACTOR	ALT 2b		ALT 2d		ALT 2i		ALT 2k	
		S	W	S	W	S	W	S	W
CONTROLLED DISCHARGE	10	5	50	5	50	5	50	5	50
WASTE GENERATION	7	3	21	1	7	3	21	2	14
RISK	8	1	10	1	10	5	40	5	40
COST	6	5	30	2	12	4	24	3	18
DESIGN AND CONST. SCHEDULE	6	5	30	2	12	4	24	3	18
FLEXIBILITY	8	1	8	1	8	1	8	1	8
WATER RIGHTS	5	1	5	5	25	1	5	5	25
AIR EMISSIONS	10	5	50	5	50	5	50	5	50
WETLANDS/T&E	10	5	50	5	50	5	50	5	50
IHSS	10	1	10	1	10	1	10	1	10
PUBLIC ACCEPTABILITY	8	2.3	18	2.3	18	3.7	30	3.7	30
TOTALS			282		252		312		313
RANK			3		4		2		1

S = SCORE
W = WEIGHTED SCORE (SCORE X WEIGHTING FACTOR)

Terminal Ponds

Table 34

Reservoir Operational Alternatives (Terminal Ponds)[1)]

Alternative Number	Description
3a	Terminal Ponds storage of surface-water runoff from 1.07, 0.41, and 0.35 mi^2 (81.0, 39.2, and 34.8 ac-ft/yr) and ground water (5.8, 2.3, and 1.9 ac-ft/yr) with Tasks 11/13 Alternative 1 low annual makeup water demand (2.74, 1.09, and 0.90 ac-ft/yr) and no releases.
3b	Terminal Ponds storage of surface-water runoff from 1.07, 0.41, and 0.35 mi^2 (81.0, 39.2, and 34.8 ac-ft/yr) and ground water (5.8, 2.3, and 1.9 ac-ft/yr) with Tasks 11/13 Alternative 2 high annual makeup water demand (81.2, 32.2, and 26.6 ac-ft/yr) and no releases.
3c	Terminal Ponds storage of surface-water runoff from 1.07, 0.41, and 0.35 mi^2 (81.0, 39.2, and 34.8 ac-ft/yr) and ground water (5.8, 2.3, and 1.9 ac-ft/yr) with Tasks 11/13 Alternative 1 low annual makeup water demand (2.74, 1.09, and 0.90 ac-ft/yr) and downstream releases for dry-year water rights (64.3, 31.3, and 27.6 ac-ft/yr).
3d	Terminal Ponds storage of surface-water runoff from 1.07, 0.41, and 0.35 mi^2 (81.0, 39.2, and 34.8 ac-ft/yr) and ground water (5.8, 2.3, and 1.9 ac-ft/yr) with Tasks 11/13 Alternative 2 high annual makeup water demand (81.2, 32.2, and 26.6 ac-ft/yr) and downstream releases for dry-year water rights (64.3, 31.3, and 27.6 ac-ft/yr).
3e	Terminal Ponds storage of surface-water runoff from 1.07, 0.41, and 0.35 mi^2 (81.0, 39.2, and 34.8 ac-ft/yr) and ground water (5.8, 2.3, and 1.9 ac-ft/yr) with no makeup water demand and no releases (Shutdown case).
3f	Terminal Ponds storage of surface-water runoff from 1.07, 0.41, and 0.35 mi^2 (81.0, 39.2, and 34.8 ac-ft/yr) and ground water (5.8, 2.3, and 1.9 ac-ft/yr) with no makeup water demand and downstream releases for dry-year water rights (64.3, 31.3, and 27.6 ac-ft/yr) (Shutdown case).
3g	Terminal Ponds storage of surface-water runoff from 1.07, 0.41, and 0.35 mi^2 (81.0, 39.2, and 34.8 ac-ft/yr) and ground water (5.8, 2.3, and 1.9 ac-ft/yr) with no makeup water demand and enhanced spray evaporation during the months of April through October (492.4 ac-ft/yr) and no releases (Shutdown case).

Table 34 (Continued)

Reservoir Operational Alternatives
(Terminal Ponds)[1)]

Alternative Number	Description
3h	Terminal Ponds storage of surface-water runoff from 1.07, 0.41, and 0.35 mi^2 (81.0, 39.2, and 34.8 ac-ft/yr), ground water (5.8, 2.3, and 1.9 ac-ft/yr), and 100-year, 72-hour flood (243, 106, and 76 ac-ft) with Tasks 11/13 Alternative 1 low annual makeup water demand (2.74, 1.09, and 0.90 ac-ft/yr) and no releases.
3i	Terminal Ponds storage of surface-water runoff from 1.07, 0.41, and 0.35 mi^2 (81.0, 39.2, and 34.8 ac-ft/yr), ground water (5.8, 2.3, and 1.9 ac-ft/yr), and 100-year, 72-hour flood (243, 106, and 76 ac-ft) with no makeup water demand and no releases (Shutdown case).
3j	Terminal Ponds storage of surface-water runoff from 1.07, 0.41, and 0.35 mi^2 (81.0, 39.2, and 34.8 ac-ft/yr), ground water (5.8, 2.3, and 1.9 ac-ft/yr), and 100-year, 72-hour flood (243, 106, and 76 ac-ft) with no makeup water demand and enhanced spray evaporation during the months of April through October (492.4 ac-ft/yr) and no releases (Shutdown case).
3k	Terminal Ponds storage of surface-water runoff from 1.07, 0.41, and 0.35 mi^2 (81.0, 39.2, and 34.8 ac-ft/yr), ground water (5.8, 2.3, and 1.9 ac-ft/yr), and STP effluent from 3,000 RFP personnel (76 and 38 ac-ft/yr), with no makeup water demand and no releases (Shutdown case).
3l	Terminal Ponds storage of surface-water runoff from 1.07, 0.41, and 0.35 mi^2 (81.0, 39.2, and 34.8 ac-ft/yr), ground water (5.8, 2.3, and 1.9 ac-ft/yr), and STP effluent from 9,000 RFP personnel (227 and 113 ac-ft/yr), with no makeup water demand and no releases (Shutdown case).

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1) Annual quantities shown in parentheses are the approximate 50-year averages and may vary from year to year.

STP effluent under selected makeup water and water-rights release scenarios. The present spillway and dam crest elevations of the storage structures at the three terminal ponds may have to be increased, based upon the operational studies. Each of the three terminal ponds was treated separately. The result was a series of 34 alternatives (12 each for Ponds A-4 and B-5, and 10 for Pond C-2) based upon Table 34.

For purposes of analyses of the terminal ponds, it was assumed that there was a finite height to which the existing dams could be increased, and thus, the maximum possible storage at each site was assumed to be fixed by this physical constraint. For each pond, this physical constraints to storage volume and surface area was estimated by extending the existing elevation-area-capacity curves for each pond as shown in Appendix C. The existing terminal pond characteristics are summarized in Tables 1 and 4.

Analyses of each of the terminal ponds is given below for a 50-year sequence (Sequence number 3 in Appendix B) of surface-water runoff. The results also are presented individually for each pond. However, care should be used in mixing the different alternatives for the three ponds, because interactions between ponds are not obvious and have not been analyzed in detail in this study. Detailed analyses of possible interactions would involve all 34 alternatives (12 each for Ponds A-4 and B-5 and 10 for Pond C-2) with each other. This is such a large number of alternatives, it was felt that reducing the number of possible combinations should be done prior to attempting analyses of the terminal pond interactions.

The initial water-surface elevation in each of the terminal ponds was that estimated as shown in Table 4 to completely store the runoff from the 100-year, 72-hour storm. The increase in elevation to store the surface-water runoff and ground-water under the constraints of makeup-water demand and water-rights releases was estimated from the "New Elevations" shown in Table 4.

3.2.4.1 Pond A-4

Results of the Pond A-4 operational studies are shown in Table 35 and Table 36. Analyses of Table 35 and Table 36 indicate that if no releases could be made from Pond A-4 (Alternatives 3a, 3b, 3e, 3g and 3j), it is possible to increase the height of the existing dam to completely store surface-water runoff, assumed ground-water contributions, and runoff from the 100-year, 72-hour storm from the Pond A-4 drainage basin of 1.07 mi^2 as defined in Table 34. The existing spillway crest must be increased by 77 ft to accomplish complete storage if minimal makeup water is taken from Pond A-4.

The increase in existing spillway elevation at Pond A-4 varies from zero, for high makeup-water reuse and downstream water-rights releases with treatment (Alternative 3d), to about 31 feet for low makeup-water reuse and downstream water-rights releases with treatment (Alternative 3c). Table 35 indicates that eight of the twelve proposed alternatives would result in no uncontrolled releases form Pond A-4. However, increasing the elevation of the existing spillway crest by about 31 ft would result in seven of the twelve alternatives still being capable of no uncontrolled releases based upon the 50-year operational studies. Therefore, a reasonable conclusion would be that Pond A-4 could minimize uncontrolled releases from its drainage basin if the spillway crest were increased by about 31 ft. This spillway crest, coupled with a separate enhanced evaporation system for Pond A-4 also would be effective in minimizing uncontrolled releases. Such an enhanced evaporation system for Pond A-4 already has been proposed by Merrick & Company (1990). Pond A-4 is does not have a liner and, therefore, would permit uncontrolled seepage downstream. Additionally, the water quality in Pond A-4 without discharge could require special treatment for makeup water and for enhanced evaporation.

For the alternatives in which STP effluent is included (3k and 3l), uncontrolled releases occur during the majority of the 50-year operating period. For these scenarios, out of 600 months, Alternative 3k will have 312 months of uncontrolled released and Alternative 3l will have 579 months of uncontrolled releases (Table 35).

Table 35

RESULTS OF TERMINAL POND A-4 SIZING
RESERVOIR OPERATIONAL ALTERNATIVES

INPUT ALTERNATIVE — ALL ALTERNATIVES INCLUDE 1.07 AF/YR RUNOFF AND 5.8 AF/Y GROUNDWATER INPUTS | OUTPUT RESULT

ALTERNATIVE	NO MAKEUP WATER DEMAND	MAKEUP WATER DEMAND OF 2.74 AF/YR	MAKEUP WATER DEMAND OF 81.2 AF/YR	INFLOW FROM 100-YR, 72-HR FLOOD (243 AF)	EFFLUENT FROM 3000 PERSONNEL (76 AF/YR)	EFFLUENT FROM 9000 PERSONNEL (227 AF/YR)	NO WATER RIGHTS RELEASES	WATER RIGHTS RELEASES WITH TREATMENT	ENHANCED EVAPORATION	UNCONTROLLED RELEASES	MAKEUP WATER SHORTAGES	RESERVOIR VOLUME 200-300 AF	RESERVOIR VOLUME 500-600 AF	RESERVOIR VOLUME 1000-1500 AF	RESERVOIR VOLUME 3000-3500 AF
3a		●					●								▲
3b			●				●				■ 12 [1)]		▲		
3c		●						●						▲	
3d			●					●			■ 536 [1)]	▲			
3e	●						●								▲
3f	●							●					▲		
3g	●						●		●				▲		
3h		●		●			●			■ 15 [2)]					▲
3i	●			●			●			■ 12 [2)]					▲
3j	●			●			●		●				▲		
3k	●				●		●			■ 312 [2)]					▲
3l										579 [2)]					▲

▲ = RESERVOIR SIZE
= INPUT ALTERNATIVE
= OUTPUT RESULT

1) TOTAL NUMBER OF MONTHS OF SHORTAGES DURING 600-MONTH OPERATIONAL PERIOD

2) TOTAL NUMBER OF MONTHS OF UNCONTROLLED RELEASES DURING 600-MONTH OPERATIONAL PERIOD

Table 36

Reservoir Sizes For Terminal Pond A-4 For Selected Operational Alternatives[1]

Alternative	Surface-Water Runoff and Ground-Water Inputs (ac-ft/yr)	STP Effluent Inflow (ac-ft)	Makeup Water Demands (ac-ft/yr)	Inflow from 100-yr, 72-hr Flood (ac-ft)	Water-Rights Releases With Treatment (ac-ft/yr)	Maximum Pond Volume (ac-ft)	Approximate Maximum Pond Surface Area (ac)	Increase in Spillway Crest Elevation[2] (ft)
3a	6.87	0	2.74	0	0	3250	68	77
3b	6.87	0	81.2	0	0	540	19	17
3c	6.87	0	2.74	0	64.3	1000	25	31
3d	6.87	0	81.2	0	64.3	252	13	0
3e	6.87	0	0	0	0	3250	68	77
3f	6.87	0	0	0	64.3	540	19	17
3g	6.87	0	0[4]	0	0	540[4]	19	17
3h	6.87	0	2.74	243	0	>3250[3]	--[3]	--[3]
3i	6.87	0	0	243	0	>3250[3]	--[3]	--[3]
3j	6.87	0	0[4]	243	0	540[4]	19	17
3k	6.87	76	0	0	0	>3250[3]	--[3]	--[3]
3l	6.87	227	0	0	0	>3250[3]	--[3]	--[3]

1) Assumes a reservoir based upon the elevation-area-capacity curves in Appendix C.

2) As measured from the "New Elevation" shown in Table 4.

3) Cannot build dam high enough to prevent uncontrolled releases.

4) Assumes 2,000 gpm pumping rate for an enhanced evaporation during the months of April through October of about 492.4 ac-ft/yr. The minimum surface area for such a system is about 23 acres (Merrick & Company, 1990).

The construction, operation, maintenance and replacement costs to permit Pond A-4 to become part of a zero-discharge system are directly proportional to the increase in the existing spillway elevation. Table 37 summarizes the construction and annual OM & R costs for Pond A-4. For purposes of the study, the costs for all three terminal ponds will be combined for each of the twelve alternatives. Costs for Alternatives 3a, 3e, 3h, 3i, 3k and 3l for Pond B-5 and Alternatives 3a, 3e, 3h, and 3i for Pond C-2 could not be estimated because no dam could be sized or constructed for these alternatives. Thus, these alternatives were dropped from further consideration.

Of the remaining six alternatives at each of the terminal ponds, the preliminary construction costs ranged from $2.6M to $17.6M (sum of each alternative on Tables 37, 40, and 43. The least expensive alternative (3b) reflects smallest increase in existing pond size with no treatment for downstream releases. The most expensive alternative (3c) is associated with the largest increase in pond size with treatment for downstream water-rights releases. Annual OM & R costs for the terminal ponds range from $0.7M to $5.1M per year.

For the purpose of this study the alternatives for all three of the terminal ponds were evaluated by combining the three ponds. Thus, the selected alternative is discussed in Section 3.2.4.3.

3.2.4.2 Pond B-5

Results of the Pond B-5 operational studies are shown in Table 38 and Table 39. Analyses of Table 38 and Table 39 indicate that if no releases could be made from Pond B-5 (Alternatives 3a and 3e), it is not physically possible to increase the height of the existing dam to completely store surface-water runoff, and assumed ground-water contributions from the Pond B-5 drainage basin of 0.41 mi^2, as defined in Table 34, unless Pond A-4 and B-5 were combined to form a single reservoir. This combined dam and reservoir was not examined in this study. Analysis of Tables 38 and 39 also indicate that if a 100-year, 72-hour storm occurs (Alternatives 3h and 3i), or if STP effluent is stored in Pond B-5 (Alternatives 3k and 3l) and no downstream releases or

Table 37

Preliminary Construction and OM & R Costs For Pond A-4 Reservoir Operational Alternatives

Alternative	Construction Cost (Million $) Earthwork	Advanced Water Treatment Plant	Piping and Pumping	Enhanced Evaporation[1]	Total	Annual OM & R Costs (15% of Total)
3a	13.6	0	0.1	0	13.7	2.1
3b	1.1	0	0.3	0	1.4	0.2
3c	2.4	6.8	0.1	0	9.3	1.4
3d	0	6.8	0.3	0	7.1	2.1
3e	13.6	0	0	0	13.6	2.0
3f	1.1	6.8	0	0	7.9	1.2
3g	1.1	0	0	2.6	3.7	0.6
3h	Not estimated because no dam can be constructed for this alternative.					
3i	Not estimated because no dam can be constructed for this alternative.					
3j	1.1	0	0	2.6	3.7	0.6
3k	Not estimated because no dam can be constructed for this alternative.					
3l	Not estimated because no dam can be constructed for this alternative.					

1) Source: Merrick & Company (1990).

Table 38

RESULTS OF TERMINAL POND B-5 SIZING
RESERVOIR OPERATIONAL ALTERNATIVES

	INPUT ALTERNATIVE — ALL ALTERNATIVES INCLUDE 0.41 AF/YR RUNOFF AND 2.3 AF/Y GROUNDWATER INPUTS									OUTPUT RESULT					
ALTERNATIVE	NO MAKEUP WATER DEMAND	MAKEUP WATER DEMAND OF 1.09 AF/YR	MAKEUP WATER DEMAND OF 32.2 AF/YR	INFLOW FROM 100-YR, 72-HR FLOOD (106 AF)	EFFLUENT FROM 3000 PERSONNEL (38 AF/YR)	EFFLUENT FROM 9000 PERSONNEL (113 AF/YR)	NO WATER RIGHTS RELEASES	WATER RIGHTS RELEASES WITH TREATMENT	ENHANCED EVAPORATION	UNCONTROLLED RELEASES	MAKEUP WATER SHORTAGES	RESERVOIR VOLUME 100-200 AF	RESERVOIR VOLUME 200-300 AF	RESERVOIR VOLUME 700-800 AF	
3a		●					●			■ 50[1]				▲	
3b			●				●						▲		
3c		●						●					▲		
3d			●					●			■ 513[2]	▲			
3e	●						●			■ 75[1]				▲	
3f	●							●					▲		
3g	●						●		●				▲		
3h		●		●			●			■ 50[1]				▲	
3i	●			●			●			■ 75[1]				▲	
3j	●			●			●		●				▲		
3k	●				●		●			■ 439[1]				▲	
3l										598[1]				▲	

▲ = RESERVOIR SIZE
= INPUT ALTERNATIVE
= OUTPUT RESULT

1) TOTAL NUMBER OF MONTHS OF UNCONTROLLED RELEASES DURING 600-MONTH OPERATIONAL PERIOD

2) TOTAL NUMBER OF MONTHS OF SHORTAGES DURING 600-MONTH OPERATIONAL PERIOD

Table 39

Reservoir Sizes For Terminal Pond B-5 For Selected Operational Alternatives[1)]

Alternative	Surface-Water Runoff and Ground-Water Inputs (ac-ft/yr)	STP Effluent Inflow (ac-ft)	Makeup Water Demands (ac-ft/yr)	Inflow from 100-yr, 72-hr Flood (ac-ft)	Water-Rights Releases With Treatment (ac-ft/yr)	Maximum Pond Volume (ac-ft)	Approximate Maximum Pond Surface Area (ac)	Increase in Spillway Crest Elevation[2)] (ft)
3a	2.71	0	1.09	0	0	>770[3)]	--[3)]	--[3)]
3b	2.71	0	32.2	0	0	260	12	16
3c	2.71	0	1.09	0	31.3	260	12	16
3d	2.71	0	32.2	0	31.3	115	7.0	0
3e	2.71	0	0	0	0	>770[3)]	--[3)]	--[3)]
3f	2.71	0	0	0	31.3	260	12	16
3g	2.71	0	0[4)]	0	0	260[4)]	12	16
3h	2.71	0	1.09	106	0	>770[3)]	--[3)]	--[3)]
3i	2.71	0	0	106	0	>770[3)]	--[3)]	--[3)]
3j	2.71	0	0[4)]	106	0	260[4)]	12	16
3k	2.71	38	0	0	0	>770[3)]	--[3)]	--[3)]
3l	2.71	113	0	0	0	>770[3)]	--[3)]	--[3)]

1) Assumes a reservoir based upon the elevation-area-capacity curves in Appendix C.

2) As measured from the "New Elevation" shown in Table 4.

3) Cannot build dam high enough to prevent uncontrolled releases.

4) Assumes 2,000 gpm pumping rate for an enhanced evaporation during the months of April through October of about 492.4 ac-ft/yr. The minimum surface area for such a system is about 23 acres (Merrick & Company, 1990).

enhanced evaporation occur, the existing dam could not be constructed high enough to completely store surface-water runoff and ground-water contributions in conjunction with runoff from the 100-year, 72-hour storm or STP effluent. The existing Pond B-5 spillway crest must be increased by more than 41 ft to accomplish complete storage if little or no makeup water is taken from Pond B-5 (Alternatives 3a, 3e, 3h, 3i, 3k, and 3l).

The increase in existing spillway elevation at Pond B-5 in order to have no uncontrolled releases, can only be done for alternatives involving either high makeup-water demands, water-rights releases with treatment or enhanced evaporation (Alternatives 3b, 3c, 3d, 3f, 3g, and 3j). An increase in the existing spillway crest varies from zero, for high makeup-water reuse and downstream water-rights releases with treatment (Alternative 3d), to about 16 feet for low makeup-water reuse and downstream water-rights releases with treatment (Alternative 3c). Table 38 indicates that six of the twelve proposed alternatives would result in no uncontrolled releases from Pond B-5. Increasing the elevation of the existing spillway crest by about 16 feet provides adequate capacity so that five of the six alternatives will be capable of no uncontrolled releases based upon the 50-year operational studies. Increase in elevation of the existing spillway would not be necessary for the sixth alternative (Alternative 3d) to completely store the water without uncontrolled releases. Therefore, a reasonable conclusion would be that Pond B-5 could minimize uncontrolled releases from its drainage basin if the spillway crest were increased by about 16 ft. This spillway crest, coupled with a separate enhanced evaporation system for Pond B-5 also would be effective in minimizing uncontrolled releases. Such an enhanced evaporation system for Pond B-5 already has been proposed by Merrick & Company (1990). Pond B-5 does not have a liner and, therefore, would permit uncontrolled seepage downstream. Additionally, the water quality in Pond B-5 without discharge could require special treatment for makeup water and for enhanced evaporation.

The construction, operation, maintenance and replacement costs to permit Pond B-5 to become part of a zero-discharge system are directly proportional to the increase in the existing spillway elevation. Table 40 summarizes the construction and annual OM & R costs for Pond B-5. For

Table 40

Preliminary Construction and OM & R Costs For Pond B-5 Reservoir Operational Alternatives

Alternative	Construction Cost (Million $) Earthwork	Advanced Water Treatment Plant	Piping and Pumping	Enhanced Evaporation[1]	Total	Annual OM & R Costs (15% of Total)
3a	Not estimated because no dam can be constructed for this alternative.					
3b	1.3	0	0.2	0	1.5	0.2
3c	1.3	2.6	0.1	0	4.0	0.6
3d	0	2.6	0.2	0	2.8	0.4
3e	Not estimated because no dam can be constructed for this alternative.					
3f	1.3	2.6	0	0	3.9	0.6
3g	1.3	0	0	2.6	3.9	0.6
3h	Not estimated because no dam can be constructed for this alternative.					
3i	Not estimated because no dam can be constructed for this alternative.					
3j	1.3	0	0	2.6	3.9	0.6
3k	Not estimated because no dam can be constructed for this alternative.					
3l	Not estimated because no dam can be constructed for this alternative.					

1) Source: Merrick & Company (1990).

purposes of this study, the costs for all three terminal ponds will be combined for each of the alternatives. Costs for Alternatives 3a, 3e, 3h, 3i, 3k, and 3l for Pond B-5 and Alternatives 3a, 3e, 3h, and 3i for Pond C-2 could not be estimated because no dam could be sized or constructed for these alternatives. Thus, these alternatives were dropped from further consideration. The costs for the remaining six alternatives at each of the terminal ponds has been presented in Section 3.2.4.1.

For the purpose of this study the alternatives for all three of the terminal ponds were evaluated by combining all three of the ponds. Thus, the selected alternative is discussed in the following section.

3.2.4.3 Pond C-2

Results of the Pond C-2 operational studies are shown in Table 41 and Table 42. Analyses of Table 41 and Table 42 indicate that if no releases could be made from Pond C-2 (Alternatives 3a, and 3e), it is not physically possible to increase the height of the existing dam to completely store surface-water runoff and assumed ground-water contributions from the Pond C-2 drainage basin of 0.35 mi^2, as defined in Table 34, unless water could be pumped to Pond A-4. This possibility was not examined in this study. Analysis of Table 41 and Table 42 also indicates that if a 100-year, 72-hour storm occurs and no downstream releases or no enhanced evaporation occurs (Alternatives 3h and 3i), it is not possible to increase the dam height enough to completely store surface-water runoff, ground-water contributions, and the runoff resulting from the 100-year, 72-hour storm. The existing Pond C-2 spillway crest must be increased by more than 14 ft to accomplish complete storage if little or no makeup water is taken from Pond C-2 (Alternatives 3a, 3e, 3h, and 3i).

Table 41

RESULTS OF TERMINAL POND C-2 SIZING RESERVOIR OPERATIONAL ALTERNATIVES

INPUT ALTERNATIVE — ALL ALTERNATIVES INCLUDE 0.35 AF/YR RUNOFF AND 1.9 AF/YR GROUNDWATER INPUTS

ALTERNATIVE	INPUT ALTERNATIVE: NO MAKEUP WATER DEMAND	MAKEUP WATER DEMAND OF 0.90 AF/YR	MAKEUP WATER DEMAND OF 26.6 AF/YR	INFLOW FROM 100-YR, 72-HR FLOOD (76 AF)	NO WATER RIGHTS RELEASES	WATER RIGHTS RELEASES WITH TREATMENT	ENHANCED EVAPORATION	OUTPUT RESULT: UNCONTROLLED RELEASES	MAKEUP WATER SHORTAGES	RESERVOIR VOLUME 50-100 AF	RESERVOIR VOLUME 200-250 AF	RESERVOIR VOLUME 250-300 AF
3a		●			●			■ 174[1]				▲
3b			●		●						▲	
3c		●				●					▲	
3d			●			●			■ 513[2]	▲		
3e	●				●			■ 191[1]				▲
3f	●					●					▲	
3g	●				●		●				▲	
3h		●		●	●			■ 174[1]				▲
3i	●			●	●			■ 191[1]				▲
3j	●			●	●		●				▲	

▲ = RESERVOIR SIZE
● = INPUT ALTERNATIVE
■ = OUTPUT RESULT

1) TOTAL NUMBER OF MONTHS OF UNCONTROLLED RELEASES DURING 600-MONTH OPERATIONAL PERIOD

2) TOTAL NUMBER OF MONTHS OF SHORTAGES DURING 600-MONTH OPERATIONAL PERIOD

Table 42

Reservoir Sizes For Terminal Pond C-2 For Selected Operational Alternatives[1)]

Alternative	Surface-Water Runoff and Ground-Water Inputs (ac-ft/yr)	Makeup Water Demands (ac-ft/yr)	Water-Rights Releases With Treatment (ac-ft/yr)	Inflow From 100-Yr, 72-Hr Flood (ac-ft)	Maximum Pond Volume (ac-ft)	Maximum Pond Surface Area (ac)	Approximate Increase in Spillway Crest Elevation[2)] (ft)
3a	2.25	0.90	0	0	>253[3)]	--[3)]	--[3)]
3b	2.25	26.6	0	0	204	14	10
3c	2.25	0.90	0	27.6	204	14	10
3d	2.25	26.6	0	27.6	83	11	0
3e	2.25	0	0	0	>253[3)]	--[3)]	--[3)]
3f	2.25	0	0	27.6	204	14	10
3g	2.25	0[4)]	0	0	204[4)]	14	10
3h	2.25	0.90	76	0	>253[3)]	--[3)]	--[3)]
3i	2.25	0	76	0	>253[3)]	--[3)]	--[3)]
3j	2.25	0[4)]	76	0	204[4)]	14	10

1) Assumes a reservoir based upon the elevation-area-capacity curves in Appendix C.

2) As measured from the "New Elevation" shown in Table 4.

3) Cannot build dam high enough to prevent uncontrolled releases.

4) Assumes 2,000 gpm pumping rate for an enhanced evaporation during the months of April through October of about 492.4 ac-ft/yr. The minimum surface area for such a system is about 23 acres (Merrick & Company, 1990).

The increase in existing spillway elevation at Pond C-2 in order to have no uncontrolled releases, can only be done for alternatives involving either high makeup-water demands, water-rights releases with treatment or enhanced evaporation (Alternatives 3b, 3c, 3d, 3f, 3g and 3j). An increase in the existing spillway crest varies from zero, for high makeup-water reuse and downstream water-rights releases with treatment (Alternative 3d), to about 10 feet for low makeup-water reuse and downstream water-rights releases with treatment (Alternative 3c). Table 41 indicates that six of the ten proposed alternatives would result in no uncontrolled releases from Pond C-2. Increasing the elevation of the existing spillway crest by about 10 ft provide adequate capacity so that five of the six alternatives will be capable of no uncontrolled releases based upon the 50-year operational studies. Increase in elevation of the existing spillway would not be necessary for the sixth alternative (Alternative 3d). Therefore, a reasonable conclusion would be that Pond C-2 could minimize uncontrolled releases from its drainage basin if the spillway crest were increased by about 10 ft. This spillway crest, coupled with a separate enhanced evaporation system for Pond C-2 also would be effective in minimizing uncontrolled releases. Pond C-2 is does not have a liner and, therefore, would permit uncontrolled seepage downstream. Additionally, the water quality in Pond C-2 without discharge could require special treatment for makeup water and for enhanced evaporation.

The construction, operation, maintenance and replacement costs to permit Pond C-2 to become part of a zero-discharge system are directly proportional to the increase in the existing spillway elevation. Table 43 summarizes the construction and annual OM & R costs for Pond C-2. For purposes of this study, the costs for all three terminal ponds will be combined for each of the twelve alternatives (twelve alternatives from Ponds A-4 and B-5). Costs for Alternatives 3a, 3e, 3h, 3i, 3k, and 3l for Pond B-5 and Alternatives 3a, 3e, 3h, and 3i for Pond C-2 could not be estimated because no dam could be sized or constructed for these alternatives. Thus, these alternatives were dropped from further consideration. The costs for the remaining six alternatives at each of the terminal ponds has been presented in Section 3.2.4.1.

Table 43

Preliminary Construction and OM & R Costs For Pond C-2 Reservoir Operational Alternatives

Alternative	Construction Cost (Million $) Earthwork	Advanced Water Treatment Plant	Piping and Pumping	Enhanced Evaporation[1]	Total	Annual OM & R Costs (15% of Total)
3a	Not estimated because no dam can be constructed for this alternative.					
3b	2.0	0	0.2	0	2.2	0.3
3c	2.0	2.2	0.1	0	4.3	0.6
3d	0	2.2	0.2	0	2.2	0.3
3e	Not estimated because no dam can be constructed for this alternative.					
3f	2.0	2.2	0	0	4.2	0.6
3g	2.0	0	0	2.6	4.6	0.7
3h	Not estimated because no dam can be constructed for this alternative.					
3i	Not estimated because no dam can be constructed for this alternative.					
3j	2.0	0	0	2.6	4.6	0.7

1) Source: Merrick & Company (1990).

Based upon the alternatives evaluation system discussed earlier, Alternative 3c (108 ac-ft/yr effluent reuse, 4.73 ac-ft/yr makeup water and 99.8 ac-ft/yr downstream releases for water rights) was selected as the best alternative for a plant population of 3,000; Alternative 3d (325 ac-ft/yr effluent reuse, 140 ac-ft/yr makeup water and 99.8 ac-ft/yr downstream releases for water rights) was selected as the best alternative for a plant population of 9,000; and Alternative 3f (99.8 ac-ft/yr downstream releases for water rights) was selected as the best alternative for a plant shutdown. Table 44 presents the results of the alternative evaluation. For the terminal ponds, it would be difficult to find a true zero-discharge case because the existing terminal pond dams could not be made to store enough water.

Environmental consequences related to selected Alternatives 3c and 3d is that the necessary increase in the size of Pond A-4 will create a larger wetland to maintain, and waste will be generated due to the treatment of water for reuse. In addition, these storage facilities are located on-channel. This creates an environmental risk of the dams failing and also may affect downstream wetlands. Although downstream releases will be made, there is no guarantee that these releases will provide enough water to sustain the downstream releases.

Environmental consequences related to selected Alternative 3f is, as with Alternatives 3c and 3d, these storage facilities are located on-channel. This creates an environmental risk of the dams failing and also may affect downstream wetlands. For this alternative there are no downstream releases. Consequently, it is likely that the downstream wetlands may dry up or become minimal in size unless additional measures are taken to maintain these wetlands. Such additional measures may include purchasing water and piping it to the wetlands of concern.

TABLE 44

Alternative Evaluation And Ranking
Terminal Ponds
(Closure Scenarios)

EVALUATION FACTORS	WEIGHTING FACTOR	ALT 3e		ALT 3f		ALT 3g		ALT 3i		ALT 3j	
		S	W	S	W	S	W	S	W	S	W
CONTROLLED DISCHARGE	10	1	10	5	50	5	50	1	10	5	50
WASTE GENERATION	7	5	35	3	21	5	35	5	35	5	35
RISK	8	1	8	1	8	1	8	1	8	1	8
COST	6	1	6	5	30	4	24	1	6	4	24
DESIGN AND CONST. SCHEDULE	6	1	6	5	30	4	24	1	6	4	24
FLEXIBILITY	8	5	40	5	40	5	40	5	40	5	40
WATER RIGHTS	5	1	5	5	25	1	5	1	5	1	5
AIR EMISSIONS	10	5	50	5	50	5	50	5	50	5	50
WETLANDS/T&E	10	2	20	4	40	4	40	2	20	4	40
IHSS	10	2	20	4	40	4	40	2	20	4	40
PUBLIC ACCEPTABILITY	8	1.3	10	3.3	26	3.3	26	1.3	10	3.3	26
TOTALS			210		360		342		210		342
RANK			3		1		2		3		2

S = SCORE

W = WEIGHTED SCORE (SCORE X WEIGHTING FACTOR)

TABLE 44
(Cont.)

Alternative Evaluation And Ranking
Terminal Ponds
(Low Population Scenarios)

EVALUATION FACTORS	WEIGHTING FACTOR	ALT 3a		ALT 3c		ALT 3h		ALT 3k	
		S	W	S	W	S	W	S	W
CONTROLLED DISCHARGE	10	1	10	5	50	1	10	1	10
WASTE GENERATION	7	4	28	2	14	4	28	5	35
RISK	8	1	10	1	10	1	10	1	10
COST	6	1	6	3	18	1	6	1	6
DESIGN AND CONST. SCHEDULE	6	1	6	3	18	1	6	1	6
FLEXIBILITY	8	5	40	5	40	5	40	5	40
WATER RIGHTS	5	1	5	5	25	1	5	1	5
AIR EMISSIONS	10	5	50	5	50	5	50	5	50
WETLANDS/T&E	10	2	20	4	40	2	20	3	30
IHSS	10	2	20	4	40	2	20	3	30
PUBLIC ACCEPTABILITY	8	1.3	10	3.3	26	1.3	10	1.7	14
TOTALS			205		331		205		236
RANK			3		1		3		2

S = SCORE
W = WEIGHTED SCORE (SCORE X WEIGHTING FACTOR)

TABLE 44
(Cont.)

Alternative Evaluation And Ranking
Terminal Ponds
(High Population Scenarios)

EVALUATION FACTORS	WEIGHTING FACTOR	ALT 3b		ALT 3d		ALT 31	
		S	W	S	W	S	W
CONTROLLED DISCHARGE	10	5	50	5	50	1	10
WASTE GENERATION	7	3	21	1	7	5	35
RISK	8	1	8	1	8	1	8
COST	6	5	30	3	18	1	6
DESIGN AND CONST. SCHEDULE	6	5	30	3	18	1	6
FLEXIBILITY	8	5	40	5	40	5	40
WATER RIGHTS	5	1	5	5	25	1	5
AIR EMISSIONS	10	5	50	5	50	5	50
WETLANDS/T&E	10	3	30	5	50	1	10
IHSS	10	3	30	5	50	1	10
PUBLIC ACCEPTABILITY	8	3	24	3.7	30	1	8
TOTALS			318		346		188
RANK			2		1		3

S = SCORE
W = WEIGHTED SCORE (SCORE X WEIGHTING FACTOR)

4.0 SUMMARY

Operational studies were performed for sizing temporary water-storage reservoirs to store selected combinations of STP effluent for various RFP personnel populations, surface-water runoff from areas of suspected contamination, ground water discharge, and precipitation falling directly on the reservoir. The reservoir sizing was done for combinations of water-use demands consisting of complete STP effluent reuse, makeup water from surface-water runoff, downstream release of treated surface-water runoff for water rights, evaporation from the reservoir and enhanced spray evaporation.

Sixty-seven operational-study alternatives were examined. Seven alternatives for off-channel storage of STP effluent separate from surface-water runoff were assessed. Twelve alternatives for off-channel storage of surface-water runoff were assessed. Two of these 12 alternatives assumed that the STP effluent would be mixed with the surface-water runoff in a single off-channel reservoir. Fourteen alternatives for storage of surface-water runoff in Great Western Reservoir were assessed. These 14 alternatives assumed that an off-channel reservoir for STP effluent would be constructed and that STP effluent would not be discharged into Great Western Reservoir. Thirty-four alternatives (12 each for Ponds A-4 and B-5 and 10 for Pond C-2) for storage of surface-water runoff in the Terminal Ponds were assessed. Four of these 34 alternatives assumed that STP effluent would be mixed with the surface-water runoff in either or both Ponds A-4 and B-5. In general the 100-yr, 72-hr storm runoff was not included in all the alternatives. However, this storm runoff was included in 13 of the 67 alternatives.

Results of the reservoir operational studies have been presented above. A preferred alternative was selected for each of the four generalistic alternatives: (1) Off-channel storage of STP effluent; (2) Off-channel storage using the existing terminal ponds for collection of surface-water runoff, and pumping this surface water to an off-channel temporary water-storage reservoir; (3) Storage in Great Western Reservoir; and (4) Storage in the three terminal ponds themselves. Additionally, a preferred alternative was selected for each of three sub-alternatives within the four generalistic alternatives. These three sub-alternatives were for two RFP population scenarios (3000 and 9000 personnel) and the plant shutdown case where no recycle water would be needed. Table 45 summarizes the 9 preferred alternatives depending upon future conditions at the RFP. Because off-channel storage of STP effluent is part of all the preferred alternatives, it has been included within each preferred alternative to give a set of 9 preferred alternatives. In addition to the alternative description, Table 45 also summarizes the estimated construction and annual OM & R costs for each of the 9 preferred alternatives.

The 9 preferred alternatives are not ranked among themselves because they are dependent upon the RFP population. A decision related to the RFP population could result in selection of one of the preferred alternatives. There is a strong possibility that other alternatives also could be selected based upon other criteria, such as the purchase of additional water for water rights or supplemental makeup water. The costs of these two possibilities have not been included in this report.

Additionally, the possibilities of combining parts of alternatives, especially the terminal ponds alternatives, have not been evaluated in this study. The possible combinations of such alternatives is very large. Decisions about RFP personnel population would be helpful in reducing the number of possible combinations.

Table 45

SUMMARY OF PREFERRED ALTERNATIVES

GENERALIZED ALTERNATIVE	RFP PERSONNEL	ALT. NOS.	PREFERRED ALTERNATIVE DESCRIPTION	CONSTR. COSTS (Million $)	OM & R COSTS (Million $/Yr)
NEW OFF-CHANNEL RESERVOIR	3,000	0b and 1a	Off-channel storage of STP effluent (114 ac-ft/yr) with 108 ac-ft/yr reuse, off-channel storage of surface-water (125.3 ac-ft/yr) and ground water (10 ac-ft/yr), annual makeup water demand (4.73 ac-ft/yr). STP reservoir = 135 ac-ft, Runoff reservoir = 3200 ac-ft.	8.2	1.3
	9,000	0f and 1d	Off-channel storage of STP effluent (340 ac-ft/yr) with 325 ac-ft/yr reuse, off-channel storage of surface-water (125.3 ac-ft/yr) and ground water (10 ac-ft/yr), annual makeup water demand (140 ac-ft/yr). STP reservoir = 410 ac-ft, Runoff reservoir = 325 ac-ft.	17.5	2.7
	Shutdown	0a and 1j	Off-channel storage of STP effluent (114 ac-ft/yr) with no reuse, off-channel storage of surface-water (125.3 ac-ft/yr) and ground water (10 ac-ft/yr), no makeup water and spray evaporation (246.2 ac-ft/yr). STP reservoir = 1730 ac-ft, Runoff reservoir = 1900 ac-ft.	11.5	1.7
GREAT WESTERN RESERVOIR	3,000	0b and 2h	Off-channel storage of STP effluent (114 ac-ft/yr) with 108 ac-ft/yr reuse, off-channel storage of surface-water (139.8 ac-ft/yr) and ground water (10 ac-ft/yr), annual makeup water demand (4.73 ac-ft/yr). STP reservoir = 135 ac-ft, Diversion channel around Great Western Reservoir.	77.7	11.7
	9,000	0f and 2k	Off-channel storage of STP effluent (340 ac-ft/yr) with 325 ac-ft/yr reuse, off-channel storage of surface-water (139.8 ac-ft/yr) and ground water (10 ac-ft/yr), annual makeup water demand (140 ac-ft/yr) with downstream releases for water rights (111.6 ac-ft/yr). STP reservoir = 410 ac-ft, Diversion channel around Great Western Reservoir.	104.5	15.7
	Shutdown	0a and 2l	Off-channel storage of STP effluent (114 ac-ft/yr) with no reuse, off-channel storage of surface-water (139.8 ac-ft/yr) and ground water (10 ac-ft/yr), no makeup water. STP reservoir = 1730 ac-ft, Diversion channel around Great Western Reservoir.	76.3	11.4
TERMINAL PONDS	3,000	0b and 3c	Off-channel storage of STP effluent (114 ac-ft/yr) with 108 ac-ft/yr reuse, terminal pond storage of surface-water (125.3 ac-ft/yr) and ground water (10 ac-ft/yr), annual makeup water demand (4.73 ac-ft/yr) and downstream releases for water rights (99.8 ac-ft/yr). STP reservoir = 135 ac-ft, Raise Pond A-4 by 31 ft, Pond B-5 by 16 ft and Pond C-2 by 10 ft.	18.6	2.8
	9,000	0f and 3d	Off-channel storage of STP effluent (340 ac-ft/yr) with 325 ac-ft/yr reuse, terminal pond storage of surface-water (125.3 ac-ft/yr) and ground water (10 ac-ft/yr), annual makeup water demand (140 ac-ft/yr). STP reservoir = 410 ac-ft, No increase in pond sizes.	13.9	2.1
	Shutdown	0a and 3f	Off-channel storage of STP effluent (114 ac-ft/yr) with no reuse, terminal pond storage of surface-water (125.3 ac-ft/yr) and ground water (10 ac-ft/yr), no makeup water and downstream releases for water rights (99.8 ac-ft/yr). STP reservoir = 1730 ac-ft, raise Pond A-4 by 17 ft, Pond B-5 by 16 ft and Pond C-2 by 10 ft.	19.6	2.9

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This report was prepared and submitted in partial fulfillment of the Zero-Offsite Water-Discharge Study being conducted by ASI on behalf of EG&G Rocky Flats, Inc. EG&G's Project Engineer for the Study was Mr. R. A. Applehans of EG&G's Facilities Engineering, Plant Civil-Structural Engineering (FE/PCSE).

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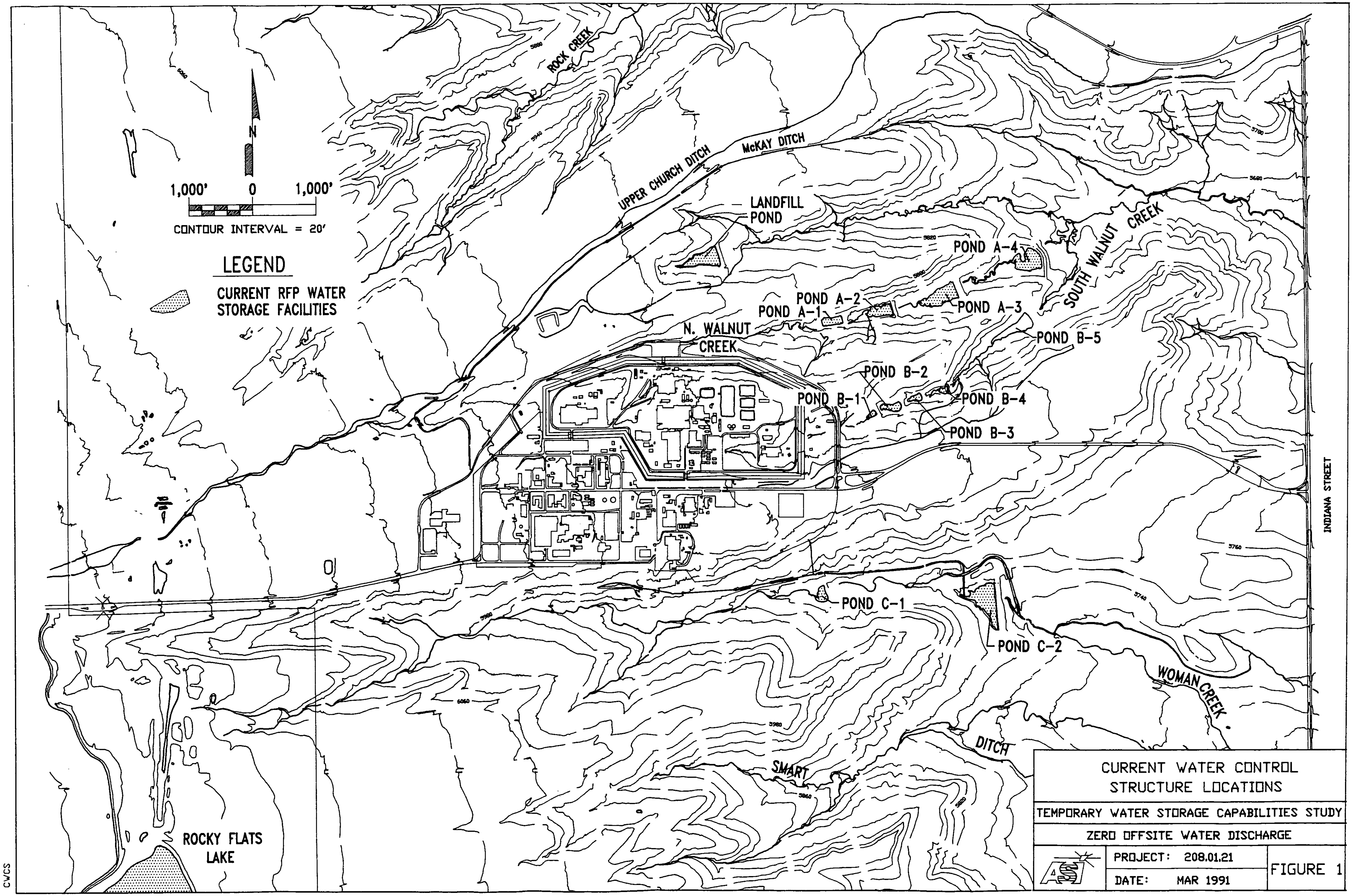
FIGURES


ROCK CREEK
UPPER CHURCH DITCH
McKAY DITCH
N
1,000' 0 1,000'
CONTOUR INTERVAL = 20'
LEGEND
CURRENT RFP WATER STORAGE FACILITIES
LANDFILL POND
POND A-4
SOUTH WALNUT CREEK
POND A-2
POND A-1
POND A-3
N. WALNUT CREEK
POND B-5
POND B-2
POND B-1
POND B-4
POND B-3
INDIANA STREET
POND C-1
POND C-2
WOMAN CREEK
DITCH
SMART
ROCKY FLATS LAKE
5880
6060
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5680
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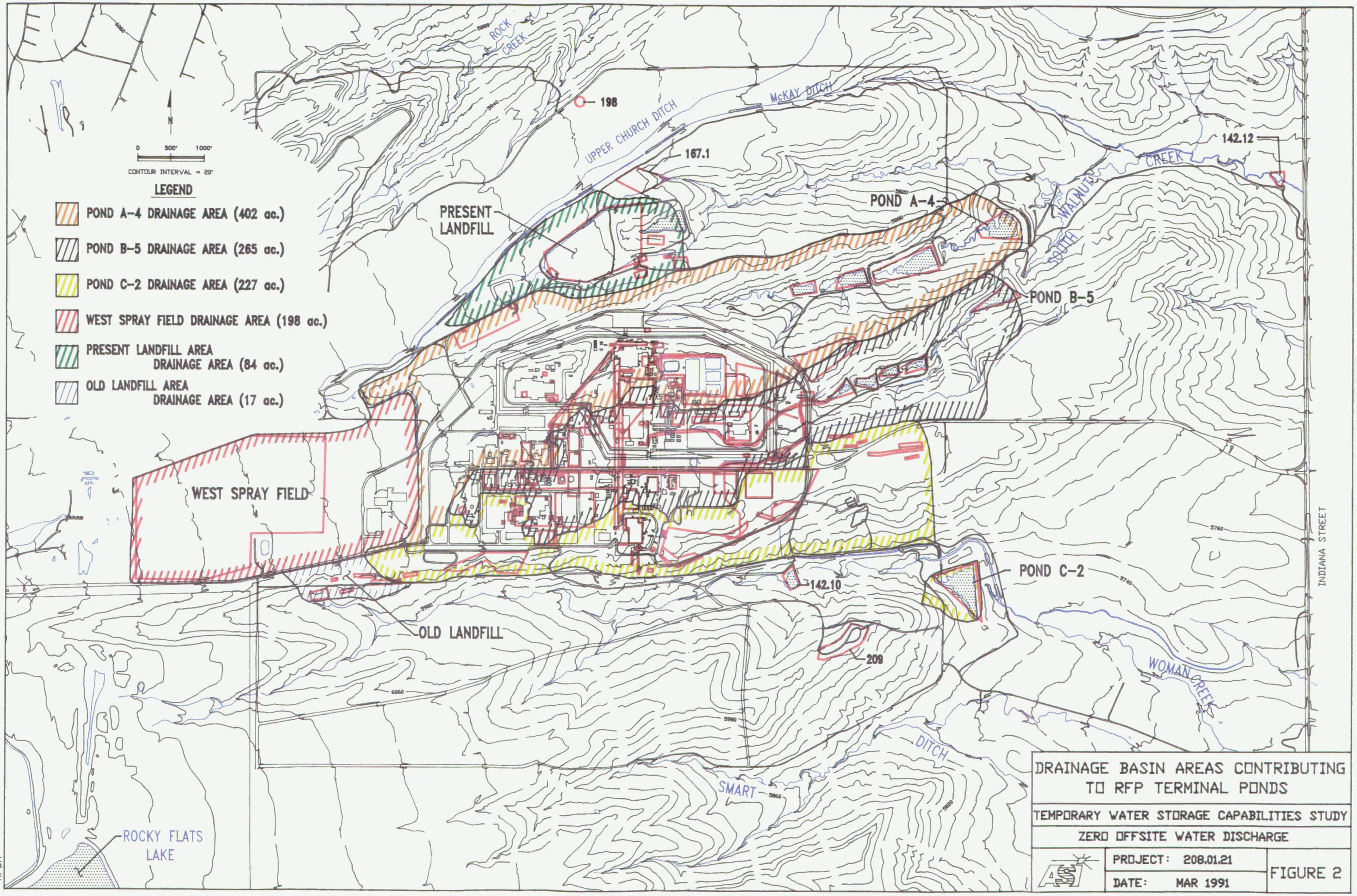
5960
5920
CURRENT WATER CONTROL STRUCTURE LOCATIONS
TEMPORARY WATER STORAGE CAPABILITIES STUDY
ZERO OFFSITE WATER DISCHARGE
ASI
PROJECT: 208.01.21
DATE: MAR 1991
FIGURE 1

CVCS



DRAINAGE BASIN AREAS CONTRIBUTING TO RFP TERMINAL PONDS

TEMPORARY WATER STORAGE CAPABILITIES STUDY

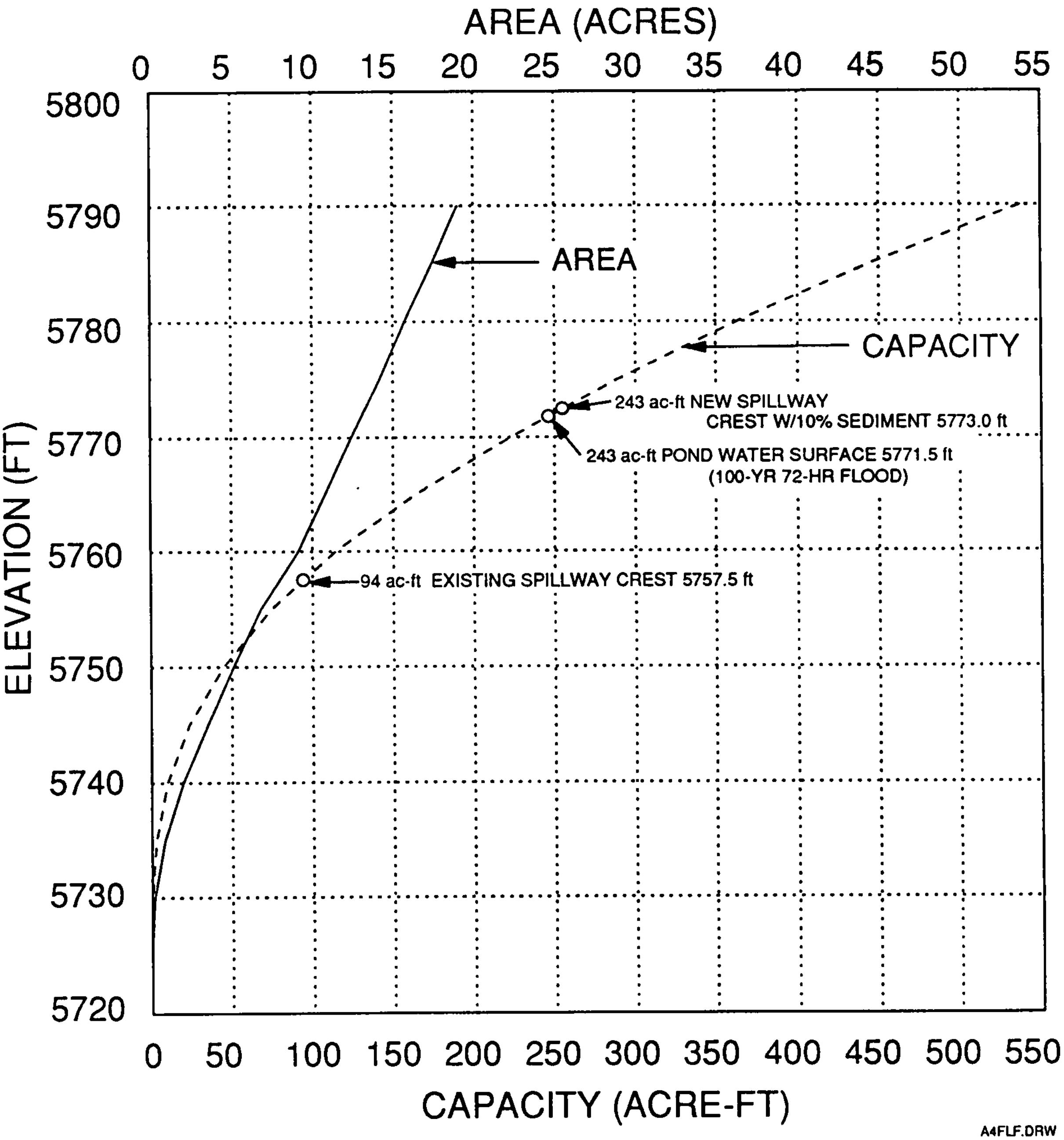
ZERO OFFSITE WATER DISCHARGE

PROJECT: 208.01.21

DATE: MAR 1991

FIGURE 2

POND A-4



POND A-4
ELEVATION-AREA-CAPACITY CURVES

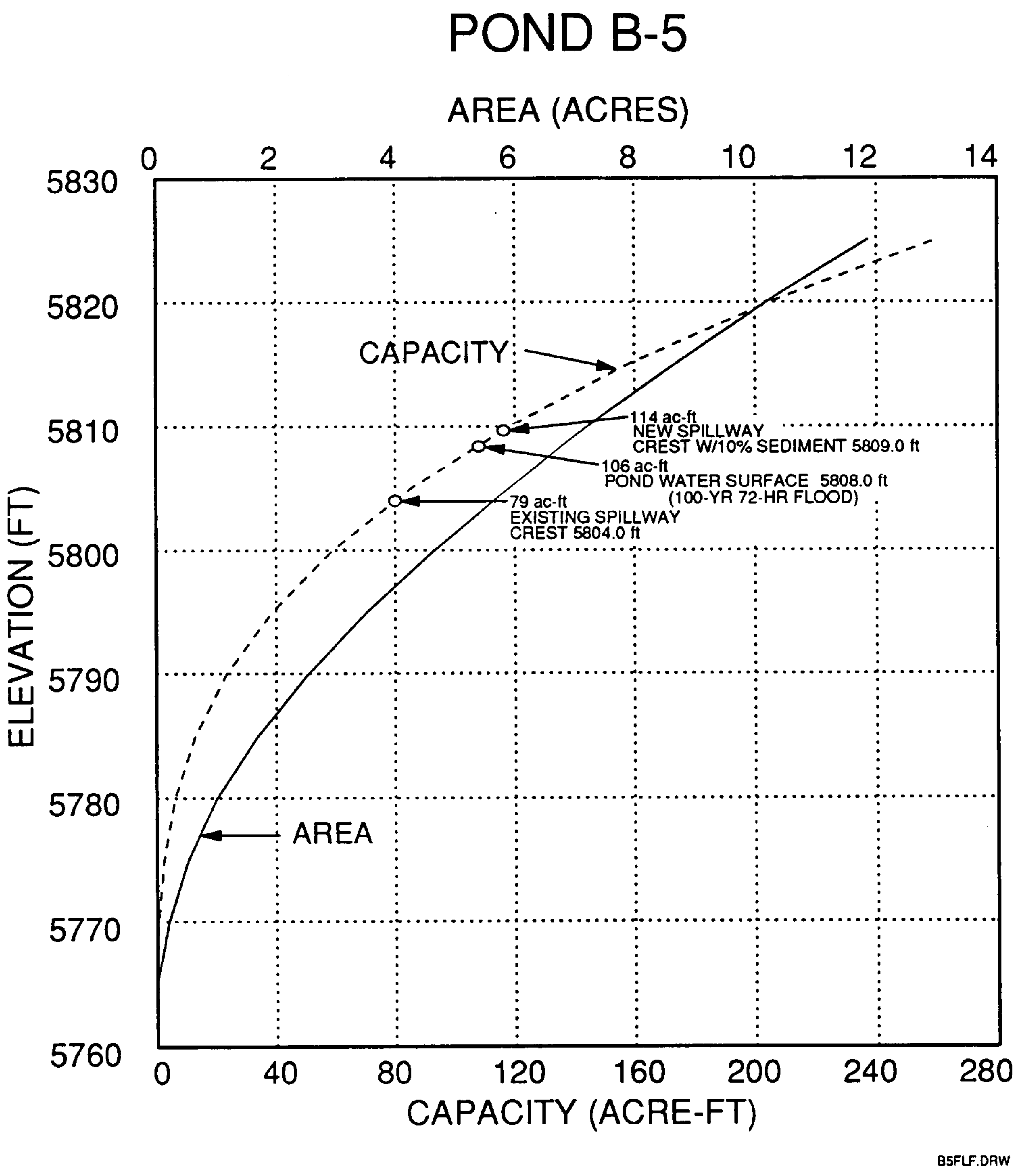
TEMPORARY WATER-STORAGE CAPABILITIES STUDY

ZERO OFFSITE WATER DISCHARGE

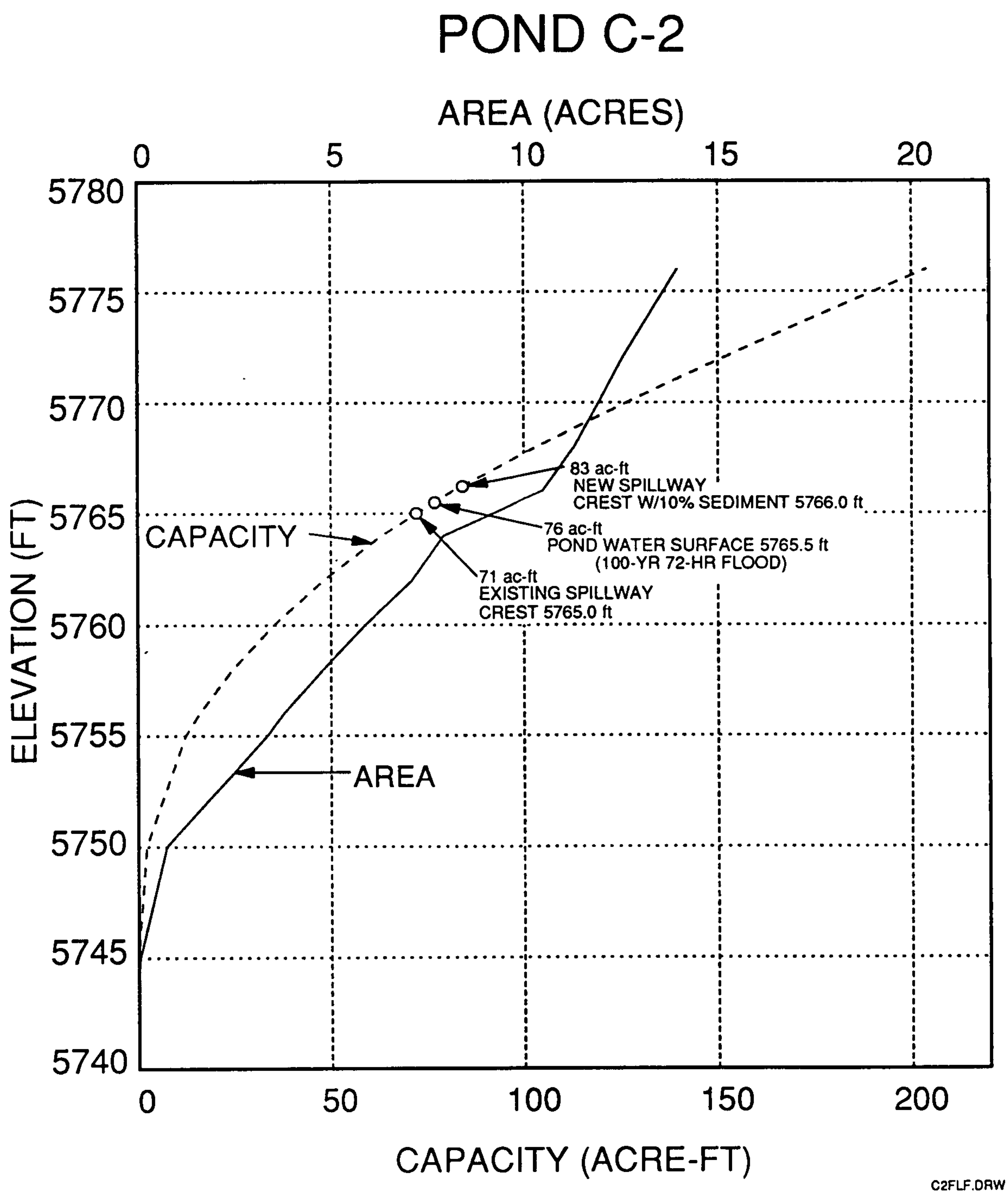
PROJECT: 208.0121

DATE: MAR 1991

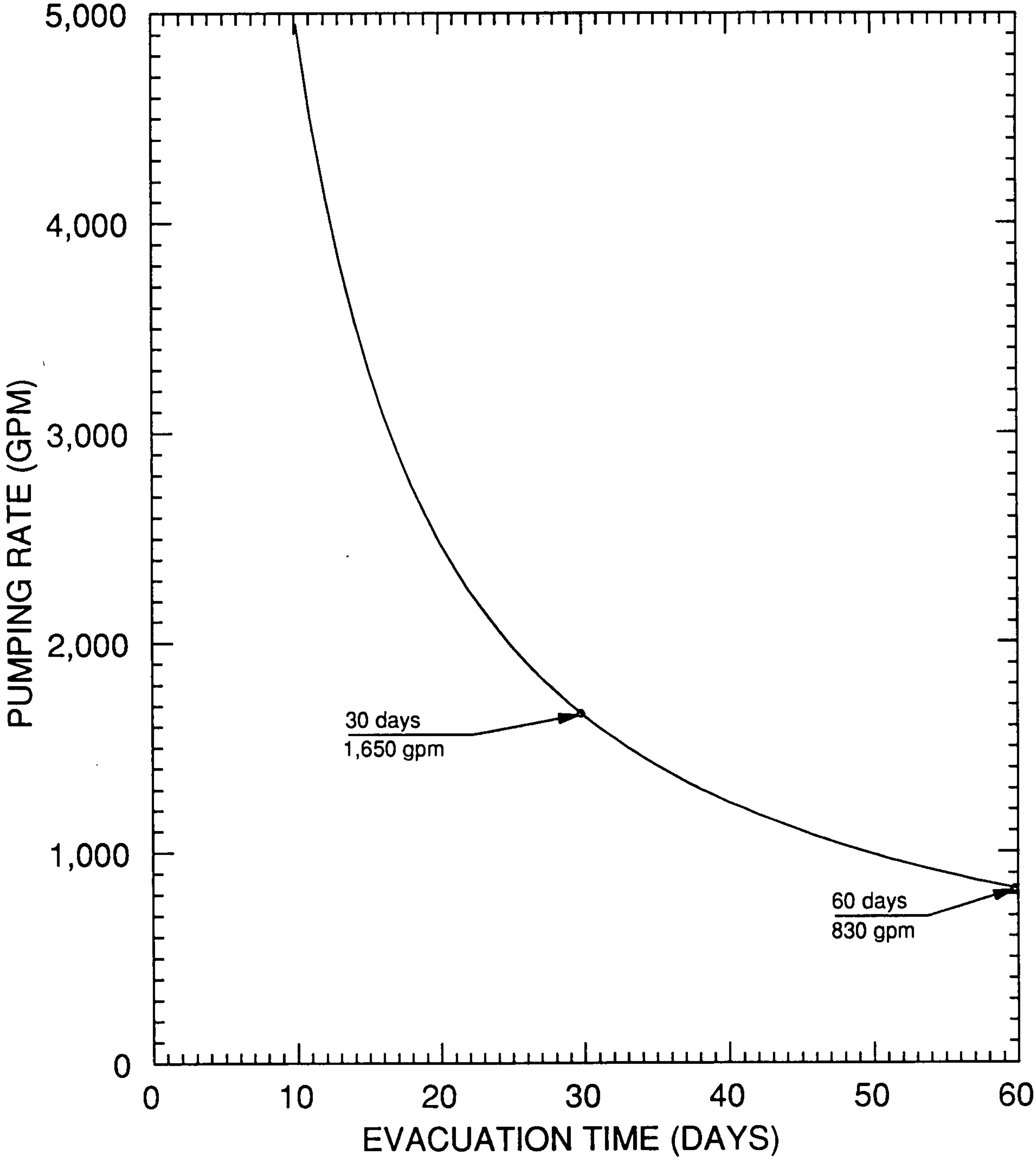
FIGURE 3



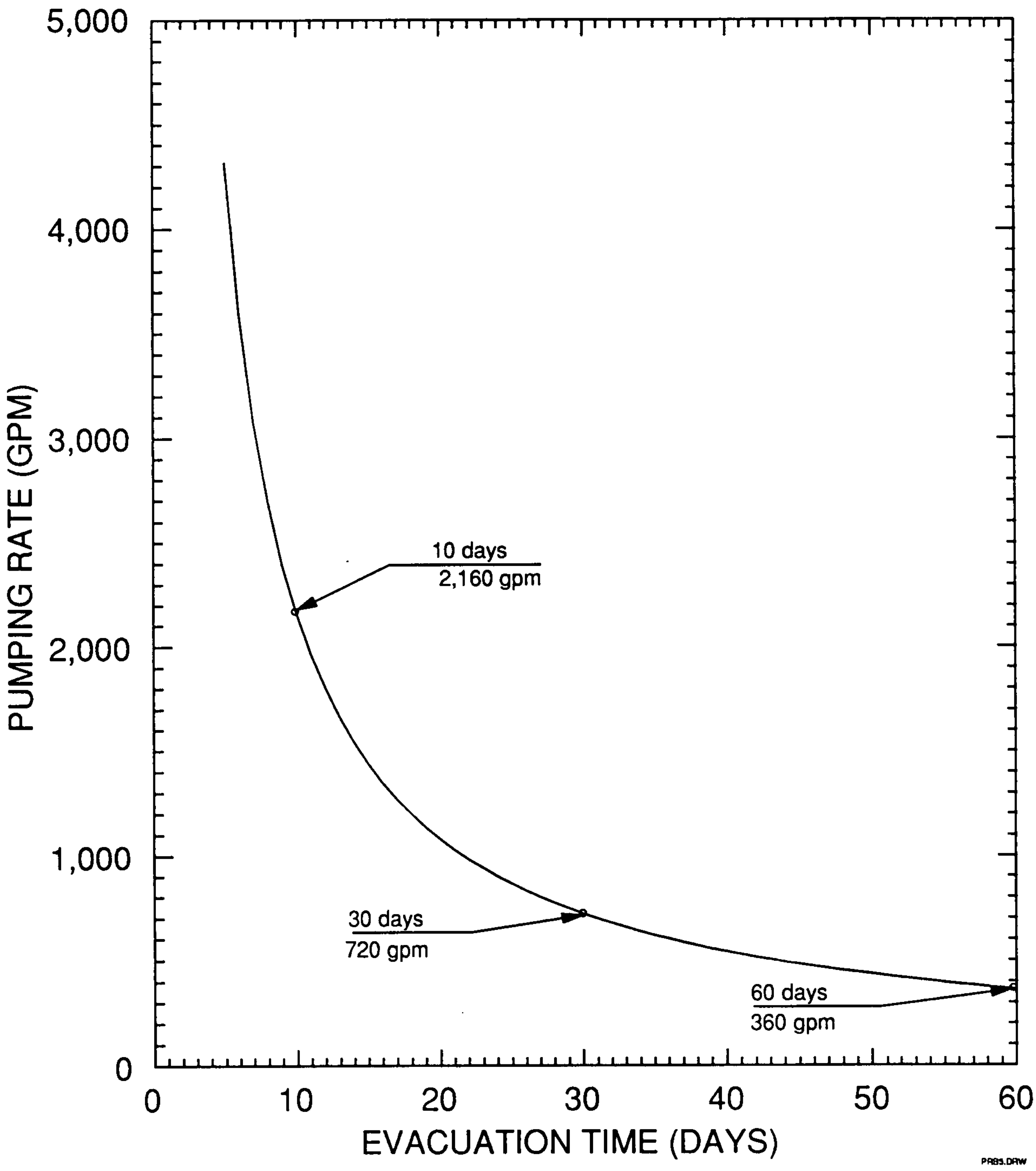
POND B-5 ELEVATION-AREA-CAPACITY CURVES		
TEMPORARY WATER-STORAGE CAPABILITIES STUDY		
ZERO OFFSITE WATER DISCHARGE		
	PROJECT: 208.0121	FIGURE 4
	DATE: MAR 1991	



POND C-2 ELEVATION-AREA-CAPACITY CURVES		
TEMPORARY WATER-STORAGE CAPABILITIES STUDY		
ZERO OFFSITE WATER DISCHARGE		
	PROJECT: 208.0121 DATE: MAR 1991	FIGURE 5



POND A-4 PUMPING RATE TO EVACUATE 90 PERCENT OF THE SPILLWAY-CREST-CAPACITY VOLUME (243 AC-FT) IN THE DESIGNATED TIME		
TEMPORARY WATER-STORAGE CAPABILITIES STUDY		
ZERO OFFSITE WATER DISCHARGE		
	PROJECT: 208.0121 DATE: MAR 1991	FIGURE 6

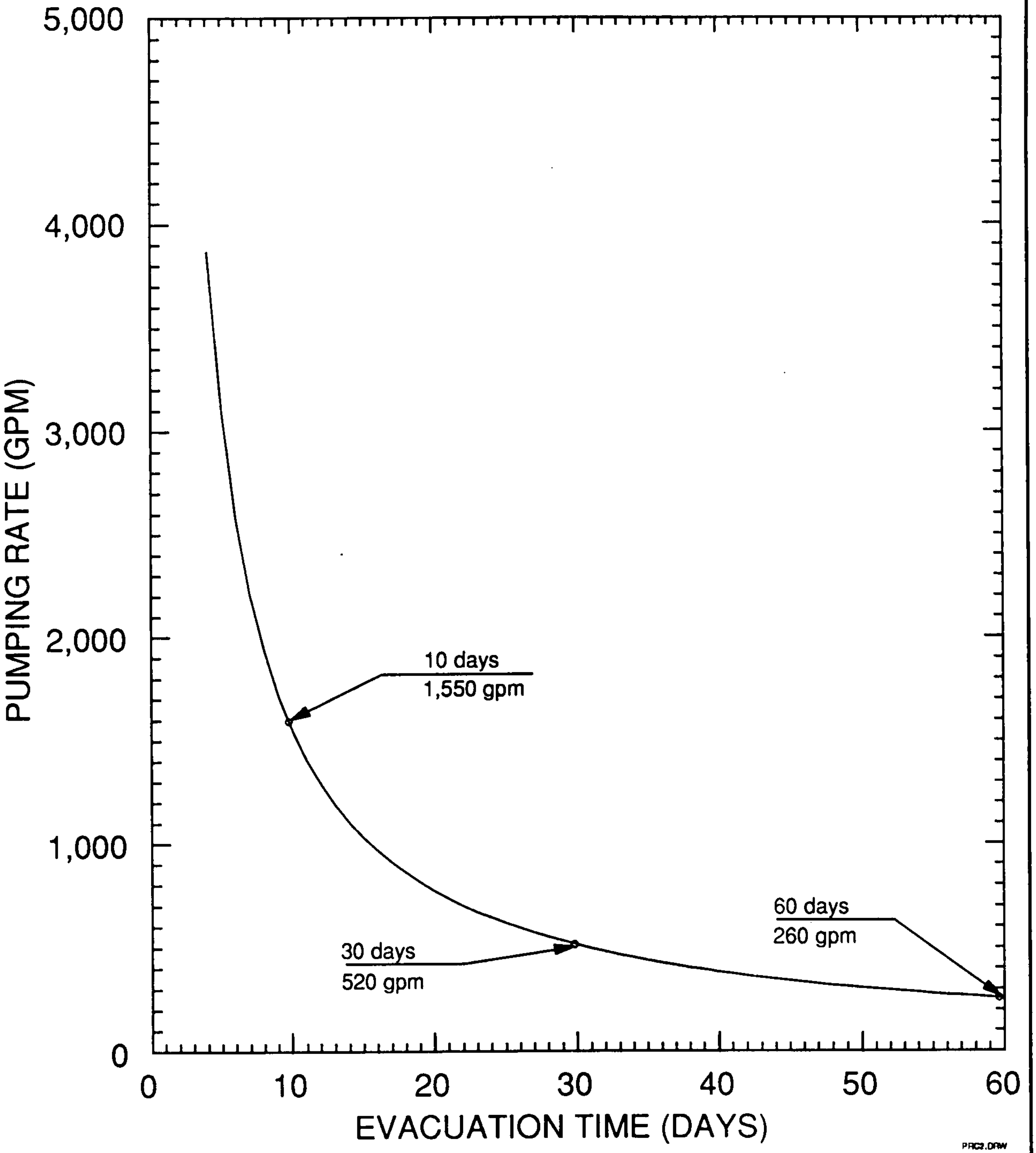


POND B-5
PUMPING RATE TO EVACUATE 90 PERCENT
OF THE SPILLWAY-CREST-CAPACITY VOLUME
(106 AC-FT) IN THE DESIGNATED TIME

TEMPORARY WATER-STORAGE CAPABILITIES STUDY

ZERO OFFSITE WATER DISCHARGE

	PROJECT: 208.0121	FIGURE 7
	DATE: MAR 1991	

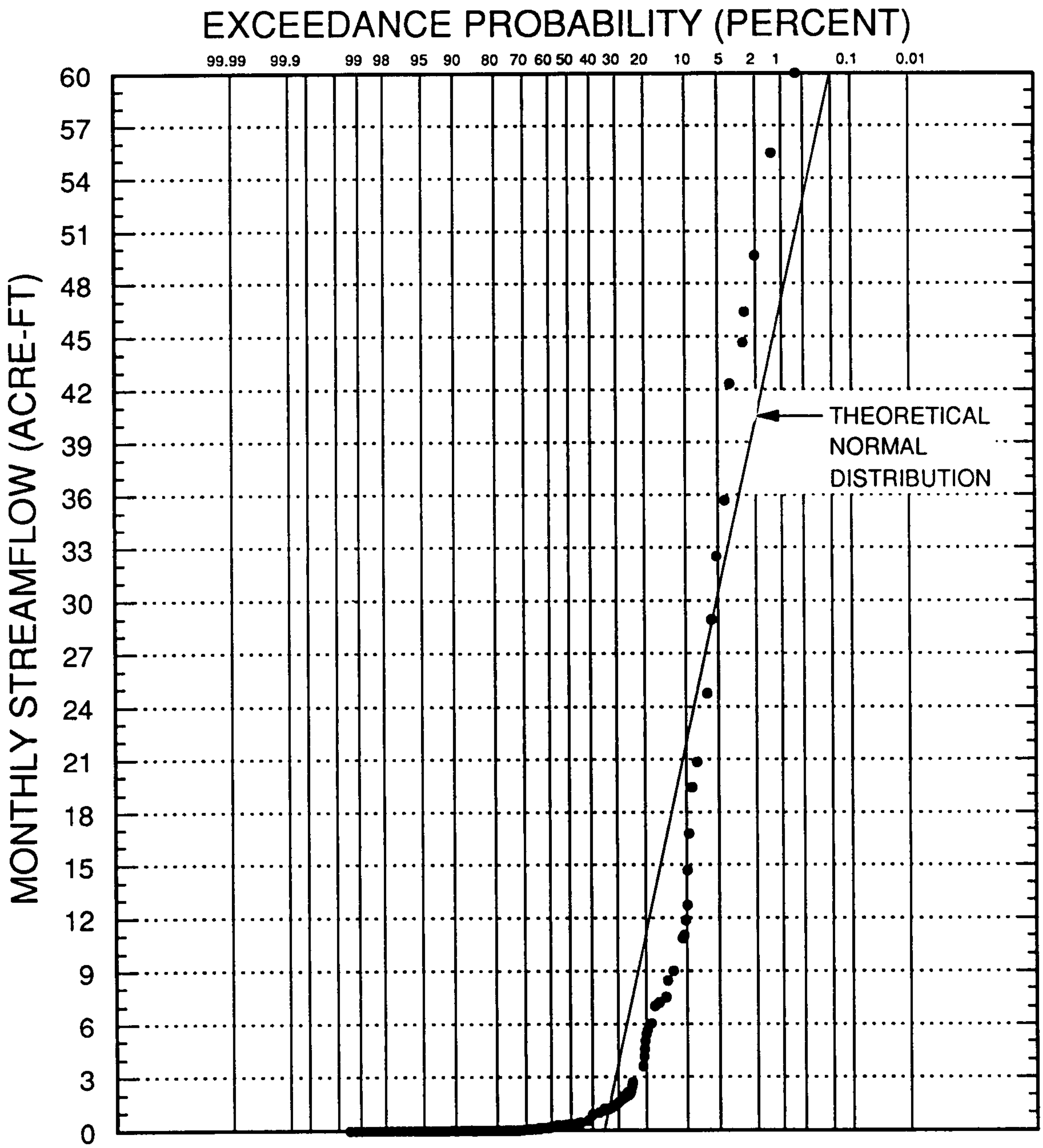


POND C-2
PUMPING RATE TO EVACUATE 90 PERCENT
OF THE SPILLWAY-CREST-CAPACITY VOLUME
(76 AC-FT) IN THE DESIGNATED TIME

TEMPORARY WATER-STORAGE CAPABILITIES STUDY

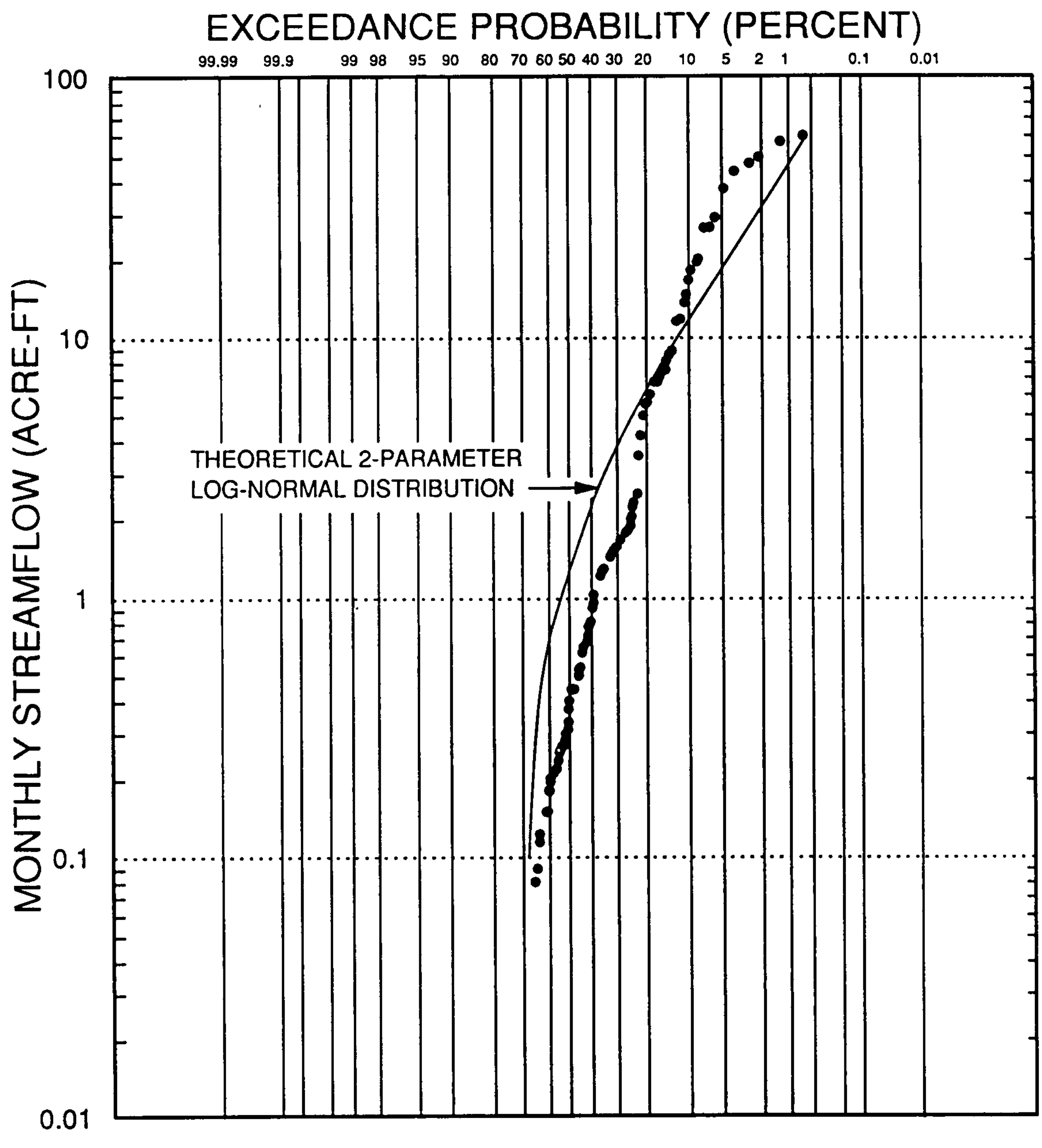
ZERO OFFSITE WATER DISCHARGE

	PROJECT: 208.0121	FIGURE 8
	DATE: MAR 1991	



EPF9.DRW

NORMAL PROBABILITY DISTRIBUTION OF MONTHLY RUNOFF FROM A TYPICAL RFP BASIN (30 PERCENT IMPERVIOUSNESS, 1 MI^2 AREA)		
TEMPORARY WATER-STORAGE CAPABILITIES STUDY		
ZERO OFFSITE WATER DISCHARGE		
	PROJECT: 208.0121 DATE: MAR 1991	FIG 9



EPF10.DRW

LOG-NORMAL PROBABILITY DISTRIBUTION
OF MONTHLY RUNOFF FROM A TYPICAL RFP BASIN
(30 PERCENT IMPERVIOUSNESS, 1 MI^2 AREA)

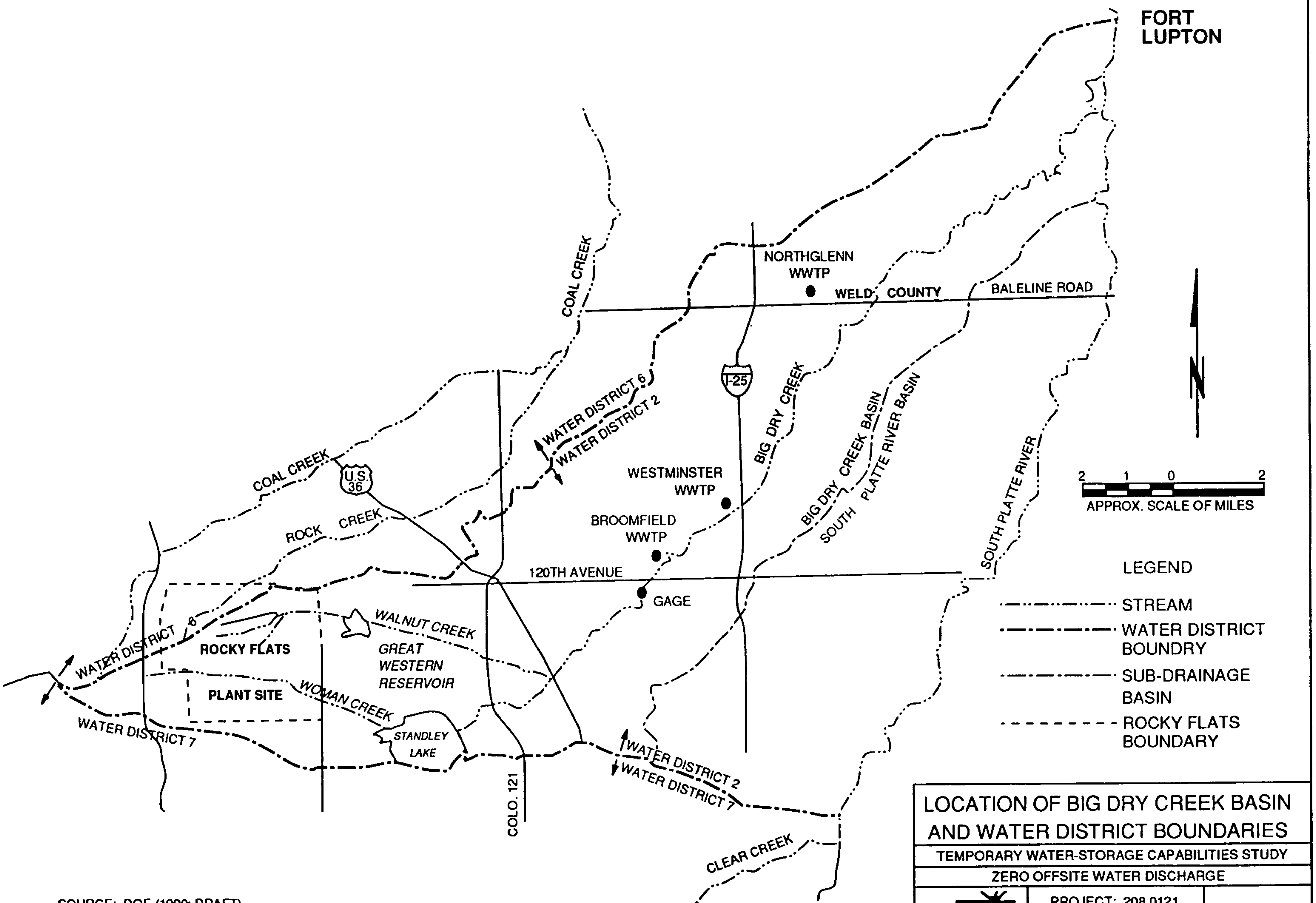
TEMPORARY WATER-STORAGE CAPABILITIES STUDY

ZERO OFFSITE WATER DISCHARGE

PROJECT: 208.0121

DATE: MAR 1991

FIG 10



SOURCE: DOE (1990; DRAFT)

LOCATION OF BIG DRY CREEK BASIN AND WATER DISTRICT BOUNDARIES

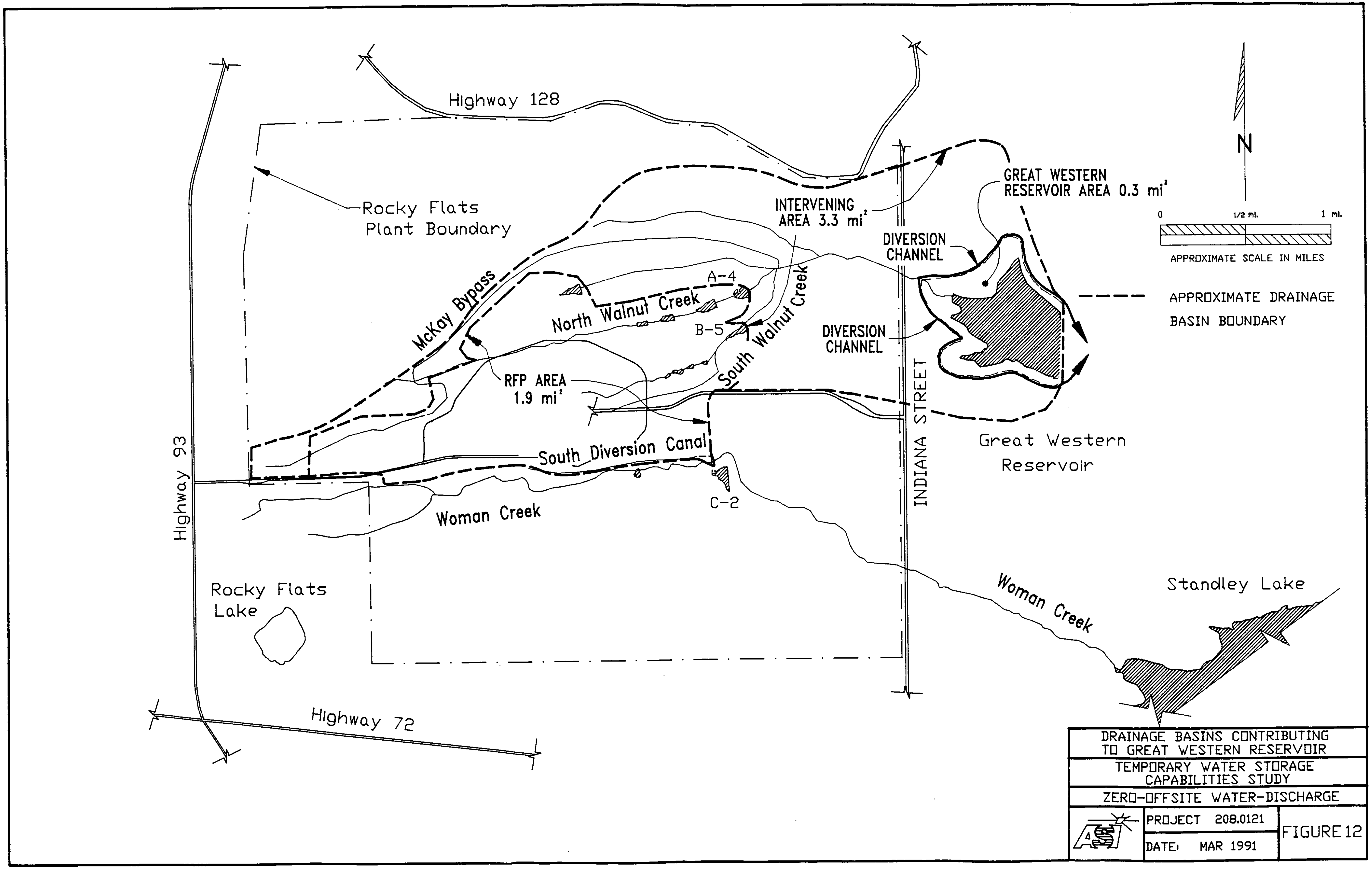
TEMPORARY WATER-STORAGE CAPABILITIES STUDY

ZERO OFFSITE WATER DISCHARGE

PROJECT: 208.0121

DATE: MAR 1991

FIGURE 11



DRAINAGE BASINS CONTRIBUTING TO GREAT WESTERN RESERVOIR

TEMPORARY WATER STORAGE CAPABILITIES STUDY

ZERO-OFFSITE WATER-DISCHARGE

PROJECT 208.0121

DATE: MAR 1991

FIGURE 12

A

APPENDIX A

SAMPLE OUTPUT FROM RESERVOIR OPERATIONAL MODEL

INPUT DATA

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.68	.12	1.05	1.75	7.32	.59	2.20	.89	2.93	1.50	.55	2.08
.86	1.02	1.64	1.44	.08	2.78	2.54	.71	.73	2.01	.84	.65
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.16	.39	2.05	1.81	.28	1.58	3.22	2.84	.19	.44	1.15	.46
.47	.66	.82	2.06	3.32	1.90	1.24	.27	.22	1.69	.51	1.11
.40	.55	2.38	1.59	1.98	1.99	.44	1.30	.42	1.01	.95	2.34
.70	.85	1.32	.92	2.38	.00	3.93	.65	.73	.10	.75	.02
.50	.36	3.68	.57	3.95	.65	3.07	1.69	.46	1.21	.50	1.00
.27	.45	.50	.42	4.15	2.48	2.71	2.23	2.37	2.18	.27	.51
.05	.00	1.64	2.40	4.09	3.10	4.82	2.14	.24	.11	1.48	.21
.07	.81	1.21	3.53	2.83	1.62	3.15	3.28	.55	3.84	.14	.33
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.45	.53	1.11	1.47	6.53	2.90	.82	.20	.96	1.53	2.50	2.41
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1.13	.27	.70	.74	1.67	1.61	2.70	1.46	1.34	.49	.37	.33
.87	.00	3.14	1.32	1.82	.41	2.53	2.44	1.52	1.02	.71	.53
.41	.55	.53	1.74	2.12	1.79	1.50	2.03	.08	.27	.20	.67
[illegible]	.08	.25	.70	.37	.50	2.31	1.05	.55	.11	.42	.50
	.11	.21	.32	2.88	1.18	1.80	3.07	1.00	.16	.30	.05
[illegible]	.22	.35	.37	.82	.37	2.59	1.84	.00	.48	.31	.30
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.35	.88	.74	1.77	4.86	1.12	1.88	1.17	1.73	.58	.50	.36
.84	.62	1.70	.97	2.74	1.68	.70	.13	1.00	1.50	.77	.12

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16.02,19.86,21.25,20.17,23.24,23.86,21.7,21.7,21.7,18.94,15.87,12.8
15.93,13.9,18.64,21.83,19.81,18.64,22.25,22.8,20.38,18.69,16.42,16.6
15.87,17.1,19.1,23.86,22.94,24.16,23.85,20.78,19.4,19.55,17.4,19.55
15.87,17.1,24.32,26.01,26.31,25.39,25.69,23.85,21.39,19.55,18.78,20.16
21.7,22.47,24.93,24.69,25.64,23.83,25.81,28.45,24.71,16.76,13.57,13.9
16.02,19.86,21.25,20.17,23.24,23.86,21.7,21.7,21.7,18.94,15.87,12.8
15.93,13.9,18.64,21.83,19.81,18.64,22.25,22.8,20.38,18.69,16.42,16.6
15.87,17.1,19.1,23.86,22.94,24.16,23.85,20.78,19.4,19.55,17.4,19.55
15.87,17.1,24.32,26.01,26.31,25.39,25.69,23.85,21.39,19.55,18.78,20.16
21.7,22.47,24.93,24.69,25.64,23.83,25.81,28.45,24.71,16.76,13.57,13.9
02,19.86,21.25,20.17,23.24,23.86,21.7,21.7,21.7,18.94,15.87,12.8
.93,13.9,18.64,21.83,19.81,18.64,22.25,22.8,20.38,18.69,16.42,16.6
15.87,17.1,19.1,23.86,22.94,24.16,23.85,20.78,19.4,19.55,17.4,19.55
15.87,17.1,24.32,26.01,26.31,25.39,25.69,23.85,21.39,19.55,18.78,20.16
21.7,22.47,24.93,24.69,25.64,23.83,25.81,28.45,24.71,16.76,13.57,13.9
16.02,19.86,21.25,20.17,23.24,23.86,21.7,21.7,21.7,18.94,15.87,12.8

15.93,13.9,18.64,21.83,19.81,18.64,22.25,22.8,20.38,18.69,16.42,16.6
15.87,17.1,19.1,23.86,22.94,24.16,23.85,20.78,19.4,19.55,17.4,19.55
15.87,17.1,24.32,26.01,26.31,25.39,25.69,23.85,21.39,19.55,18.78,20.16
,22.47,24.93,24.69,25.64,23.83,25.81,28.45,24.71,16.76,13.57,13.9
2,19.86,21.25,20.17,23.24,23.86,21.7,21.7,21.7,18.94,15.87,12.8
15.93,13.9,18.64,21.83,19.81,18.64,22.25,22.8,20.38,18.69,16.42,16.6
15.87,17.1,19.1,23.86,22.94,24.16,23.85,20.78,19.4,19.55,17.4,19.55
15.87,17.1,24.32,26.01,26.31,25.39,25.69,23.85,21.39,19.55,18.78,20.16
21.7,22.47,24.93,24.69,25.64,23.83,25.81,28.45,24.71,16.76,13.57,13.9
16.02,19.86,21.25,20.17,23.24,23.86,21.7,21.7,21.7,18.94,15.87,12.8
15.93,13.9,18.64,21.83,19.81,18.64,22.25,22.8,20.38,18.69,16.42,16.6
15.87,17.1,19.1,23.86,22.94,24.16,23.85,20.78,19.4,19.55,17.4,19.55
15.87,17.1,24.32,26.01,26.31,25.39,25.69,23.85,21.39,19.55,18.78,20.16
21.7,22.47,24.93,24.69,25.64,23.83,25.81,28.45,24.71,16.76,13.57,13.9
16.02,19.86,21.25,20.17,23.24,23.86,21.7,21.7,21.7,18.94,15.87,12.8
15.93,13.9,18.64,21.83,19.81,18.64,22.25,22.8,20.38,18.69,16.42,16.6
15.87,17.1,19.1,23.86,22.94,24.16,23.85,20.78,19.4,19.55,17.4,19.55
15.87,17.1,24.32,26.01,26.31,25.39,25.69,23.85,21.39,19.55,18.78,20.16
21.7,22.47,24.93,24.69,25.64,23.83,25.81,28.45,24.71,16.76,13.57,13.9
16.02,19.86,21.25,20.17,23.24,23.86,21.7,21.7,21.7,18.94,15.87,12.8
15.93,13.9,18.64,21.83,19.81,18.64,22.25,22.8,20.38,18.69,16.42,16.6
15.87,17.1,19.1,23.86,22.94,24.16,23.85,20.78,19.4,19.55,17.4,19.55
15.87,17.1,24.32,26.01,26.31,25.39,25.69,23.85,21.39,19.55,18.78,20.16
21.7,22.47,24.93,24.69,25.64,23.83,25.81,28.45,24.71,16.76,13.57,13.9
16.02,19.86,21.25,20.17,23.24,23.86,21.7,21.7,21.7,18.94,15.87,12.8
15.93,13.9,18.64,21.83,19.81,18.64,22.25,22.8,20.38,18.69,16.42,16.6

OUTPUT

INITIAL AND RESERVOIR VARIABLES

1 INDICATES THAT A SINGLE SET OF DEMANDS IS APPLIED TO ALL YEARS
2 INDICATES EACH YEAR IS SUPPLIED WITH A SEPARATE DEMAND SCHEDULE: (1)

1 INDICATES THAT A SINGLE SET OF RELEASES IS APPLIED TO ALL YEARS
2 INDICATES EACH YEAR IS SUPPLIED WITH A SEPARATE RELEASE SCHEDULE: (1)

1 INDICATES THAT A SINGLE SET OF OTHER "INPUTS" IS APPLIED TO ALL YEARS
2 INDICATES EACH YEAR IS SUPPLIED WITH A SEPARATE OTHER "INPUTS" SCHEDULE: (2)

MONTHLY SEDIMENT INFLOW IN ACRE-FEET = .0630

RATIO OF WATERSHED AREA AT DAM TO AREA AT FLOW STATION, DELA = 1.63

RESERVOIR RELEASES WERE MULTIPLIED BY RELA = 1.00

"OTHER" RESERVOIR INFLOWS WERE MULTIPLIED BY FELA = .48

RESERVOIR DEMANDS WERE MULTIPLIED BY EELA = 1.00

NUMBER OF POINTS FROM THE AREA-CAPACITY TABLE THAT WERE INPUT = 2

NUMBER OF YEARS OF RESERVOIR OPERATION TO BE SIMULATED = 50

THE YEAR IN WHICH SIMULATED RESERVOIR OPERATION IS TO BEGIN = 1948

THE INITIAL CONTENT OF THE RESERVOIR IN ACRE-FEET = 4820.

THE INITIAL SURFACE AREA OF THE RESERVOIR IN ACRES = 235.

THE LOWER LIMIT OF USEABLE STORAGE IN ACRE-FEET = 0.

RESERVOIR CONTENT AT SPILLWAY CREST OR CONTENT AT SURCHARGE IN ACRE-FEET = 4820.

RESERVOIR SURFACE AREA AT SPILLWAY CREST OR SURCHARGE IN ACRES = 247.

INITIAL AREA-CAPACITY TABLE

RESERVOIR CONTENT (ACRE-FEET)	RESERVOIR SURFACE AREA (ACRES)
.0	235.0
4820.0	247.0

MONTHLY INFLOWS TO THE RESERVOIR IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1948	2.	2.	3.	13.	45.	43.	0.	17.	0.	0.	3.	2.	131.
1949	1.	1.	1.	0.	0.	27.	65.	41.	12.	0.	1.	1.	150.
1950	2.	3.	3.	5.	42.	31.	46.	21.	0.	2.	2.	1.	159.
1951	0.	0.	0.	0.	6.	0.	16.	25.	14.	22.	3.	2.	90.
1952	0.	0.	0.	0.	0.	34.	32.	17.	21.	24.	3.	2.	132.
1953	0.	0.	0.	0.	3.	47.	73.	31.	16.	17.	3.	2.	191.
1954	1.	1.	1.	0.	0.	0.	0.	38.	0.	0.	2.	1.	43.
1955	2.	3.	3.	0.	10.	0.	14.	52.	23.	16.	2.	1.	126.
1956	1.	1.	1.	8.	25.	70.	35.	35.	13.	0.	3.	1.	192.
1957	2.	2.	2.	0.	0.	52.	82.	25.	20.	4.	2.	1.	193.
1958	0.	0.	0.	6.	34.	0.	70.	0.	18.	19.	3.	2.	153.
1959	0.	0.	0.	7.	1.	26.	0.	63.	8.	10.	3.	2.	120.
1960	1.	1.	2.	0.	0.	23.	0.	13.	24.	0.	2.	1.	68.
1961	1.	2.	2.	0.	0.	6.	65.	29.	23.	11.	3.	1.	142.
1962	1.	1.	2.	0.	0.	20.	35.	0.	9.	0.	3.	2.	72.
1963	2.	2.	2.	5.	0.	20.	62.	7.	1.	19.	0.	0.	121.
1964	2.	2.	3.	10.	38.	12.	1.	0.	7.	8.	2.	1.	87.
1965	0.	0.	0.	0.	35.	40.	55.	50.	17.	0.	3.	2.	201.
1966	2.	2.	2.	3.	21.	3.	0.	0.	1.	2.	2.	1.	38.
1967	2.	2.	3.	0.	0.	5.	0.	16.	23.	0.	0.	0.	50.
1968	3.	3.	4.	3.	8.	83.	6.	0.	6.	0.	0.	0.	116.
1969	1.	1.	2.	11.	21.	19.	70.	16.	11.	29.	5.	3.	187.
1970	1.	1.	1.	4.	0.	51.	256.	247.	15.	5.	5.	3.	589.
1971	0.	0.	0.	3.	19.	10.	0.	7.	17.	5.	2.	1.	64.
1972	0.	1.	1.	0.	0.	0.	23.	63.	11.	9.	0.	0.	108.
1973	3.	3.	4.	11.	36.	20.	0.	1.	18.	0.	2.	1.	100.
1974	3.	3.	4.	9.	3.	45.	26.	26.	11.	5.	0.	0.	135.
1975	2.	3.	3.	5.	22.	64.	0.	45.	15.	0.	1.	0.	161.
1976	3.	3.	4.	9.	1.	7.	2.	24.	0.	0.	2.	1.	55.
1977	2.	2.	2.	0.	13.	37.	34.	0.	6.	19.	3.	2.	120.
1978	2.	2.	3.	13.	51.	56.	27.	32.	16.	0.	0.	0.	203.
1979	0.	0.	0.	0.	0.	36.	46.	24.	15.	0.	0.	0.	120.
1980	2.	2.	2.	2.	21.	44.	26.	92.	8.	25.	3.	2.	228.
1981	2.	2.	2.	0.	33.	38.	58.	0.	2.	0.	4.	2.	144.
1982	1.	1.	1.	2.	19.	5.	68.	10.	19.	16.	4.	2.	149.
1983	1.	1.	1.	4.	0.	14.	45.	84.	6.	0.	0.	0.	157.
1984	2.	2.	2.	0.	6.	0.	20.	77.	0.	0.	1.	1.	110.
1985	2.	2.	2.	0.	0.	0.	35.	14.	22.	0.	2.	1.	80.
1986	0.	0.	0.	3.	0.	23.	0.	15.	0.	0.	1.	1.	42.
1987	0.	0.	1.	2.	18.	62.	0.	12.	8.	0.	0.	0.	104.
1988	2.	3.	3.	7.	19.	16.	0.	16.	0.	10.	3.	1.	80.
1989	1.	2.	2.	4.	0.	38.	43.	36.	12.	3.	3.	2.	146.
1990	2.	3.	3.	8.	22.	0.	33.	0.	0.	7.	4.	2.	84.
1991	1.	2.	2.	6.	0.	33.	28.	39.	8.	19.	2.	1.	139.
1992	0.	0.	0.	0.	0.	37.	25.	9.	0.	24.	4.	2.	101.
1993	0.	0.	0.	0.	17.	5.	40.	39.	9.	13.	4.	2.	128.
1994	2.	3.	3.	8.	50.	0.	32.	9.	11.	5.	3.	2.	128.
1995	2.	2.	2.	2.	0.	27.	53.	53.	11.	4.	3.	2.	160.
1996	2.	2.	2.	0.	47.	32.	0.	52.	15.	11.	0.	0.	165.
1997	1.	1.	1.	0.	0.	0.	37.	63.	20.	0.	3.	1.	126.

MONTHLY RESERVOIR EVAPORATION IN INCHES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1948	.50	.62	1.06	2.22	3.87	4.71	4.87	4.68	4.63	2.74	1.26	.70	31.86
1949	.50	.62	1.06	4.54	3.98	5.85	6.27	5.04	3.94	2.51	1.26	.70	36.27
1950	.50	.62	1.06	4.84	5.38	3.70	6.10	4.31	3.81	2.49	1.26	.70	34.77
1951	.50	.62	1.06	2.95	3.63	5.57	5.36	4.24	4.35	2.86	1.26	.70	33.10
1952	.50	.62	1.06	1.90	2.95	4.43	4.99	4.30	3.54	1.58	1.26	.70	27.83
1953	.50	.62	1.06	2.22	3.87	4.71	4.87	4.68	4.63	2.74	1.26	.70	31.86
1954	.50	.62	1.06	4.54	3.98	5.85	6.27	5.04	3.94	2.51	1.26	.70	36.27
1955	.50	.62	1.06	4.84	5.38	3.70	6.10	4.31	3.81	2.49	1.26	.70	34.77
1956	.50	.62	1.06	2.95	3.63	5.57	5.36	4.24	4.35	2.86	1.26	.70	33.10
1957	.50	.62	1.06	1.90	2.95	4.43	4.99	4.30	3.54	1.58	1.26	.70	27.83
1958	.50	.62	1.06	3.00	3.56	4.56	4.30	4.98	3.82	2.61	1.26	.70	30.97
1959	.50	.62	1.06	3.30	3.44	4.30	5.08	4.50	3.48	1.58	1.26	.70	29.82
1960	.50	.62	1.06	3.77	3.62	5.01	5.36	5.71	4.15	2.26	1.26	.70	34.02
1961	.50	.62	1.06	2.98	3.19	3.35	3.82	3.55	2.23	2.16	1.26	.70	25.42
1962	.50	.62	1.06	3.43	3.76	3.46	3.93	3.73	3.12	2.21	1.26	.70	27.78
1963	.50	.62	1.06	3.43	3.62	4.31	4.89	3.09	3.15	2.09	1.26	.70	28.72
1964	.50	.62	1.06	3.43	4.10	3.60	4.44	4.19	3.12	2.28	1.26	.70	29.30
1965	.50	.62	1.06	3.43	2.91	3.07	3.89	3.84	2.63	2.28	1.26	.70	26.19
1966	.50	.62	1.06	3.43	4.28	4.23	4.98	4.51	3.29	2.45	1.26	.70	31.31
1967	.50	.62	1.06	3.87	2.78	1.97	2.96	3.60	2.48	1.98	1.26	.70	23.78
1968	.50	.62	1.06	3.43	3.98	4.56	4.41	4.03	3.20	2.14	1.26	.70	29.89
1969	.50	.62	1.06	3.43	3.98	3.28	4.62	4.62	3.50	2.27	1.26	.70	29.84
1970	.50	.62	1.06	3.43	3.98	3.98	4.73	4.05	3.29	1.87	1.26	.70	29.47
1971	.50	.62	1.06	3.43	3.98	4.02	4.45	4.58	3.33	2.07	1.26	.70	30.00
1972	.50	.62	1.06	3.43	3.59	4.38	4.34	3.97	3.26	2.14	1.26	.70	29.25
1973	.50	.62	1.06	3.43	3.98	4.53	4.56	4.78	3.13	2.33	1.26	.70	30.88
1974	.50	.62	1.06	3.43	5.54	5.01	5.49	4.72	3.27	2.65	1.26	.70	34.25
1975	.50	.62	1.06	3.43	3.98	4.87	5.40	5.18	3.43	2.27	1.26	.70	32.70
1976	.50	.62	1.06	3.43	3.98	5.29	5.57	4.26	2.95	2.27	1.26	.70	31.89
1977	.50	.62	1.06	3.43	3.98	5.97	6.54	4.24	4.37	2.27	1.26	.70	34.94
1978	.50	.62	1.06	3.85	4.73	5.31	5.34	4.92	4.25	2.67	1.26	.70	35.21
1979	.50	.62	1.06	3.43	3.70	3.85	4.52	3.68	3.69	2.74	1.26	.70	29.75
1980	.50	.62	1.06	3.43	3.98	4.54	5.08	4.40	3.40	2.27	1.26	.70	31.24
1981	.50	.62	1.06	3.43	3.98	5.85	6.23	4.37	3.84	2.27	1.26	.70	34.11
1982	.50	.62	1.06	3.43	3.98	5.45	6.37	5.29	2.79	2.27	1.26	.70	33.72
1983	.50	.62	1.06	3.43	3.98	4.64	5.47	4.76	3.79	2.28	1.26	.70	32.49
1984	.50	.62	1.06	3.37	4.79	4.26	5.58	4.49	3.27	2.27	1.26	.70	32.17
1985	.50	.62	1.06	3.77	4.65	5.24	4.46	4.78	3.29	2.23	1.26	.70	32.56
1986	.50	.62	1.06	2.98	3.90	5.22	5.35	4.47	2.82	1.86	1.26	.70	30.74
1987	.50	.62	1.06	3.88	3.74	5.34	6.80	4.55	3.17	2.27	1.26	.70	33.89
1988	.50	.62	1.06	3.60	3.98	5.77	5.12	4.43	3.93	2.53	1.26	.70	33.50
1989	.50	.62	1.06	4.04	4.89	4.33	5.91	4.35	3.31	2.53	1.26	.70	33.50
1990	.50	.62	1.06	2.85	3.98	4.54	5.08	4.40	3.40	2.27	1.26	.70	30.66
1991	.50	.62	1.06	2.22	3.87	4.71	4.87	4.68	4.63	2.74	1.26	.70	31.86
1992	.50	.62	1.06	4.54	3.98	5.85	6.27	5.04	3.94	2.51	1.26	.70	36.27
1993	.50	.62	1.06	4.84	5.38	3.70	6.10	4.31	3.81	2.49	1.26	.70	34.77
1994	.50	.62	1.06	2.95	3.63	5.57	5.36	4.24	4.35	2.86	1.26	.70	33.10
1995	.50	.62	1.06	1.90	2.95	4.43	4.99	4.30	3.54	1.58	1.26	.70	27.83
1996	.50	.62	1.06	3.00	3.56	4.56	4.30	4.98	3.82	2.61	1.26	.70	30.97
1997	.50	.62	1.06	3.30	3.44	4.30	5.08	4.50	3.48	1.58	1.26	.70	29.82

MONTHLY PRECIPITATION IN INCHES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1948	.97	.28	1.32	1.90	1.76	3.07	.84	2.13	.23	.21	.59	.27	13.57
1949	.67	.11	1.27	1.17	3.36	3.11	1.90	.56	.17	.86	.20	.13	13.51
1950	.43	.57	.35	2.69	1.82	1.45	3.08	.24	.58	.13	.81	.20	12.35
1951	.56	.55	1.30	1.66	2.34	1.40	.76	3.46	.53	1.26	.77	.21	14.80
1952	.00	.28	1.04	2.11	2.21	.08	.51	1.71	.37	.07	.76	.23	9.37
1953	.41	.55	.53	1.74	2.12	1.79	1.50	2.03	.08	.27	.20	.67	11.89
1954	.15	.08	.25	.70	.37	.50	2.31	1.05	.55	.11	.42	.50	6.99
1955	.05	.11	.21	.32	2.88	1.18	1.80	3.07	1.00	.16	.30	.05	11.13
1956	.17	.22	.35	.37	.82	.37	2.59	1.84	.00	.48	.31	.30	7.82
1957	.24	.55	.55	2.83	5.75	1.26	2.71	2.19	.78	2.24	.25	.07	19.42
1958	.35	.88	.74	1.77	4.86	1.12	1.88	1.17	1.73	.58	.50	.36	15.94
1959	.84	.62	1.70	.97	2.74	1.68	.70	.13	1.00	1.50	.77	.12	12.77
1960	.47	1.05	.51	1.17	2.15	.22	2.20	.20	.33	2.13	.09	.56	11.08
1961	.00	.46	1.76	.99	2.26	2.29	1.07	1.37	3.91	.63	.50	.10	15.34
1962	.40	.39	.28	1.11	.57	2.89	1.54	.76	.36	.30	.67	.17	9.44
1963	.85	.21	1.78	.02	.94	2.43	.70	4.70	2.32	.54	.73	.57	15.79
1964	.75	1.72	1.30	.61	2.49	1.06	1.76	.99	.76	.03	1.01	.54	13.02
1965	.75	1.26	1.29	2.53	2.12	10.00	5.08	3.11	2.99	.65	.20	.34	30.32
1966	.46	1.07	.50	.98	.66	1.12	2.90	.98	1.14	1.06	.45	.08	11.40
1967	.85	.29	.51	3.02	4.08	3.19	4.15	1.41	.81	1.31	.61	.97	21.20
1968	.46	.92	.70	1.80	1.09	.38	2.24	1.93	1.09	1.00	.99	.40	13.00
1969	.14	.19	1.15	.89	7.48	3.06	2.60	2.23	.22	4.37	.86	.62	23.81
1970	.13	.17	1.69	.57	1.74	1.74	2.20	.94	2.44	1.18	1.31	.02	14.13
1971	.25	1.06	.52	1.86	2.00	.08	1.40	1.35	2.61	1.09	.00	.61	12.83
1972	.53	.41	.67	1.39	.42	2.86	1.48	2.16	1.17	.52	2.22	.60	14.43
1973	.68	.12	1.05	1.75	7.32	.59	2.20	.89	2.93	1.50	.55	2.08	21.66
1974	.86	1.02	1.64	1.44	.08	2.78	2.54	.71	.73	2.01	.84	.65	15.30
1975	.38	.20	.55	1.13	3.03	2.52	3.30	2.15	.24	.09	1.50	.07	15.16
1976	.50	.17	.63	1.38	1.17	.88	3.11	1.25	2.55	1.69	.29	.44	14.06
1977	.16	.39	2.05	1.81	.28	1.58	3.22	2.84	.19	.44	1.15	.46	14.57
1978	.47	.66	.82	2.06	3.32	1.90	1.24	.27	.22	1.69	.51	1.11	14.27
1979	.40	.55	2.38	1.59	1.98	1.99	.44	1.30	.42	1.01	.95	2.34	15.35
1980	.70	.85	1.32	.92	2.38	.00	3.93	.65	.73	.10	.75	.02	12.35
1981	.50	.36	3.68	.57	3.95	.65	3.07	1.69	.46	1.21	.50	1.00	17.64
1982	.27	.45	.50	.42	4.15	2.48	2.71	2.23	2.37	2.18	.27	.51	18.54
1983	.05	.00	1.64	2.40	4.09	3.10	4.82	2.14	.24	.11	1.48	.21	20.28
1984	.07	.81	1.21	3.53	2.83	1.62	3.15	3.28	.55	3.84	.14	.33	21.36
1985	.48	1.01	.70	2.25	2.72	2.29	4.77	.31	3.13	.37	1.47	.30	19.80
1986	.25	.25	1.11	2.38	1.97	2.02	3.53	.37	.19	1.87	.71	.53	15.18
1987	.45	.53	1.11	1.47	6.53	2.90	.82	.20	.96	1.53	2.50	2.41	21.41
1988	.32	.99	1.19	.99	4.46	2.95	1.28	3.59	1.09	.06	.50	.86	18.28
1989	1.13	.27	.70	.74	1.67	1.61	2.70	1.46	1.34	.49	.37	.33	12.81
1990	.87	.00	3.14	1.32	1.82	.41	2.53	2.44	1.52	1.02	.71	.53	16.31
1991	.41	.55	.53	1.74	2.12	1.79	1.50	2.03	.08	.27	.20	.67	11.89
1992	.15	.08	.25	.70	.37	.50	2.31	1.05	.55	.11	.42	.50	6.99
1993	.05	.11	.21	.32	2.88	1.18	1.80	3.07	1.00	.16	.30	.05	11.13
1994	.17	.22	.35	.37	.82	.37	2.59	1.84	.00	.48	.31	.30	7.82
1995	.24	.55	.55	2.83	5.75	1.26	2.71	2.19	.78	2.24	.25	.07	19.42
1996	.35	.88	.74	1.77	4.86	1.12	1.88	1.17	1.73	.58	.50	.36	15.94
1997	.84	.62	1.70	.97	2.74	1.68	.70	.13	1.00	1.50	.77	.12	12.77

MONTHLY DEMAND ON THE RESERVOIR IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
9999	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

MONTHLY OTHER INFLOWS TO THE RESERVOIR IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1948	8.	8.	9.	11.	11.	12.	11.	10.	9.	9.	8.	9.	117.
1949	8.	8.	12.	12.	13.	12.	12.	11.	10.	9.	9.	10.	127.
1950	10.	11.	12.	12.	12.	11.	12.	14.	12.	8.	7.	7.	128.
1951	8.	10.	10.	10.	11.	11.	10.	10.	10.	9.	8.	6.	114.
1952	8.	7.	9.	10.	10.	9.	11.	11.	10.	9.	8.	8.	108.
1953	8.	8.	9.	11.	11.	12.	11.	10.	9.	9.	8.	9.	117.
1954	8.	8.	12.	12.	13.	12.	12.	11.	10.	9.	9.	10.	127.
1955	10.	11.	12.	12.	12.	11.	12.	14.	12.	8.	7.	7.	128.
1956	8.	10.	10.	10.	11.	11.	10.	10.	10.	9.	8.	6.	114.
1957	8.	7.	9.	10.	10.	9.	11.	11.	10.	9.	8.	8.	108.
1958	8.	8.	9.	11.	11.	12.	11.	10.	9.	9.	8.	9.	117.
1959	8.	8.	12.	12.	13.	12.	12.	11.	10.	9.	9.	10.	127.
1960	10.	11.	12.	12.	12.	11.	12.	14.	12.	8.	7.	7.	128.
1961	8.	10.	10.	10.	11.	11.	10.	10.	10.	9.	8.	6.	114.
1962	8.	7.	9.	10.	10.	9.	11.	11.	10.	9.	8.	8.	108.
1963	8.	8.	9.	11.	11.	12.	11.	10.	9.	9.	8.	9.	117.
1964	8.	8.	12.	12.	13.	12.	12.	11.	10.	9.	9.	10.	127.
1965	10.	11.	12.	12.	12.	11.	12.	14.	12.	8.	7.	7.	128.
1966	8.	10.	10.	10.	11.	11.	10.	10.	10.	9.	8.	6.	114.
1967	8.	7.	9.	10.	10.	9.	11.	11.	10.	9.	8.	8.	108.
1968	8.	8.	9.	11.	11.	12.	11.	10.	9.	9.	8.	9.	117.
1969	8.	8.	12.	12.	13.	12.	12.	11.	10.	9.	9.	10.	127.
1970	10.	11.	12.	12.	12.	11.	12.	14.	12.	8.	7.	7.	128.
1971	8.	10.	10.	10.	11.	11.	10.	10.	10.	9.	8.	6.	114.
1972	8.	7.	9.	10.	10.	9.	11.	11.	10.	9.	8.	8.	108.
1973	8.	8.	9.	11.	11.	12.	11.	10.	9.	9.	8.	9.	117.
1974	8.	8.	12.	12.	13.	12.	12.	11.	10.	9.	9.	10.	127.
1975	10.	11.	12.	12.	12.	11.	12.	14.	12.	8.	7.	7.	128.
1976	8.	10.	10.	10.	11.	11.	10.	10.	10.	9.	8.	6.	114.
1977	8.	7.	9.	10.	10.	9.	11.	11.	10.	9.	8.	8.	108.
1978	8.	8.	9.	11.	11.	12.	11.	10.	9.	9.	8.	9.	117.
1979	8.	8.	12.	12.	13.	12.	12.	11.	10.	9.	9.	10.	127.
1980	10.	11.	12.	12.	12.	11.	12.	14.	12.	8.	7.	7.	128.
1981	8.	10.	10.	10.	11.	11.	10.	10.	10.	9.	8.	6.	114.
1982	8.	7.	9.	10.	10.	9.	11.	11.	10.	9.	8.	8.	108.
1983	8.	8.	9.	11.	11.	12.	11.	10.	9.	9.	8.	9.	117.
1984	8.	8.	12.	12.	13.	12.	12.	11.	10.	9.	9.	10.	127.
1985	10.	11.	12.	12.	12.	11.	12.	14.	12.	8.	7.	7.	128.
1986	8.	10.	10.	10.	11.	11.	10.	10.	10.	9.	8.	6.	114.
1987	8.	7.	9.	10.	10.	9.	11.	11.	10.	9.	8.	8.	108.
1988	8.	8.	9.	11.	11.	12.	11.	10.	9.	9.	8.	9.	117.
1989	8.	8.	12.	12.	13.	12.	12.	11.	10.	9.	9.	10.	127.
1990	10.	11.	12.	12.	12.	11.	12.	14.	12.	8.	7.	7.	128.
1991	8.	10.	10.	10.	11.	11.	10.	10.	10.	9.	8.	6.	114.
1992	8.	7.	9.	10.	10.	9.	11.	11.	10.	9.	8.	8.	108.
1993	8.	8.	9.	11.	11.	12.	11.	10.	9.	9.	8.	9.	117.
1994	8.	8.	12.	12.	13.	12.	12.	11.	10.	9.	9.	10.	127.
1995	10.	11.	12.	12.	12.	11.	12.	14.	12.	8.	7.	7.	128.
1996	8.	10.	10.	10.	11.	11.	10.	10.	10.	9.	8.	6.	114.
1997	8.	7.	9.	10.	10.	9.	11.	11.	10.	9.	8.	8.	108.

MONTHLY RELEASES FOR DOWNSTREAM DEMANDS IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
9999	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

RESERVOIR CONTENT AT END OF MONTH ADJUSTED FOR SEDIMENT INFLOW IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1948	4820.	4820.	4820.	4820.	4820.	4820.	4748.	4723.	4641.	4599.	4597.	4599.
1949	4611.	4610.	4627.	4570.	4570.	4553.	4541.	4501.	4446.	4422.	4410.	4409.
1950	4420.	4433.	4434.	4406.	4387.	4384.	4380.	4331.	4277.	4239.	4238.	4236.
1951	4245.	4254.	4269.	4252.	4243.	4169.	4102.	4121.	4068.	4066.	4067.	4065.
1952	4063.	4062.	4071.	4086.	4080.	4035.	3986.	3961.	3927.	3928.	3929.	3929.
1953	3935.	3942.	3940.	3942.	3920.	3919.	3934.	3920.	3853.	3829.	3819.	3829.
1954	3831.	3829.	3825.	3759.	3698.	3601.	3533.	3501.	3443.	3403.	3397.	3404.
1955	3408.	3411.	3409.	3329.	3301.	3261.	3201.	3241.	3219.	3196.	3184.	3179.
1956	3181.	3183.	3180.	3145.	3124.	3101.	3090.	3086.	3022.	2983.	2974.	2973.
1957	2977.	2984.	2985.	3014.	3081.	3077.	3124.	3117.	3092.	3119.	3108.	3105.
1958	3110.	3123.	3126.	3119.	3190.	3132.	3165.	3098.	3083.	3070.	3067.	3071.
1959	3085.	3094.	3119.	3091.	3090.	3075.	2999.	2986.	2954.	2971.	2973.	2973.
1960	2984.	3005.	3007.	2967.	2949.	2887.	2836.	2751.	2710.	2715.	2701.	2706.
1961	2705.	2713.	2739.	2709.	2701.	2697.	2717.	2712.	2780.	2768.	2763.	2759.
1962	2766.	2769.	2764.	2728.	2673.	2690.	2687.	2638.	2602.	2572.	2571.	2570.
1963	2586.	2588.	2614.	2562.	2519.	2513.	2502.	2552.	2546.	2543.	2541.	2548.
1964	2563.	2595.	2615.	2580.	2598.	2571.	2530.	2477.	2447.	2420.	2426.	2434.
1965	2449.	2473.	2490.	2484.	2515.	2706.	2797.	2846.	2881.	2856.	2845.	2846.
1966	2854.	2875.	2876.	2839.	2798.	2749.	2718.	2657.	2625.	2608.	2602.	2597.
1967	2613.	2616.	2616.	2610.	2645.	2684.	2718.	2701.	2700.	2695.	2690.	2703.
1968	2713.	2731.	2736.	2718.	2679.	2689.	2663.	2630.	2603.	2589.	2593.	2596.
1969	2598.	2599.	2614.	2586.	2690.	2717.	2758.	2737.	2692.	2773.	2779.	2789.
1970	2793.	2796.	2822.	2780.	2747.	2765.	2982.	3180.	3190.	3189.	3201.	3197.
1971	3199.	3218.	3217.	3198.	3188.	3130.	3079.	3031.	3044.	3038.	3022.	3028.
1972	3036.	3039.	3041.	3010.	2955.	2934.	2910.	2947.	2926.	2911.	2938.	2944.
1973	2958.	2959.	2972.	2961.	3075.	3027.	2991.	2924.	2947.	2940.	2936.	2975.
1974	2992.	3012.	3039.	3021.	2926.	2938.	2916.	2873.	2843.	2844.	2845.	2853.
1975	2864.	2869.	2874.	2845.	2860.	2888.	2858.	2855.	2818.	2782.	2794.	2789.
1976	2799.	2803.	2808.	2786.	2741.	2671.	2633.	2607.	2609.	2606.	2596.	2598.
1977	2601.	2604.	2635.	2613.	2562.	2519.	2498.	2480.	2412.	2404.	2412.	2417.
1978	2426.	2438.	2445.	2433.	2467.	2466.	2422.	2371.	2315.	2305.	2299.	2316.
1979	2322.	2329.	2367.	2342.	2321.	2331.	2307.	2295.	2254.	2229.	2232.	2274.
1980	2290.	2308.	2327.	2290.	2291.	2256.	2271.	2301.	2267.	2257.	2256.	2251.
1981	2260.	2267.	2332.	2284.	2328.	2273.	2278.	2235.	2179.	2167.	2164.	2179.
1982	2182.	2187.	2186.	2138.	2170.	2124.	2130.	2090.	2111.	2134.	2125.	2132.
1983	2131.	2128.	2150.	2145.	2158.	2153.	2197.	2239.	2183.	2149.	2161.	2161.
1984	2162.	2176.	2193.	2209.	2188.	2147.	2130.	2194.	2150.	2191.	2178.	2181.
1985	2193.	2214.	2221.	2202.	2176.	2128.	2182.	2120.	2150.	2121.	2134.	2133.
1986	2136.	2138.	2149.	2150.	2122.	2092.	2066.	2010.	1967.	1977.	1974.	1978.
1987	1985.	1990.	2000.	1965.	2048.	2071.	1962.	1898.	1871.	1865.	1898.	1941.
1988	1947.	1965.	1980.	1946.	1985.	1956.	1891.	1900.	1853.	1823.	1819.	1833.
1989	1854.	1857.	1864.	1814.	1762.	1758.	1749.	1739.	1722.	1694.	1689.	1693.
1990	1713.	1714.	1770.	1759.	1751.	1680.	1675.	1649.	1624.	1614.	1613.	1619.
1991	1626.	1636.	1637.	1643.	1619.	1605.	1576.	1573.	1500.	1479.	1467.	1474.
1992	1474.	1470.	1463.	1398.	1335.	1275.	1232.	1173.	1115.	1101.	1096.	1102.
1993	1101.	1099.	1091.	1013.	991.	958.	924.	948.	911.	887.	880.	879.
1994	882.	885.	886.	856.	863.	773.	762.	735.	671.	638.	631.	635.
1995	642.	653.	657.	689.	756.	732.	753.	777.	746.	771.	761.	756.
1996	763.	780.	786.	771.	855.	831.	793.	780.	765.	745.	738.	738.
1997	753.	761.	783.	748.	743.	701.	662.	649.	630.	637.	638.	636.

TOTAL SEDIMENT INFLOW FOR 50 YEARS = 38. ACRE-FEET

SUMMARY OF RESERVOIR OPERATION

MONTH	AVERAGE DEMAND (AC-FT)	AVERAGE YIELD (AC-FT)	NO.OF MONTHS OF SHORTAGE	NO.OF MONTHS OF U.N.R.	AVERAGE U.N.R. (AC-FT)
JAN	0.	0.	0	1	19.
FEB	0.	0.	0	1	4.
MAR	0.	0.	0	1	17.
APR	0.	0.	0	1	18.
MAY	0.	0.	0	1	13.
JUN	0.	0.	0	1	21.
JUL	0.	0.	0	0	0.
AUG	0.	0.	0	0	0.
SEP	0.	0.	0	0	0.
OCT	0.	0.	0	0	0.
NOV	0.	0.	0	0	0.
DEC	0.	0.	0	0	0.

U.N.R. = Uncontrolled Releases

MONTHLY RESERVOIR YIELD IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1948	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1949	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1950	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1951	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1952	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1953	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1954	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1955	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1956	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1957	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1958	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1959	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1960	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1963	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1964	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1965	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1966	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1967	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1968	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1969	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1970	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1971	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1972	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1973	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1974	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1975	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1976	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1977	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1978	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1979	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1980	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1984	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1986	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1987	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1988	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1989	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1991	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1992	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1993	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1994	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1996	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1997	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

SUMMARY OF RESERVOIR UNCONTROLLED RELEASES IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1948	19.	4.	17.	18.	13.	21.	0.	0.	0.	0.	0.	0.	92.
1949	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1950	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1951	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1952	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1953	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1954	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1955	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1956	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1957	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1958	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1959	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1960	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1963	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1964	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1965	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1966	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1967	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1968	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1969	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1970	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1971	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1972	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1973	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1974	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1975	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1976	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1977	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1978	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1979	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1980	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1984	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1986	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1987	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1988	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1989	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1991	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1992	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1993	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1994	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1996	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1997	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

ACTUAL DOWNSTREAM RELEASES IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1948	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1949	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1950	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1951	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1952	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1953	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1954	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1955	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1956	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1957	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1958	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1959	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1960	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1963	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1964	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1965	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1966	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1967	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1968	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1969	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1970	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1971	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1972	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1973	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1974	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1975	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1976	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1977	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1978	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1979	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1980	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1984	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1986	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1987	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1988	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1989	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1991	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1992	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1993	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1994	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1996	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1997	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

MONTHLY RESERVOIR SURFACE AREA IN ACRES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1948	235.	247.	247.	247.	247.	247.	247.	247.	247.	247.	246.	246.
1949	246.	246.	246.	247.	246.	246.	246.	246.	246.	246.	246.	246.
1950	246.	246.	246.	246.	246.	246.	246.	246.	246.	246.	246.	246.
1951	246.	246.	246.	246.	246.	246.	245.	245.	245.	245.	245.	245.
1952	245.	245.	245.	245.	245.	245.	245.	245.	245.	245.	245.	245.
1953	245.	245.	245.	245.	245.	245.	245.	245.	245.	245.	245.	245.
1954	245.	245.	245.	245.	244.	244.	244.	244.	244.	244.	243.	243.
1955	243.	243.	244.	243.	243.	243.	243.	243.	243.	243.	243.	243.
1956	243.	243.	243.	243.	243.	243.	243.	243.	243.	243.	242.	242.
1957	242.	242.	242.	242.	243.	243.	243.	243.	243.	243.	243.	243.
1958	243.	243.	243.	243.	243.	243.	243.	243.	243.	243.	243.	243.
1959	243.	243.	243.	243.	243.	243.	243.	242.	242.	242.	242.	242.
1960	242.	242.	242.	243.	242.	242.	242.	242.	242.	242.	242.	242.
1961	242.	242.	242.	242.	242.	242.	242.	242.	242.	242.	242.	242.
1962	242.	242.	242.	242.	242.	242.	242.	242.	242.	241.	241.	241.
1963	241.	241.	241.	242.	241.	241.	241.	241.	241.	241.	241.	241.
1964	241.	241.	241.	242.	241.	241.	241.	241.	241.	241.	241.	241.
1965	241.	241.	241.	241.	241.	241.	242.	242.	242.	242.	242.	242.
1966	242.	242.	242.	242.	242.	242.	242.	242.	242.	242.	242.	241.
1967	241.	242.	242.	242.	242.	242.	242.	242.	242.	242.	242.	242.
1968	242.	242.	242.	242.	242.	242.	242.	242.	242.	242.	241.	241.
1969	241.	241.	241.	242.	241.	242.	242.	242.	242.	242.	242.	242.
1970	242.	242.	242.	242.	242.	242.	242.	242.	243.	243.	243.	243.
1971	243.	243.	243.	243.	243.	243.	243.	243.	243.	243.	243.	243.
1972	243.	243.	243.	243.	243.	242.	242.	242.	242.	242.	242.	242.
1973	242.	242.	242.	242.	242.	243.	243.	242.	242.	242.	242.	242.
1974	242.	242.	243.	243.	243.	242.	242.	242.	242.	242.	242.	242.
1975	242.	242.	242.	242.	242.	242.	242.	242.	242.	242.	242.	242.
1976	242.	242.	242.	242.	242.	242.	242.	242.	242.	242.	242.	241.
1977	241.	242.	242.	242.	242.	241.	241.	241.	241.	241.	241.	241.
1978	241.	241.	241.	241.	241.	241.	241.	241.	241.	241.	241.	241.
1979	241.	241.	241.	241.	241.	241.	241.	241.	241.	241.	241.	241.
1980	241.	241.	241.	241.	241.	241.	241.	241.	241.	241.	241.	241.
1981	241.	241.	241.	241.	241.	241.	241.	241.	241.	240.	240.	240.
1982	240.	240.	240.	240.	240.	240.	240.	240.	240.	240.	240.	240.
1983	240.	240.	240.	240.	240.	240.	240.	240.	241.	240.	240.	240.
1984	240.	240.	240.	240.	241.	240.	240.	240.	240.	240.	240.	240.
1985	240.	240.	241.	241.	241.	240.	240.	240.	240.	240.	240.	240.
1986	240.	240.	240.	240.	240.	240.	240.	240.	240.	240.	240.	240.
1987	240.	240.	240.	240.	240.	240.	240.	240.	240.	240.	240.	240.
1988	240.	240.	240.	240.	240.	240.	240.	240.	240.	240.	240.	240.
1989	240.	240.	240.	240.	240.	239.	239.	239.	239.	239.	239.	239.
1990	239.	239.	239.	239.	239.	239.	239.	239.	239.	239.	239.	239.
1991	239.	239.	239.	239.	239.	239.	239.	239.	239.	239.	239.	239.
1992	239.	239.	239.	239.	239.	238.	238.	238.	238.	238.	238.	238.
1993	238.	238.	238.	238.	238.	237.	237.	237.	237.	237.	237.	237.
1994	237.	237.	237.	237.	237.	237.	237.	237.	237.	237.	237.	237.
1995	237.	237.	237.	237.	237.	237.	237.	237.	237.	237.	237.	237.
1996	237.	237.	237.	237.	237.	237.	237.	237.	237.	237.	237.	237.
1997	237.	237.	237.	237.	237.	237.	237.	237.	237.	237.	237.	237.

YEAR	NET EVAPORATION (AC-FT)
====	===============
1948	-376.7
1949	-467.2
1950	-459.4
1951	-374.2
1952	-376.9
1953	-407.3
1954	-595.5
1955	-479.1
1956	-511.4
1957	-170.2
1958	-304.1
1959	-344.7
1960	-462.9
1961	-203.1
1962	-369.4
1963	-260.1
1964	-327.4
1965	82.8
1966	-401.3
1967	-52.0
1968	-340.2
1969	-121.6
1970	-309.6
1971	-347.5
1972	-299.4
1973	-186.4
1974	-382.7
1975	-353.9
1976	-359.3
1977	-409.7
1978	-420.7
1979	-289.0
1980	-378.9
1981	-330.4
1982	-304.1
1983	-244.7
1984	-216.6
1985	-255.7
1986	-311.5
1987	-249.7
1988	-304.2
1989	-412.8
1990	-286.1
1991	-397.7
1992	-581.4
1993	-467.8
1994	-499.3
1995	-166.1
1996	-296.9
1997	-336.4
AVE	-334.4

FINAL AREA-CAPACITY
TABLE

RESERVOIR CONTENT (ACRE-FEET)	RESERVOIR SURFACE AREA (ACRES)
.0	235.0
4782.2	247.0

B

APPENDIX B

SIMULATED STREAMFLOWS

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

ORIGINAL DATA - ACRE-FEET (OR STANDARDIZED VALUES)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
1.59	1.86	2.13	.00	.00	19.20	60.00	24.30	20.70	.00	2.39	1.33	133.50	1969
.92	1.07	1.23	.00	.00	55.20	16.40	.00	.00	.00	1.38	.77	76.97	1970
.54	.64	.73	.00	.00	.00	.00	42.40	.00	.00	.82	.45	45.58	1971
.45	.53	.61	.00	.00	35.50	.00	.00	.00	.00	.68	.38	38.15	1972
.09	.11	.12	.00	.00	.00	.00	7.07	.00	.00	.14	.08	7.61	1973
.21	.24	.27	.00	.00	.00	12.50	.00	3.54	.00	.31	.17	17.24	1974
1.22	1.42	1.63	.00	5.43	10.70	8.46	46.10	.00	24.40	1.83	1.02	102.21	1975
.20	.23	.27	.00	.00	.00	.00	8.21	7.33	.00	.30	.17	16.71	1976
.95	1.11	1.27	8.97	.00	6.06	49.30	4.29	5.68	.00	1.43	.79	79.85	1977
.17	.19	.22	.00	1.77	10.60	.51	.00	.00	.00	.25	.14	13.85	1978
1.71	2.00	2.29	7.58	44.80	28.80	6.94	32.20	1.39	11.70	2.57	1.43	143.41	1979
.34	.40	.45	.00	.00	.00	6.94	14.50	5.05	.00	.51	.28	28.47	1980
.70	.82	.93	1.38	4.33	13.84	13.42	14.92	3.64	3.01	1.05	.58	58.63	AVE.
.57	.66	.76	3.23	12.84	17.76	20.14	17.12	6.00	7.53	.85	.48	47.73	ST.D
.81	.81	.82	2.35	2.96	1.28	1.50	1.15	1.65	2.50	.81	.81	.81	C.V.
.25	.25	.25	1.49	2.49	.86	1.21	.48	1.68	1.89	.25	.25	.25	SKEW

TOTAL AVERAGE = 4.886
STANDARD DEV = 11.338
SKEW COEFFICIENT = 3.073

```
           **            Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent)            **

              TIME SERIES OF OBSERVED DATA (O) AND THE ANNUAL COMPONENT (*)

                   100 UNITS =     60.00


1969   Jan      .7      1.6 I* O    .
1969   Feb      .8      1.9 I* O    .
1969   Mar      .9      2.1 I * O   .
1969   Apr     1.4       .0 O *     .
1969   May     4.3       .0 O      *.
1969   Jun    13.8     19.2 I       .             *        O
1969   Jul    13.4     60.0 I       .            *                                                                            O
1969   Aug    14.9     24.3 I       .               *               O
1969   Sep     3.6     20.7 I     * .                         O
1969   Oct     3.0       .0 O    *  .
1969   Nov     1.1      2.4 I * O   .
1969   Dec      .6      1.3 I*O     .
1970   Jan      .7       .9 I*O     .
1970   Feb      .8      1.1 I*O     .
1970   Mar      .9      1.2 I O     .
1970   Apr     1.4       .0 O *     .
1970   May     4.3       .0 O      *.
1970   Jun    13.8     55.2 I       .             *                                                                   O
1970   Jul    13.4     16.4 I       .            *    O
1970   Aug    14.9       .0 O       .               *
1970   Sep     3.6       .0 O     * .
   0   Oct     3.0       .0 O    *  .
   0   Nov     1.1      1.4 I O     .
1970   Dec      .6       .8 IO      .
1971   Jan      .7       .5 IO      .
1971   Feb      .8       .6 IO      .
1971   Mar      .9       .7 IO*     .
1971   Apr     1.4       .0 O *     .
1971   May     4.3       .0 O      *.
1971   Jun    13.8       .0 O       .             *
1971   Jul    13.4       .0 O       .            *
1971   Aug    14.9     42.4 I       .               *                                             O
1971   Sep     3.6       .0 O     * .
1971   Oct     3.0       .0 O    *  .
1971   Nov     1.1       .8 IO*     .
1971   Dec      .6       .5 IO      .
1972   Jan      .7       .5 IO      .
1972   Feb      .8       .5 IO      .
1972   Mar      .9       .6 IO*     .
1972   Apr     1.4       .0 O *     .
1972   May     4.3       .0 O      *.
1972   Jun    13.8     35.5 I       .             *                                   O
1972   Jul    13.4       .0 O       .            *
1972   Aug    14.9       .0 O       .               *
1972   Sep     3.6       .0 O     * .
1972   Oct     3.0       .0 O    *  .
  72   Nov     1.1       .7 IO*     .
   2   Dec      .6       .4 IO      .
1973   Jan      .7       .1 O*      .
1973   Feb      .8       .1 O*      .
1973   Mar      .9       .1 O *     .
1973   Apr     1.4       .0 O *     .
```

```
1973   May      4.3      .0 0      *.
1973   Jun     13.8      .0 0       .              *
1973   Jul     13.4      .0 0       .             *
1973   Aug     14.9     7.1 I       .   0            *
1973   Sep      3.6      .0 0     * .
1973   Oct      3.0      .0 0    *  .
1973   Nov      1.1      .1 0 *     .
1973   Dec       .6      .1 0*      .
1974   Jan       .7      .2 0*      .
1974   Feb       .8      .2 0*      .
1974   Mar       .9      .3 0 *     .
1974   Apr      1.4      .0 0 *     .
1974   May      4.3      .0 0      *.
1974   Jun     13.8      .0 0       .              *
1974   Jul     13.4    12.5 I       .            0*
1974   Aug     14.9      .0 0       .                *
1974   Sep      3.6     3.5 I     0 .
1974   Oct      3.0      .0 0    *  .
1974   Nov      1.1      .3 I0*     .
1974   Dec       .6      .2 0*      .
1975   Jan       .7     1.2 I*0     .
1975   Feb       .8     1.4 I*0     .
1975   Mar       .9     1.6 I *0    .
1975   Apr      1.4      .0 0 *     .
1975   May      4.3     5.4 I      *.0
1975   Jun     13.8    10.7 I       .         0    *
1975   Jul     13.4     8.5 I       .     0       *
1975   Aug     14.9    46.1 I       .                *                                                    0
1975   Sep      3.6      .0 0     * .
1975   Oct      3.0    24.4 I    *  .                                0
1975   Nov      1.1     1.8 I *0    .
1975   Dec       .6     1.0 I*0     .
1976   Jan       .7      .2 0*      .
1976   Feb       .8      .2 0*      .
1976   Mar       .9      .3 0 *     .
1976   Apr      1.4      .0 0 *     .
1976   May      4.3      .0 0      *.
1976   Jun     13.8      .0 0       .              *
1976   Jul     13.4      .0 0       .             *
1976   Aug     14.9     8.2 I       .     0          *
1976   Sep      3.6     7.3 I     * .   0
1976   Oct      3.0      .0 0    *  .
1976   Nov      1.1      .3 I0*     .
1976   Dec       .6      .2 0*      .
1977   Jan       .7     1.0 I*0     .
1977   Feb       .8     1.1 I*0     .
1977   Mar       .9     1.3 I 0     .
1977   Apr      1.4     9.0 I *     .      0
1977   May      4.3      .0 0      *.
1977   Jun     13.8     6.1 I       . 0            *
1977   Jul     13.4    49.3 I       .             *                                                            0
1977   Aug     14.9     4.3 I      0.                *
1977   Sep      3.6     5.7 I     * .0
1977   Oct      3.0      .0 0    *  .
1977   Nov      1.1     1.4 I 0     .
1977   Dec       .6      .8 I0      .
1978   Jan       .7      .2 0*      .
1978   Feb       .8      .2 0*      .
1978   Mar       .9      .2 0 *     .
1978   Apr      1.4      .0 0 *     .
```

```
1978  May    4.3     1.8 I  O   *.
1978  Jun   13.8    10.6 I       .         O    *
1978  Jul   13.4      .5 IO      .             *
1978  Aug   14.9      .0 O       .                *
  '8  Sep    3.6      .0 O     * .
.,78  Oct    3.0      .0 O    *  .
1978  Nov    1.1      .3 O *     .
1978  Dec     .6      .1 O*      .
1979  Jan     .7     1.7 I* O    .
1979  Feb     .8     2.0 I* O    .
1979  Mar     .9     2.3 I * O   .
1979  Apr    1.4     7.6 I *     .    O
1979  May    4.3    44.8 I      *.                                                                   O
1979  Jun   13.8    28.8 I       .              *                        O
1979  Jul   13.4     6.9 I       .   O         *
1979  Aug   14.9    32.2 I       .                *                             O
1979  Sep    3.6     1.4 I O   * .
1979  Oct    3.0    11.7 I    *  .          O
1979  Nov    1.1     2.6 I * O   .
1979  Dec     .6     1.4 I*O     .
1980  Jan     .7      .3 IO      .
1980  Feb     .8      .4 IO      .
1980  Mar     .9      .5 IO*     .
1980  Apr    1.4      .0 O *     .
1980  May    4.3      .0 O      *.
1980  Jun   13.8      .0 O       .              *
1980  Jul   13.4     6.9 I       .   O         *
1980  Aug   14.9    14.5 I       .               O*
1980  Sep    3.6     5.1 I     * O
 '80  Oct    3.0      .0 O    *  .
  )0  Nov    1.1      .5 IO*     .
1980  Dec     .6      .3 O*      .
```

**   Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent)   **

MONTH OF Jan

DATA FOR 1969 TO 1980

AVERAGE	=	.699
STANDARD DEVIATION	=	.568
COEFFICIENT OF VARIATION	=	.813
SKEW COEFFICIENT	=	.249

RELATIVE AND CUMULATIVE FREQUENCY FUNCTIONS

```
      INTER.    FREQ.   CUM.  0        10        20        30        40        50        60        70        80        90       100
                              I---------I---------I---------I---------I---------I---------I---------I---------I---------I---------I

          .09 ----------------*******************************************
                 41.7         I                                         *
                         41.7 I                                         *
          .36 ----------------I                ************************** 
                 16.7         I                *                                        I
                         58.3 I                *                                        I
          .63 ----------------******************                                        I
                   .0         *                                                         I
                         58.3 *                                                         I
          .90 ----------------******************                                        I                I
                 16.7         I                *                                                         I
                         75.0 I                *                                                         I
         1.17 ----------------I       **********                                                         I       I
                  8.3         I       *                                                                          I
                         83.3 I       *                                                                          I
         1.44 ----------------I       **********                                                                 I                I
                 16.7         I                *                                                                                  I
                        100.0 I                *                                                                                  I
         1.71 ----------------******************                                                                                  I
```

**   Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent)   **

MONTH OF Feb

DATA FOR 1969 TO 1980

```
                   AVERAGE =      .817
        STANDARD DEVIATION =      .665
  COEFFICIENT OF VARIATION =      .814
           SKEW COEFFICIENT =      .249
```

RELATIVE AND CUMULATIVE FREQUENCY FUNCTIONS

```
INTER.    FREQ.   CUM.  0        10        20        30        40        50        60        70        80        90        100
                        I---------I---------I---------I---------I---------I---------I---------I---------I---------I---------I

    .11 ----------------*******************************************
            41.7        I                                         *
                   41.7 I                                         *
    .43 ----------------I                ***************************               I
            16.7        I                *                                        I
                   58.3 I                *                                        I
    .74 ----------------******************                                        I
              .0        *                                                         I
                   58.3 *                                                         I
   1.06 ----------------******************                                        I                I
            16.7        I                *                                                         I
                   75.0 I                *                                                         I
   1.37 ----------------I       **********                                                         I       I
             8.3        I       *                                                                          I
                   83.3 I       *                                                                          I
   1.69 ----------------I       **********                                                                 I                I
            16.7        I                *                                                                                  I
                  100.0 I                *                                                                                  I
   2.00 ----------------******************                                                                                  I
```

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

MONTH OF Mar

DATA FOR 1969 TO 1980

AVERAGE = .935
STANDARD DEVIATION = .762
COEFFICIENT OF VARIATION = .815
SKEW COEFFICIENT = .247

RELATIVE AND CUMULATIVE FREQUENCY FUNCTIONS

```
INTER.    FREQ.   CUM.  0         10        20        30        40        50        60        70        80        90        100
                        I---------I---------I---------I---------I---------I---------I---------I---------I---------I---------I

    .12 ----------------*******************************************
           41.7         I                                         *
                  41.7  I                                         *
    .48 ----------------I                ************************** I
           16.7         I                *                                        I
                  58.3  I                *                                        I
    .84 ----------------******************                                        I
             .0         *                                                         I
                  58.3  *                                                         I
   1.21 ----------------******************                                        I                I
           16.7         I                *                                                         I
                  75.0  I                *                                                         I
   1.57 ----------------I       **********                                                         I       I
            8.3         I       *                                                                          I
                  83.3  I       *                                                                          I
   1.93 ----------------I       **********                                                                 I                I
           16.7         I                *                                                                                  I
                 100.0  I                *                                                                                  I
   2.29 ----------------******************                                                                                  I
```

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

MONTH OF Apr

DATA FOR 1969 TO 1980

AVERAGE	=	1.379
STANDARD DEVIATION	=	3.235
COEFFICIENT OF VARIATION	=	2.345
SKEW COEFFICIENT	=	1.493

RELATIVE AND CUMULATIVE FREQUENCY FUNCTIONS

```
INTER.    FREQ.   CUM.  0        10        20        30        40        50        60        70        80        90       100
                        I---------I---------I---------I---------I---------I---------I---------I---------I---------I---------I

   .00 ----------------************************************************************************************
           83.3         I                                                                                  *
                  83.3  I                                                                                  *
  1.50 ----------------************************************************************************************
             .0         *
                  83.3  *
  2.99 ----------------*                                                                                  I
             .0         *                                                                                  I
                  83.3  *                                                                                  I
  4.49 ----------------*                                                                                  I
             .0         *                                                                                  I
                  83.3  *                                                                                  I
  5.98 ----------------*                                                                                  I
             .0         *                                                                                  I
                  83.3  *                                                                                  I
  7.48 ----------------******************                                                                 I                I
           16.7         I                *                                                                                  I
                 100.0  I                *                                                                                  I
  8.97 ----------------******************                                                                                  I
```

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

MONTH OF May

DATA FOR 1969 TO 1980

AVERAGE	=	4.333
STANDARD DEVIATION	=	12.843
COEFFICIENT OF VARIATION	=	2.964
SKEW COEFFICIENT	=	2.493

RELATIVE AND CUMULATIVE FREQUENCY FUNCTIONS

```
INTER.    FREQ.   CUM.  0         10        20        30        40        50        60        70        80        90        100
                        I---------I---------I---------I---------I---------I---------I---------I---------I---------I---------I

    .00 ----------------*********************************************************************************************
            91.7        I                                                                                           *
                   91.7 I                                                                                           *
   7.47 ----------------*********************************************************************************************
              .0        *
                   91.7 *
  14.93 ----------------*                                                                                           I
              .0        *                                                                                           I
                   91.7 *                                                                                           I
  22.40 ----------------*                                                                                           I
              .0        *                                                                                           I
                   91.7 *                                                                                           I
  29.87 ----------------*                                                                                           I
              .0        *                                                                                           I
                   91.7 *                                                                                           I
  37.33 ----------------*********                                                                                   I       I
             8.3        I       *                                                                                           I
                  100.0 I       *                                                                                           I
  44.80 ----------------*********                                                                                           I
```

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

MONTH OF Jun

DATA FOR 1969 TO 1980

AVERAGE = 13.838
STANDARD DEVIATION = 17.763
COEFFICIENT OF VARIATION = 1.284
SKEW COEFFICIENT = .856

RELATIVE AND CUMULATIVE FREQUENCY FUNCTIONS

```
INTER.    FREQ.   CUM.  0         10        20        30        40        50        60        70        80        90       100
                        I---------I---------I---------I---------I---------I---------I---------I---------I---------I---------I

     .00 ---------------***************************************************
          50.0          I                                                 *
                  50.0  I                                                 *
    9.20 ---------------I                **********************************                I
          16.7          I                *                                                 I
                  66.7  I                *                                                 I
   18.40 ---------------I       **********                                                 I       I
           8.3          I       *                                                                  I
                  75.0  I       *                                                                  I
   27.60 ---------------I       **********                                                         I                I
          16.7          I                *                                                                          I
                  91.7  I                *                                                                          I
   36.80 ---------------******************                                                                          I
            .0          *                                                                                           I
                  91.7  *                                                                                           I
   46.00 ---------------*********                                                                                   I       I
           8.3          I       *                                                                                           I
                 100.0  I       *                                                                                           I
   55.20 ---------------*********                                                                                           I
```

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

MONTH OF Jul

DATA FOR 1969 TO 1980

```
                    AVERAGE =     13.421
         STANDARD DEVIATION =     20.141
   COEFFICIENT OF VARIATION =      1.501
            SKEW COEFFICIENT =      1.208
```

RELATIVE AND CUMULATIVE FREQUENCY FUNCTIONS

```
INTER.    FREQ.   CUM.  0        10        20        30        40        50        60        70        80        90       100
                        I---------I---------I---------I---------I---------I---------I---------I---------I---------I---------I

    .00 --------------------------------------------------------------------------------------------
           66.7         I                                                                  *
                  66.7  I                                                                  *
  10.00 ----------------I                ***************************************************               I
           16.7         I                *                                                                 I
                  83.3  I                *                                                                 I
  20.00 ----------------******************                                                                 I
             .0         *                                                                                  I
                  83.3  *                                                                                  I
  30.00 ----------------*                                                                                  I
             .0         *                                                                                  I
                  83.3  *                                                                                  I
  40.00 ----------------*********                                                                          I        I
            8.3         I       *                                                                                   I
                  91.7  I       *                                                                                   I
  50.00 ----------------I       *                                                                                   I       I
            8.3         I       *                                                                                           I
                 100.0  I       *                                                                                           I
  60.00 ----------------*********                                                                                           I
```

```
                  **            Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent)             **
                      --------------------------------------------------------------------------------


       MONTH OF Aug

                 DATA FOR  1969 TO 1980

                                      AVERAGE =    14.923
                           STANDARD DEVIATION =    17.120
                     COEFFICIENT OF VARIATION =     1.147
                             SKEW COEFFICIENT =      .475

RELATIVE AND CUMULATIVE FREQUENCY FUNCTIONS

INTER.    FREQ.   CUM.  0        10        20        30        40        50        60        70        80        90       100
                        I---------I---------I---------I---------I---------I---------I---------I---------I---------I---------I

    .00 ----------------***************************************************
           50.0         I                                                 *
                  50.0  I                                                 *
   7.68 ----------------I                **********************************                I
           16.7         I                *                                                 I
                  66.7  I                *                                                 I
  15.37 ------------------------------------------                                                 I
             .0         *                                                                  I
                  66.7  *                                                                  I
  23.05 ----------------*********                                                          I       I
            8.3         I       *                                                                  I
                  75.0  I       *                                                                  I
  30.73 ----------------I       *                                                                  I       I
            8.3         I       *                                                                          I
                  83.3  I       *                                                                          I
  38.42 ----------------I       **********                                                                 I                I
           16.7         I                *                                                                                  I
                 100.0  I                *                                                                                  I
  46.10 ----------------******************                                                                                  I
```

**   Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent)   **

MONTH OF Sep

DATA FOR 1969 TO 1980

AVERAGE =	3.641
STANDARD DEVIATION =	5.995
COEFFICIENT OF VARIATION =	1.647
SKEW COEFFICIENT =	1.675

RELATIVE AND CUMULATIVE FREQUENCY FUNCTIONS

```
INTER.  FREQ.  CUM. 0         10        20        30        40        50        60        70        80        90        100
                    I---------I---------I---------I---------I---------I---------I---------I---------I---------I---------I

  .00 --------------***********************************************************
       58.3         I                                                         *
              58.3  I                                                         *
 3.45 --------------I                        **********************************                        I
       25.0         I                        *                                                         I
              83.3  I                        *                                                         I
 6.90 --------------I       ******************                                                         I        I
        8.3         I       *                                                                                   I
              91.7  I       *                                                                                   I
10.35 --------------*********                                                                                   I
         .0         *                                                                                           I
              91.7  *                                                                                           I
13.80 --------------*                                                                                           I
         .0         *                                                                                           I
              91.7  *                                                                                           I
17.25 --------------*********                                                                                   I       I
        8.3         I       *                                                                                           I
             100.0  I       *                                                                                           I
20.70 --------------*********                                                                                           I
```

**   Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent)   **

MONTH OF Oct

DATA FOR 1969 TO 1980

AVERAGE =	3.008
STANDARD DEVIATION =	7.530
COEFFICIENT OF VARIATION =	2.503
SKEW COEFFICIENT =	1.886

RELATIVE AND CUMULATIVE FREQUENCY FUNCTIONS

```
INTER.    FREQ.   CUM.  0        10        20        30        40        50        60        70        80        90       100
                        I---------I---------I---------I---------I---------I---------I---------I---------I---------I---------I

    .00 ----------------************************************************************************************
          83.3          I                                                                                   *
                   83.3 I                                                                                   *
   4.07 ----------------************************************************************************************
            .0          *
                   83.3 *
   8.13 ----------------*********                                                                                   I
           8.3          I        *                                                                                  I
                   91.7 I        *                                                                                  I
  12.20 ----------------*********                                                                                   I
            .0          *                                                                                           I
                   91.7 *                                                                                           I
  16.27 ----------------*                                                                                           I
            .0          *                                                                                           I
                   91.7 *                                                                                           I
  20.33 ----------------*********                                                                                   I       I
           8.3          I        *                                                                                          I
                  100.0 I        *                                                                                          I
  24.40 ----------------*********                                                                                           I
```

**   Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent)   **

MONTH OF Nov

DATA FOR 1969 TO 1980

AVERAGE =	1.051
STANDARD DEVIATION =	.854
COEFFICIENT OF VARIATION =	.813
SKEW COEFFICIENT =	.247

RELATIVE AND CUMULATIVE FREQUENCY FUNCTIONS

```
INTER.   FREQ.   CUM.   0         10        20        30        40        50        60        70        80        90        100
                        I---------I---------I---------I---------I---------I---------I---------I---------I---------I---------I

   .14 -----------------*******************************************
        41.7            I                                         *
                  41.7  I                                         *
   .54 -----------------I                **************************               I
        16.7            I                *                                        I
                  58.3  I                *                                        I
   .95 -----------------******************                                        I
          .0            *                                                         I
                  58.3  *                                                         I
  1.36 -----------------******************                                        I                I
        16.7            I                *                                                         I
                  75.0  I                *                                                         I
  1.76 -----------------I       **********                                                         I       I
         8.3            I       *                                                                          I
                  83.3  I       *                                                                          I
  2.17 -----------------I       **********                                                                 I                I
        16.7            I                *                                                                                  I
                 100.0  I                *                                                                                  I
  2.57 -----------------******************                                                                                  I
```

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

MONTH OF Dec

DATA FOR 1969 TO 1980

```
                     AVERAGE =      .584
          STANDARD DEVIATION =      .475
    COEFFICIENT OF VARIATION =      .814
            SKEW COEFFICIENT =      .252
```

RELATIVE AND CUMULATIVE FREQUENCY FUNCTIONS

```
INTER.   FREQ.   CUM.  0         10        20        30        40        50        60        70        80        90        100
                       I---------I---------I---------I---------I---------I---------I---------I---------I---------I---------I

 .08 -------------------*******************************************
         41.7          I                                         *
                  41.7 I                                         *
 .31 ------------------I                ***************************               I
         16.7          I                *                                        I
                  58.3 I                *                                        I
 .53 -------------------******************                                        I
           .0          *                                                         I
                  58.3 *                                                         I
 .76 -------------------******************                                        I                I
         16.7          I                *                                                         I
                  75.0 I                *                                                         I
 .98 ------------------I       **********                                                         I       I
          8.3          I       *                                                                          I
                  83.3 I       *                                                                          I
1.21 ------------------I       **********                                                                 I                I
         16.7          I                *                                                                                  I
                 100.0 I                *                                                                                  I
1.43 -------------------******************                                                                                  I
```

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

ANNUAL VALUE

DATA FOR 1969 TO 1980

```
                 AVERAGE =    58.629
      STANDARD DEVIATION =    47.728
COEFFICIENT OF VARIATION =      .814
        SKEW COEFFICIENT =      .246
```

RELATIVE AND CUMULATIVE FREQUENCY FUNCTIONS

```
INTER.    FREQ.   CUM.  0         10        20        30        40        50        60        70        80        90        100
                        I---------I---------I---------I---------I---------I---------I---------I---------I---------I---------I

   7.61 ----------------*******************************************
           41.7         I                                         *
                  41.7  I                                         *
  30.24 ----------------I                *************************                I
           16.7         I                *                                        I
                  58.3  I                *                                        I
  52.88 ----------------******************                                        I
             .0         *                                                         I
                  58.3  *                                                         I
  75.51 ----------------******************                                        I                I
           16.7         I                *                                                         I
                  75.0  I                *                                                         I
  98.14 ----------------I       **********                                                         I       I
            8.3         I       *                                                                          I
                  83.3  I       *                                                                          I
 120.78 ----------------I       **********                                                                 I                I
           16.7         I                *                                                                                  I
                 100.0  I                *                                                                                  I
 143.41 ----------------******************                                                                                  I
```

NORMAL DISTRIBUTION

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

R	LAG
1.0000	0
.2277	1
.1357	2
.0082	3
-.0853	4
-.0870	5
-.1234	6
-.1183	7
-.1339	8
-.0661	9
.0878	10
.1871	11
.0416	12
-.0080	13
.0658	14
-.0730	15
-.1180	16
-.1251	17
-.1016	18
-.1023	19
-.0474	20
.0218	21
.0650	22
.2528	23
.1925	24
.2670	25
.0095	26
-.0640	27
-.0875	28
-.1102	29
-.1130	30
-.1113	31
-.0783	32
-.0242	33
-.0134	34
.1009	35
.0342	36
-.0383	37
.0327	38
-.1369	39
-.0642	40
-.1186	41
-.0880	42
-.0208	43
-.0362	44
.0781	45
.1115	46
.0400	47
.2522	48
-.0013	49
.0588	50

(Scale: -1.0, -0.5, 0.0, +0.5, +1.0)

** CORRELOGRAM OF THE ORIGINAL TIME SERIES PLUS THE ANNUAL COMPONENT **

Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent)

MONTHLY CORRELATIONS J - J+1	BJ COEF OF REGRESSION (J,J+1)	RJ, COEF OF CORRELATION (J,J+1)	STANDARD DEVIATION OF MONTH (J+1)	AVERAGE OF MONTH (J)
Jan - Feb	1.1692	1.0000	.568	.699
Feb - Mar	1.1467	1.0000	.665	.817
Mar - Apr	2.0779	.4896	.762	.935
Apr - May	2.3274	.5862	3.235	1.379
May - Jun	.3569	.2580	12.843	4.333
Jun - Jul	.1219	.1075	17.763	13.838
Jul - Aug	-.0044	-.0052	20.141	13.421
Aug - Sep	.0166	.0475	17.120	14.923
Sep - Oct	-.2913	-.2319	5.995	3.641
Oct - Nov	.0590	.5199	7.530	3.008
Nov - Dec	.5564	1.0000	.854	1.051
Dec - Jan	-.3591	-.3343	.475	.584

* NOTE: THE COMPLETE SEQUENCE FROM DEC. TO JAN. CANNOT BE CALCULATED.
BJ AND RJ ARE CALCULATED, IN THIS CASE, FROM 11 YEARS OF DATA.
THE MEAN AND STANDARD DEVIATION WERE DETERMINED USING ALL THE DATA (12 YEARS).

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 1 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
1.59	1.86	2.13	.00	16.08	13.95	23.94	.00	.00	5.48	.00	.00	65.05	1
1.31	1.53	1.75	8.31	21.73	42.26	48.07	33.83	.00	15.28	1.14	.63	175.85	2
.57	.67	.77	.00	.00	.00	24.22	34.78	4.11	6.50	.45	.25	72.33	3
1.30	1.53	1.75	4.93	28.59	40.09	23.78	.00	6.03	16.36	2.37	1.32	128.03	4
1.17	1.37	1.56	.96	.00	5.32	.00	5.28	5.77	1.37	.00	.00	22.81	5
1.06	1.23	1.41	.85	3.78	20.36	.00	22.54	9.38	.00	.00	.00	60.62	6
.98	1.15	1.32	1.53	16.73	47.36	18.27	21.13	8.50	21.92	1.85	1.03	141.76	7
.70	.82	.94	.69	12.27	27.97	.00	39.27	5.61	9.06	2.36	1.32	101.01	8
.00	.00	.01	3.91	4.28	36.86	33.80	41.55	.00	.00	.00	.00	120.40	9
1.63	1.91	2.19	2.35	19.05	27.60	57.04	26.32	.00	1.61	.40	.22	140.33	10
1.59	1.85	2.13	.00	7.42	.00	23.12	41.90	.00	.00	1.18	.65	79.84	11
1.17	1.37	1.57	3.41	38.06	31.99	.00	46.04	7.51	.00	.57	.32	132.02	12
1.32	1.55	1.77	1.80	7.90	47.35	23.98	.00	.00	16.61	2.02	1.12	105.42	13
.89	1.05	1.19	.64	11.89	25.68	.00	24.50	7.87	.00	.64	.36	74.71	14
.86	1.01	1.16	4.40	24.96	18.07	.00	.00	.00	3.56	.43	.23	54.67	15
.68	.79	.90	1.88	7.12	46.15	20.24	56.44	11.91	.14	.00	.00	146.24	16
.01	.02	.01	.00	1.91	10.57	65.34	11.24	.00	16.16	.92	.51	106.69	17
.00	.00	.01	.00	.00	.00	10.37	9.18	.00	.00	.02	.02	19.60	18
.10	.11	.13	.00	.00	.00	43.12	2.06	1.89	.00	.00	.00	47.41	19
.27	.32	.36	5.68	14.91	40.90	19.79	52.44	15.76	.79	.00	.00	151.22	20
1.15	1.34	1.53	3.82	28.52	62.93	32.30	.00	3.59	.37	1.53	.85	137.94	21
1.01	1.18	1.36	.23	.00	33.26	46.61	18.92	.00	4.92	2.06	1.15	110.70	22
.00	.00	.00	2.20	.00	.00	20.03	28.18	6.96	14.74	1.74	.97	74.83	23
.25	.28	.32	1.27	.00	1.85	21.43	.00	.00	.00	.00	.00	25.41	24
1.01	1.19	1.36	9.56	26.55	33.64	33.98	16.25	5.92	.00	.81	.45	130.72	25
1.17	1.38	1.57	7.74	16.06	20.25	30.90	13.97	11.90	.00	1.08	.60	106.61	26
1.18	1.38	1.58	.00	.00	.00	.00	14.87	11.18	5.17	.00	.00	35.37	27
1.87	2.18	2.50	5.29	14.15	.00	.00	2.71	.32	16.56	1.86	1.04	48.48	28
.91	1.07	1.23	.00	.00	30.43	24.57	4.51	10.21	.00	.00	.00	72.91	29
.85	.99	1.14	4.98	17.16	.00	.00	6.83	7.61	.00	1.69	.94	42.20	30
1.40	1.64	1.88	1.74	5.23	48.87	27.21	30.75	9.44	.00	.58	.33	129.07	31
.96	1.12	1.29	1.17	.00	9.46	21.08	.00	2.56	.00	.43	.24	38.30	32
.00	.00	.01	6.65	30.11	9.78	42.21	.00	11.75	.00	1.06	.60	102.17	33
1.33	1.55	1.78	1.21	2.83	3.01	.00	.00	11.74	.00	.94	.53	24.93	34
.18	.20	.23	.00	.00	40.37	9.41	27.65	.00	14.35	2.24	1.24	95.87	35
1.23	1.44	1.65	.00	8.71	.00	21.09	34.22	5.80	3.77	1.42	.79	80.14	36
1.11	1.29	1.48	3.78	11.98	9.01	.00	.00	.00	.00	.01	.00	28.65	37
1.02	1.19	1.37	4.82	18.60	36.85	42.85	.00	4.51	12.40	2.25	1.25	127.09	38
.00	.00	.00	.00	2.66	31.87	.00	35.69	13.19	13.80	2.23	1.24	100.70	39
.00	.00	.00	2.88	15.80	5.14	32.78	38.73	7.46	7.21	2.13	1.18	113.31	40
.21	.24	.27	.00	.00	31.65	19.29	.00	2.94	14.15	1.16	.64	70.56	41
1.10	1.29	1.48	9.15	26.16	1.34	3.84	.00	.00	10.42	2.34	1.30	58.41	42
.21	.25	.28	1.53	8.27	17.86	.00	.32	2.08	.00	.25	.14	31.19	43
.71	.82	.94	2.31	8.29	4.06	48.99	.00	11.70	8.59	.84	.47	87.72	44
.73	.85	.98	2.24	29.25	26.83	33.63	11.20	.00	12.13	.96	.53	119.32	45
1.43	1.68	1.93	6.72	30.77	.00	.00	.00	6.85	8.62	2.33	1.30	61.62	46
.00	.00	.00	.00	.00	9.87	27.01	25.27	7.41	10.01	.79	.44	80.80	47
.00	.00	.00	2.00	13.11	2.25	.00	.00	7.57	.00	.00	.00	24.92	48
.84	.98	1.13	.00	6.52	43.28	8.74	8.24	7.43	.00	.62	.34	78.12	49
1.06	1.24	1.42	.00	.00	1.83	7.96	.00	1.91	10.92	2.60	1.45	30.40	50

.80	.94	1.07	2.45	11.15	19.96	19.82	15.74	5.13	5.66	1.01	.56	84.29	AVE.
.54	.63	.72	2.69	10.73	17.89	17.65	16.86	4.57	6.50	.86	.48	41.08	ST.D
.67	.67	.67	1.10	.96	.90	.89	1.07	.89	1.15	.86	.86	.49	C.V.
-.31	-.31	-.31	.99	.59	.32	.43	.63	.27	.64	.26	.26	-.01	SKEW

TOTAL AVERAGE = 7.024
STANDARD DEV = 11.986
SKEW COEFFICIENT = 2.182

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 2 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
-.38	.00	.01	.00	.00	29.86	18.03	.00	.00	.22	1.24	.69	49.65	1
.00	.00	.01	.00	.00	38.29	7.51	17.66	11.21	4.19	.26	.14	79.27	2
.48	.56	.64	.00	.00	.00	5.67	9.51	13.84	6.36	1.84	1.02	39.93	3
1.53	1.79	2.06	.00	5.56	43.91	7.04	.00	6.77	.00	2.38	1.33	72.38	4
.00	.00	.00	.00	8.05	.00	10.83	.00	.81	.00	1.18	.66	21.53	5
1.48	1.74	1.99	.00	12.97	26.73	.00	34.31	10.21	.00	.14	.08	89.65	6
1.67	1.95	2.24	.00	3.23	.00	23.87	1.08	1.98	.74	1.29	.72	38.76	7
1.14	1.33	1.53	4.25	.00	22.85	26.57	2.85	6.31	15.48	1.32	.73	84.37	8
.90	1.06	1.21	2.93	16.09	24.49	15.49	37.76	5.92	3.08	1.36	.75	111.03	9
.83	.97	1.11	.33	13.17	39.13	20.61	19.70	.00	10.07	2.64	1.46	110.01	10
.00	.00	.00	.00	.00	1.13	39.47	20.23	7.71	.00	.28	.15	68.97	11
1.16	1.35	1.55	1.02	7.77	49.99	27.25	31.36	8.09	.00	.00	.00	129.54	12
1.35	1.59	1.81	2.32	12.59	.00	.00	.00	.00	.00	.56	.31	20.52	13
1.07	1.25	1.43	.74	.74	.00	.00	.00	4.00	14.39	1.01	.56	25.18	14
1.33	1.55	1.78	4.93	15.44	12.75	28.64	.00	4.82	9.86	.79	.44	82.34	15
1.17	1.36	1.55	3.18	.00	32.41	31.24	1.58	12.13	.00	.83	.46	85.90	16
.42	.49	.57	.97	7.09	17.16	.00	6.97	6.99	.00	1.41	.79	42.85	17
.73	.86	.99	.00	.00	32.19	36.54	.00	6.97	12.03	2.11	1.17	93.58	18
.15	.17	.19	.00	5.04	46.03	24.01	8.24	.00	.00	.32	.18	84.33	19
1.61	1.88	2.16	5.68	.00	12.58	42.31	42.11	.00	9.30	2.09	1.16	120.89	20
2.14	2.49	2.86	5.84	21.23	37.69	50.13	.00	.00	6.58	.23	.13	129.31	21
1.46	1.71	1.95	.36	.00	.00	5.71	8.05	5.12	.00	1.49	.83	26.68	22
1.54	1.80	2.06	1.77	.74	24.49	30.80	47.25	1.63	7.15	1.35	.75	121.34	23
.00	.00	.00	.00	4.59	46.36	2.10	4.15	.00	.00	.31	.16	57.66	24
.95	1.10	1.27	.00	.00	20.45	.00	.00	8.55	2.86	1.68	.94	37.81	25
.23	.28	.32	.00	2.71	.00	19.06	26.74	3.95	.00	1.22	.67	55.18	26
1.14	1.34	1.54	4.28	.00	.00	26.11	37.27	.16	.00	.13	.07	72.05	27
1.07	1.26	1.44	.03	.00	42.82	28.45	.71	.00	.00	1.25	.69	77.72	28
.18	.20	.23	.61	12.29	.00	13.88	28.09	7.53	19.05	2.47	1.37	85.89	29
.48	.56	.64	4.72	26.40	30.71	28.91	21.06	7.33	10.09	.65	.36	131.92	30
.21	.24	.28	.00	.00	.00	.00	3.95	.00	18.62	2.33	1.29	26.93	31
.00	.00	.00	1.93	14.06	26.25	21.78	.00	.00	.00	.79	.44	65.25	32
.81	.95	1.09	2.74	18.05	35.64	19.22	3.07	10.97	9.00	.47	.26	102.25	33
.82	.95	1.09	5.52	5.83	.00	19.73	8.23	7.81	.00	1.81	1.01	52.80	34
.72	.85	.96	1.56	22.11	48.14	19.54	6.13	4.70	4.40	2.20	1.22	112.51	35
.00	.00	.00	.64	.00	.00	.00	13.51	10.63	4.52	.10	.06	29.45	36
.27	.30	.36	.00	.00	7.43	33.91	.00	.00	14.14	1.06	.58	58.06	37
.50	.58	.66	3.10	11.75	.00	5.31	30.50	.00	.00	1.33	.74	54.47	38
1.50	1.76	2.02	4.19	16.70	29.50	19.19	8.21	7.20	5.53	2.72	1.51	100.03	39
.78	.91	1.05	.21	.00	.00	5.28	15.42	13.55	.00	2.43	1.35	40.97	40
.43	.50	.56	.00	.00	.00	11.60	.00	13.60	11.89	3.00	1.67	43.25	41
.42	.48	.55	.00	10.34	2.09	.00	.00	.00	7.30	1.41	.78	23.35	42
.05	.06	.07	.00	17.68	27.37	26.64	12.07	7.24	11.29	2.41	1.33	106.21	43
1.06	1.23	1.41	.78	.00	.00	.00	9.64	7.12	8.11	2.40	1.34	33.09	44
.43	.51	.58	.00	.00	17.67	.00	.00	.00	.00	.00	.00	19.19	45
.53	.62	.70	3.16	21.86	.00	19.74	28.51	4.21	.00	2.82	1.57	83.73	46
.12	.14	.16	.00	.00	2.49	.00	12.09	6.26	11.40	1.72	.96	35.32	47
1.38	1.60	1.83	3.23	.00	26.03	55.99	.00	1.33	.00	.92	.51	92.82	48
1.59	1.84	2.11	3.80	.00	19.07	30.29	24.02	.00	1.70	.00	.00	84.43	49
.23	.28	.32	.00	10.72	5.55	22.30	39.17	11.16	.00	.00	.00	89.72	50

.75	.89	1.02	1.50	6.50	17.58	17.62	12.42	4.96	4.79	1.27	.71	70.00	AVE.
.59	.68	.77	1.89	7.74	17.04	14.40	13.91	4.47	5.69	.88	.49	33.24	ST.D
.79	.76	.76	1.26	1.19	.97	.82	1.12	.90	1.19	.69	.69	.47	C.V.
.11	.19	.19	.88	.78	.28	.38	.84	.26	.80	.09	.09	.01	SKEW

TOTAL AVERAGE = 5.834
STANDARD DEV = 10.235
SKEW COEFFICIENT = 2.310

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 3 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
1.28	1.49	1.72	7.96	27.72	26.51	.00	10.33	.00	.00	2.04	1.13	80.18	1
.51	.59	.67	.00	.00	16.40	40.07	25.13	7.40	.00	.81	.46	92.04	2
1.48	1.74	1.99	3.10	25.64	19.04	28.17	12.80	.00	1.32	1.32	.73	97.33	3
.15	.18	.20	.03	3.56	.00	9.92	15.45	8.74	13.58	2.00	1.11	54.92	4
.05	.04	.05	.00	.00	21.10	19.73	10.31	12.70	14.42	1.78	.99	81.15	5
.00	.00	.00	.00	1.87	28.68	44.52	18.75	9.97	10.37	1.85	1.02	117.02	6
.42	.48	.54	.00	.00	.00	.00	23.19	.00	.00	1.20	.67	26.49	7
1.50	1.76	2.02	.19	5.96	.00	8.75	31.98	13.93	9.76	.93	.51	77.28	8
.51	.60	.69	4.79	15.19	43.00	21.42	21.20	7.92	.00	1.62	.90	117.83	9
.99	1.15	1.32	.00	.00	31.88	50.23	15.62	12.53	2.71	1.45	.80	118.68	10
.14	.17	.19	3.81	20.61	.00	43.16	.00	10.86	11.96	1.96	1.09	93.96	11
.10	.12	.14	4.14	.65	15.91	.00	38.92	4.75	6.05	1.84	1.03	73.66	12
.73	.85	.98	.00	.00	14.34	.00	7.68	14.80	.00	1.35	.75	41.48	13
.90	1.08	1.22	.00	.00	3.52	39.59	17.68	14.40	6.47	1.62	.89	87.39	14
.73	.85	.96	.00	.00	12.11	21.27	.00	5.60	.00	1.84	1.02	44.38	15
.98	1.14	1.30	3.13	.00	12.10	38.34	4.59	.90	11.71	.00	.00	74.20	16
1.25	1.46	1.68	5.87	23.11	7.60	.39	.00	4.20	5.21	1.48	.82	53.07	17
.07	.08	.10	.00	21.53	24.35	33.57	30.56	10.15	.00	1.96	1.08	123.44	18
.96	1.12	1.29	1.55	12.90	1.64	.00	.00	.82	1.26	1.26	.70	23.49	19
1.25	1.47	1.69	.00	.00	2.81	.00	9.71	13.94	.00	.00	.00	30.88	20
1.71	2.00	2.30	1.70	5.13	50.96	3.45	.00	3.63	.00	.30	.17	71.35	21
.71	.82	.94	6.58	12.72	11.75	42.88	9.51	6.78	17.92	2.82	1.56	114.98	22
.64	.74	.85	2.34	.00	31.43	26.57	21.44	9.20	2.93	2.99	1.66	100.78	23
.00	.00	.01	1.72	11.50	6.43	.00	4.60	10.19	3.25	1.15	.64	39.49	24
.26	.31	.35	.00	.00	.00	14.05	38.85	6.59	5.71	.00	.00	66.11	25
1.62	1.89	2.17	7.03	22.07	12.35	.00	.85	10.91	.00	1.47	.82	61.18	26
1.81	2.10	2.40	5.70	1.77	27.36	15.67	16.22	6.62	2.90	.00	.00	82.56	27
1.53	1.78	2.05	3.21	13.42	39.41	.00	27.50	9.31	.00	.46	.26	98.91	28
1.76	2.06	2.36	5.50	.52	4.44	1.00	14.50	.00	.00	1.05	.58	33.77	29
.98	1.15	1.32	.00	8.26	22.69	20.94	.00	3.83	11.68	1.94	1.08	73.87	30
1.23	1.44	1.65	7.74	31.48	34.27	16.86	19.88	9.51	.00	.20	.11	124.38	31
.00	.00	.00	.00	.00	21.93	28.05	14.42	9.19	.00	.01	.01	73.62	32
1.00	1.17	1.34	.95	12.75	27.22	16.14	56.20	4.63	15.24	1.94	1.08	139.66	33
1.07	1.24	1.41	.00	20.34	23.58	35.60	.00	1.07	.00	2.69	1.49	88.48	34
.56	.66	.74	1.15	11.59	3.32	42.02	6.31	11.90	9.55	2.19	1.22	91.24	35
.54	.63	.72	2.56	.00	8.68	27.89	51.75	3.67	.00	.00	.00	96.46	36
1.15	1.34	1.53	.00	3.43	.00	11.97	47.14	.00	.00	.56	.31	67.42	37
1.09	1.29	1.47	.04	.00	.00	21.63	8.50	13.29	.00	1.09	.61	49.00	38
.00	.00	.00	1.75	.00	13.97	.00	9.14	.00	.00	.62	.35	25.81	39
.23	.26	.31	1.17	11.21	38.26	.00	7.47	4.82	.00	.14	.07	63.95	40
1.39	1.61	1.85	4.04	11.67	9.65	.00	9.95	.00	6.23	1.58	.89	48.87	41
.82	.96	1.09	2.15	.00	23.20	26.67	22.03	7.53	1.78	2.02	1.13	89.37	42
1.34	1.56	1.78	4.84	13.72	.00	20.48	.00	.00	4.53	2.23	1.24	51.72	43
.86	1.02	1.17	3.40	.00	20.04	16.99	23.99	4.62	11.48	1.04	.58	85.19	44
.00	.00	.00	.16	.00	22.65	15.59	5.23	.00	14.62	2.48	1.38	62.11	45
.00	.00	.00	.00	10.16	3.23	24.29	23.67	5.41	7.83	2.36	1.31	78.27	46
1.42	1.66	1.90	5.16	30.83	.00	19.54	5.66	6.64	3.07	1.85	1.03	78.76	47
.97	1.14	1.30	1.04	.00	16.56	32.54	32.33	6.73	2.71	1.70	.95	97.97	48
1.11	1.30	1.48	.00	28.85	19.70	.00	31.72	9.45	7.02	.23	.13	100.99	49
.48	.56	.65	.00	.00	.00	22.66	38.36	12.24	.00	1.65	.92	77.52	50

.81	.94	1.08	2.09	8.40	15.48	18.05	16.82	6.63	4.47	1.34	.75	76.85	AVE.
.55	.64	.74	2.43	9.97	13.23	15.33	14.40	4.67	5.29	.83	.46	28.15	ST.D
.68	.68	.68	1.16	1.19	.85	.85	.86	.70	1.18	.62	.62	.37	C.V.
-.11	-.11	-.11	.83	.82	.50	.21	.77	-.10	.84	-.29	-.29	-.18	SKEW

TOTAL AVERAGE = 6.404
STANDARD DEV = 10.254
SKEW COEFFICIENT = 2.148

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 4 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
-.03	.00	.00	3.22	11.88	4.97	13.50	.00	6.95	5.36	2.14	1.19	49.17	1
.00	.00	.00	1.54	13.11	10.52	40.17	1.89	2.43	.00	1.03	.58	71.25	2
.00	.00	.00	2.52	12.79	29.58	55.52	27.11	5.40	.00	.89	.49	134.32	3
.63	.73	.83	.00	4.14	2.18	38.15	11.34	5.66	5.28	1.57	.87	71.36	4
1.18	1.38	1.58	2.67	26.57	40.66	.00	41.82	9.03	12.45	.48	.27	138.09	5
.85	1.00	1.15	.00	3.74	13.04	34.80	14.50	5.68	1.27	.13	.08	76.25	6
1.29	1.50	1.72	.00	3.17	.00	.00	.00	.00	2.42	.00	.00	10.09	7
2.01	2.35	2.69	3.26	2.43	.00	9.39	.00	.00	5.47	.45	.25	28.31	8
.85	.99	1.13	.31	.00	.00	36.82	27.12	6.43	.00	1.18	.65	75.48	9
1.25	1.45	1.65	7.74	19.26	8.50	.70	22.95	.00	16.30	2.02	1.13	82.95	10
.89	1.03	1.19	5.52	.00	.00	28.46	31.69	.00	.00	1.33	.74	70.85	11
.00	.00	.00	.05	2.56	26.12	20.01	33.81	.00	.00	.89	.50	83.94	12
1.22	1.43	1.64	3.03	28.33	6.58	4.63	23.98	.00	3.37	1.50	.83	76.55	13
.18	.21	.23	.00	13.12	.00	8.84	.00	9.27	9.40	.82	.45	42.52	14
.44	.51	.58	.00	.00	15.53	39.25	21.88	13.22	3.84	1.35	.75	97.35	15
.29	.34	.39	.85	25.24	9.24	.00	.00	.00	9.21	.53	.30	46.38	16
1.18	1.38	1.59	.00	3.09	43.32	.00	.00	.00	14.75	.79	.44	66.53	17
1.31	1.52	1.74	7.57	27.24	10.56	4.35	58.40	.00	5.42	1.84	1.02	120.98	18
.91	1.06	1.21	1.94	.00	20.68	.00	15.94	10.65	.00	.29	.16	52.85	19
2.32	2.71	3.11	5.00	25.38	40.43	34.95	20.05	.00	18.98	3.08	1.71	157.72	20
.15	.17	.20	1.21	7.40	15.86	28.49	15.49	5.06	11.22	1.83	1.01	88.09	21
1.44	1.69	1.94	7.64	26.08	11.87	.00	.00	1.68	.00	.11	.06	52.52	22
.22	.26	.29	4.03	11.61	20.79	17.15	42.61	6.89	10.49	1.71	.95	117.00	23
1.26	1.47	1.68	.23	8.86	.00	1.12	34.03	.00	20.67	2.57	1.43	73.34	24
.56	.66	.76	.49	.00	27.66	17.13	19.36	6.33	8.32	.48	.27	82.01	25
1.03	1.20	1.38	1.48	.00	19.51	26.74	19.38	6.35	.00	1.14	.64	78.85	26
.24	.28	.31	1.79	9.76	16.09	58.82	22.30	4.27	8.44	1.55	.86	124.71	27
1.24	1.44	1.65	3.20	.00	22.09	38.83	13.95	6.55	7.07	2.95	1.65	100.62	28
.60	.70	.79	.00	.00	2.56	17.16	33.22	11.03	.00	.66	.37	67.07	29
.13	.15	.18	.00	.00	.00	.00	20.79	4.24	5.25	2.19	1.21	34.13	30
.00	.00	.00	.00	.00	18.42	16.60	15.17	.00	.00	.66	.37	51.23	31
.88	1.03	1.19	.88	20.29	7.42	22.45	7.05	6.67	4.62	2.57	1.42	76.47	32
.59	.68	.78	.00	.00	10.71	36.35	11.16	8.02	2.82	1.40	.78	73.29	33
.63	.74	.85	4.26	.00	6.85	54.91	12.19	.00	10.42	1.65	.92	93.40	34
1.16	1.35	1.55	2.77	16.58	7.70	16.65	24.90	5.02	7.44	2.13	1.18	88.42	35
.36	.42	.49	5.33	31.10	42.15	47.06	8.85	5.25	6.05	.00	.00	147.05	36
.91	1.07	1.22	.00	6.63	26.29	.00	.00	12.12	7.74	.64	.35	56.97	37
1.64	1.91	2.19	4.42	17.77	30.83	62.05	34.15	14.29	2.64	1.25	.70	173.84	38
.94	1.09	1.25	.00	1.83	.00	1.61	.00	6.60	24.48	2.23	1.24	41.26	39
.00	.00	.00	1.00	7.85	.00	10.18	9.44	13.81	.00	.70	.39	43.38	40
1.60	1.86	2.13	.00	18.99	9.08	.00	9.16	.00	.00	.91	.51	44.24	41
2.16	2.52	2.89	10.26	31.27	23.67	24.54	20.81	11.20	.00	2.10	1.16	132.58	42
.00	.00	.00	.23	10.44	2.33	21.57	7.09	.00	1.33	1.19	.67	44.86	43
.05	.06	.08	.00	6.97	7.53	.00	24.00	4.62	.00	1.68	.93	45.93	44
.00	.00	.00	.00	8.53	18.02	49.55	16.96	7.90	.00	2.33	1.29	104.59	45
1.53	1.78	2.05	1.28	2.81	.00	10.89	7.93	.00	.00	.23	.13	28.64	46
1.16	1.35	1.55	.09	.00	16.01	.00	5.43	16.25	1.40	1.18	.67	45.09	47
.34	.39	.45	2.19	7.45	3.62	27.29	.00	4.34	.00	.12	.07	46.26	48
.88	1.03	1.18	5.59	19.01	18.37	.00	.00	.00	27.05	2.95	1.64	77.69	49
.68	.80	.92	.00	.00	1.22	31.02	.00	4.45	9.93	2.42	1.34	52.77	50

.78	.91	1.05	2.07	9.87	13.37	20.15	15.76	4.95	5.82	1.32	.73	76.78	AVE.
.61	.72	.82	2.55	9.96	12.35	18.66	13.67	4.59	6.76	.84	.47	36.04	ST.D
.79	.78	.78	1.23	1.01	.92	.93	.87	.93	1.16	.64	.64	.47	C.V.
.37	.37	.38	1.23	.66	.76	.48	.67	.48	1.28	.19	.18	.60	SKEW

TOTAL AVERAGE = 6.399
STANDARD DEV = 10.624
SKEW COEFFICIENT = 2.371

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 5 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
.27	.32	.36	.17	9.87	.00	20.46	30.99	10.16	.00	.30	.16	73.06	1
1.60	1.87	2.13	3.09	.00	12.64	30.05	.00	.00	1.86	.00	.00	53.25	2
1.29	1.50	1.73	1.87	7.48	41.83	.00	12.14	.00	.00	.00	.00	67.83	3
1.21	1.41	1.61	.16	.00	.00	62.02	7.48	5.25	23.48	1.32	.73	104.67	4
.21	.25	.29	.00	12.52	25.50	20.25	15.21	6.71	3.41	2.59	1.44	88.38	5
.00	.00	.00	3.92	4.16	.00	11.31	6.78	7.68	.00	1.10	.61	35.55	6
.96	1.12	1.28	.00	.00	32.19	42.60	49.31	4.22	.00	2.66	1.47	135.82	7
.41	.47	.54	.00	.00	18.91	26.31	6.72	7.48	.00	1.15	.63	62.62	8
.77	.90	1.03	8.03	10.82	3.80	35.20	53.23	9.87	.00	.93	.52	125.09	9
1.27	1.48	1.69	3.87	13.02	19.20	25.83	.00	.00	8.97	1.66	.93	77.92	10
.05	.06	.07	2.93	18.78	12.57	.00	2.78	.00	.00	.86	.48	38.60	11
1.17	1.37	1.57	.35	.00	30.01	17.92	9.53	13.88	3.18	1.16	.64	80.79	12
1.50	1.75	2.00	7.60	19.86	.00	17.56	.00	11.71	.00	1.87	1.04	64.91	13
2.00	2.33	2.66	10.01	30.35	26.44	15.13	8.56	.00	.00	.81	.46	98.73	14
.51	.60	.68	4.89	31.82	19.94	37.73	31.45	.00	5.56	2.74	1.52	137.44	15
1.21	1.42	1.63	.19	1.95	10.83	28.00	29.23	4.07	12.83	1.04	.57	92.96	16
.68	.79	.91	3.11	26.10	40.20	.00	24.99	5.45	.00	.00	.00	102.22	17
2.38	2.78	3.19	7.57	5.06	42.18	22.45	13.87	11.85	7.01	2.05	1.13	121.51	18
.73	.85	.97	.00	6.44	27.06	43.20	.00	3.68	5.68	1.27	.71	90.60	19
1.25	1.46	1.67	.00	7.63	12.04	.00	25.47	5.01	10.76	.75	.41	66.45	20
.97	1.14	1.31	3.00	.00	45.92	18.21	47.86	.00	.00	.61	.34	119.36	21
1.22	1.43	1.65	2.16	29.80	52.75	7.78	28.72	6.96	.00	1.38	.76	134.61	22
.71	.82	.94	.00	.00	37.26	17.65	14.66	5.91	2.58	.13	.07	80.71	23
1.91	2.23	2.56	2.73	4.76	36.81	2.01	11.03	9.26	.00	.00	.00	73.30	24
1.10	1.27	1.46	.00	.00	13.97	.00	.00	12.01	10.24	2.23	1.24	43.52	25
.00	.00	.00	.00	.00	12.65	.00	40.11	.00	.00	.01	.00	52.78	26
.72	.84	.97	1.25	.00	36.56	24.52	.00	11.51	3.19	2.31	1.29	83.18	27
.69	.81	.91	.00	.00	13.57	.00	23.20	7.18	.00	1.55	.86	48.77	28
.95	1.10	1.25	.00	.00	19.92	20.66	8.17	.00	10.74	1.94	1.09	65.83	29
1.29	1.50	1.72	4.89	25.49	.00	27.76	17.44	3.73	.00	1.11	.61	85.54	30
.63	.73	.84	.00	15.12	38.02	21.88	50.29	2.35	.00	.43	.24	130.53	31
1.60	1.88	2.15	1.16	4.59	36.56	22.75	5.50	.00	14.56	1.30	.72	92.76	32
1.25	1.46	1.68	.00	.00	10.85	43.82	19.78	12.72	3.86	2.06	1.15	98.63	33
.59	.70	.80	1.26	.00	11.89	38.06	.00	.00	.13	.98	.55	54.96	34
1.05	1.23	1.41	8.55	13.02	50.05	19.16	3.60	7.88	.00	.99	.55	107.50	35
2.01	2.35	2.70	3.46	.00	2.37	20.13	3.76	5.67	7.75	1.40	.77	52.36	36
.00	.00	.00	2.51	16.49	28.97	.00	.00	6.20	4.83	1.37	.76	61.13	37
1.34	1.56	1.79	2.39	20.18	53.73	13.37	18.68	9.91	10.80	2.38	1.33	137.46	38
.05	.06	.08	.00	.00	41.25	17.67	.00	.00	6.42	1.38	.77	67.67	39
.80	.92	1.06	7.02	.00	5.37	43.97	33.35	.00	2.50	.00	.00	94.98	40
1.33	1.55	1.78	.00	.00	.00	.00	34.32	12.00	.00	2.67	1.48	55.14	41
.08	.08	.09	.00	1.79	5.19	30.37	7.10	4.44	8.00	1.48	.82	59.42	42
.61	.71	.80	.00	11.45	35.77	31.82	4.07	.00	.00	2.13	1.19	88.55	43
.73	.86	.98	.00	.00	3.92	.00	21.58	9.87	7.32	2.25	1.25	48.75	44
.79	.92	1.06	.00	.00	3.45	33.07	1.74	4.89	4.17	1.14	.64	51.86	45
.03	.03	.04	.00	13.00	13.00	.00	.00	.00	13.07	1.82	1.01	42.00	46
.18	.21	.24	.10	10.55	.00	.00	27.16	10.65	2.62	1.10	.61	53.41	47
.00	.00	.00	5.90	12.90	.00	5.37	38.40	4.89	14.76	1.80	1.00	85.01	48
.00	.00	.00	1.28	11.37	21.55	.00	10.40	.00	.00	1.59	.89	47.07	49
.95	1.12	1.28	1.05	.00	34.59	3.62	22.51	8.75	.00	.00	.00	73.87	50

.86	1.00	1.15	2.13	7.93	20.83	18.39	16.42	5.28	4.21	1.28	.71	80.18	AVE.
.60	.70	.80	2.76	9.40	16.46	15.50	15.45	4.47	5.36	.80	.45	28.78	ST.D
.70	.70	.70	1.29	1.19	.79	.84	.94	.85	1.27	.63	.63	.36	C.V.
.21	.21	.21	1.19	.97	.22	.38	.70	.11	1.30	-.13	-.13	.33	SKEW

TOTAL AVERAGE = 6.682
STANDARD DEV = 11.201
SKEW COEFFICIENT = 2.224

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 6 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
1.35	1.58	1.81	.00	.00	.00	4.92	.00	.00	.00	1.24	.69	11.58	1
1.32	1.54	1.77	3.74	11.17	50.26	13.23	38.46	.00	7.20	1.98	1.10	131.76	2
.00	.00	.00	3.38	23.28	30.26	35.10	4.22	2.27	2.96	1.33	.73	103.55	3
.44	.52	.59	.62	6.35	.00	.00	5.92	13.48	4.80	.43	.23	33.39	4
1.95	2.27	2.61	9.65	15.01	34.01	32.08	29.88	8.12	.00	.27	.16	136.01	5
2.06	2.41	2.76	5.20	30.20	22.70	20.69	29.74	.00	.00	.90	.50	117.17	6
.87	1.01	1.16	4.39	28.34	30.80	15.89	31.23	8.76	.00	.00	.00	122.44	7
1.01	1.18	1.36	6.80	5.34	25.18	.00	25.26	9.12	.00	1.16	.65	77.07	8
.80	.93	1.07	3.24	9.36	14.18	.00	13.09	8.29	.00	1.61	.90	53.48	9
.60	.71	.81	.00	2.24	17.83	20.05	14.94	9.41	3.75	1.52	.84	72.70	10
.00	.00	.00	1.34	7.88	30.82	52.69	10.95	11.76	3.72	1.62	.90	121.69	11
1.27	1.49	1.71	.00	.69	12.07	28.49	24.88	12.82	10.05	2.61	1.45	97.53	12
.39	.46	.52	.00	10.59	29.65	36.00	.00	.00	.00	.19	.11	77.90	13
1.24	1.45	1.67	3.49	.00	4.12	35.33	33.19	.00	6.58	2.52	1.39	90.97	14
.36	.42	.48	.99	16.80	19.99	44.72	.00	6.44	.00	.21	.11	90.53	15
.79	.92	1.05	3.94	11.74	8.10	.00	5.61	.00	.00	2.12	1.18	35.44	16
.81	.94	1.08	.00	7.32	36.84	51.97	6.82	8.53	.00	.27	.14	114.72	17
.69	.81	.93	.00	8.12	.00	41.10	.00	1.79	8.72	2.83	1.57	66.56	18
1.30	1.52	1.73	.39	16.68	18.10	22.21	31.68	.00	7.99	.38	.22	102.20	19
.41	.47	.53	.00	.00	19.39	19.14	5.00	12.81	.00	2.84	1.57	62.17	20
.00	.00	.00	.00	.00	6.85	.00	.00	5.41	.00	.36	.20	12.83	21
1.39	1.63	1.87	2.03	.00	34.71	25.42	1.11	16.42	1.45	.00	.00	86.03	22
.11	.11	.13	1.96	13.08	9.38	.00	36.92	.00	4.85	.45	.25	67.24	23
1.26	1.47	1.68	3.83	.00	7.59	29.49	25.97	.00	12.16	.93	.52	84.89	24
.23	.26	.31	.00	5.87	43.58	17.70	.00	1.12	.00	.00	.00	69.08	25
1.08	1.27	1.46	.00	.00	56.15	62.08	9.56	16.44	.28	.00	.00	148.32	26
2.06	2.40	2.76	5.79	15.28	23.40	.00	.00	3.54	.00	.01	.01	55.26	27
1.39	1.64	1.88	5.17	.00	9.46	24.87	.00	.14	.00	1.55	.86	46.96	28
1.06	1.23	1.40	.39	.00	16.62	19.54	10.12	.00	.00	.28	.16	50.79	29
.00	.01	.02	2.10	.00	49.31	.00	.00	7.86	.00	.11	.06	59.48	30
1.71	1.99	2.28	7.53	25.38	18.67	21.26	.00	8.47	.00	.37	.20	87.84	31
.95	1.11	1.27	.86	5.34	46.85	1.76	.29	.00	7.54	3.14	1.74	70.85	32
.00	.00	.00	.00	.00	17.91	.00	33.19	12.93	.00	1.15	.64	65.82	33
1.27	1.48	1.71	1.33	.59	8.09	.00	31.33	10.17	9.72	2.56	1.43	69.68	34
1.04	1.21	1.38	3.96	.00	10.54	.00	36.16	6.24	.00	.32	.18	61.01	35
1.14	1.34	1.52	.00	3.52	.00	.00	13.07	6.43	13.48	2.16	1.20	43.86	36
.20	.25	.29	.00	.00	.00	23.64	13.79	16.29	6.14	1.45	.81	62.85	37
1.50	1.75	1.99	.00	.00	.00	5.59	17.21	9.45	.00	.10	.05	37.65	38
.76	.89	1.02	2.87	15.52	37.79	29.45	37.04	.00	.00	.37	.20	125.91	39
.85	.99	1.14	.02	7.00	18.34	25.36	.00	.00	.00	.00	.00	53.70	40
1.10	1.28	1.47	.00	17.97	.00	34.17	.00	4.23	4.47	.43	.23	65.37	41
.69	.80	.91	.23	.00	10.28	53.63	71.61	3.61	4.70	.31	.17	146.92	42
1.75	2.04	2.33	1.24	.00	10.17	31.95	29.47	7.52	.00	.50	.27	87.23	43
.00	.00	.01	.00	.00	15.51	36.47	25.15	13.92	13.36	.44	.24	105.11	44
.35	.41	.47	.00	9.96	23.85	56.02	6.60	.00	9.28	1.87	1.04	109.85	45
.04	.04	.04	2.29	8.12	15.72	51.72	27.10	8.08	.00	.00	.00	113.14	46
.09	.11	.12	.00	11.44	34.05	23.00	21.49	.00	4.15	.00	.00	94.46	47
.00	.00	.00	.00	.00	.00	53.94	1.74	8.65	2.43	.00	.00	66.76	48
.00	.00	.00	1.24	18.33	23.70	.00	29.07	16.27	.00	.00	.00	88.61	49
.80	.94	1.07	10.14	15.20	52.60	47.93	14.98	12.30	.00	.66	.36	157.00	50

.81	.95	1.08	2.00	7.67	20.11	22.97	16.08	6.18	3.00	.91	.51	82.27	AVE.
.60	.70	.81	2.61	8.35	15.56	19.02	15.61	5.54	4.09	.94	.52	34.00	ST.D
.75	.75	.74	1.30	1.09	.77	.83	.97	.90	1.37	1.03	1.03	.41	C.V.
.13	.13	.14	1.36	.85	.48	.20	.87	.23	1.05	.78	.78	.04	SKEW

TOTAL AVERAGE = 6.856
STANDARD DEV = 11.895
SKEW COEFFICIENT = 2.333

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 7 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
.98	1.14	1.30	.80	10.86	.00	1.69	56.93	.00	.00	.51	.28	74.51	1
.48	.56	.64	.00	11.02	47.58	10.66	.00	6.70	.00	.98	.54	79.15	2
1.11	1.29	1.47	4.11	12.08	8.20	35.14	.00	16.04	.00	1.68	.93	82.04	3
.20	.23	.26	.00	.00	31.10	.00	38.27	8.39	.00	1.12	.63	80.19	4
1.01	1.17	1.34	.26	2.50	8.86	58.23	.00	9.99	.00	2.34	1.30	87.01	5
.65	.76	.87	4.18	34.33	47.78	1.60	37.07	9.32	.00	1.67	.93	139.16	6
1.07	1.25	1.42	.53	.00	.00	10.12	32.76	8.73	.00	.28	.15	56.31	7
1.36	1.58	1.81	6.06	24.80	24.84	.00	22.01	.00	8.93	2.66	1.48	95.52	8
.49	.56	.64	2.41	7.36	19.25	15.51	4.10	5.50	4.47	.35	.19	60.83	9
.39	.45	.52	.00	7.88	.00	26.91	51.03	5.40	9.07	2.96	1.65	106.25	10
.78	.92	1.04	3.55	14.79	33.70	23.63	.00	.00	.00	.00	.00	78.42	11
.00	.00	.00	.00	.00	47.65	4.98	47.08	.00	6.68	1.64	.91	108.94	12
1.49	1.74	2.00	2.91	27.06	10.32	9.22	45.41	7.58	18.82	2.67	1.48	130.71	13
.57	.67	.77	.00	.00	.00	.00	21.26	10.51	5.14	2.16	1.20	42.29	14
.88	1.03	1.18	8.49	30.62	49.27	24.86	18.08	.00	.00	.69	.38	135.47	15
1.00	1.18	1.34	.00	3.74	24.61	32.68	3.42	14.18	7.81	.01	.00	89.98	16
1.71	2.00	2.28	4.44	.00	.00	10.60	4.67	6.17	.00	.28	.15	32.31	17
1.42	1.65	1.90	10.10	41.42	.00	34.50	39.65	.00	2.26	1.24	.70	134.82	18
1.21	1.41	1.61	8.03	27.58	8.10	16.23	18.74	.00	.58	1.39	.77	85.66	19
.22	.26	.30	.00	9.85	11.82	.00	.00	1.31	.00	.65	.36	24.77	20
.30	.34	.39	.00	.00	.00	8.83	36.52	6.95	.00	1.56	.86	55.76	21
.00	.00	.00	.78	.00	12.22	.00	6.85	7.91	5.60	.22	.12	33.70	22
.40	.46	.53	2.48	.00	39.47	.00	12.29	7.44	1.86	1.29	.72	66.95	23
.88	1.03	1.18	.00	.00	.00	.00	32.33	13.98	.92	1.63	.90	52.85	24
1.55	1.82	2.08	2.17	7.83	2.17	25.75	5.24	7.40	.00	1.13	.63	57.77	25
.00	.01	.00	.00	6.72	14.14	.00	.00	.00	4.20	.21	.11	25.40	26
.95	1.11	1.26	.47	15.39	25.87	41.09	28.09	10.02	.00	.00	.00	124.24	27
1.37	1.61	1.84	6.01	28.82	57.75	28.08	26.84	6.43	.00	1.48	.82	161.06	28
1.84	2.15	2.45	6.27	.00	35.25	36.63	10.04	16.74	.00	1.45	.81	113.62	29
.92	1.08	1.24	3.20	.00	.00	39.87	32.42	6.06	.00	1.14	.63	86.57	30
1.36	1.59	1.83	5.34	17.10	53.14	42.23	33.86	.00	9.02	3.07	1.71	170.25	31
.69	.81	.92	5.34	30.08	53.84	25.70	3.72	8.94	4.54	1.42	.80	136.80	32
1.47	1.71	1.97	6.23	27.85	23.77	35.81	6.12	.00	.00	1.25	.70	106.89	33
.85	.99	1.14	.18	.00	26.04	.00	13.27	8.43	.00	.21	.11	51.22	34
1.14	1.33	1.52	4.41	.00	2.92	55.62	23.83	8.98	.00	2.03	1.13	102.93	35
.00	.00	.00	.00	.00	20.13	18.19	35.53	7.08	1.11	1.89	1.06	84.99	36
1.42	1.66	1.90	7.83	31.69	2.83	27.40	.00	7.22	17.55	3.28	1.82	104.61	37
.00	.00	.00	.00	6.35	7.51	51.00	.00	2.08	19.57	2.71	1.50	90.72	38
.94	1.10	1.25	5.17	18.88	17.73	49.43	16.30	4.92	8.94	1.41	.78	126.86	39
.36	.42	.47	.00	4.83	16.11	19.06	.00	6.75	.77	2.72	1.52	53.01	40
.00	.00	.01	.00	.00	.00	34.33	.15	7.69	.00	.25	.14	42.57	41
1.44	1.67	1.92	.43	8.81	6.02	30.72	8.52	5.45	5.74	.32	.17	71.21	42
.63	.74	.86	4.83	.00	11.29	18.83	6.83	7.15	.00	.00	.01	51.15	43
.44	.51	.58	.51	7.51	.00	9.61	.00	9.93	1.02	1.15	.64	31.91	44
1.64	1.92	2.20	2.59	2.03	.00	43.70	.00	12.63	.00	2.36	1.31	70.38	45
.69	.81	.92	.00	.00	16.10	39.79	41.79	.73	10.28	2.15	1.20	114.48	46
.71	.84	.96	2.43	22.85	.00	20.75	.00	9.03	1.09	.09	.05	58.82	47
1.35	1.57	1.79	.00	.00	.00	6.72	27.40	7.51	.00	.00	.00	46.35	48
.95	1.10	1.26	.02	.22	51.37	31.14	3.46	.00	13.16	.96	.53	104.18	49
1.35	1.58	1.81	.79	10.30	17.67	24.62	36.78	6.91	3.39	.00	.00	105.21	50

.85	1.00	1.14	2.47	10.26	17.73	21.63	17.77	6.28	3.45	1.25	.70	84.53	AVE.
.52	.60	.69	2.82	11.82	18.20	16.85	17.02	4.51	5.21	.95	.53	35.98	ST.D
.61	.61	.61	1.14	1.15	1.03	.78	.96	.72	1.51	.76	.76	.43	C.V.
-.21	-.20	-.20	.81	.87	.72	.20	.44	.03	1.60	.25	.25	.16	SKEW

TOTAL AVERAGE = 7.045

STANDARD DEV = 12.089

SKEW COEFFICIENT = 2.223

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 8 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
1.25	1.47	1.67	9.36	29.71	54.97	.00	1.05	6.54	16.84	1.87	1.04	125.77	1
1.48	1.72	1.98	2.71	20.50	21.65	18.42	44.56	12.63	14.33	1.60	.89	142.47	2
.37	.43	.49	.00	.00	4.84	21.32	.00	.00	11.87	2.81	1.56	43.69	3
.78	.91	1.04	.00	5.74	25.95	42.73	17.42	5.18	11.34	1.92	1.07	114.09	4
.65	.76	.87	.00	.00	3.83	20.27	37.85	.00	9.84	2.76	1.54	78.36	5
1.24	1.44	1.65	.00	.00	7.84	34.86	7.09	5.49	19.17	1.07	.60	80.45	6
.58	.68	.78	.00	18.55	.00	41.11	.00	5.01	.00	1.22	.67	68.59	7
.66	.77	.89	5.19	35.70	15.40	13.66	3.83	5.65	.00	.00	.00	81.77	8
1.30	1.51	1.73	1.43	11.78	2.01	13.59	1.81	.32	.00	.29	.16	35.91	9
.12	.14	.16	.00	.00	7.84	57.73	1.37	.00	10.06	.00	.00	77.42	10
1.24	1.45	1.67	2.15	.00	30.90	.43	19.80	12.68	4.04	.00	.00	74.35	11
.68	.79	.91	.97	16.91	.00	38.36	.00	3.04	.00	1.78	.98	64.43	12
.72	.84	.96	1.86	.00	19.96	63.19	10.70	6.46	.00	1.23	.68	106.60	13
.68	.79	.90	.00	2.38	11.15	28.50	2.45	.00	.00	.38	.21	47.44	14
1.09	1.28	1.48	5.57	19.90	45.38	8.40	19.63	.00	13.17	3.15	1.76	120.81	15
.46	.53	.62	2.77	22.22	.00	34.82	23.30	4.62	.00	.36	.20	89.90	16
.00	.00	.00	2.21	.00	7.94	.00	.00	6.06	13.46	2.04	1.13	32.84	17
.89	1.04	1.18	.00	.00	21.94	.00	8.57	13.27	4.81	2.06	1.14	54.90	18
.53	.63	.73	3.32	23.84	4.05	20.37	22.36	6.57	8.63	2.72	1.52	95.27	19
.00	.00	.01	.00	12.68	3.72	8.92	18.79	13.46	2.22	2.39	1.33	63.52	20
.73	.86	.98	.00	.00	31.79	33.85	.00	9.25	.00	.24	.13	77.83	21
1.42	1.66	1.90	1.30	5.23	15.52	21.01	33.58	.00	4.45	1.98	1.10	89.16	22
1.05	1.23	1.40	1.43	.00	41.73	32.57	35.89	8.56	5.66	1.41	.78	131.71	23
.00	.00	.00	3.69	9.91	6.67	19.14	.00	12.18	.00	1.41	.78	53.79	24
1.32	1.54	1.77	2.44	12.21	17.89	34.77	.00	.00	14.43	1.32	.73	88.42	25
.87	1.03	1.18	1.03	6.90	.00	.99	.00	8.80	2.90	1.61	.90	26.20	26
.03	.04	.03	.00	17.87	15.39	.00	50.56	8.39	1.71	.00	.01	94.03	27
.54	.63	.72	3.26	27.56	41.24	.00	43.86	.00	3.40	2.19	1.22	124.61	28
1.02	1.18	1.35	5.26	.00	.00	79.89	29.78	3.89	1.98	1.53	.85	126.73	29
.66	.76	.86	2.95	20.80	24.84	48.53	20.44	11.13	.71	1.71	.95	134.35	30
.83	.97	1.12	.16	9.42	23.35	31.32	.00	.00	8.98	1.48	.83	78.45	31
.00	.00	.00	4.73	7.90	.00	17.42	19.56	.00	18.36	.06	.04	68.07	32
.22	.26	.30	2.77	15.99	13.91	25.13	6.06	13.67	.32	2.55	1.42	82.59	33
1.21	1.40	1.61	7.08	12.81	30.67	27.71	23.29	.00	.00	.15	.09	106.02	34
1.05	1.24	1.42	3.56	.00	.00	4.41	44.23	7.73	.00	1.14	.63	65.42	35
.16	.19	.22	4.16	14.54	44.91	33.58	43.69	6.70	.00	.00	.00	148.14	36
.91	1.07	1.23	.00	.00	.00	42.53	44.51	5.38	8.03	2.28	1.27	107.19	37
.00	.00	.00	.00	6.75	.00	.00	26.16	8.60	5.19	1.54	.85	49.09	38
.41	.49	.56	2.75	12.93	18.55	.00	20.98	.00	.00	.78	.42	57.87	39
.74	.85	.98	1.95	27.19	59.03	.00	27.32	.00	.00	1.13	.63	119.82	40
.78	.90	1.03	.19	.00	2.42	3.49	11.80	.00	2.34	1.85	1.03	25.81	41
2.06	2.41	2.76	6.64	.00	.16	35.78	.00	.00	6.70	1.70	.94	59.15	42
1.04	1.21	1.39	.00	12.65	11.08	36.98	31.17	11.79	.00	1.60	.89	109.79	43
.86	1.00	1.15	6.89	.00	.00	44.26	.00	13.78	.00	.00	.00	67.94	44
1.93	2.26	2.58	2.52	20.77	28.79	26.92	32.65	4.67	.00	2.29	1.27	126.64	45
.40	.46	.52	.00	20.01	18.65	.00	16.89	.00	.46	1.10	.60	59.11	46
.14	.16	.18	.00	14.73	10.52	38.96	38.20	5.81	1.10	1.84	1.02	112.65	47
1.10	1.29	1.48	4.03	15.73	46.60	18.60	17.93	9.70	.00	.68	.38	117.50	48
.00	.00	.00	.00	.00	28.69	31.43	15.81	8.95	.00	1.82	1.01	87.72	49
.43	.49	.56	3.59	11.83	13.72	.00	24.37	.00	7.62	1.74	.97	65.31	50

.73	.86	.98	2.20	10.47	16.71	23.12	17.99	5.32	4.68	1.38	.76	85.19	AVE.
.50	.59	.67	2.33	9.78	16.13	19.04	15.62	4.78	5.73	.87	.48	31.73	ST.D
.68	.68	.69	1.06	.93	.97	.82	.87	.90	1.22	.63	.63	.37	C.V.
.27	.28	.28	.90	.43	.80	.47	.30	.20	.95	-.25	-.24	-.08	SKEW

TOTAL AVERAGE = 7.099
STANDARD DEV = 11.936
SKEW COEFFICIENT = 2.311

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 9 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
-.56	.00	.00	1.01	6.33	.00	16.98	24.48	9.04	.00	.17	.09	57.55	1
.08	.10	.12	8.53	42.11	40.55	28.94	35.08	7.86	1.97	2.64	1.47	169.46	2
.00	.00	.00	.00	.00	38.55	29.88	2.87	2.84	.00	.87	.48	75.50	3
1.48	1.73	1.98	.00	1.59	19.28	17.78	17.77	6.21	.00	1.18	.66	69.67	4
1.21	1.41	1.61	4.19	.00	.00	.87	.14	8.93	.00	1.09	.61	20.04	5
1.07	1.26	1.44	.00	5.06	20.94	15.01	8.06	9.85	3.87	.00	.00	66.56	6
1.15	1.35	1.55	7.12	26.23	42.57	29.70	17.82	8.94	9.75	2.90	1.61	150.68	7
.52	.60	.69	2.65	21.59	8.20	10.63	33.96	13.01	.00	.14	.07	92.08	8
.60	.70	.79	.00	.00	10.07	.00	2.74	10.44	.00	1.37	.76	27.47	9
.00	.00	.00	4.07	11.47	21.33	58.72	.00	8.23	.00	1.52	.85	106.20	10
.84	.97	1.12	.51	12.10	1.41	.00	40.16	8.21	.80	2.40	1.33	69.86	11
.00	.00	.00	.33	2.73	19.35	29.88	1.90	12.51	2.14	.16	.08	69.08	12
1.62	1.89	2.16	.35	1.16	.00	6.51	18.22	.00	.00	1.77	.98	34.68	13
.95	1.11	1.27	10.23	15.93	48.40	25.29	17.13	7.20	8.28	1.52	.84	138.15	14
.06	.06	.07	.00	5.59	32.59	36.65	.09	9.53	.00	.45	.25	85.34	15
1.49	1.74	1.99	6.31	3.43	43.46	36.57	2.03	.00	9.85	2.21	1.23	110.30	16
.00	.00	.00	.00	5.23	66.88	9.37	6.76	4.54	.00	.76	.42	93.96	17
.91	1.06	1.21	3.75	20.30	5.82	15.57	31.14	.00	11.75	2.24	1.25	95.00	18
.84	.99	1.13	.00	12.43	26.81	30.68	28.87	6.39	10.42	1.72	.95	121.23	19
.00	.00	.00	3.88	4.36	.00	5.42	17.13	.00	.12	.45	.26	31.62	20
.12	.14	.16	3.85	10.85	50.62	41.90	.00	3.56	.00	1.10	.61	112.90	21
.97	1.14	1.30	.00	6.80	6.18	20.75	43.95	11.23	8.64	2.48	1.38	104.81	22
.42	.49	.57	.00	1.76	4.42	.00	.00	.00	9.12	1.43	.80	19.00	23
1.59	1.86	2.14	8.66	31.51	29.14	39.99	.00	14.02	.46	1.35	.75	131.48	24
.56	.65	.75	.57	9.36	17.69	.00	7.05	4.96	.00	1.14	.64	43.38	25
.75	.88	1.01	.00	.42	11.07	25.97	30.83	11.76	.00	1.41	.79	84.89	26
.89	1.04	1.19	.00	.00	13.28	31.09	33.44	11.04	13.51	2.38	1.32	109.19	27
.00	.00	.00	5.12	15.62	43.18	18.00	60.83	18.00	.00	1.06	.58	162.39	28
1.33	1.55	1.78	.00	.00	28.70	.00	21.60	.00	.00	1.52	.85	57.34	29
.00	.00	.00	.00	18.85	29.82	53.89	.00	.00	8.88	.40	.23	112.06	30
.97	1.14	1.31	2.57	11.16	46.75	36.89	6.77	8.26	.00	.50	.28	116.61	31
1.06	1.24	1.42	.00	.00	.00	13.54	24.85	.00	14.13	2.34	1.30	59.90	32
.07	.09	.09	6.38	9.89	19.19	25.23	10.81	6.68	.00	1.11	.62	80.15	33
.59	.69	.78	6.04	5.14	1.42	32.88	.00	3.23	5.06	2.38	1.32	59.53	34
.00	.00	.00	.00	.00	10.07	.00	3.60	11.46	2.34	1.96	1.09	30.51	35
.00	.00	.00	.06	6.32	.00	19.11	.00	4.56	21.81	2.14	1.19	55.19	36
.00	.00	.00	3.40	18.04	34.44	.00	.00	4.94	4.50	1.35	.75	67.41	37
1.00	1.16	1.33	7.31	21.89	33.58	26.19	42.74	.00	1.43	.30	.17	137.10	38
1.02	1.19	1.37	.00	.00	.00	34.85	5.53	.00	7.20	2.34	1.30	54.79	39
1.27	1.48	1.69	.47	.00	.00	8.71	17.25	6.53	.00	1.70	.94	40.04	40
.88	1.02	1.17	.00	4.76	56.86	.00	3.47	1.84	.00	1.51	.83	72.34	41
1.60	1.87	2.15	7.50	3.78	.00	12.22	.00	.00	5.06	.36	.21	34.75	42
.21	.24	.27	1.35	6.37	.00	23.56	8.47	8.40	.00	.67	.37	49.92	43
.80	.94	1.08	.00	.00	.00	20.04	32.53	5.39	.82	1.41	.78	63.78	44
.19	.23	.26	.00	8.24	.00	41.96	2.92	3.86	.00	1.43	.80	59.90	45
.23	.27	.31	.00	5.52	.39	54.49	3.11	11.19	.00	.17	.09	75.75	46
1.06	1.24	1.42	.02	.00	11.51	27.70	21.52	7.43	17.00	.00	.00	88.89	47
.38	.45	.52	.00	9.22	.00	10.24	31.62	.00	.00	.00	.00	52.43	48
1.50	1.75	2.00	2.05	7.39	.00	40.37	24.51	11.09	19.00	2.93	1.63	114.22	49
.85	.99	1.13	3.64	21.27	14.84	.00	.00	3.67	4.40	1.46	.82	53.07	50

.65	.77	.89	2.24	8.64	18.19	21.28	14.88	6.14	4.05	1.32	.73	79.76	AVE.
.56	.63	.72	2.96	9.23	18.60	15.98	15.26	4.65	5.73	.83	.46	37.25	ST.D
.86	.82	.82	1.32	1.07	1.02	.75	1.03	.76	1.42	.63	.63	.47	C.V.
-.06	.07	.07	1.01	1.38	.66	.23	.78	.10	1.32	-.02	-.02	.35	SKEW

TOTAL AVERAGE = 6.647
STANDARD DEV = 11.475
SKEW COEFFICIENT = 2.364

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 10 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
.76	.89	1.02	.89	9.87	25.05	.00	1.15	.33	8.72	2.39	1.33	52.40	1
.56	.66	.76	2.02	11.12	32.77	16.89	6.76	7.60	3.66	1.22	.69	84.71	2
.21	.25	.29	.42	8.28	34.36	24.60	.00	4.48	13.31	2.82	1.57	90.60	3
.88	1.04	1.19	1.00	25.28	4.90	4.65	1.46	11.83	2.07	.00	.00	54.30	4
.20	.23	.25	.00	24.26	7.35	7.76	26.67	8.64	.00	.36	.20	75.93	5
1.70	2.00	2.29	3.85	.17	34.65	25.48	2.25	.85	15.41	3.49	1.94	94.08	6
.00	.00	.00	.44	2.56	23.72	24.92	2.22	1.37	5.13	2.50	1.39	64.26	7
.34	.39	.45	.33	11.72	.00	.00	3.13	5.16	.00	1.58	.88	23.98	8
.99	1.17	1.34	.32	1.57	19.91	.00	.00	2.04	.00	.78	.43	28.56	9
1.65	1.93	2.21	2.20	12.81	.00	41.92	16.67	6.99	.00	.63	.35	87.35	10
.90	1.05	1.20	.00	13.22	34.33	42.44	39.82	.00	.00	2.28	1.27	136.51	11
1.52	1.78	2.04	3.70	.00	30.87	22.13	29.52	.00	.00	.32	.18	92.05	12
.66	.76	.88	.00	22.71	27.97	19.11	.00	5.34	2.20	2.16	1.20	82.98	13
.74	.86	1.00	.00	9.34	11.79	.00	31.71	.00	.00	1.50	.83	57.77	14
.20	.23	.27	5.13	.00	.00	6.47	.00	7.99	7.92	.50	.27	28.97	15
1.09	1.28	1.45	.60	11.27	43.12	6.32	26.85	11.37	.00	.00	.00	103.36	16
1.41	1.65	1.89	1.81	.00	.39	.00	25.31	.00	.00	2.10	1.17	35.73	17
.83	.97	1.12	.00	.37	.00	32.74	19.85	4.42	4.92	1.45	.81	67.47	18
1.25	1.45	1.66	5.91	44.83	.53	24.71	41.40	.00	9.72	1.69	.94	134.11	19
2.07	2.41	2.76	2.16	5.10	48.18	.00	32.34	8.74	.00	1.04	.58	105.38	20
.00	.00	.00	.00	.00	22.74	52.74	45.53	2.31	.00	.00	.00	123.32	21
.28	.33	.38	.00	.00	19.31	21.73	.00	.00	.00	1.60	.89	44.53	22
.74	.86	.99	3.45	.00	.00	3.43	.00	.00	.00	.77	.43	10.66	23
.00	.00	.00	2.14	.00	.00	4.57	40.38	4.31	.00	1.92	1.07	54.39	24
.57	.68	.79	3.02	17.58	33.45	.00	4.05	.87	5.78	.10	.06	66.95	25
.43	.50	.56	7.87	33.03	54.51	22.02	24.90	12.82	.00	.22	.13	156.98	26
.90	1.06	1.22	4.46	.00	19.42	26.68	.00	4.43	3.75	2.11	1.17	65.21	27
.52	.60	.68	2.12	.00	30.75	19.84	.00	7.95	1.66	1.77	.99	66.89	28
.68	.81	.93	.00	.00	.00	5.10	.00	.00	11.91	.04	.01	19.48	29
1.23	1.43	1.64	3.34	11.16	24.69	33.92	11.98	.00	7.21	2.06	1.15	99.82	30
1.28	1.48	1.70	2.52	18.23	4.03	27.15	20.01	.00	4.64	.00	.00	81.04	31
.41	.48	.56	1.71	9.77	55.68	14.34	15.35	.00	3.48	2.20	1.22	105.20	32
.00	.00	.00	.00	11.74	13.26	.00	13.07	15.82	.00	1.11	.62	55.63	33
.78	.91	1.04	.40	12.41	.00	2.22	14.72	5.88	.00	.00	.00	38.35	34
.00	.00	.01	.00	14.86	8.21	.00	30.37	16.66	.00	.77	.43	71.32	35
.81	.95	1.08	.03	.00	.00	10.56	24.43	4.21	.00	1.09	.60	43.75	36
1.10	1.29	1.47	.00	17.66	36.55	37.13	20.32	.00	11.22	.70	.39	127.84	37
.00	.00	.00	.00	10.16	.00	32.99	.00	12.83	.00	.01	.01	55.99	38
.31	.35	.40	8.12	15.53	27.86	.00	24.50	.00	.00	.23	.12	77.43	39
.96	1.12	1.28	2.86	16.54	.00	.00	5.57	8.91	.00	.15	.08	37.47	40
1.59	1.86	2.14	9.98	34.10	4.41	.00	.00	.00	.00	.76	.43	55.27	41
.71	.82	.93	3.90	.00	4.84	.00	48.00	1.38	8.00	1.49	.83	70.89	42
.49	.56	.65	2.23	23.35	12.07	18.85	12.14	7.31	.00	1.81	1.00	80.48	43
.00	.00	.00	.00	.00	.00	23.39	.00	.00	3.32	1.30	.73	28.73	44
.93	1.08	1.23	3.94	16.64	1.43	.00	17.01	.00	14.81	3.11	1.74	61.91	45
.00	.00	.00	.00	13.31	.00	.00	16.85	9.31	.00	.00	.00	39.48	46
.70	.81	.93	5.14	27.29	29.65	51.23	39.49	.31	.69	1.27	.71	158.23	47
1.03	1.20	1.38	3.26	.00	41.34	.00	3.82	.00	4.28	.45	.25	57.02	48
.91	1.06	1.21	1.17	7.96	16.28	.00	27.97	4.31	.00	.00	.00	60.86	49
1.88	2.19	2.52	3.13	2.29	18.07	43.99	17.81	5.77	6.88	1.86	1.03	107.41	50

.74	.87	1.00	2.11	10.56	17.17	15.04	15.71	4.25	3.21	1.15	.64	72.46	AVE.
.54	.63	.72	2.38	10.65	16.52	15.75	14.62	4.69	4.45	.94	.52	34.68	ST.D
.72	.72	.72	1.13	1.01	.96	1.05	.93	1.10	1.38	.82	.81	.48	C.V.
.33	.33	.33	1.25	.94	.48	.64	.43	.83	1.21	.34	.34	.46	SKEW

TOTAL AVERAGE = 6.038
STANDARD DEV = 10.648
SKEW COEFFICIENT = 2.288

SUMMARY OF STATISTICS
GENERATED SEQUENCES

	AVER.	STD DEVIATION
TOTAL	6.603	11.234
SEQUENCE NO.		
1	7.024	11.986
2	5.834	10.235
3	6.404	10.254
4	6.399	10.624
5	6.682	11.201
6	6.856	11.895
7	7.045	12.089
8	7.099	11.936
9	6.647	11.475
10	6.038	10.648

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE
.78	.91	1.05	2.13	9.14	17.71	19.81	15.96	5.51	4.33	1.22	.68	79.23
.56	.65	.75	2.54	9.76	16.20	16.82	15.24	4.69	5.48	.87	.49	34.09

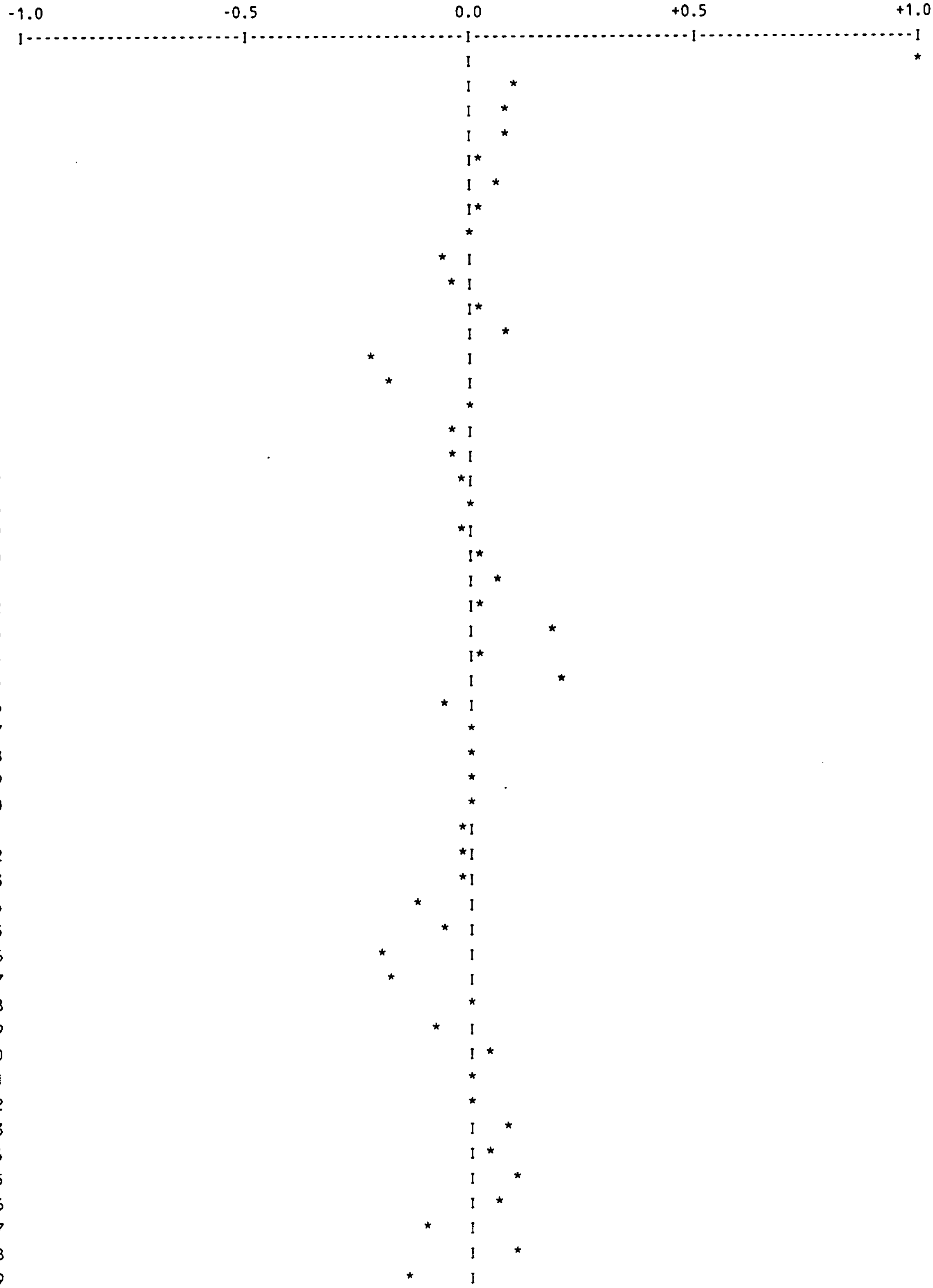
11283 RANDOM NUMBERS WERE GENERATED

AVERAGE = .4949992E+00
STANDARD DEV = .2886307E+00

6000 RANDOM NORMAL DEVIATES WERE GENERATED

AVERAGE = .4035718E-02
VARIANCE = .1206173E+01

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **



R	LAG
1.0000	0
.0941	1
.0893	2
.0779	3
.0255	4
.0569	5
.0151	6
-.0043	7
-.0636	8
-.0405	9
.0191	10
.0735	11
-.2202	12
-.1763	13
-.0024	14
-.0358	15
-.0348	16
-.0148	17
.0096	18
-.0104	19
.0265	20
.0558	21
.0214	22
.1823	23
.0151	24
.2032	25
-.0606	26
-.0047	27
-.0079	28
-.0033	29
-.0018	30
-.0136	31
-.0152	32
-.0159	33
-.1116	34
-.0616	35
-.2028	36
-.1894	37
-.0024	38
-.0857	39
.0307	40
-.0027	41
.0080	42
.0834	43
.0368	44
.1038	45
.0637	46
-.1087	47
.0932	48
-.1332	49

** CORRELOGRAM OF THE ORIGINAL TIME SERIES MINUS THE ANNUAL COMPONENT **

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

DEVIATIONS FROM THE ANNUAL AVERAGES

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
.00	.00	-.00	-3.86	-1.12	6.91	45.93	9.58	16.90	1.96	1.52	.00	77.81	1969
.49	-.00	.00	-1.99	-1.12	42.91	-2.06	-14.91	-3.39	-4.07	.51	.00	16.36	1970
-.09	.01	-.00	-.95	-1.12	-12.29	-11.73	27.42	-4.10	-4.07	-.05	-.01	-6.99	1971
-.30	.00	.00	-.70	-1.12	23.21	-16.06	-14.98	-3.39	-4.07	-.19	.00	-17.60	1972
-.68	.01	-.00	.31	-1.12	-12.29	-11.73	-7.91	-3.51	-4.07	-.73	.00	-41.74	1973
-.67	-.00	-.00	.00	-1.12	-12.29	.77	-14.93	.15	-3.04	-.56	-.00	-31.71	1974
.37	-.01	.00	-2.82	4.31	-3.53	-4.58	31.16	-4.16	20.33	-.48	.00	40.59	1975
-.34	-.00	.01	.00	-1.12	-12.29	-11.73	-6.77	3.80	-1.93	-.57	.00	-30.96	1976
.10	.00	-.00	6.89	-22.00	-6.23	36.83	-10.47	2.22	-2.41	.56	-.01	5.47	1977
-.46	-.01	.00	.11	.65	-2.32	-12.52	-14.98	-3.39	-4.07	-.62	.00	-37.61	1978
.85	.00	-.00	3.39	26.03	.52	-8.30	17.25	-2.54	8.04	1.01	.00	46.24	1979
-.06	.00	-.01	-.37	-1.12	-12.29	-4.79	-.45	1.42	-2.60	-.36	-.00	-20.64	1980

**   Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent)   **

SEQUENTIAL PLOT OF DEVIATION FROM THE MOVING MONTHLY AVERAGE

100 UNITS =   7056.00

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1969  Jan     .89  I                                                  .*                                                I
1969  Feb    1.04  I                                                  .*                                                I
1969  Mar    1.20  I                                                  .*                                                I
1969  Apr   -1.38  I                                                .DI*                                                I
1969  May   -4.33  I                                               D*.I                                                 I
1969  Jun    5.36  I                                                 *I  D.                                             I
1969  Jul   46.58  I                                                  *                          .D                     I
1969  Aug    9.38  I                                                  *     .                                           I
1969  Sep   17.06  I                                                  *         .                                       I
1969  Oct   -3.01  I                                               *D I.                                                I
1969  Nov    1.34  I                                                  *.                                                I
1969  Dec     .75  I                                                  .                                                 I
1970  Jan     .22  I                                                  .                                                 I
1970  Feb     .25  I                                                  .                                                 I
1970  Mar     .30  I                                                  .                                                 I
1970  Apr   -1.38  I                                                 .*                                                 I
1970  May   -4.33  I                                               D*.I                                                 I
1970  Jun   41.36  I                                                 *I                        D.                       I
1970  Jul    2.98  I                                                 .I D*                                              I
1970  Aug  -14.92  I                                         .        *                                                 I
1970  Sep   -3.64  I                                                . *                                                 I
1970  Oct   -3.01  I                                                . I*                                                I
1970  Nov     .33  I                                                  .                                                 I
1970  Dec     .19  I                                                  .                                                 I
1971  Jan    -.16  I                                                  .                                                 I
1971  Feb    -.18  I                                                  .                                                 I
1971  Mar    -.21  I                                                  .                                                 I
1971  Apr   -1.38  I                                                 .*                                                 I
1971  May   -4.33  I                                               D*.I                                                 I
1971  Jun  -13.84  I                                          D.     *I                                                 I
1971  Jul  -13.42  I                                          D.     *I                                                 I
1971  Aug   27.48  I                                                  *               .                                 I
1971  Sep   -3.64  I                                                . *                                                 I
1971  Oct   -3.01  I                                                . I*                                                I
1971  Nov    -.23  I                                                  .                                                 I
1971  Dec    -.13  I                                                  .                                                 I
1972  Jan    -.25  I                                                  .                                                 I
1972  Feb    -.29  I                                                  .                                                 I
1972  Mar    -.33  I                                                  .                                                 I
1972  Apr   -1.38  I                                                 D.                                                 I
1972  May   -4.33  I                                               D*.I                                                 I
1972  Jun   21.66  I                                                 *I            D.                                   I
1972  Jul  -13.42  I                                        . D       I *                                               I
1972  Aug  -14.92  I                                         .        *                                                 I
1972  Sep   -3.64  I                                                . *                                                 I
1972  Oct   -3.01  I                                                . I*                                                I
1972  Nov    -.37  I                                                  .                                                 I
1972  Dec    -.20  I                                                  .                                                 I
1973  Jan    -.61  I                                                  .                                                 I
1973  Feb    -.71  I                                                  .                                                 I
1973  Mar    -.81  I                                                  .                                                 I
1973  Apr   -1.38  I                                                 *.                                                 I
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1973  May   -4.33  I                                              D*.I                                                  I
1973  Jun  -13.84  I                                         D.     *I                                                  I
1973  Jul  -13.42  I                                         D.     *I                                                  I
1973  Aug   -7.85  I                                            .    *                                                  I
 973  Sep   -3.64  I                                               . *                                                  I
1973  Oct   -3.01  I                                               . I*                                                 I
1973  Nov    -.91  I                                                D.                                                  I
1973  Dec    -.50  I                                                 .                                                  I
1974  Jan    -.49  I                                                 .                                                  I
1974  Feb    -.58  I                                                 .                                                  I
1974  Mar    -.66  I                                                 .                                                  I
1974  Apr   -1.38  I                                                *.                                                  I
1974  May   -4.33  I                                              D*.I                                                  I
1974  Jun  -13.84  I                                         D.     *I                                                  I
1974  Jul    -.92  I                                                *.                                                  I
1974  Aug  -14.92  I                                        .        *                                                  I
1974  Sep    -.10  I                                                 .                                                  I
1974  Oct   -3.01  I                                               . *                                                  I
1974  Nov    -.74  I                                                 .                                                  I
1974  Dec    -.41  I                                                 .                                                  I
1975  Jan     .52  I                                                 .                                                  I
1975  Feb     .60  I                                                 .                                                  I
1975  Mar     .70  I                                                 .                                                  I
1975  Apr   -1.38  I                                               .DI*                                                 I
1975  May    1.10  I                                               * ID .                                               I
1975  Jun   -3.14  I                                               . *                                                  I
1975  Jul   -4.96  I                                              .  *                                                  I
1975  Aug   31.18  I                                                 *                   .                              I
1975  Sep   -3.64  I                                               . *                                                  I
 975  Oct   21.39  I                                                 I*           .D                                    I
1975  Nov     .78  I                                                 .*                                                 I
1975  Dec     .44  I                                                 .                                                  I
1976  Jan    -.50  I                                                 .                                                  I
1976  Feb    -.59  I                                                 .                                                  I
1976  Mar    -.66  I                                                 .                                                  I
1976  Apr   -1.38  I                                                *.                                                  I
1976  May   -4.33  I                                              D*.I                                                  I
1976  Jun  -13.84  I                                         D.     *I                                                  I
1976  Jul  -13.42  I                                         D.     *I                                                  I
1976  Aug   -6.71  I                                              .  *                                                  I
1976  Sep    3.69  I                                                 *  .                                               I
1976  Oct   -3.01  I                                               D.I                                                  I
1976  Nov    -.75  I                                                 .                                                  I
1976  Dec    -.41  I                                                 .                                                  I
1977  Jan     .25  I                                                 .                                                  I
1977  Feb     .29  I                                                 .                                                  I
1977  Mar     .34  I                                                 .                                                  I
1977  Apr    7.59  I                                                 *   .D                                             I
1977  May   -4.33  I                                     .        D  I           *                                      I
1977  Jun   -7.78  I                                            D.  *I                                                  I
1977  Jul   35.88  I                                                *I                     D.                           I
1977  Aug  -10.63  I                                            .    *                                                  I
1977  Sep    2.04  I                                                 *.                                                 I
1977  Oct   -3.01  I                                               D.*                                                  I
1977  Nov     .38  I                                                 .                                                  I
1977  Dec     .21  I                                                 .                                                  I
1978  Jan    -.53  I                                                 .                                                  I
1978  Feb    -.63  I                                                 .                                                  I
1978  Mar    -.72  I                                                 .                                                  I
1978  Apr   -1.38  I                                                *.                                                  I
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1978  May     -2.56 I                                                  * .                                                    I
1978  Jun     -3.24 I                                                  D.I                                                    I
1978  Jul    -12.91 I                                           D.       *                                                    I
1978  Aug    -14.92 I                                          .         *                                                    I
1978  Sep     -3.64 I                                                  . *                                                    I
1978  Oct     -3.01 I                                                  . I*                                                   I
1978  Nov      -.80 I                                                    .                                                    I
1978  Dec      -.44 I                                                    .                                                    I
1979  Jan      1.01 I                                                    *.                                                   I
1979  Feb      1.18 I                                                    .*                                                   I
1979  Mar      1.36 I                                                    .*                                                   I
1979  Apr      6.20 I                                                    I . D                                                I
1979  May     40.47 I                                                    I         *     .        D                           I
1979  Jun     14.96 I                                                    .         *                                          I
1979  Jul     -6.48 I                                               .D   I*                                                   I
1979  Aug     17.28 I                                                    *          .                                         I
1979  Sep     -2.25 I                                                  .D*                                                    I
1979  Oct      8.69 I                                                    *    .                                               I
1979  Nov      1.52 I                                                    *.                                                   I
1979  Dec       .85 I                                                    .*                                                   I
1980  Jan      -.36 I                                                    .                                                    I
1980  Feb      -.42 I                                                    .                                                    I
1980  Mar      -.48 I                                                    .                                                    I
1980  Apr     -1.38 I                                                   *.                                                    I
1980  May     -4.33 I                                                 D*.I                                                    I
1980  Jun    -13.84 I                                            D.     *I                                                    I
1980  Jul     -6.48 I                                                D. *I                                                    I
1980  Aug      -.42 I                                                    .                                                    I
1980  Sep      1.41 I                                                    *.                                                   I
1980  Oct     -3.01 I                                                  . *                                                    I
1980  Nov      -.54 I                                                    .                                                    I
1980  Dec      -.30 I                                                    .                                                    I
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** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

DEVIATIONS FROM THE ANNUAL AVERAGES

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
-.61	-.71	-.81	-1.38	-4.33	-13.84	-13.42	-14.92	-3.64	-3.01	-.91	-.50	-51.02	1
-.53	-.63	-.72	-1.38	-4.33	-13.84	-13.42	-14.92	-3.64	-3.01	-.80	-.44	-44.78	2
-.50	-.59	-.66	-1.38	-4.33	-13.84	-13.42	-14.92	-3.64	-3.01	-.75	-.41	-41.92	3
-.49	-.58	-.66	-1.38	-4.33	-13.84	-13.42	-14.92	-3.64	-3.01	-.74	-.41	-41.39	4
-.36	-.42	-.48	-1.38	-4.33	-13.84	-12.91	-10.63	-3.64	-3.01	-.54	-.30	-30.16	5
-.25	-.29	-.33	-1.38	-4.33	-7.78	-6.48	-7.85	-3.64	-3.01	-.37	-.20	-20.48	6
-.16	-.18	-.21	-1.38	-4.33	-3.24	-6.48	-6.71	-2.25	-3.01	-.23	-.13	-13.05	7
.22	.25	.30	-1.38	-4.33	-3.14	-4.96	-.42	-.10	-3.01	.33	.19	18.34	8
.25	.29	.34	-1.38	-4.33	5.36	-.92	9.38	1.41	-3.01	.38	.21	21.22	9
.52	.60	.70	-1.38	-2.56	14.96	2.98	17.28	2.04	-3.01	.78	.44	43.58	10
.89	1.04	1.20	6.20	1.10	21.66	35.88	27.48	3.69	8.69	1.34	.75	74.87	11
1.01	1.18	1.36	7.59	40.47	41.36	46.58	31.18	17.06	21.39	1.52	.85	84.78	12

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

DEVIATIONS FROM THE ANNUAL AVERAGES

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
-.68	-.01	-.01	-3.86	-22.00	-12.29	-16.06	-14.98	-4.16	-4.07	-.73	-.01	-41.74	1
-.67	-.01	-.00	-2.82	-1.12	-12.29	-12.52	-14.98	-4.10	-4.07	-.62	-.01	-37.61	2
-.46	-.00	-.00	-1.99	-1.12	-12.29	-11.73	-14.93	-3.51	-4.07	-.57	-.00	-31.71	3
-.34	-.00	-.00	-.95	-1.12	-12.29	-11.73	-14.91	-3.39	-4.07	-.56	-.00	-30.96	4
-.30	-.00	-.00	-.70	-1.12	-12.29	-11.73	-10.47	-3.39	-4.07	-.48	.00	-20.64	5
-.09	.00	-.00	-.37	-1.12	-6.23	-8.30	-7.91	-3.39	-3.04	-.36	.00	-17.60	6
-.06	.00	-.00	.00	-1.12	-3.53	-4.79	-6.77	-2.54	-2.60	-.19	.00	-6.99	7
.00	.00	.00	.00	-1.12	-2.32	-4.58	-.45	.15	-2.41	-.05	.00	5.47	8
.10	.00	.00	.11	-1.12	.52	-2.06	9.58	1.42	-1.93	.51	.00	16.36	9
.37	.00	.00	.31	.65	6.91	.77	17.25	2.22	1.96	.56	.00	40.59	10
.49	.01	.00	3.39	4.31	23.21	36.83	27.42	3.80	8.04	1.01	.00	46.24	11
.85	.01	.01	6.89	26.03	42.91	45.93	31.16	16.90	20.33	1.52	.00	77.81	12

LOG-NORMAL DISTRIBUTION

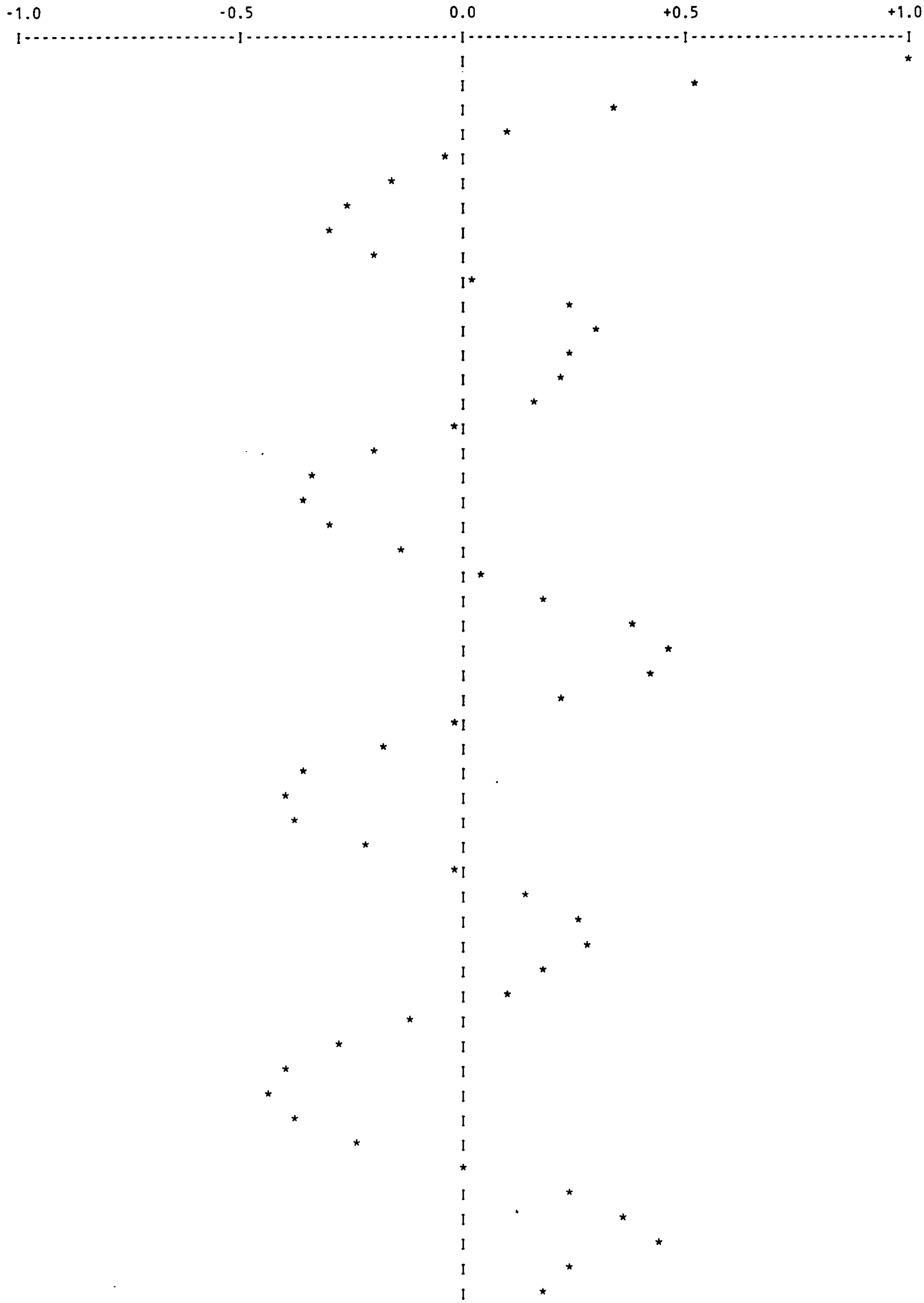
** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

ORIGINAL DATA - ACRE-FEET (OR STANDARDIZED VALUES)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
.46	.62	.76	.00	.00	2.95	4.09	3.19	3.03	.00	.87	.29	16.27	1
-.08	.07	.21	.00	.00	4.01	2.80	.00	.00	.00	.32	-.26	7.06	2
-.62	-.45	-.31	.00	.00	.00	.00	3.75	.00	.00	-.20	-.80	1.37	3
-.80	-.63	-.49	.00	.00	3.57	.00	.00	.00	.00	-.39	-.97	.29	4
-2.41	-2.21	-2.12	.00	.00	.00	.00	1.96	.00	.00	-1.97	-2.53	-9.27	5
-1.56	-1.43	-1.31	.00	.00	.00	2.53	.00	1.26	.00	-1.17	-1.77	-3.45	6
.20	.35	.49	.00	1.69	2.37	2.14	3.83	.00	3.19	.60	.02	14.89	7
-1.61	-1.47	-1.31	.00	.00	.00	.00	2.11	1.99	.00	-1.20	-1.77	-3.27	8
-.05	.10	.24	2.19	.00	1.80	3.90	1.46	1.74	.00	.36	-.24	11.50	9
-1.77	-1.66	-1.51	.00	.57	2.36	-.67	.00	.00	.00	-1.39	-1.97	-6.04	10
.54	.69	.83	2.03	3.80	3.36	1.94	3.47	.33	2.46	.94	.36	20.75	11
-1.08	-.92	-.80	.00	.00	.00	1.94	2.67	1.62	.00	-.67	-1.27	1.49	12

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

R	LAG
1.0000	0
.5299	1
.3434	2
.1025	3
-.0447	4
-.1611	5
-.2675	6
-.2978	7
-.2000	8
.0153	9
.2379	10
.2977	11
.2329	12
.2231	13
.1615	14
-.0143	15
-.2048	16
-.3494	17
-.3621	18
-.3061	19
-.1438	20
.0374	21
.1776	22
.3881	23
.4526	24
.4150	25
.2280	26
-.0180	27
-.1730	28
-.3540	29
-.3902	30
-.3736	31
-.2206	32
-.0249	33
.1363	34
.2567	35
.2738	36
.1757	37
.0987	38
-.1298	39
-.2774	40
-.3993	41
-.4414	42
-.3810	43
-.2324	44
-.0090	45
.2301	46
.3561	47
.4334	48
.2397	49
.1887	50



** CORRELOGRAM OF THE ORIGINAL TIME SERIES PLUS THE ANNUAL COMPONENT **

Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent)

MONTHLY CORRELATIONS J - J+1	BJ COEF OF REGRESSION (J,J+1)	RJ, COEF OF CORRELATION (J,J+1)	STANDARD DEVIATION OF MONTH (J+1)	AVERAGE OF MONTH (J)
Jan - Feb	.9998	.9998	.966	-.732
Feb - Mar	1.0067	.9998	.966	-.577
Mar - Apr	.3917	.4638	.973	-.445
Apr - May	.7493	.5350	.822	.352
May - Jun	.5357	.3830	1.151	.505
Jun - Jul	.3006	.2946	1.610	1.702
Jul - Aug	.1334	.1410	1.643	1.554
Aug - Sep	.1214	.1791	1.553	1.869
Sep - Oct	-.3185	-.3019	1.054	.831
Oct - Nov	.4476	.5157	1.112	.471
Nov - Dec	.9948	.9999	.965	-.324
Dec - Jan	-.2406	-.2558	.960	-.909

* NOTE: THE COMPLETE SEQUENCE FROM DEC. TO JAN. CANNOT BE CALCULATED.
BJ AND RJ ARE CALCULATED, IN THIS CASE, FROM 11 YEARS OF DATA.
THE MEAN AND STANDARD DEVIATION WERE DETERMINED USING ALL THE DATA (12 YEARS).

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 1 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
1.59	1.91	2.15	.65	3.75	5.96	11.06	.87	.62	2.98	.13	.00	31.66	1
1.48	1.66	1.94	8.45	7.11	82.00	123.00	55.49	.96	10.72	.83	.45	294.08	2
.39	.46	.53	.81	.41	.86	7.21	40.99	2.94	2.50	.35	.20	57.64	3
1.31	1.61	1.84	3.47	14.44	80.34	18.58	2.00	3.14	11.06	3.15	1.72	142.66	4
1.22	1.44	1.58	1.30	.65	1.82	.37	1.93	2.95	1.28	.18	.10	14.82	5
.88	.99	1.14	1.20	1.56	9.50	1.03	10.43	6.43	.66	.13	.00	33.94	6
.83	.98	1.13	1.50	5.33	127.68	12.93	12.97	5.68	22.71	1.66	.91	194.33	7
.52	.62	.70	1.23	3.63	22.23	.86	45.76	3.82	3.55	3.04	1.71	87.66	8
.00	.00	.00	1.87	1.17	33.46	32.30	92.35	.50	1.01	.15	.00	162.80	9
2.46	2.94	3.43	1.80	6.32	23.49	196.37	30.19	.45	1.89	.41	.23	269.98	10
2.07	2.38	2.78	.79	1.92	1.49	7.81	78.53	1.09	.80	.75	.42	100.84	11
1.14	1.35	1.52	2.39	36.90	49.12	.68	81.49	5.58	.49	.30	.17	181.13	12
1.49	1.75	2.02	1.58	2.29	106.56	19.17	1.79	.85	13.50	2.26	1.25	154.50	13
.72	.86	.95	1.19	3.46	17.97	1.44	13.01	5.06	.24	.24	.13	45.26	14
.73	.85	.99	3.25	10.98	11.52	.10	.29	.69	2.18	.39	.22	32.19	15
.43	.50	.56	1.56	2.07	93.33	13.90	312.64	13.65	.85	.00	.00	439.50	16
.17	.20	.22	.46	.76	2.95	237.25	8.02	.71	13.37	.67	.37	265.15	17
.11	.12	.14	.89	.42	.83	2.41	3.53	.44	1.09	.23	.13	10.35	18
.16	.18	.20	.52	.39	.50	26.95	2.60	1.58	.11	.00	.00	33.17	19
.27	.33	.37	4.72	4.29	68.73	12.87	216.02	25.72	.90	.14	.00	334.37	20
1.08	1.23	1.41	2.64	14.85	591.43	53.09	2.15	2.08	1.13	1.26	.72	673.06	21
.86	1.00	1.15	1.06	.39	15.54	72.54	13.54	.77	2.56	2.45	1.37	113.24	22
.11	.13	.15	1.65	.83	.88	5.24	21.69	4.55	8.09	1.50	.82	45.65	23
.23	.27	.30	1.43	.62	1.31	6.47	.46	.74	.64	.00	.00	12.47	24
.95	1.15	1.29	12.30	11.25	42.81	36.39	9.67	3.56	.64	.45	.25	120.72	25
1.13	1.35	1.51	7.32	4.25	11.01	21.60	7.34	9.76	.44	.51	.29	66.50	26
1.23	1.45	1.62	.94	.98	1.36	.19	4.19	8.03	2.02	.15	.00	22.17	27
3.75	4.24	4.83	3.73	3.65	1.44	.29	1.48	1.12	12.44	1.84	1.02	39.82	28
.73	.88	1.02	.72	.67	16.32	13.43	2.94	6.70	.91	.19	.11	44.62	29
.60	.69	.80	3.52	4.96	.54	.14	1.95	4.04	.62	1.19	.67	19.72	30
1.82	2.12	2.46	1.59	1.81	116.52	25.01	33.74	7.31	.42	.29	.16	193.25	31
.80	.93	1.09	1.37	.48	2.22	6.85	1.43	1.65	.82	.32	.18	18.16	32
.00	.00	.00	4.08	12.93	5.23	46.33	2.06	8.49	.58	.57	.32	80.57	33
1.54	1.77	2.06	1.37	1.45	2.09	.51	.50	7.13	.24	.34	.19	19.20	34
.22	.26	.29	.54	.49	32.65	4.58	20.23	.90	9.55	2.90	1.58	74.19	35
1.32	1.55	1.79	.72	2.03	1.37	6.50	38.41	3.92	1.65	1.06	.59	60.92	36
1.03	1.17	1.31	2.61	3.17	4.04	.83	.72	.93	.57	.17	.00	16.55	37
.83	.96	1.11	3.41	5.73	50.38	74.29	2.18	2.44	6.34	2.78	1.53	151.98	38
.11	.14	.15	.88	1.34	24.58	.56	31.33	13.66	6.47	2.51	1.37	83.10	39
.15	.18	.20	2.20	4.84	3.22	19.97	67.18	5.52	2.61	2.31	1.27	109.64	40
.23	.26	.29	.38	.26	10.98	7.79	1.27	1.74	8.51	.82	.46	32.99	41
.97	1.15	1.33	10.52	10.55	2.55	2.00	.38	.89	5.42	3.27	1.79	40.82	42
.22	.27	.29	1.55	2.47	8.53	.99	1.41	1.52	1.10	.30	.17	18.82	43
.46	.51	.59	1.75	2.29	2.47	66.48	.96	7.66	3.44	.55	.32	87.47	44
.50	.58	.67	1.77	16.65	26.92	32.88	6.06	.68	7.56	.71	.39	95.38	45
1.68	1.97	2.34	5.51	16.93	1.33	.93	.58	3.11	3.75	3.11	1.72	42.97	46
.00	.00	.00	.59	.31	1.80	10.21	18.29	4.85	4.07	.51	.29	40.92	47
.00	.00	.00	1.21	2.91	2.07	1.36	.88	3.71	.64	.00	.00	12.77	48
.70	.81	.94	.60	1.43	60.78	5.10	3.59	4.20	.68	.37	.20	79.38	49
.92	1.06	1.22	.52	.25	.80	1.94	.26	1.20	5.75	4.38	2.42	20.71	50

.84	.98	1.13	2.36	4.77	35.67	25.02	26.16	4.11	3.83	1.04	.56	106.48	AVE.
.72	.84	.97	2.52	6.54	86.96	46.64	55.26	4.50	4.69	1.12	.63	124.11	ST.D
.86	.85	.86	1.07	1.37	2.44	1.86	2.11	1.09	1.22	1.09	1.11	1.17	C.V.
1.40	1.30	1.29	2.24	2.70	5.23	3.03	3.60	2.49	1.80	1.11	1.07	2.41	SKEW

TOTAL AVERAGE = 8.873
STANDARD DEV = 34.585
SKEW COEFFICIENT = 10.590

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 2 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
.00	.00	.11	.29	.27	9.55	6.88	1.70	.75	1.31	.99	.55	22.40	1
.00	.00	.00	.36	.14	13.85	3.11	7.83	8.64	1.71	.28	.16	36.08	2
.31	.37	.42	.33	.14	.38	1.32	3.35	12.58	2.33	1.67	.93	24.14	3
2.21	2.63	3.04	.77	1.59	69.89	4.62	1.31	3.39	.24	1.71	.97	92.38	4
.00	.00	.00	.34	1.08	1.02	2.66	.45	1.06	.42	.56	.32	7.89	5
2.09	2.50	2.90	.67	2.85	17.16	.97	29.79	8.15	.53	.19	.11	67.91	6
2.63	3.05	3.45	.91	1.44	.90	7.10	1.98	1.55	1.22	.97	.55	25.75	7
1.05	1.24	1.45	2.98	.39	6.28	12.68	2.51	3.36	9.64	.96	.53	43.06	8
.71	.84	.94	2.13	4.81	16.98	7.06	53.27	4.12	1.48	.98	.53	93.84	9
.62	.73	.84	1.10	3.92	59.26	13.34	11.47	.65	5.70	4.80	2.63	105.06	10
.00	.11	.12	.40	.29	.82	23.25	13.05	4.97	.48	.22	.12	43.84	11
1.10	1.24	1.46	1.29	2.29	134.69	25.92	35.83	5.82	.14	.00	.00	209.78	12
1.93	2.35	2.62	1.97	3.73	.52	.52	.68	.35	1.35	.47	.26	16.74	13
.85	1.01	1.13	1.16	1.17	.72	.10	.32	1.77	9.17	.70	.39	18.49	14
1.44	1.64	1.91	3.47	4.21	5.84	16.06	2.00	2.55	4.39	.53	.30	44.33	15
1.07	1.22	1.38	2.20	.21	10.42	19.43	2.38	9.18	.57	.43	.24	48.70	16
.31	.36	.42	1.32	2.22	7.86	.52	2.35	3.71	.83	.99	.56	21.44	17
.54	.63	.73	.83	.28	11.77	30.58	1.96	3.69	5.85	2.36	1.28	60.49	18
.20	.23	.26	.74	1.47	82.03	17.99	4.27	.36	.75	.28	.15	108.73	19
2.31	2.69	3.14	4.17	.90	4.06	42.14	100.95	1.06	4.37	2.40	1.34	169.54	20
6.35	7.29	8.54	4.41	7.13	56.16	134.71	1.38	1.01	2.99	.30	.17	230.42	21
1.69	1.99	2.21	1.03	.47	.51	1.45	2.98	2.75	.75	1.04	.57	17.45	22
2.22	2.64	2.98	1.57	1.17	12.82	21.55	145.84	2.16	2.73	.98	.55	197.22	23
.14	.16	.18	.65	1.28	79.33	3.18	2.33	.98	.61	.25	.14	89.22	24
.74	.85	1.00	.56	.69	6.94	.53	.14	3.53	1.68	1.53	.87	19.07	25
.22	.27	.30	.21	.46	.12	2.64	17.38	2.64	.59	.69	.38	25.88	26
1.13	1.34	1.54	3.07	.93	.17	5.11	49.01	1.51	.83	.23	.13	64.98	27
.87	1.04	1.21	.98	.57	43.62	21.73	2.23	.97	.63	.73	.40	74.99	28
.21	.24	.27	1.22	3.67	1.88	4.06	20.73	4.99	15.00	3.36	1.83	57.45	29
.37	.43	.49	3.55	12.53	35.36	23.75	14.04	4.69	4.15	.44	.25	100.06	30
.20	.23	.27	.39	.52	.73	1.01	1.96	.96	17.35	3.15	1.73	28.51	31
.00	.00	.10	1.33	3.47	17.69	11.51	1.77	.85	.50	.39	.22	37.83	32
.62	.71	.82	2.05	5.85	46.65	11.51	2.52	7.53	3.56	.36	.20	82.37	33
.57	.67	.77	4.09	1.71	1.11	5.48	3.63	4.49	.96	1.65	.94	26.06	34
.53	.63	.70	1.52	8.83	151.57	14.93	3.44	2.62	1.96	2.65	1.46	190.85	35
.00	.00	.00	.83	.25	.29	.00	3.25	7.11	1.87	.24	.13	13.97	36
.21	.24	.29	.92	.51	1.92	18.30	1.00	.44	11.61	.85	.46	36.76	37
.33	.37	.42	2.19	3.15	1.50	1.94	23.24	.52	.29	.57	.31	34.83	38
2.29	2.68	3.12	3.05	5.07	26.48	10.28	3.94	4.08	2.23	4.70	2.58	70.52	39
.63	.74	.86	1.11	.43	.52	1.41	5.75	12.55	.30	1.99	1.11	27.40	40
.38	.43	.49	.83	.56	.67	2.49	1.53	11.28	5.31	6.21	3.40	33.57	41
.35	.39	.45	1.03	3.08	2.29	1.02	.59	.33	4.74	1.32	.73	16.32	42
.15	.18	.21	.89	5.51	22.31	17.86	6.02	4.28	5.07	3.24	1.76	67.48	43
1.02	1.13	1.28	1.24	.92	.40	.33	2.82	3.84	3.29	3.29	1.83	21.39	44
.34	.40	.46	.53	.33	3.67	.87	.99	.91	.67	.16	.00	9.31	45
.36	.43	.46	2.25	8.16	1.41	5.89	22.69	2.84	.92	5.13	2.80	53.33	46
.20	.23	.27	.58	.51	1.25	.36	3.55	3.39	5.32	1.50	.84	18.00	47
1.67	1.89	2.09	2.25	.79	12.14	150.51	.61	1.21	.29	.35	.20	173.99	48
2.57	2.84	3.28	2.67	.30	3.96	15.32	17.29	.26	2.27	.13	.00	50.88	49
.22	.27	.30	.66	2.29	2.61	8.22	61.83	10.35	.24	.00	.00	87.00	50

.92	1.07	1.23	1.50	2.29	19.80	14.68	14.04	3.65	3.02	1.38	.76	64.35	AVE.
1.10	1.27	1.47	1.12	2.64	33.38	28.07	27.00	3.32	3.75	1.47	.81	56.35	ST.D
1.20	1.19	1.19	.74	1.15	1.69	1.91	1.92	.91	1.24	1.07	1.07	.88	C.V.
2.54	2.49	2.59	.97	1.75	2.31	3.77	3.13	1.13	2.05	1.48	1.44	1.38	SKEW

TOTAL AVERAGE = 5.363
STANDARD DEV = 16.126
SKEW COEFFICIENT = 6.457

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 3 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
1.72	1.99	2.37	8.52	13.49	24.53	.21	2.82	.77	1.04	2.23	1.24	60.93	1
.37	.43	.49	.80	.83	5.40	37.14	21.57	4.95	.33	.33	.19	72.84	2
2.09	2.47	2.80	2.24	11.77	12.73	18.43	6.46	.55	1.69	1.12	.62	62.98	3
.18	.21	.24	1.01	1.60	1.39	2.71	6.30	5.53	6.93	2.02	1.12	29.25	4
.17	.19	.21	.19	.19	3.67	6.42	4.47	10.66	7.50	1.54	.85	36.05	5
.00	.00	.11	.29	.54	11.69	59.02	12.96	7.38	4.18	1.67	.92	98.76	6
.32	.36	.40	.33	.22	.12	.46	9.93	.74	.71	.73	.41	14.72	7
2.04	2.50	2.87	1.05	1.99	.80	2.10	26.88	15.42	3.58	.58	.31	60.12	8
.35	.43	.48	3.48	4.26	81.48	15.08	13.34	5.16	.90	1.29	.73	126.97	9
.84	.98	1.13	.54	.00	5.81	72.56	10.08	11.25	1.34	1.07	.59	106.20	10
.19	.23	.25	2.76	7.36	1.80	39.74	1.95	7.23	5.51	1.93	1.06	70.02	11
.18	.21	.25	3.07	1.15	6.04	.99	45.23	3.29	2.32	1.71	.96	65.40	12
.54	.63	.73	.55	.46	3.31	.91	2.70	14.53	.90	.96	.53	26.75	13
.71	.90	1.00	.77	.24	.92	23.75	10.41	15.53	2.26	1.28	.69	58.49	14
.54	.62	.68	.80	.79	3.62	7.85	.26	2.28	.58	1.38	.76	20.17	15
.89	1.04	1.16	2.31	.47	2.75	27.57	3.28	1.35	5.95	.20	.11	47.06	16
1.19	1.37	1.58	4.35	8.33	4.24	1.67	.94	2.09	2.32	1.20	.65	29.94	17
.17	.19	.22	.51	5.19	14.77	27.98	33.75	8.27	.27	1.12	.61	93.05	18
.94	1.10	1.27	1.61	3.90	2.31	.71	.90	1.16	1.37	.96	.53	16.75	19
1.27	1.52	1.77	.71	.26	.89	.33	2.83	12.53	.40	.12	.00	22.64	20
3.00	3.56	4.17	1.55	1.77	138.56	4.01	1.21	1.95	.49	.22	.12	160.62	21
.50	.58	.65	5.45	3.21	5.03	47.35	5.49	3.93	13.32	5.10	2.78	93.38	22
.50	.58	.67	1.94	.75	18.87	16.26	13.80	6.46	1.44	6.24	3.41	70.91	23
.00	.00	.00	1.11	2.50	2.88	.37	1.81	6.29	1.59	.79	.44	17.78	24
.23	.27	.30	.33	.49	.52	2.79	51.84	4.59	2.15	.11	.00	63.62	25
2.63	3.02	3.48	6.12	7.60	6.30	1.54	1.57	7.08	.83	1.06	.59	41.82	26
3.52	3.91	4.43	4.21	1.15	15.76	6.81	7.65	3.91	1.51	.20	.11	53.17	27
1.93	2.17	2.56	2.16	3.56	57.24	.61	15.20	6.55	.17	.17	.00	92.33	28
3.53	4.12	4.78	4.22	1.07	2.16	1.48	5.32	.40	1.40	.83	.46	29.78	29
.76	.92	1.07	.45	1.37	9.47	9.24	.43	1.78	6.13	2.03	1.11	34.77	30
1.29	1.51	1.75	7.43	18.15	50.15	9.91	11.19	6.68	.51	.20	.11	108.90	31
.14	.17	.19	.65	.49	6.61	14.59	7.24	6.08	.36	.14	.00	36.68	32
.84	.97	1.12	1.27	3.68	20.69	7.68	282.30	3.82	8.33	1.83	1.03	333.57	33
1.00	1.12	1.26	.46	4.29	12.95	31.75	.88	1.20	.61	3.65	2.00	61.17	34
.45	.53	.59	1.44	3.46	2.61	39.43	4.02	9.28	3.75	2.50	1.39	69.45	35
.40	.47	.54	2.03	.47	2.05	11.50	200.76	3.15	.77	.00	.00	222.15	36
1.22	1.40	1.57	.91	1.47	1.35	3.16	110.95	.93	.36	.26	.14	123.71	37
1.03	1.27	1.44	1.03	.73	1.07	6.28	3.79	11.63	.56	.58	.32	29.71	38
.15	.18	.19	1.62	.25	2.28	.77	3.01	.43	1.37	.50	.29	11.03	39
.20	.23	.27	1.34	3.15	51.95	.98	2.68	2.59	.79	.23	.12	64.51	40
1.54	1.73	2.01	2.70	2.99	4.17	1.42	3.51	.53	3.50	1.51	.86	26.48	41
.60	.70	.77	1.72	.38	6.39	12.80	14.10	4.85	1.25	2.09	1.18	46.80	42
1.59	1.80	2.07	3.49	3.68	1.36	6.17	.93	.28	3.33	3.45	1.90	30.06	43
.67	.80	.94	2.45	.99	8.16	6.65	15.34	2.94	5.26	.69	.38	45.27	44
.10	.11	.13	.90	.33	5.65	5.20	2.75	.83	10.18	3.84	2.11	32.13	45
.00	.00	.00	.22	.95	1.36	8.07	15.35	3.37	3.07	3.10	1.70	37.19	46
1.89	2.19	2.54	3.85	18.30	1.69	6.13	2.93	3.59	1.59	1.78	.98	47.47	47
.82	.99	1.14	1.34	.16	2.27	15.82	36.65	4.60	1.40	1.45	.81	67.44	48
1.05	1.21	1.37	.83	14.81	13.81	.52	21.73	6.92	2.57	.27	.15	65.23	49
.31	.37	.42	.81	.72	.18	4.00	52.25	12.24	.29	.81	.45	72.86	50

.93	1.08	1.25	2.00	3.32	12.84	12.58	22.28	5.19	2.58	1.38	.76	66.18	AVE.
.88	1.02	1.18	1.87	4.57	24.40	16.30	49.77	4.21	2.81	1.30	.72	55.33	ST.D
.95	.94	.94	.94	1.38	1.90	1.30	2.23	.81	1.09	.94	.95	.84	C.V.
1.28	1.25	1.25	1.57	1.94	3.38	1.78	3.84	.81	1.77	1.60	1.53	2.66	SKEW

TOTAL AVERAGE = 5.515
STANDARD DEV = 17.891
SKEW COEFFICIENT = 9.882

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 4 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
.16	.19	.22	2.47	3.40	2.96	4.30	.41	3.04	2.37	2.52	1.41	23.45	1
.00	.00	.11	1.23	3.27	4.52	37.51	2.68	1.74	.48	.50	.28	52.32	2
.00	.00	.00	1.49	2.95	22.52	168.83	31.74	3.65	.61	.48	.27	232.53	3
.44	.52	.58	.88	1.54	1.93	26.86	5.98	3.26	2.17	1.28	.70	46.14	4
1.17	1.38	1.54	1.98	12.83	84.41	2.74	67.17	7.17	5.48	.35	.19	186.43	5
.61	.74	.86	.84	1.42	4.81	24.50	7.84	3.34	1.20	.25	.14	46.56	6
1.25	1.45	1.64	.38	.75	.20	.18	.94	.26	2.54	.15	.00	9.74	7
4.80	5.67	6.44	2.22	1.29	1.32	2.57	1.35	.56	3.07	.42	.23	29.94	8
.58	.67	.75	1.03	.62	.77	18.76	23.52	4.20	.58	.65	.36	52.49	9
1.35	1.53	1.69	7.30	5.71	4.23	1.70	11.58	.54	14.89	2.42	1.35	54.30	10
.70	.81	.95	4.21	.93	1.11	10.86	32.85	.99	.60	.78	.44	55.23	11
.14	.17	.19	1.03	1.48	15.79	9.69	39.02	.68	.27	.33	.19	68.98	12
1.37	1.61	1.87	2.26	15.46	4.61	2.42	13.33	.24	2.96	1.55	.85	48.53	13
.19	.22	.25	.53	2.44	.88	2.18	.14	3.99	4.29	.57	.31	15.99	14
.30	.35	.39	.31	.46	3.67	31.26	15.74	13.15	1.55	.94	.54	68.66	15
.24	.29	.33	1.28	12.13	5.60	.66	.85	.80	4.72	.43	.24	27.57	16
1.04	1.25	1.46	.57	1.00	56.10	2.25	.94	.93	10.03	.56	.31	76.45	17
1.35	1.55	1.77	6.77	11.83	5.83	2.44	293.99	1.20	2.39	1.80	1.00	331.92	18
.73	.84	.96	1.66	.30	4.57	.48	5.22	7.50	.35	.19	.10	22.91	19
8.59	10.09	12.02	3.54	10.70	77.84	44.06	13.96	.88	18.83	7.46	4.04	212.00	20
.21	.25	.29	1.47	2.35	7.18	16.40	8.10	3.01	5.12	1.70	.92	46.99	21
1.89	2.20	2.60	7.23	10.96	6.49	1.47	.46	1.24	.61	.20	.11	35.44	22
.21	.24	.27	2.82	3.07	11.14	7.34	82.83	5.07	4.22	1.42	.79	119.41	23
1.37	1.60	1.80	1.06	2.61	1.23	1.31	30.27	.91	23.78	4.17	2.32	72.42	24
.42	.50	.58	1.19	.12	5.01	5.40	9.84	3.80	3.30	.37	.21	30.72	25
.83	.95	1.08	1.41	.19	3.23	10.86	10.86	3.86	.33	.49	.27	34.36	26
.24	.29	.31	1.67	2.84	7.53	178.92	20.79	2.89	3.36	1.24	.68	220.76	27
1.29	1.46	1.67	2.26	.55	7.10	34.64	7.83	3.90	2.76	6.07	3.37	72.88	28
.47	.55	.61	.32	.43	1.14	4.41	33.28	9.54	.24	.24	.14	51.37	29
.20	.24	.27	.49	.27	.18	.26	7.43	2.54	2.20	2.59	1.43	18.11	30
.12	.14	.15	.48	.34	3.97	5.28	6.74	.63	.91	.44	.25	19.43	31
.64	.79	.91	1.25	7.47	4.30	9.49	3.52	3.68	1.98	3.98	2.17	40.19	32
.45	.52	.58	.83	.61	2.81	24.06	5.80	4.89	1.47	1.05	.59	43.65	33
.44	.52	.61	3.06	.56	1.91	95.37	7.70	.64	6.02	1.56	.87	119.26	34
1.10	1.26	1.44	2.01	4.99	3.98	5.87	16.37	3.17	2.91	2.39	1.31	46.81	35
.29	.34	.40	4.15	19.16	103.40	122.01	5.87	3.05	2.43	.11	.00	261.22	36
.76	.89	.99	.54	1.35	13.45	.39	1.11	8.39	3.00	.44	.24	31.57	37
2.42	2.82	3.27	3.00	5.26	29.32	301.32	64.68	18.15	1.23	.82	.46	432.76	38
.75	.86	1.00	.53	.85	.21	.80	.88	3.14	36.70	2.65	1.47	49.84	39
.00	.00	.00	1.02	1.96	.51	2.06	3.54	12.60	.31	.28	.16	22.44	40
2.55	2.94	3.29	.53	4.22	3.81	.50	2.85	.35	.91	.59	.33	22.88	41
6.12	7.05	8.26	13.45	16.03	18.86	14.93	12.89	9.07	.72	2.03	1.10	110.51	42
.00	.00	.00	.80	2.45	2.07	7.46	3.42	.89	1.46	.91	.51	19.97	43
.15	.18	.21	.58	1.46	2.73	1.05	11.93	2.85	.78	1.31	.72	23.97	44
.14	.16	.18	.89	2.33	8.32	87.50	11.66	5.13	.15	1.30	.71	118.46	45
2.79	3.19	3.70	1.52	1.54	1.22	2.82	3.23	.56	.60	.23	.13	21.53	46
1.07	1.20	1.39	.99	.26	2.80	.61	2.09	18.22	1.12	.80	.46	31.00	47
.26	.30	.35	1.79	2.21	2.40	12.07	1.46	2.26	.39	.16	.00	23.64	48
.68	.79	.93	4.27	5.96	10.25	.28	.75	.79	62.64	6.40	3.50	97.24	49
.53	.64	.73	.90	.71	1.34	13.88	1.45	2.30	4.51	3.42	1.83	32.24	50

1.07	1.24	1.44	2.09	3.87	11.43	27.26	18.98	3.91	5.11	1.46	.80	78.66	AVE.
1.58	1.85	2.17	2.35	4.74	21.89	56.26	43.53	4.23	10.59	1.66	.91	87.27	ST.D
1.48	1.49	1.51	1.12	1.22	1.92	2.06	2.29	1.08	2.07	1.14	1.14	1.11	C.V.
3.00	3.03	3.12	2.73	1.58	2.89	3.10	5.11	1.83	3.84	1.91	1.87	2.16	SKEW

TOTAL AVERAGE = 6.555
STANDARD DEV = 23.084
SKEW COEFFICIENT = 8.760

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 5 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
.26	.29	.33	1.10	2.98	.12	2.96	25.86	8.01	.33	.19	.10	42.52	1
2.48	2.81	3.20	2.18	.36	2.51	13.94	1.36	.25	2.37	.28	.16	31.91	2
1.16	1.35	1.59	1.51	2.09	63.72	2.16	4.52	.51	.00	.00	.00	78.61	3
1.62	1.85	2.10	1.15	.97	.11	76.05	4.90	3.00	30.45	.94	.52	123.66	4
.21	.26	.29	1.03	3.78	18.20	10.37	7.40	3.96	1.62	4.04	2.21	53.38	5
.12	.14	.15	2.56	1.46	1.14	2.85	2.91	4.29	.56	.58	.32	17.08	6
.82	.93	1.06	.32	.29	12.11	49.62	197.09	3.48	.84	4.08	2.20	272.84	7
.34	.38	.44	.23	.17	2.88	10.20	3.46	4.23	.99	.79	.44	24.55	8
.55	.65	.75	8.00	2.61	2.40	22.39	251.21	9.43	.19	.30	.16	298.63	9
1.55	1.81	2.03	2.83	3.64	10.16	14.31	.69	.62	4.94	1.60	.90	45.09	10
.16	.18	.21	2.19	6.31	6.44	1.42	1.85	.77	1.07	.60	.34	21.53	11
1.06	1.29	1.50	1.08	1.08	20.26	8.55	4.33	13.06	1.45	.78	.43	54.87	12
2.00	2.31	2.58	6.89	5.97	.77	4.14	.16	6.19	.68	1.53	.85	34.07	13
5.15	5.81	6.60	13.03	15.18	23.95	7.47	3.89	.75	.50	.40	.23	82.96	14
.37	.43	.48	3.60	20.26	15.21	40.79	38.52	.83	2.74	5.26	2.91	131.39	15
1.31	1.56	1.82	1.09	1.40	4.16	14.06	27.26	2.82	6.32	.69	.38	62.87	16
.47	.53	.62	2.23	12.19	80.01	.75	12.47	3.30	.91	.17	.00	113.66	17
8.73	10.30	12.02	6.62	1.46	58.45	14.92	6.90	9.60	2.56	2.11	1.15	134.82	18
.56	.64	.72	.95	2.01	17.93	61.50	.58	1.80	2.55	.96	.54	90.75	19
1.26	1.49	1.73	.47	1.33	3.76	.35	11.75	3.03	4.76	.50	.27	30.71	20
.76	.90	1.04	2.14	.83	69.96	10.89	139.95	1.43	.64	.36	.20	229.10	21
1.21	1.46	1.71	1.74	17.62	257.90	6.67	23.38	4.58	.64	.85	.47	318.23	22
.52	.59	.69	.83	.73	30.86	8.86	6.89	3.43	1.46	.25	.14	55.26	23
3.72	4.29	4.92	1.88	1.58	38.67	2.79	4.24	5.83	.63	.00	.00	68.56	24
1.14	1.30	1.51	.79	.58	3.63	.52	.49	7.46	4.46	2.68	1.48	26.03	25
.00	.10	.12	.39	.13	1.44	.45	45.27	1.43	.38	.14	.00	49.84	26
.51	.59	.69	1.39	.38	20.42	13.50	.78	7.24	1.59	2.98	1.64	51.72	27
.53	.61	.67	.49	.38	2.79	.00	7.09	4.18	.26	.68	.39	18.06	28
.90	1.00	1.12	.35	.13	2.70	6.36	3.69	.66	6.27	2.19	1.24	26.60	29
1.40	1.63	1.89	3.52	11.02	2.02	12.31	9.28	2.42	.66	.64	.35	47.13	30
.45	.52	.59	.94	4.49	54.52	14.53	181.26	2.48	.77	.31	.18	261.04	31
2.28	2.69	3.12	1.30	1.67	39.12	14.28	3.24	1.15	9.11	.97	.53	79.44	32
1.28	1.51	1.77	.79	.79	3.26	45.16	13.71	11.93	1.57	2.12	1.18	85.09	33
.44	.52	.60	1.45	.61	3.10	28.02	.37	.61	1.38	.76	.42	38.28	34
.85	1.02	1.19	8.92	3.11	135.34	13.76	2.71	4.44	.80	.60	.34	173.08	35
4.82	5.64	6.69	2.37	.57	1.31	5.81	2.45	2.99	3.18	1.06	.58	37.48	36
.00	.00	.11	1.56	4.33	23.39	1.44	1.18	3.03	2.12	1.04	.58	38.78	37
1.51	1.72	1.98	1.81	7.03	231.09	9.91	10.02	7.09	4.50	3.07	1.73	281.45	38
.17	.21	.24	.62	.54	37.13	9.03	.84	.98	2.95	1.09	.62	54.44	39
.58	.65	.76	6.08	.42	1.44	37.68	45.29	.51	2.06	.21	.12	95.80	40
1.35	1.56	1.81	.40	.26	.31	.39	26.42	10.93	.58	3.53	1.91	49.45	41
.20	.22	.25	.67	1.00	2.14	14.63	3.76	2.52	3.31	1.16	.64	30.50	42
.43	.49	.55	.84	2.93	39.98	29.50	3.14	.66	1.15	2.59	1.46	83.71	43
.54	.65	.74	.38	.37	1.19	1.06	9.61	6.94	2.73	2.67	1.46	28.35	44
.62	.72	.84	.63	.43	1.24	15.60	2.34	2.62	1.92	.81	.45	28.22	45
.15	.17	.20	.75	3.12	5.48	.16	1.01	.79	8.27	1.85	1.01	22.97	46
.20	.24	.28	1.06	3.15	.57	.37	13.79	8.16	1.36	.73	.41	30.31	47
.00	.11	.13	3.98	2.99	.18	1.02	43.39	3.36	8.19	1.60	.88	65.81	48
.15	.17	.19	1.43	3.29	12.43	.39	3.08	.53	.90	1.26	.70	24.53	49
.79	.94	1.06	1.32	.00	6.61	1.90	11.31	5.82	.48	.11	.00	30.36	50

1.15	1.34	1.55	2.20	3.20	27.49	13.32	24.54	3.92	2.80	1.28	.70	83.51	AVE.
1.55	1.80	2.09	2.55	4.52	52.02	16.63	52.66	3.28	4.57	1.20	.67	80.21	ST.D
1.34	1.34	1.35	1.16	1.41	1.89	1.25	2.15	.84	1.63	.94	.95	.96	C.V.
2.94	3.01	3.05	2.28	2.23	3.06	1.90	2.97	.91	4.49	1.29	1.25	1.62	SKEW

TOTAL AVERAGE = 6.959
STANDARD DEV = 23.667
SKEW COEFFICIENT = 7.588

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 6 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
1.62	1.97	2.25	.97	.17	.53	1.37	.51	.40	.74	.77	.43	11.74	1
1.49	1.72	2.01	2.61	2.97	142.51	8.76	58.33	1.20	3.09	2.10	1.15	227.95	2
.15	.18	.20	2.50	9.61	32.50	37.78	3.30	1.72	1.65	1.01	.55	91.15	3
.31	.37	.42	1.19	2.07	1.34	.30	1.99	11.21	1.90	.34	.19	21.63	4
4.08	4.73	5.51	11.40	3.54	34.01	29.16	31.90	5.80	.77	.26	.15	131.32	5
4.99	5.85	6.95	3.63	16.38	18.13	11.01	27.55	1.08	.55	.47	.26	96.85	6
.68	.79	.90	3.13	14.70	36.53	8.63	30.42	6.41	.27	.00	.00	102.46	7
1.07	1.23	1.43	6.29	1.71	14.44	.70	12.64	6.24	.58	.63	.36	47.32	8
.62	.71	.80	2.34	2.57	6.11	.59	4.14	4.89	.44	.94	.53	24.68	9
.46	.55	.63	.99	1.41	7.57	8.44	7.03	6.30	1.65	1.18	.66	36.88	10
.00	.00	.00	.95	1.72	21.86	132.44	7.19	9.59	1.59	1.31	.73	177.36	11
1.38	1.65	1.93	.95	1.18	4.39	14.67	18.55	12.42	3.81	3.89	2.15	66.98	12
.32	.38	.42	.81	2.63	22.79	36.65	1.59	.85	.19	.13	.00	66.78	13
1.38	1.64	1.90	2.53	.53	1.47	19.49	40.76	.41	3.97	4.50	2.43	81.03	14
.29	.34	.38	1.34	5.54	12.13	65.91	1.61	3.29	.65	.23	.13	91.82	15
.55	.63	.73	2.71	3.08	3.70	.24	1.88	.29	1.49	2.87	1.57	19.74	16
.60	.70	.81	.35	1.04	28.67	128.20	4.94	5.30	.77	.26	.14	171.78	17
.46	.54	.62	.70	1.87	.45	22.26	.38	1.23	4.13	5.67	3.09	41.40	18
1.56	1.81	2.05	1.13	5.49	10.29	10.93	32.78	1.13	3.55	.35	.20	71.26	19
.27	.31	.35	.76	.00	2.02	5.21	2.70	10.39	.61	4.36	2.36	29.35	20
.00	.00	.11	.35	.29	1.35	.66	.20	2.13	.82	.30	.17	6.38	21
1.57	1.88	2.17	1.64	.39	17.53	14.08	2.18	19.10	1.11	.10	.00	61.73	22
.19	.21	.24	1.74	3.85	4.47	1.41	39.58	.63	2.71	.41	.23	55.66	23
1.19	1.37	1.52	2.53	.79	2.45	13.89	20.32	1.01	6.71	.65	.37	52.80	24
.21	.24	.28	.83	1.72	70.32	10.72	1.63	1.31	.59	.00	.00	87.85	25
1.07	1.28	1.51	.68	.20	79.24	319.66	7.16	21.61	.91	.11	.00	433.43	26
5.65	6.47	7.80	4.44	4.14	14.63	.67	.97	1.87	.57	.17	.00	47.38	27
1.59	1.91	2.23	3.72	.57	2.42	9.47	1.25	1.07	.17	.57	.31	25.27	28
1.14	1.29	1.46	1.18	.60	4.62	7.07	4.45	.81	.95	.29	.16	24.03	29
.00	.00	.11	1.42	.40	63.18	1.64	.88	3.91	.38	.16	.00	72.08	30
2.88	3.34	3.80	6.79	10.04	11.41	10.41	1.33	4.56	.43	.23	.13	55.36	31
.77	.91	1.04	1.25	1.86	98.76	3.30	1.65	.84	3.65	8.22	4.48	126.73	32
.15	.17	.20	.98	.24	3.14	.88	26.58	12.91	.16	.35	.20	45.96	33
1.59	1.87	2.20	1.51	1.23	3.19	.30	19.49	7.75	3.78	3.76	2.08	48.75	34
.99	1.14	1.27	2.86	.89	3.39	.18	28.12	4.04	.35	.20	.11	43.53	35
1.10	1.29	1.42	.87	1.43	1.23	.85	4.34	3.56	7.13	2.45	1.34	27.03	36
.22	.27	.31	.12	.20	.00	3.46	5.64	20.21	2.15	1.05	.60	34.23	37
2.03	2.33	2.60	.68	.80	.00	.82	6.28	6.21	.72	.21	.12	22.79	38
.52	.62	.71	2.07	4.53	52.97	26.15	59.76	.52	.90	.32	.18	149.24	39
.60	.70	.83	.99	2.18	8.64	13.24	1.86	1.06	.63	.00	.00	30.73	40
1.17	1.37	1.60	.55	3.94	.79	15.36	.79	2.05	2.10	.37	.20	30.30	41
.45	.50	.57	1.02	.59	2.65	92.03	1593.67	3.78	1.74	.29	.16	1697.47	42
2.89	3.28	3.73	1.29	.23	1.59	14.43	28.00	5.14	.62	.31	.17	61.69	43
.00	.00	.00	.18	.11	1.69	19.91	19.86	15.14	6.06	.33	.18	63.46	44
.26	.30	.34	.59	1.96	12.03	153.62	4.96	.74	4.88	1.98	1.09	182.76	45
.16	.18	.21	1.87	2.38	6.97	100.58	29.54	5.74	.69	.13	.00	148.44	46
.18	.21	.24	.98	3.29	36.65	14.63	13.65	.81	2.26	.18	.10	73.18	47
.00	.10	.11	.53	.17	.48	62.30	2.84	5.13	1.41	.00	.00	73.07	48
.13	.15	.17	1.34	6.05	16.74	1.25	19.25	22.38	.68	.18	.00	68.30	49
.56	.68	.76	13.55	3.68	172.89	137.92	10.36	10.88	.18	.21	.12	351.78	50

1.03	1.20	1.40	2.12	2.74	21.94	31.87	44.94	5.54	1.76	1.10	.59	116.22	AVE.
1.22	1.41	1.66	2.56	3.45	35.81	57.62	224.00	5.91	1.75	1.69	.93	242.00	ST.D
1.18	1.17	1.19	1.21	1.26	1.63	1.81	4.98	1.07	1.00	1.55	1.57	2.08	C.V.
2.05	2.03	2.14	2.84	2.29	2.51	2.97	6.59	1.36	1.40	2.26	2.22	5.60	SKEW

TOTAL AVERAGE = 9.685
STANDARD DEV = 68.488
SKEW COEFFICIENT = 20.870

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 7 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
.92	1.05	1.18	1.28	3.19	1.23	1.37	238.37	.47	.70	.33	.18	250.27	1
.33	.38	.43	.76	2.61	105.95	6.72	1.38	3.37	.70	.56	.31	123.51	2
1.02	1.15	1.30	2.85	3.18	3.75	24.44	.61	15.36	.35	.92	.51	55.43	3
.24	.27	.31	.53	.25	10.23	.53	39.23	6.08	.60	.62	.35	59.24	4
.88	.99	1.14	1.07	1.44	3.50	145.46	.39	5.11	.84	2.86	1.59	165.29	5
.50	.58	.68	3.10	26.70	182.19	3.88	45.96	7.30	.16	.64	.36	272.05	6
1.17	1.37	1.53	1.23	.62	1.07	2.55	29.60	6.32	.54	.23	.12	46.35	7
1.54	1.74	1.96	4.62	9.82	19.61	1.49	10.45	.33	5.98	5.42	2.96	65.91	8
.36	.40	.45	1.89	2.18	9.25	6.19	2.54	2.91	1.98	.33	.18	28.68	9
.27	.31	.35	.52	1.46	1.02	9.38	182.95	4.21	3.42	5.90	3.25	213.03	10
.65	.79	.88	2.66	4.40	37.44	15.52	1.86	.76	.27	.12	.00	65.35	11
.15	.17	.19	1.00	.19	36.87	3.13	109.93	.25	4.75	1.79	.98	159.39	12
1.89	2.20	2.57	2.06	13.11	6.06	3.63	96.63	5.78	13.89	4.12	2.27	154.20	13
.45	.52	.61	.64	.14	.37	.27	7.77	7.56	1.99	2.43	1.35	24.09	14
.72	.86	.97	9.22	16.72	180.81	23.64	10.72	.45	.00	.16	.00	244.26	15
1.04	1.23	1.38	1.01	1.64	14.12	25.67	2.91	13.34	2.86	.21	.12	65.53	16
2.62	3.14	3.46	2.94	.92	1.22	2.76	2.40	3.25	.94	.29	.16	24.10	17
1.60	1.84	2.18	13.00	41.84	.62	14.66	70.10	.83	1.70	.97	.55	149.89	18
1.18	1.32	1.49	7.65	12.11	4.72	5.96	9.43	.35	1.77	1.31	.72	48.00	19
.20	.24	.27	.34	1.27	3.37	.65	.69	1.22	.78	.40	.22	9.66	20
.24	.27	.31	.34	.35	.00	1.10	37.07	4.73	.89	1.21	.66	47.18	21
.00	.00	.00	.87	.28	2.11	.37	2.22	4.32	2.28	.28	.16	12.90	22
.27	.31	.35	1.84	.37	26.07	.41	3.68	4.17	1.32	.94	.53	40.26	23
.68	.80	.90	.72	.19	.26	.37	21.94	15.15	1.00	1.30	.72	44.02	24
2.25	2.70	3.14	1.76	2.27	2.12	10.45	3.04	4.12	.24	.41	.23	32.72	25
.14	.17	.19	.95	2.06	5.88	.48	.32	.36	2.94	.34	.19	14.02	26
.66	.77	.85	1.06	4.54	18.97	53.58	29.57	8.02	.63	.10	.00	118.75	27
1.72	2.01	2.34	4.79	14.84	374.23	34.93	24.84	4.23	.66	.96	.54	466.07	28
3.82	4.42	4.94	4.95	.63	23.98	37.05	5.55	22.06	.69	.95	.54	109.58	29
.77	.91	1.02	2.32	.69	.18	15.29	36.90	4.10	.19	.38	.21	62.94	30
1.85	2.17	2.49	4.17	5.18	205.10	92.39	53.42	.93	4.37	7.49	4.11	383.66	31
.55	.63	.70	4.13	17.31	278.50	27.52	3.01	5.41	1.90	1.07	.61	341.36	32
1.90	2.20	2.58	4.93	13.20	19.04	36.19	3.89	1.08	.77	.80	.45	87.05	33
.65	.77	.90	1.06	.31	7.35	.17	3.55	4.91	.37	.18	.00	20.23	34
1.08	1.27	1.43	3.11	.49	1.26	92.38	21.82	6.53	.44	1.50	.85	132.17	35
.11	.12	.14	.65	.32	4.52	6.11	42.80	4.93	1.10	1.80	1.02	63.63	36
1.83	2.10	2.45	7.55	18.39	3.29	13.49	1.00	3.54	13.30	8.83	4.83	80.61	37
.00	.00	.11	.42	1.08	2.37	74.32	1.80	1.56	18.60	4.70	2.57	107.52	38
.84	.96	1.08	3.92	6.06	9.82	91.38	11.05	3.04	3.64	1.06	.58	133.44	39
.27	.33	.36	.57	1.18	5.48	7.20	.77	3.17	1.19	4.86	2.74	28.13	40
.00	.00	.11	.64	.31	.52	13.72	2.00	4.19	.78	.26	.14	22.65	41
1.69	1.92	2.23	1.07	2.50	3.02	16.55	4.34	3.04	2.35	.31	.17	39.19	42
.40	.48	.57	3.46	.77	3.34	6.38	3.27	3.97	.78	.00	.00	23.42	43
.35	.40	.46	1.21	2.38	.81	2.26	.23	4.74	1.24	.83	.47	15.37	44
2.49	2.97	3.37	1.89	1.27	.50	28.24	1.14	9.20	.18	1.46	.79	53.50	45
.64	.75	.83	.73	.32	3.15	30.99	94.08	1.78	4.40	2.44	1.37	141.47	46
.54	.64	.74	1.94	9.41	1.45	6.44	1.49	5.10	1.18	.24	.14	29.32	47
1.38	1.58	1.77	.72	.51	.93	1.87	17.54	4.89	.63	.15	.00	31.97	48
.75	.85	.96	.98	1.15	132.46	34.52	3.04	.91	8.00	.68	.38	184.70	49
1.48	1.72	2.01	1.19	2.88	8.55	12.55	52.86	4.89	1.53	.00	.00	89.65	50

.94	1.10	1.25	2.45	5.10	35.37	20.93	27.04	4.69	2.44	1.50	.82	103.63	AVE.
.80	.94	1.06	2.54	8.03	77.95	30.15	46.75	4.26	3.70	1.99	1.10	100.92	ST.D
.85	.85	.85	1.04	1.57	2.20	1.44	1.73	.91	1.52	1.33	1.34	.97	C.V.
1.18	1.19	1.15	2.04	2.49	2.69	2.19	2.73	1.89	2.76	1.97	1.93	1.63	SKEW

TOTAL AVERAGE = 8.636
STANDARD DEV = 29.869
SKEW COEFFICIENT = 7.149

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 8 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
1.43	1.69	1.90	11.48	14.99	287.67	.97	1.50	3.30	11.92	1.79	1.00	339.63	1
2.00	2.31	2.71	2.01	7.31	14.49	8.70	100.99	13.95	6.77	1.21	.66	163.12	2
.29	.34	.39	.45	.19	.89	5.55	.51	.30	9.47	6.52	3.56	28.47	3
.61	.70	.81	.69	1.49	14.18	55.83	11.41	3.18	5.14	1.87	1.04	96.96	4
.48	.55	.65	.62	.47	1.34	5.83	52.43	.36	6.69	6.01	3.32	78.73	5
1.34	1.53	1.76	.92	.79	2.52	21.29	3.96	3.05	16.39	.71	.41	54.67	6
.40	.46	.52	.59	4.40	1.38	31.23	.74	2.34	.76	.76	.42	43.99	7
.47	.55	.64	3.90	28.96	11.03	5.86	2.46	2.98	.73	.00	.00	57.60	8
1.61	1.84	2.10	1.50	3.42	2.30	4.14	1.96	1.16	.35	.19	.11	20.67	9
.19	.21	.24	.88	.26	1.37	106.50	2.96	.90	5.14	.11	.00	118.75	10
1.34	1.60	1.86	1.78	.12	6.83	1.55	8.61	11.20	1.64	.10	.00	36.65	11
.52	.59	.68	1.33	5.57	.58	19.38	1.39	1.79	.53	1.23	.67	34.26	12
.57	.67	.75	1.69	.55	5.92	226.06	7.58	3.86	.92	.84	.47	249.86	13
.48	.55	.61	.66	1.05	3.62	13.98	2.46	.33	.58	.26	.15	24.74	14
.96	1.15	1.36	4.22	6.45	107.97	5.78	10.14	.50	9.70	8.88	4.99	162.10	15
.36	.42	.49	2.18	8.97	1.62	20.02	16.83	2.98	.63	.26	.15	54.91	16
.12	.13	.16	1.67	.82	2.59	1.03	.00	2.10	8.28	2.31	1.26	20.46	17
.72	.83	.93	.51	.58	7.19	.42	2.64	11.10	1.89	2.17	1.18	30.15	18
.39	.47	.55	2.47	10.20	3.40	7.76	13.54	4.08	3.40	4.64	2.57	53.48	19
.00	.00	.00	.17	1.00	1.34	2.40	8.37	12.82	1.25	3.10	1.71	32.16	20
.58	.68	.76	1.02	.35	12.96	25.59	.73	4.85	.29	.16	.00	47.98	21
1.82	2.15	2.43	1.40	1.81	6.47	8.87	37.80	1.24	2.06	2.12	1.17	69.33	22
.96	1.09	1.25	1.45	.72	44.96	30.61	55.11	6.57	2.07	1.02	.56	146.37	23
.14	.16	.19	2.64	2.69	3.21	6.75	.69	8.01	.65	.89	.49	26.51	24
1.54	1.74	2.03	1.88	3.39	8.97	28.12	.53	.93	9.55	1.02	.57	60.28	25
.66	.80	.94	1.32	2.15	.39	.92	.62	4.41	1.59	1.37	.76	15.93	26
.16	.18	.20	.30	2.46	5.10	.00	91.34	6.50	1.16	.10	.00	107.50	27
.41	.46	.52	2.40	14.28	91.11	1.93	76.97	1.36	1.72	2.64	1.47	195.27	28
.91	1.05	1.17	3.92	.53	.38	442.94	46.31	2.92	1.29	1.21	.68	503.31	29
.47	.53	.59	2.14	7.47	19.17	97.29	16.15	9.23	1.01	1.45	.81	156.32	30
.65	.76	.87	1.06	2.80	14.15	23.36	.47	.19	7.24	1.56	.87	53.97	31
.12	.14	.16	3.26	2.08	.30	3.09	9.30	.50	20.61	.26	.15	39.98	32
.19	.23	.25	2.00	4.70	6.73	12.59	3.35	12.34	.97	3.80	2.08	49.21	33
1.32	1.51	1.74	6.38	3.26	26.10	19.74	16.73	.81	.39	.17	.00	78.16	34
.92	1.11	1.28	2.52	.95	.28	1.09	73.85	5.76	.90	.76	.42	89.84	35
.19	.23	.26	3.00	4.12	96.18	40.39	115.29	5.09	.10	.00	.00	264.84	36
.84	.98	1.13	.51	.62	1.06	32.29	120.85	4.07	2.97	2.73	1.51	169.56	37
.00	.00	.11	.45	1.18	.31	.44	12.88	5.70	2.03	1.20	.66	24.95	38
.30	.37	.43	2.12	3.71	9.74	.91	8.92	.56	.70	.45	.24	28.45	39
.53	.59	.68	1.65	13.86	423.92	.55	14.73	.77	.40	.52	.29	458.49	40
.61	.70	.78	1.08	.77	1.55	1.66	4.24	.67	1.85	1.99	1.11	17.00	41
5.32	6.36	7.40	5.40	.87	1.35	20.44	2.01	.37	4.20	1.83	1.00	56.55	42
.88	1.01	1.17	.72	2.92	4.53	29.08	35.89	11.05	.30	.78	.43	88.75	43
.75	.89	1.00	6.28	.51	.12	19.17	2.03	12.03	.69	.12	.00	43.61	44
4.39	5.05	5.77	1.86	7.37	26.81	19.04	38.58	3.24	.35	1.82	1.00	115.28	45
.35	.41	.46	.66	5.48	9.73	.72	5.99	.83	1.31	.83	.45	27.21	46
.18	.21	.24	.29	1.78	3.10	30.45	67.95	4.16	1.10	1.70	.93	112.07	47
1.04	1.21	1.40	2.87	4.57	113.52	12.90	9.73	6.83	.57	.36	.20	155.21	48
.10	.12	.13	.33	.20	7.31	18.37	8.48	5.93	.50	1.26	.68	43.40	49
.34	.39	.44	2.66	3.30	6.23	.00	8.89	.63	4.04	1.75	.98	29.64	50

.82	.95	1.10	2.07	3.97	28.48	29.47	22.74	4.20	3.30	1.58	.86	99.53	AVE.
.97	1.14	1.31	2.00	5.18	74.15	70.02	32.29	3.92	4.36	1.76	.99	105.45	ST.D
1.18	1.19	1.20	.97	1.31	2.60	2.38	1.42	.93	1.32	1.12	1.14	1.06	C.V.
2.96	3.02	3.05	2.42	2.64	3.92	4.55	1.61	.93	2.04	2.14	2.13	2.13	SKEW

TOTAL AVERAGE = 8.294
STANDARD DEV = 32.574
SKEW COEFFICIENT = 9.469

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 9 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
.00	.00	.00	.90	1.54	.65	3.77	14.86	6.29	.85	.25	.14	29.25	1
.16	.19	.22	9.10	48.08	104.90	30.04	51.06	5.78	1.23	4.18	2.33	257.26	2
.00	.12	.13	.37	.31	21.73	20.53	2.69	1.86	.12	.22	.12	48.20	3
2.35	2.71	3.08	.72	1.04	7.44	6.93	8.83	3.69	.49	.60	.34	38.21	4
1.28	1.45	1.65	2.96	.53	.55	1.01	1.39	4.96	.23	.39	.22	16.63	5
1.09	1.28	1.49	.98	1.81	10.42	6.07	3.62	6.39	1.70	.14	.00	35.00	6
1.08	1.30	1.50	6.29	11.23	93.64	30.22	10.84	6.06	3.90	5.55	3.02	174.64	7
.41	.48	.55	2.11	8.49	4.74	3.84	34.84	13.50	.19	.12	.00	69.26	8
.45	.53	.58	.60	.73	2.91	.70	1.67	6.54	.20	.50	.28	15.70	9
.17	.20	.22	3.09	3.22	12.02	194.45	2.81	4.79	.63	.99	.56	223.15	10
.67	.77	.88	1.17	3.57	2.22	1.19	51.78	6.06	1.04	3.18	1.76	74.27	11
.12	.14	.15	1.02	1.40	8.51	18.61	2.43	9.81	1.29	.25	.14	43.89	12
2.27	2.56	2.95	1.03	1.21	.00	.79	6.85	.32	.40	1.08	.60	20.06	13
.87	1.02	1.18	14.79	4.13	124.95	22.07	9.75	4.43	3.24	1.19	.66	188.28	14
.16	.19	.21	.45	1.06	21.10	36.63	2.27	5.85	.41	.24	.14	68.71	15
2.00	2.37	2.65	5.03	1.35	65.71	46.18	2.78	.72	5.36	2.91	1.62	138.69	16
.11	.13	.15	.53	1.16	437.17	7.73	3.32	2.53	.23	.27	.15	453.48	17
.80	.92	1.04	2.74	7.18	3.67	5.36	28.32	.67	7.21	3.03	1.69	62.63	18
.66	.79	.89	.95	3.52	19.68	23.75	28.35	4.24	4.32	1.46	.81	89.41	19
.15	.17	.19	2.80	1.61	1.03	1.74	6.90	.39	1.59	.44	.25	17.27	20
.16	.19	.21	2.63	2.83	144.68	83.00	1.15	1.91	.64	.62	.34	238.37	21
.82	.97	1.08	.76	1.76	2.70	7.31	93.52	10.86	3.04	3.33	1.82	127.96	22
.34	.39	.46	.56	.87	1.86	.13	.70	.88	4.51	1.17	.66	12.53	23
2.32	2.74	3.23	9.20	17.47	31.49	55.48	2.36	12.77	.99	.97	.53	139.56	24
.39	.45	.52	1.17	2.73	8.57	.00	1.84	2.53	.38	.52	.29	19.40	25
.59	.69	.81	.62	.83	3.36	11.22	30.52	10.79	.54	.82	.46	61.24	26
.74	.87	.98	.91	.72	3.83	17.07	40.91	9.79	6.29	3.00	1.65	86.77	27
.15	.17	.20	3.86	4.46	83.63	11.60	452.36	40.43	.28	.41	.23	597.79	28
1.65	1.96	2.28	.98	1.10	18.24	.87	9.37	.31	.48	.88	.50	38.62	29
.00	.00	.00	.26	2.44	17.19	136.73	.82	.64	4.83	.38	.22	163.51	30
.72	.86	.98	1.87	2.97	105.24	52.86	4.34	4.98	.50	.28	.16	175.76	31
.94	1.09	1.26	.77	.43	.92	3.18	15.01	.30	13.12	3.81	2.09	42.92	32
.17	.20	.22	5.38	2.54	9.24	13.27	5.16	3.82	.51	.57	.32	41.41	33
.43	.51	.56	4.86	1.63	1.81	17.54	.77	1.72	2.32	3.37	1.85	37.37	34
.00	.00	.00	.19	.17	1.34	.68	1.80	7.86	1.37	1.98	1.07	16.46	35
.10	.12	.13	.90	1.88	1.20	5.34	.82	2.19	25.69	2.46	1.35	42.16	36
.14	.16	.17	2.38	5.65	41.32	.77	1.09	2.41	2.06	1.03	.57	57.75	37
.83	.94	1.09	6.52	7.38	39.26	19.26	95.64	.41	1.89	.37	.21	173.81	38
.76	.88	1.03	.75	.48	.11	9.00	3.06	.76	3.58	3.38	1.84	25.62	39
1.41	1.65	1.86	1.14	.64	.75	2.05	7.13	3.80	.56	1.15	.63	22.76	40
.74	.86	.99	.26	.64	135.76	1.20	1.92	1.50	.36	.76	.42	145.41	41
2.67	3.18	3.68	7.16	1.39	.82	2.78	1.31	.82	2.56	.36	.20	26.95	42
.19	.22	.25	1.39	1.98	.00	2.78	3.40	4.93	.63	.38	.21	16.36	43
.59	.69	.80	.96	.81	1.19	5.73	32.44	3.59	1.09	1.06	.58	49.53	44
.21	.24	.28	.59	1.68	1.40	33.57	2.90	2.24	.98	1.09	.60	45.79	45
.22	.26	.30	.90	1.77	1.71	94.85	3.40	8.11	.16	.12	.00	111.79	46
1.02	1.22	1.41	1.05	.88	3.65	13.12	13.52	4.75	11.29	.18	.00	52.09	47
.27	.31	.36	.65	1.98	.70	2.27	26.31	.82	1.16	.23	.13	35.19	48
1.80	2.02	2.27	1.57	2.05	.48	21.47	18.97	9.24	14.23	5.54	3.02	82.66	49
.75	.83	.95	2.68	7.94	8.20	1.39	.83	1.88	2.09	1.19	.66	29.38	50

.72	.84	.96	2.41	3.67	32.27	21.76	22.98	5.04	2.85	1.37	.75	95.62	AVE.
.69	.81	.93	2.88	7.15	70.43	36.51	65.51	6.19	4.58	1.43	.79	110.58	ST.D
.97	.96	.97	1.20	1.95	2.18	1.68	2.85	1.23	1.61	1.04	1.05	1.16	C.V.
1.15	1.17	1.19	2.18	4.91	3.98	2.92	5.65	3.73	3.05	1.31	1.27	2.56	SKEW

TOTAL AVERAGE = 7.968
STANDARD DEV = 31.427
SKEW COEFFICIENT = 10.082

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

SIMULATED DATA SEQUENCE NUMBER 10 DIS = 11

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
.55	.65	.74	1.27	2.84	16.28	.21	1.23	1.10	4.02	3.42	1.88	34.18	1
.42	.50	.58	1.77	3.21	32.68	8.86	3.39	4.31	1.70	.86	.49	58.79	2
.21	.24	.28	1.14	2.50	35.84	16.42	1.47	2.32	7.35	5.35	2.93	76.05	3
.76	.91	1.05	1.36	12.36	3.88	2.34	1.75	8.40	1.31	.17	.00	34.29	4
.20	.23	.25	.45	6.10	3.39	2.80	17.33	5.94	.60	.26	.15	37.70	5
2.77	3.42	3.90	2.64	1.04	29.56	16.56	2.47	1.31	10.25	11.49	6.21	91.61	6
.00	.11	.13	.98	1.30	11.98	13.41	2.39	1.43	2.30	3.83	2.09	39.93	7
.28	.33	.38	1.15	3.54	1.35	.93	1.80	2.65	.41	.87	.50	14.18	8
.92	1.11	1.27	1.14	1.37	9.12	.47	.20	1.19	.67	.44	.24	18.15	9
2.57	3.05	3.54	1.73	3.55	.38	22.64	9.45	4.27	.25	.24	.14	51.81	10
.76	.88	1.03	.52	2.43	30.22	63.18	86.78	.24	1.70	3.67	2.03	193.46	11
2.08	2.52	2.89	2.58	.43	13.27	10.38	26.80	.89	.56	.24	.14	62.79	12
.45	.52	.60	.31	3.98	16.92	9.05	.59	2.40	1.51	2.60	1.44	40.38	13
.56	.64	.75	.87	2.47	4.88	1.08	23.93	1.14	.47	.85	.47	38.12	14
.23	.26	.31	4.00	.35	.40	1.43	.00	3.02	3.59	.40	.22	14.20	15
.91	1.06	1.17	1.12	3.13	78.78	4.56	18.79	9.62	.36	.12	.00	119.63	16
1.77	2.04	2.37	1.59	.69	1.23	1.16	13.58	.53	.81	2.14	1.18	29.10	17
.67	.78	.92	.73	.94	.38	11.02	11.38	2.78	2.05	1.11	.63	33.39	18
1.30	1.46	1.67	4.52	64.78	3.53	11.40	79.03	1.20	4.47	1.51	.85	175.72	19
5.48	6.26	7.22	1.68	1.71	106.75	1.32	26.00	6.25	.31	.42	.23	163.63	20
.12	.15	.17	.26	.30	5.38	94.26	153.41	2.45	.24	.00	.00	256.74	21
.30	.36	.41	.64	.74	6.52	9.07	1.05	.84	.89	1.27	.71	22.78	22
.55	.63	.73	2.48	.75	1.02	1.49	.71	.60	1.04	.53	.30	10.83	23
.11	.13	.14	1.60	.52	.45	1.27	53.38	3.09	.75	1.69	.93	64.05	24
.43	.52	.61	2.31	5.76	38.83	2.04	2.17	1.28	2.56	.25	.14	56.91	25
.28	.32	.35	7.34	20.22	292.68	20.80	19.42	12.49	.64	.23	.13	374.89	26
.68	.81	.93	3.13	.57	5.74	12.86	.74	2.11	1.89	2.45	1.36	33.28	27
.38	.42	.48	1.76	.32	11.34	8.29	.70	3.85	1.34	1.65	.92	31.47	28
.49	.62	.70	.76	.64	1.00	1.69	.49	.49	8.14	.26	.14	15.41	29
1.10	1.24	1.43	2.21	2.85	15.20	28.90	6.39	.93	3.37	2.39	1.32	67.32	30
1.41	1.56	1.80	1.90	5.90	3.01	12.73	11.75	.85	2.39	.00	.00	43.31	31
.34	.41	.48	1.69	2.92	235.87	10.56	7.50	.35	2.68	3.26	1.79	267.84	32
.00	.00	.00	.39	1.68	4.19	.00	3.13	17.39	.61	.61	.34	28.33	33
.59	.67	.77	1.12	3.65	1.21	1.43	5.40	3.31	.17	.00	.00	18.32	34
.00	.11	.12	.56	2.97	3.32	.61	19.66	23.93	.31	.31	.17	52.07	35
.65	.76	.84	1.03	.21	.55	2.17	13.71	2.70	.81	.68	.38	24.48	36
1.00	1.18	1.33	.98	5.87	51.19	47.83	14.47	.43	7.69	.57	.31	132.84	37
.00	.11	.12	.34	1.31	.33	10.73	1.78	10.04	.17	.10	.00	25.04	38
.27	.31	.35	8.50	4.16	21.41	.29	10.50	.65	1.32	.32	.18	48.25	39
.70	.79	.90	1.98	4.82	1.21	.77	2.19	5.14	.66	.21	.12	19.49	40
2.24	2.55	3.04	12.65	21.20	3.78	.51	.74	.69	.34	.32	.18	48.27	41
.54	.60	.68	2.79	.56	1.60	.75	98.50	1.96	3.15	1.16	.64	112.93	42
.35	.39	.46	1.81	9.78	6.77	7.85	5.41	4.27	.55	1.29	.71	39.65	43
.10	.12	.14	.60	.00	.21	4.45	.84	.96	1.90	1.02	.57	10.91	44
.72	.83	.92	2.71	4.87	2.28	.19	5.05	.69	11.12	8.10	4.53	42.00	45
.14	.16	.18	.27	1.47	.73	.30	5.32	5.95	.91	.12	.00	15.55	46
.52	.59	.68	3.85	13.20	32.26	134.30	93.42	1.66	1.10	.92	.51	283.02	47
.88	1.01	1.18	2.31	.32	28.06	.91	1.91	1.05	2.11	.38	.22	40.34	48
.66	.75	.85	1.30	2.28	7.18	1.02	16.96	2.79	.32	.11	.00	34.21	49
4.05	4.68	5.68	2.24	1.32	7.45	54.76	11.79	3.54	2.67	1.75	.96	100.89	50

.85	.99	1.15	2.06	4.80	23.83	13.44	17.94	3.55	2.13	1.44	.79	72.97	AVE.
1.04	1.20	1.40	2.21	9.78	53.98	25.17	31.18	4.49	2.56	2.12	1.16	79.64	ST.D
1.22	1.21	1.22	1.07	2.04	2.26	1.87	1.74	1.27	1.20	1.47	1.48	1.09	C.V.
2.51	2.47	2.48	2.85	4.75	3.72	3.08	2.56	2.60	1.98	2.84	2.77	1.98	SKEW

TOTAL AVERAGE = 6.081
STANDARD DEV = 20.915
SKEW COEFFICIENT = 8.446

SUMMARY OF STATISTICS
GENERATED SEQUENCES

	AVER.	STD DEVIATION
TOTAL	7.393	29.863
SEQUENCE NO.		
1	8.873	34.585
2	5.363	16.126
3	5.515	17.891
4	6.555	23.084
5	6.959	23.667
6	9.685	68.488
7	8.636	29.869
8	8.294	32.574
9	7.968	31.427
10	6.081	20.915

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE
.93	1.08	1.25	2.13	3.77	24.91	21.03	24.16	4.38	2.98	1.35	.74	88.72
1.06	1.23	1.42	2.26	5.66	53.10	38.34	62.79	4.43	4.34	1.58	.87	104.19

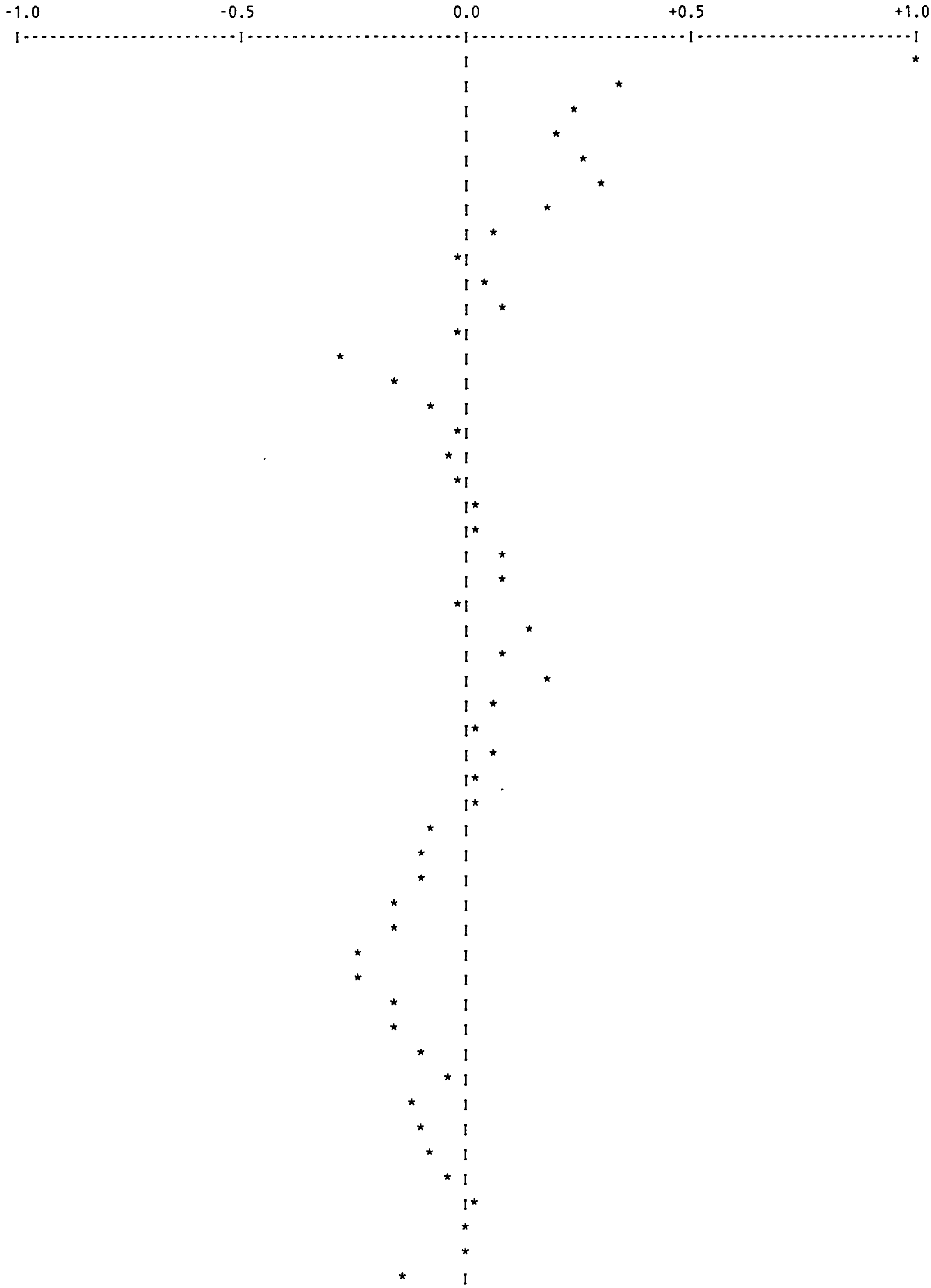
11283 RANDOM NUMBERS WERE GENERATED

AVERAGE = .4949992E+00
STANDARD DEV = .2886307E+00

6000 RANDOM NORMAL DEVIATES WERE GENERATED

AVERAGE = .4035718E-02
VARIANCE = .1206173E+01

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **



R	LAG
1.0000	0
.3494	1
.2402	2
.1972	3
.2584	4
.3065	5
.1890	6
.0525	7
-.0256	8
.0370	9
.0747	10
-.0118	11
-.2768	12
-.1521	13
-.0839	14
-.0290	15
-.0407	16
-.0295	17
.0124	18
.0166	19
.0739	20
.0774	21
-.0165	22
.1344	23
.0803	24
.1777	25
.0546	26
.0270	27
.0548	28
.0197	29
.0190	30
-.0710	31
-.0975	32
-.0950	33
-.1600	34
-.1591	35
-.2389	36
-.2413	37
-.1545	38
-.1503	39
-.0970	40
-.0438	41
-.1214	42
-.1063	43
-.0882	44
-.0425	45
.0103	46
.0058	47
.0034	48
-.1381	49

** CORRELOGRAM OF THE ORIGINAL TIME SERIES MINUS THE ANNUAL COMPONENT **

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

DEVIATIONS FROM THE ANNUAL AVERAGES

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
.00	.00	-.00	-.82	-.24	1.52	2.16	.98	2.04	.23	1.41	.01	7.28	1969
.94	-.00	.00	-.61	-.24	2.58	.55	-2.04	-.60	-.74	.86	.01	.70	1970
.27	.02	-.00	-.40	-.24	-1.43	-1.04	2.09	-1.06	-.74	.34	-.01	-2.22	1971
-.04	.01	.01	-.33	-.24	2.14	-2.12	-1.66	-.60	-.74	.15	.00	-3.42	1972
-1.69	.05	-.03	.30	-.24	-1.43	-1.04	.29	-.84	-.74	-1.43	.02	-6.79	1973
-1.22	-.02	-.01	-.01	-.24	-1.43	1.48	-2.00	.66	-.33	-.64	-.02	-3.78	1974
.72	-.00	.00	-.72	1.45	.03	.38	1.88	-1.07	2.46	-.29	.01	4.85	1975
-.65	-.01	.03	-.01	-.24	-1.43	-1.04	.44	1.13	-.10	-.67	.01	-2.55	1976
.47	.00	-.00	1.57	-1.89	.37	2.31	-.73	.96	-.18	.89	-.00	3.78	1977
-.88	-.04	.02	.07	.33	.62	-2.43	-1.57	-.60	-.74	-.85	.00	-6.07	1978
1.01	.00	-.01	1.17	2.04	-.11	-.12	1.55	-.70	1.83	.38	.01	7.07	1979
-.04	.01	-.01	-.21	-.24	-1.43	.89	.75	.69	-.22	-.14	-.02	.03	1980

**   Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent)   **

SEQUENTIAL PLOT OF DEVIATION FROM THE MOVING MONTHLY AVERAGE

100 UNITS =   256.00

```
1969  Jan    1.20 I                                                 .   *                                              I
1969  Feb    1.20 I                                                 .   *                                              I
1969  Mar    1.20 I                                                 .   *                                              I
1969  Apr    -.35 I                                              . DI*                                                 I
1969  May    -.51 I                                               D.I                                                  I
1969  Jun    1.25 I                                                *I   D.                                             I
1969  Jul    2.54 I                                                 I*     .D                                          I
1969  Aug    1.32 I                                                 I* .D                                              I
1969  Sep    2.20 I                                                 I*    .D                                           I
1969  Oct    -.47 I                                               *DI.                                                 I
1969  Nov    1.20 I                                                *I    .                                             I
1969  Dec    1.19 I                                                 .   *                                              I
1970  Jan     .65 I                                                *I D.                                               I
1970  Feb     .64 I                                                 . *                                                I
1970  Mar     .65 I                                                 . *                                                I
1970  Apr    -.35 I                                               .DI*                                                 I
1970  May    -.51 I                                               D.I                                                  I
1970  Jun    2.31 I                                                *I      D.                                          I
1970  Jul    1.24 I                                                 I . D                                              I
1970  Aug   -1.87 I                                            .    I*                                                 I
1970  Sep    -.83 I                                              D.*I                                                  I
1970  Oct    -.47 I                                               .DI*                                                 I
1970  Nov     .65 I                                                *I D.                                               I
1970  Dec     .65 I                                                 . *                                                I
1971  Jan     .12 I                                                 *.                                                 I
1971  Feb     .13 I                                                 .                                                  I
1971  Mar     .13 I                                                 .                                                  I
1971  Apr    -.35 I                                                .*                                                  I
1971  May    -.51 I                                               D.I                                                  I
1971  Jun   -1.70 I                                            D.  *I                                                  I
1971  Jul   -1.55 I                                            D .* I                                                  I
1971  Aug    1.88 I                                                *I     D.                                           I
1971  Sep    -.83 I                                               . I*                                                 I
1971  Oct    -.47 I                                               .DI*                                                 I
1971  Nov     .13 I                                                *D.                                                 I
1971  Dec     .11 I                                                 .                                                  I
1972  Jan    -.07 I                                                 .                                                  I
1972  Feb    -.06 I                                                 .                                                  I
1972  Mar    -.05 I                                                 .                                                  I
1972  Apr    -.35 I                                                .*                                                  I
1972  May    -.51 I                                               D.I                                                  I
1972  Jun    1.87 I                                                *I     D.                                           I
1972  Jul   -1.55 I                                           . D   I *                                                I
1972  Aug   -1.87 I                                           D.   *I                                                  I
1972  Sep    -.83 I                                              D.*I                                                  I
1972  Oct    -.47 I                                               .DI*                                                 I
1972  Nov    -.06 I                                                *.                                                  I
1972  Dec    -.06 I                                                 .                                                  I
1973  Jan   -1.68 I                                             .   *                                                  I
1973  Feb   -1.63 I                                             *   .                                                  I
1973  Mar   -1.68 I                                             *   .                                                  I
1973  Apr    -.35 I                                               *DI.                                                 I
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1973  May     -.51  I                                          D.I                                    I
1973  Jun    -1.70  I                                       D.  *I                                    I
1973  Jul    -1.55  I                                       D .* I                                    I
1973  Aug      .09  I                                           *D.                                   I
 973  Sep     -.83  I                                         .  *                                    I
1973  Oct     -.47  I                                          .DI*                                   I
1973  Nov    -1.64  I                                       D.  *I                                    I
1973  Dec    -1.62  I                                       *    .                                    I
1974  Jan     -.83  I                                        .D  I*                                   I
1974  Feb     -.85  I                                         *  .                                    I
1974  Mar     -.86  I                                         *  .                                    I
1974  Apr     -.35  I                                           *.                                    I
1974  May     -.51  I                                          D.I                                    I
1974  Jun    -1.70  I                                       D.  *I                                    I
1974  Jul      .97  I                                          * I  D .                               I
1974  Aug    -1.87  I                                      .     *                                    I
1974  Sep      .43  I                                           *ID.                                  I
1974  Oct     -.47  I                                           .*                                    I
1974  Nov     -.85  I                                         D.*I                                    I
1974  Dec     -.86  I                                         *  .                                    I
1975  Jan      .93  I                                            I*.D                                 I
1975  Feb      .93  I                                            .  *                                 I
1975  Mar      .93  I                                            .  *                                 I
1975  Apr     -.35  I                                          .DI*                                   I
1975  May     1.19  I                                           *I   D.                               I
1975  Jun      .67  I                                            . *                                  I
1975  Jul      .58  I                                            I.D                                  I
1975  Aug     1.96  I                                            *     .                              I
1975  Sep     -.83  I                                         .  I*                                   I
1975  Oct     2.72  I                                            I*     .D                            I
1975  Nov      .93  I                                           .I  D*                                I
1975  Dec      .93  I                                            .  *                                 I
1976  Jan     -.88  I                                         D.*I                                    I
1976  Feb     -.89  I                                         *  .                                    I
1976  Mar     -.86  I                                         *  .                                    I
1976  Apr     -.35  I                                           *.                                    I
1976  May     -.51  I                                          D.I                                    I
1976  Jun    -1.70  I                                       D.  *I                                    I
1976  Jul    -1.55  I                                       D .* I                                    I
1976  Aug      .24  I                                           *I.                                   I
1976  Sep     1.16  I                                            *   .                                I
1976  Oct     -.47  I                                           *.                                    I
1976  Nov     -.88  I                                         D.*I                                    I
1976  Dec     -.86  I                                         *  .                                    I
1977  Jan      .68  I                                            I.D                                  I
1977  Feb      .68  I                                            . *                                  I
1977  Mar      .68  I                                            . *                                  I
1977  Apr     1.84  I                                            I*   .D                              I
1977  May     -.51  I                                      .   D I   *                                I
1977  Jun      .10  I                                           *D.                                   I
1977  Jul     2.34  I                                            *     .                              I
1977  Aug     -.41  I                                          .DI*                                   I
1977  Sep      .91  I                                            *  .                                 I
1977  Oct     -.47  I                                           .I                                    I
1977  Nov      .68  I                                           *I D.                                 I
1977  Dec      .67  I                                            . *                                  I
1978  Jan    -1.04  I                                         . *I                                    I
1978  Feb    -1.08  I                                         *  .                                    I
1978  Mar    -1.07  I                                         *  .                                    I
1978  Apr     -.35  I                                           *.                                    I
```

```
1978   May      .07  I                                               *D.                                             I
1978   Jun      .66  I                                                * .                                            I
1978   Jul    -2.23  I                                        .D      I*                                             I
1978   Aug    -1.87  I                                          D.    *I                                             I
1978   Sep     -.83  I                                             D.*I                                              I
1978   Oct     -.47  I                                              .DI*                                             I
1978   Nov    -1.06  I                                              . *I                                             I
1978   Dec    -1.06  I                                              *  .                                             I
1979   Jan     1.27  I                                                I* .D                                          I
1979   Feb     1.27  I                                                .   *                                          I
1979   Mar     1.27  I                                                .   *                                          I
1979   Apr     1.67  I                                                I * .D                                         I
1979   May     3.30  I                                                I   * .   D                                    I
1979   Jun     1.66  I                                                .    D*                                        I
1979   Jul      .38  I                                                .D*                                            I
1979   Aug     1.60  I                                                *    .                                         I
1979   Sep     -.50  I                                              . I*                                             I
1979   Oct     1.99  I                                                *     .                                        I
1979   Nov     1.27  I                                                I. *D                                          I
1979   Dec     1.27  I                                                .   *                                          I
1980   Jan     -.35  I                                               *.                                              I
1980   Feb     -.34  I                                               *.                                              I
1980   Mar     -.35  I                                               *.                                              I
1980   Apr     -.35  I                                               .*                                              I
1980   May     -.51  I                                              D.I                                              I
1980   Jun    -1.70  I                                           D.   *I                                             I
1980   Jul      .38  I                                              * ID .                                           I
1980   Aug      .80  I                                                * .D                                           I
1980   Sep      .79  I                                                * .                                            I
1980   Oct     -.47  I                                               .I                                              I
 980   Nov     -.35  I                                               *.                                              I
1980   Dec     -.36  I                                               *.                                              I
```

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

DEVIATIONS FROM THE ANNUAL AVERAGES

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
-1.68	-1.63	-1.68	-.35	-.51	-1.70	-2.23	-1.87	-.83	-.47	-1.64	-1.62	-13.57	1
-1.04	-1.08	-1.07	-.35	-.51	-1.70	-1.55	-1.87	-.83	-.47	-1.06	-1.06	-10.34	2
-.88	-.89	-.86	-.35	-.51	-1.70	-1.55	-1.87	-.83	-.47	-.88	-.86	-7.75	3
-.83	-.85	-.86	-.35	-.51	-1.70	-1.55	-1.87	-.83	-.47	-.85	-.86	-7.57	4
-.35	-.34	-.35	-.35	-.51	-1.70	-1.55	-.41	-.83	-.47	-.35	-.36	-4.01	5
-.07	-.06	-.05	-.35	-.51	.10	.38	.09	-.83	-.47	-.06	-.06	-2.93	6
.12	.13	.13	-.35	-.51	.66	.38	.24	-.50	-.47	.13	.11	-2.81	7
.65	.64	.65	-.35	-.51	.67	.58	.80	.43	-.47	.65	.65	2.76	8
.68	.68	.68	-.35	-.51	1.25	.97	1.32	.79	-.47	.68	.67	7.20	9
.93	.93	.93	-.35	.07	1.66	1.24	1.60	.91	-.47	.93	.93	10.59	10
1.20	1.20	1.20	1.67	1.19	1.87	2.34	1.88	1.16	1.99	1.20	1.19	11.97	11
1.27	1.27	1.27	1.84	3.30	2.31	2.54	1.96	2.20	2.72	1.27	1.27	16.45	12

** Typical RFP Basin (D.A. = 1.0 sq. mi., Imp. = 30 percent) **

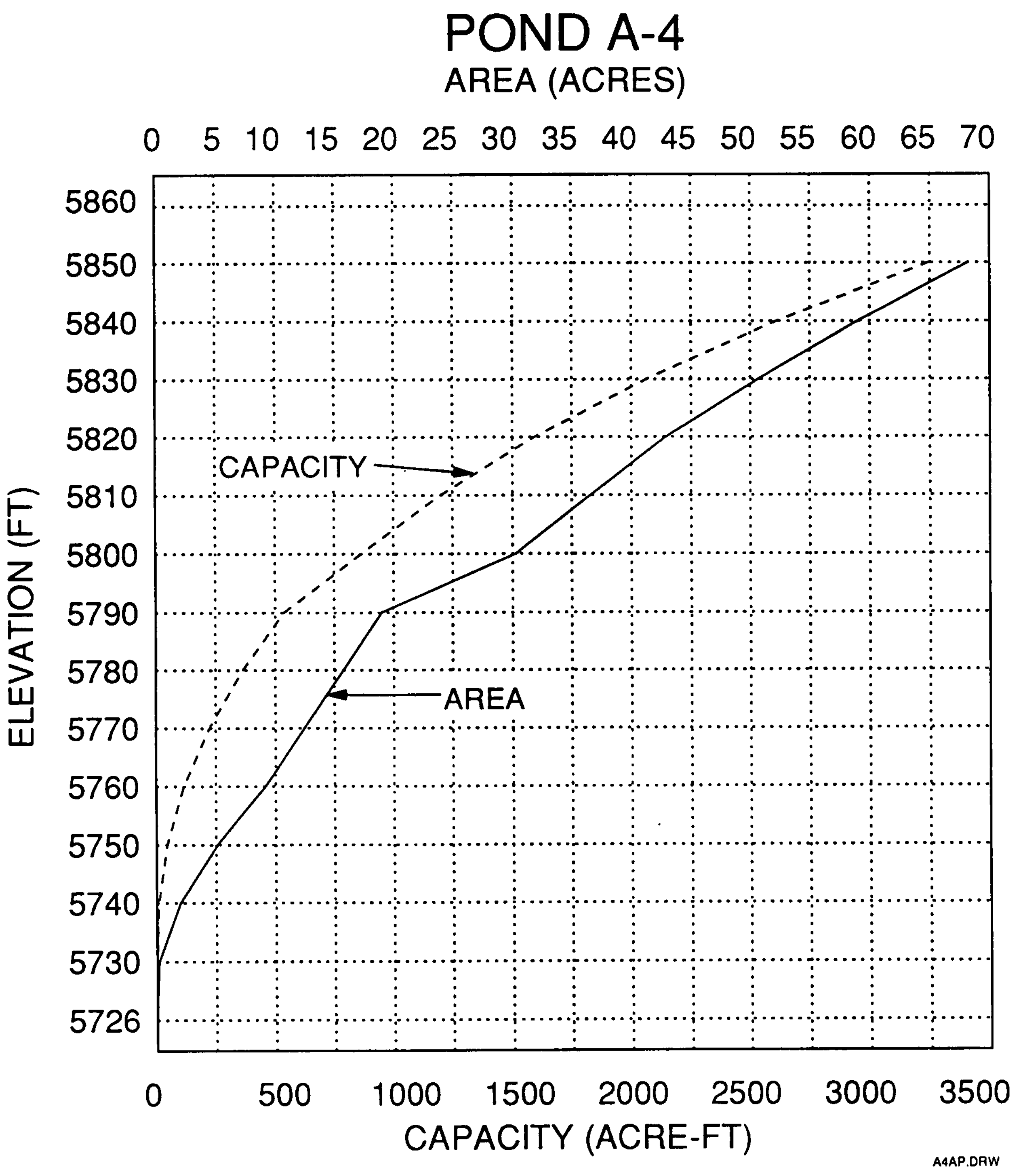
DEVIATIONS FROM THE ANNUAL AVERAGES

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANNUAL VALUE	YEAR
-1.69	-.04	-.03	-.82	-1.89	-1.43	-2.43	-2.04	-1.07	-.74	-1.43	-.02	-6.79	1
-1.22	-.02	-.01	-.72	-.24	-1.43	-2.12	-2.00	-1.06	-.74	-.85	-.02	-6.07	2
-.88	-.01	-.01	-.61	-.24	-1.43	-1.04	-1.66	-.84	-.74	-.67	-.01	-3.78	3
-.65	-.00	-.01	-.40	-.24	-1.43	-1.04	-1.57	-.70	-.74	-.64	-.00	-3.42	4
-.04	-.00	-.00	-.33	-.24	-1.43	-1.04	-.73	-.60	-.74	-.29	.00	-2.55	5
-.04	.00	-.00	-.21	-.24	-.11	-.12	.29	-.60	-.33	-.14	.00	-2.22	6
.00	.00	-.00	-.01	-.24	.03	.38	.44	-.60	-.22	.15	.01	.03	7
.27	.00	.00	-.01	-.24	.37	.55	.75	.66	-.18	.34	.01	.70	8
.47	.01	.00	.07	-.24	.62	.89	.98	.69	-.10	.38	.01	3.78	9
.72	.01	.01	.30	.33	1.52	1.48	1.55	.96	.23	.86	.01	4.85	10
.94	.02	.02	1.17	1.45	2.14	2.16	1.88	1.13	1.83	.89	.01	7.07	11
1.01	.05	.03	1.57	2.04	2.58	2.31	2.09	2.04	2.46	1.41	.02	7.28	12

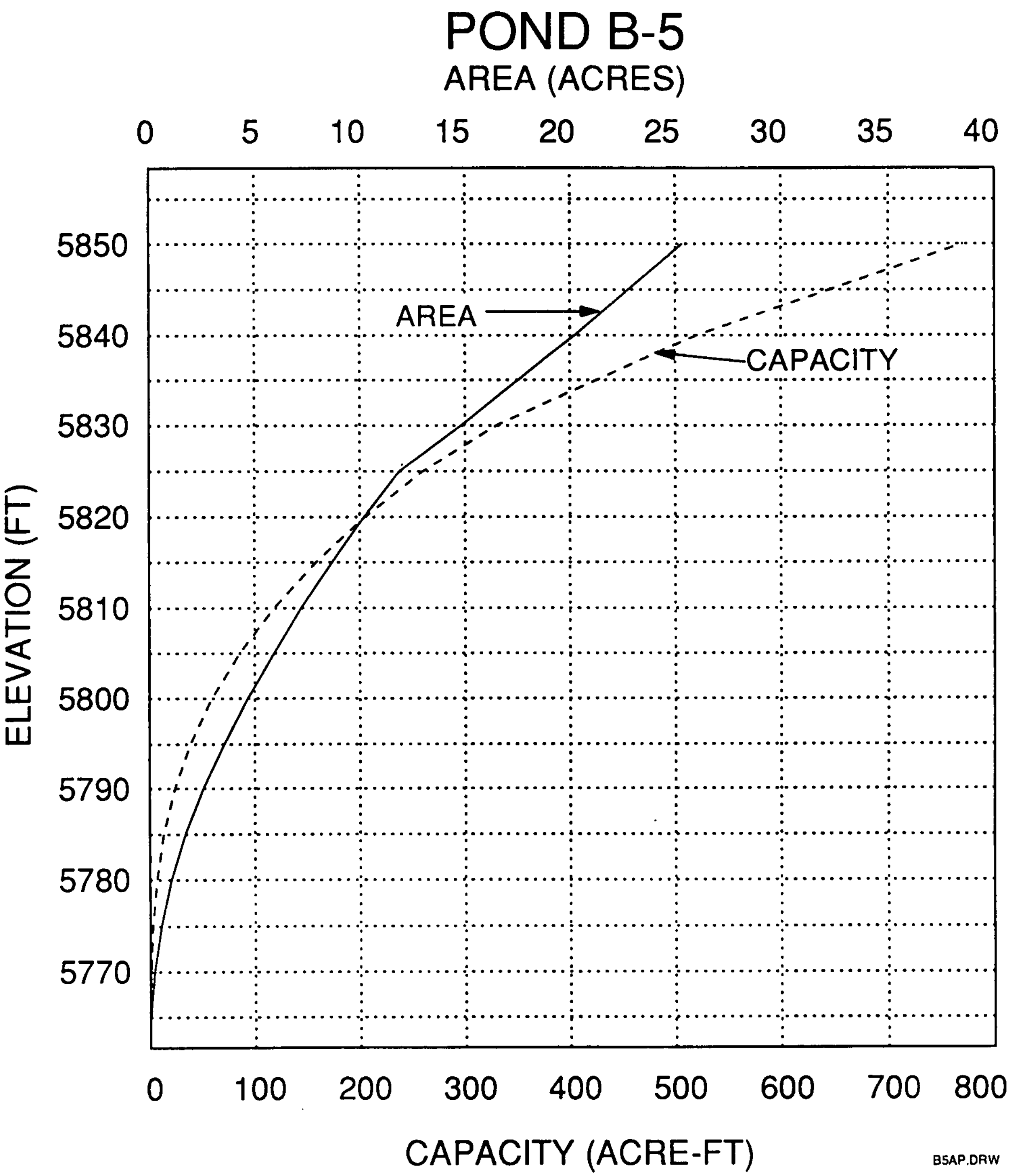
C

APPENDIX C

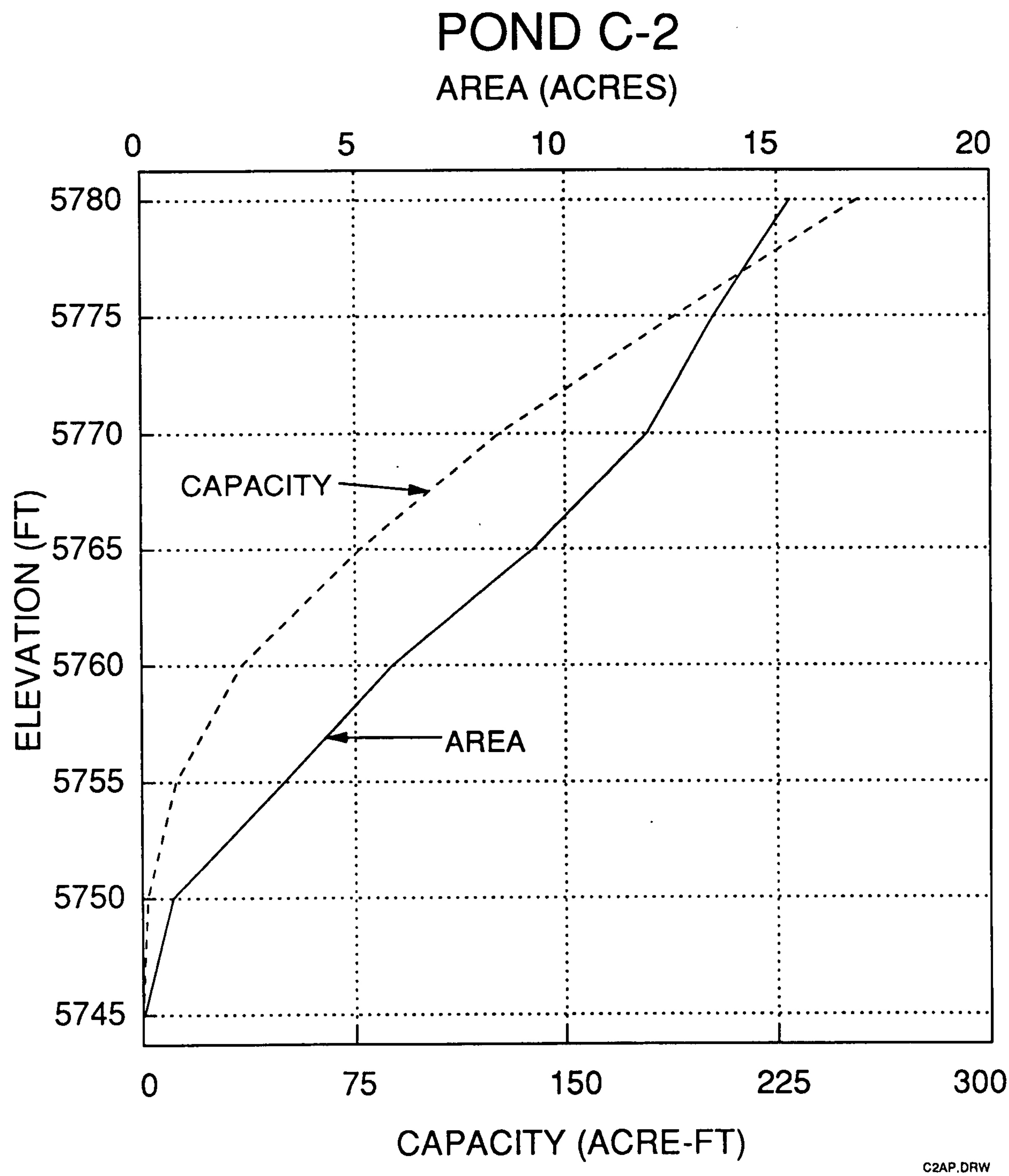
ELEVATION-AREA-CAPACITY CURVES
POND A-4, POND B-5, POND C-2, AND
GREAT WESTERN RESERVOIR



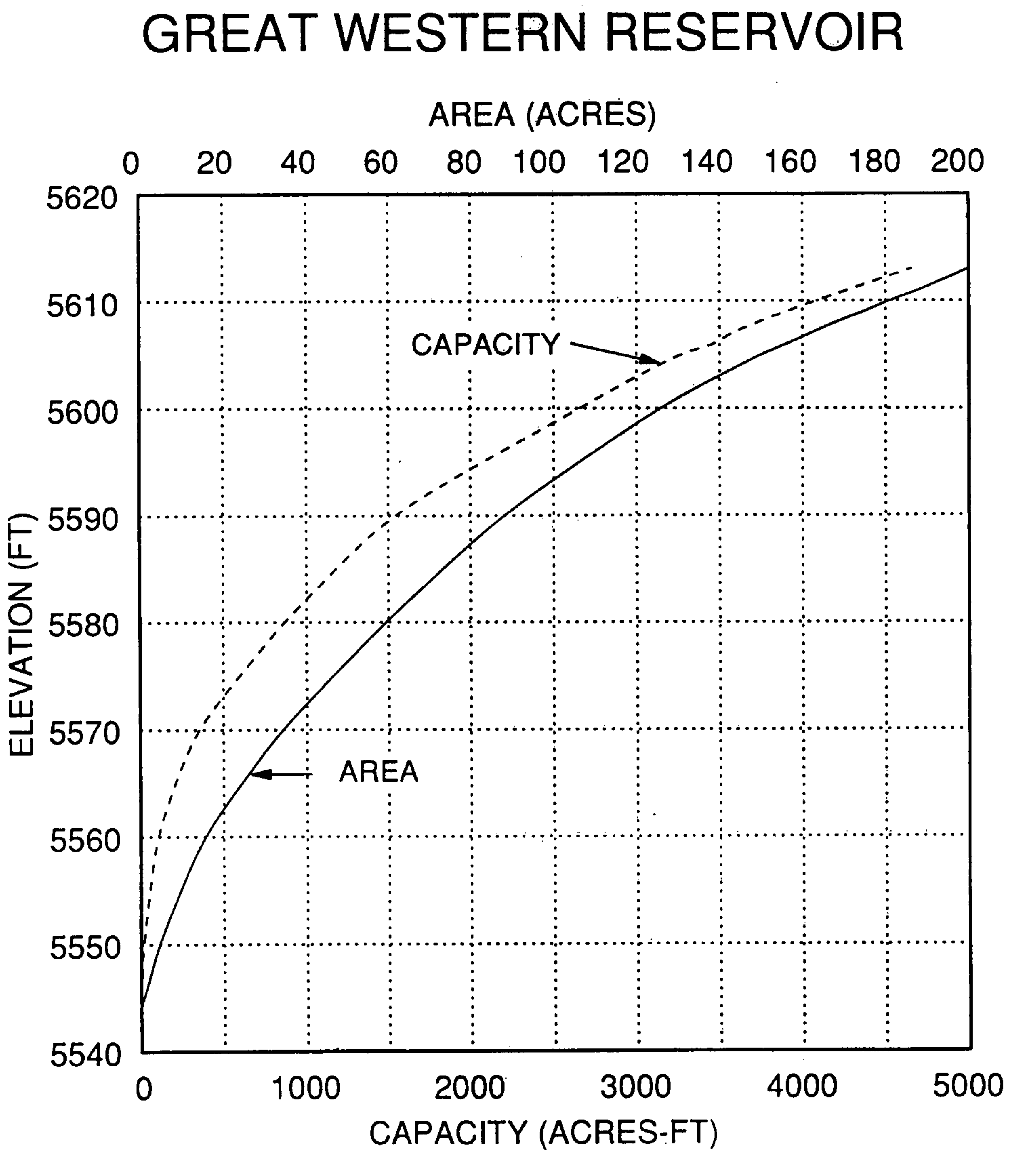
POND A-4 ELEVATION-AREA-CAPACITY CURVES		
TEMPORARY WATER-STORAGE CAPABILITIES STUDY		
ZERO OFFSITE WATER DISCHARGE		
	PROJECT: 208.0121 DATE: MAR 1991	FIGURE C-1



POND B-5 ELEVATION-AREA-CAPACITY CURVES		
TEMPORARY WATER-STORAGE CAPABILITIES STUDY		
ZERO OFFSITE WATER DISCHARGE		
	PROJECT: 208.0121 DATE: MAR 1991	FIGURE C-2



POND C-2 ELEVATION-AREA-CAPACITY CURVES	
TEMPORARY WATER-STORAGE CAPABILITIES STUDY	
ZERO OFFSITE WATER DISCHARGE	
PROJECT: 208.0121 DATE: MAR 1991	FIGURE C-3



GREAT WESTERN RESERVOIR ELEVATION-AREA-CAPACITY CURVES		
TEMPORARY WATER-STORAGE CAPABILITIES STUDY		
ZERO OFFSITE WATER DISCHARGE		
	PROJECT: 208.0121 DATE: MAR 1991	FIGURE C-4