Final Report

EVALUATION OF AMISTAD-FALCON WATER SUPPLY UNDER CURRENT AND EXTENDED DROUGHT CONDITIONS

Phase II
Lower Rio Grande Valley Regional
Integrated Water Resources Planning Study

prepared for

LOWER RIO GRANDE VALLEY DEVELOPMENT COUNCIL

and

VALLEY WATER POLICY AND MANAGEMENT COUNCIL
of the
LOWER RIO GRANDE WATER COMMITTEE, INC.

March 1999

prepared by

R.J. BRANDES COMPANY
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EVALUATION OF AMISTAD-FALCON WATER SUPPLY UNDER CURRENT AND EXTENDED DROUGHT CONDITIONS

INTRODUCTION

This investigation has been undertaken as part of Phase II of the Lower Rio Grande Valley Regional Integrated Water Resources Planning Study (LRGIWRP-II Study) that presently is being completed by Perez-Freese and Nichols, L.L.C. (P-F&N) for the Lower Rio Grande Valley Development Council. This work has been performed by R. J. Brandes Company (RJBCO) through a subcontract arrangement with P-F&N, and it has involved modification and application of the existing reservoir operations model (ROM) of the Amistad-Falcon reservoir system to evaluate the available water supply from these reservoirs under current and extended drought conditions. For purposes of this investigation, the existing Amistad-Falcon ROM conforms to the version of the model described in the August, 1998 report prepared by RJBCO for the Valley Water Policy and Management Council of the Lower Rio Grande Water Committee, Inc.[1]. The revised historical inflows to the reservoirs as developed by P-F&N during the LRGIWRP-II Study have been used as input to the model in this investigation.

Of particular concern in these analyses has been the delivery of water to municipal users in the Lower Valley during severe drought periods when irrigation water use may be curtailed or ceased all together as the total supply of United States water stored in Amistad and Falcon Reservoirs falls to low levels. Under the current Rio Grande operating rules of the Texas Natural Resource Conservation Commission (TNRCC), the available supply of water in the reservoirs for irrigation use is gradually depleted as irrigation diversions are made during periods when the inflows to the reservoirs are low. During extended periods of continued irrigation use and low reservoir inflows, the available quantity of irrigation water stored in the reservoirs can be reduced to zero. Should such conditions occur, no releases of irrigation water would be made from Falcon Reservoir, and deliveries of municipal water from the reservoir to entities in the Lower Valley would have to be made without the normal carrying water provided by the irrigation water deliveries. Under these circumstances, the water losses, due to such factors as seepage and evaporation, that may be experienced either along the river channel or within the irrigation district delivery systems that are used to convey raw water from the river to the municipal water users could be substantial. Preliminary estimates of these losses have been made in this investigation.

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[1] "The International Reservoirs Operations and Drought Contingency Planning Study for the Middle and Lower Rio Grande; Phase I-Development, Testing and Application of ROM/CPM Modeling System and Phase II-Extension of ROM/CPM Modeling System to Include Individual Municipal and Irrigation Water Rights Accounts".

The following specific technical activities have been undertaken in this investigation, and results from these activities are described and summarized in this report.:

1. The existing historical 1945-1996 monthly data base for the ROM[2] has been extended through March, 1998, using available data and information provided by the International Boundary and Water Commission (IBWC), and the ROM has been operated to evaluate the firm annual yield of the reservoir system and to simulate water availability through the year 2000 assuming that drought conditions corresponding to the year 1995 will be repeated.

2. Information describing preliminary estimates of irrigation district delivery system water losses has been compiled from documents prepared for the LRGIWRP-II Study, and this information has been used to project quantities of the additional water needed to supply year-2000 municipal demands in the four-county Lower Rio Grande Valley during severe drought periods when no irrigation water deliveries would be made.

3. Historical streamflows in the Lower Rio Grande have been examined under low-flow conditions for the purpose of quantifying the amount of channel losses that could be expected during severe drought periods when releases from Falcon Reservoir would be made only to supply municipal demands in the four-county Lower Rio Grande Valley without irrigation water deliveries.

4. The network used for the existing Amistad-Falcon ROM has been expanded to include additional links and nodes along the Lower Rio Grande downstream of Falcon Reservoir so that municipal demands and associated water losses along the river and within irrigation district delivery systems can be effectively described, particularly under severe drought conditions without irrigation carrying water.

5. The modified Amistad-Falcon ROM has been operated to evaluate water availability for the period 1995-2000 based on actual historical conditions through March, 1998, and on assumed year-1995 hydrologic conditions and year-2000 municipal demands for the period April, 1998 through December, 2000, taking into account water losses along the river and within irrigation district delivery systems without irrigation carrying water.

EXTENSION OF ROM HISTORICAL DATA BASE

A request was made to the IBWC on August 21, 1998, for various specific types of data needed to extend the existing 1945-1996 monthly data base for the Amistad-Falcon ROM. A copy of

[2] In this investigation, the existing historical 1945-1996 data base includes revised estimates of monthly inflows to Amistad and Falcon Reservoirs for the U. S. and Mexico as derived by P-F&N in the LRGIWRP-II Study.

this request is included with this report as Attachment 1. By letter dated September 24, 1998, the IBWC transmitted hard copies and computer files of the requested data to RJBCO. Using the additional data provided by IBWC, the existing 1945-1996 monthly data base for the Amistad-Falcon ROM has been extended to include the period January, 1997, through March, 1998. Complete sets of the required model input data were not available beyond March, 1998.

Using the extended historical data base for the period January, 1995 through March, 1998, the ROM has been operated to test the simulation accuracy of the program. These results are plotted in Figures 1 and 2 in terms of the monthly variations of storage in Amistad and Falcon Reservoirs for the United States and for Mexico, respectively. As shown on these plots, the simulated storage values generally are in close agreement with the observed values for all of the reservoir storage compartments of the model, with the most deviation indicated in the Mexico Falcon results for 1997 and 1998 as plotted in Figure 2. The cause of these differences has not been determined; however, considering the overall accuracy of the simulated results, the ROM appears to be effectively simulating the storage behavior of the reservoirs for the prescribed conditions of historical reservoir inflows, evaporation losses, and demands. A copy of the printed output from the ROM for this 1995-1998 simulation of historical conditions is contained in Attachment 2.

The ROM also has been operated using the extended data base corresponding to historical inflow and evaporation conditions for the period January, 1945 through December, 1997, for the purpose of reanalyzing the firm annual yield of the Amistad-Falcon Reservoir system. Based on these historical hydrologic conditions with the current storage capacities of the two reservoirs[3], the firm annual yield for the United States has been estimated to be 1,195,098 acre-feet per year, and for Mexico, it has been estimated to be 992,250 acre-feet per year. Based on the ROM simulations, the historical low-flow conditions that occurred during the severe drought of the 1950's represent the critical flow conditions that have determined these yield values.

The occurrence of the critical drought period when the combined storage in both reservoirs for each of the two countries falls to a minimum level (1950's) is illustrated on the reservoir storage plot in Figure 3. This graph shows the variations in the monthly quantities of the total amount of water stored in both of the reservoirs for each country as simulated with the ROM for the entire analysis period (1945-1997). As indicated, the total storage in the two reservoirs for the United

[3] Based on 1992 hydrographic surveys conducted by IBWC, the normal conservation storage capacities of the reservoirs by country are as follows:

	United States Acre-Feet	Mexico Acre-Feet
Amistad Reservoir	1,771,041	1,380,278
Falcon Reservoir	1,555,129	1,098,674
Both Reservoirs	3,326,170	2,478952

FIGURE 1
COMPARISON OF 1995-1998 SIMULATED AND OBSERVED MONTHLY STORAGE
IN AMISTAD AND FALCON RESERVOIRS FOR THE UNITED STATES

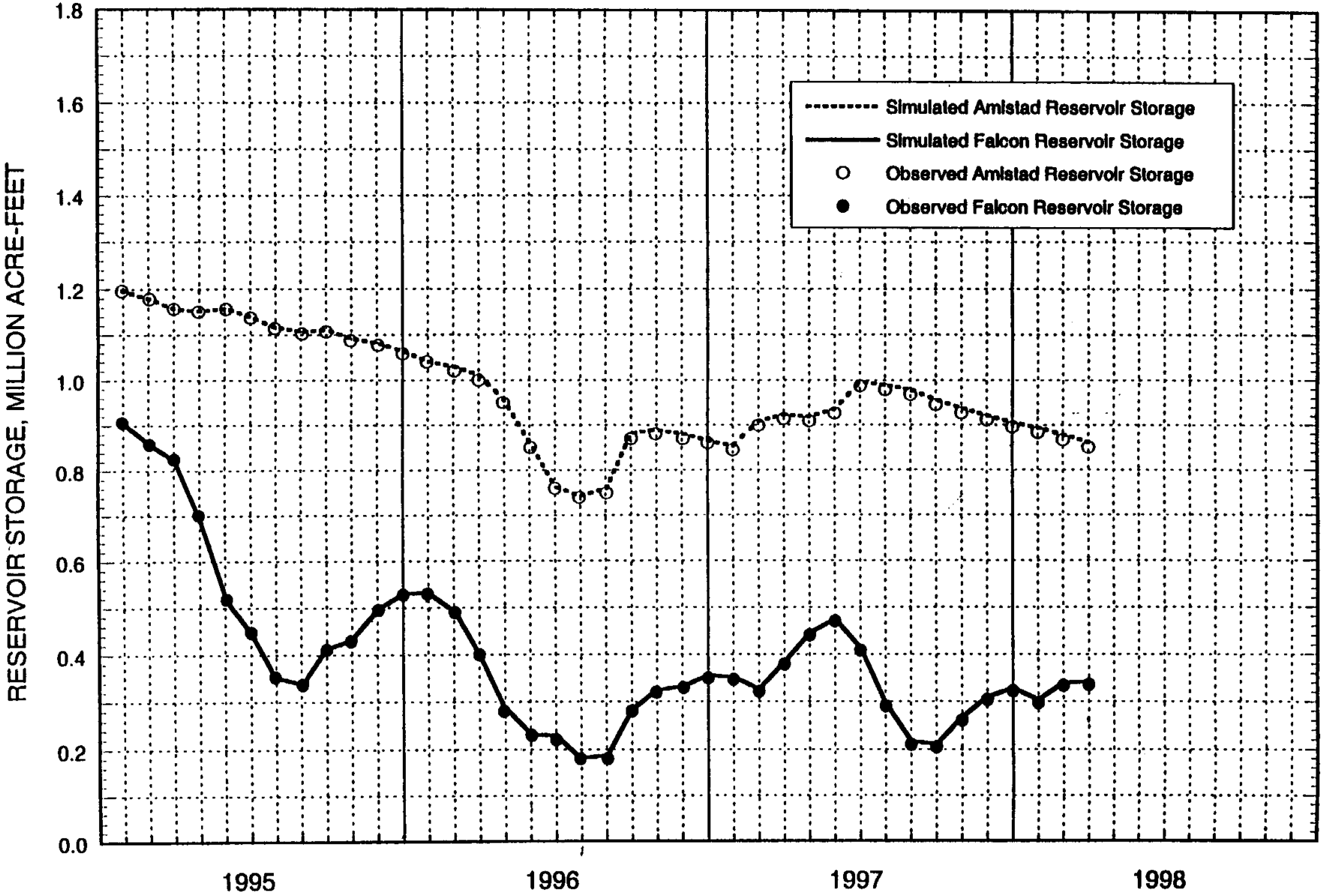


FIGURE 2
COMPARISON OF 1995-1998 SIMULATED AND OBSERVED MONTHLY STORAGE
IN AMISTAD AND FALCON RESERVOIRS FOR MEXICO

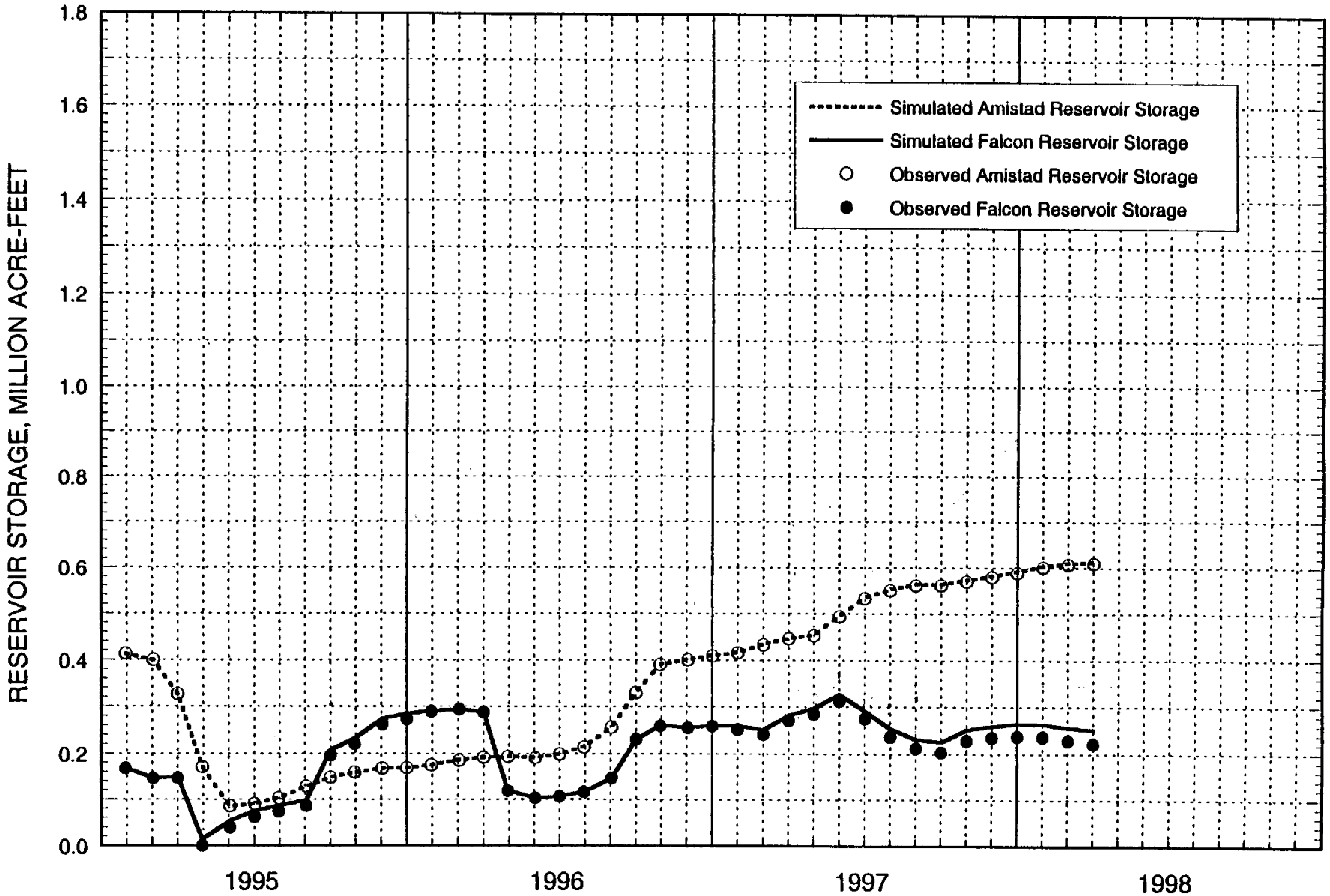
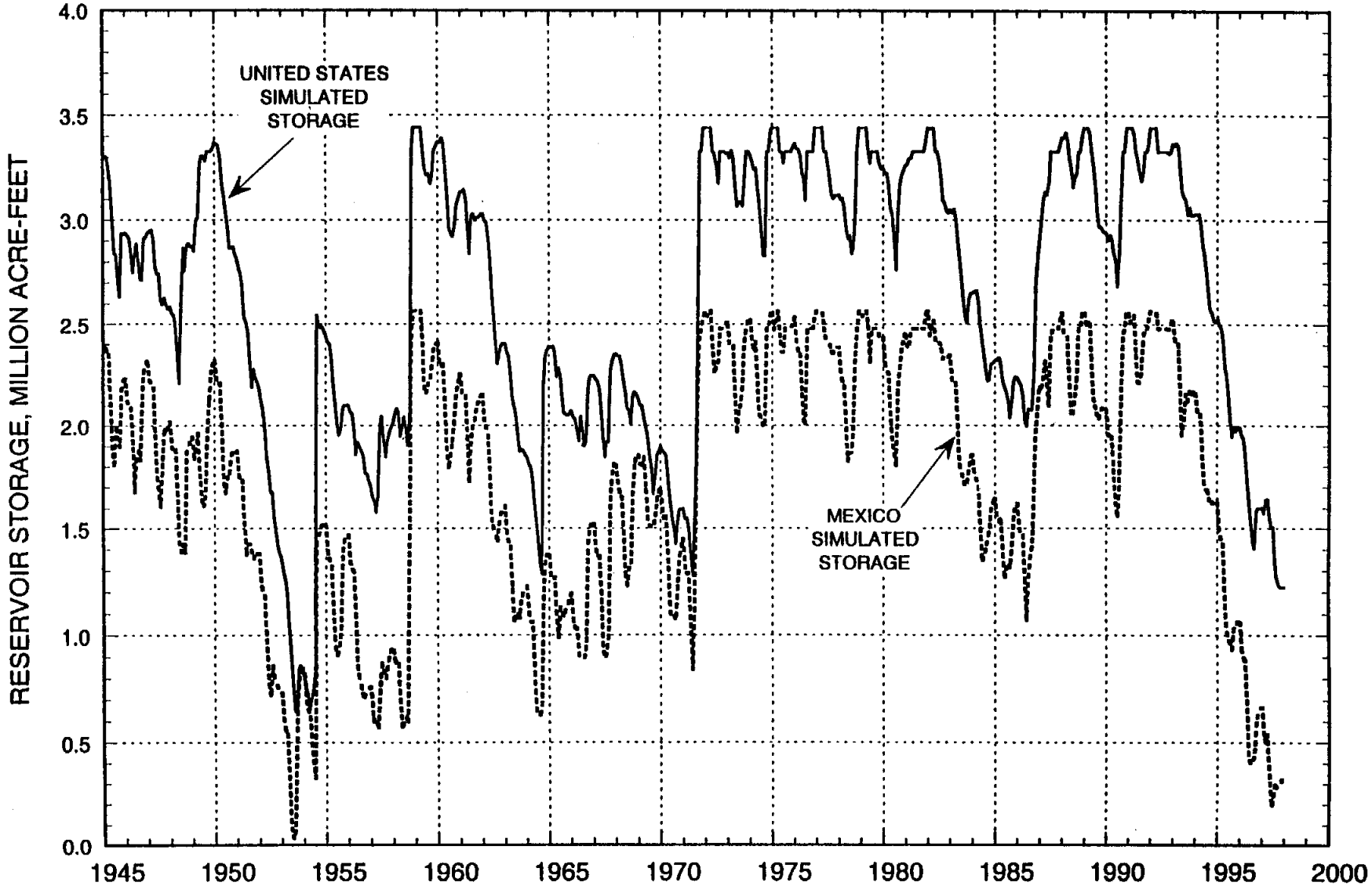


FIGURE 3
SIMULATED 1945-1997 TOTAL MONTHLY STORAGE FOR THE UNITED STATES AND MEXICO
WITH HISTORICAL INFLOWS AND FIRM ANNUAL YIELD DEMANDS



States reaches a minimum level of approximately 650,000 acre-feet during 1953. For Mexico, the minimum storage condition (~2,500 acre-feet) also occurs during 1953. The corresponding simulated monthly variations in the storage in each of the reservoirs for each of the countries are plotted on the graphs in Figures 4 and 5 for Amistad and Falcon Reservoirs, respectively. These plots illustrate the wide fluctuations in the storage for both countries in Falcon Reservoir, compared to the relatively stable storage conditions in Amistad Reservoir. These conditions reflect the current operating procedures for the reservoir system that require Amistad Reservoir, the most upstream impoundment, to be kept as full as possible to minimize system-wide evaporation losses and to conserve water for downstream use.

The historical annual inflows to the Rio Grande from the watersheds above and below Amistad Reservoir for each of the two countries as used in this investigation are summarized in Table 1 for the period 1945-1997. These annual flows are listed chronologically, and they also are ranked in descending order, with the flows for 1995, 1996 and 1997 highlighted. As indicated, annual flows that occurred during the 1950's drought are the lowest over the entire 53-year historical period; however, those flows corresponding to the current drought period (1995-1997) also are near the lower end of the rankings, indicating that the current drought is indeed a severe and rare event.

It is important to note that the firm annual yield values reported above are based on historical inflows that do not necessarily reflect current watershed and water resource development conditions throughout the Rio Grande basin. Because of tributary reservoir projects that have been developed in Mexico since the 1950's and other watershed modifications that have been implemented over the years, it is likely that the firm annual yield estimates derived in this study (based on actual flows during the 1950's) do not represent the actual yields of the reservoirs under today's conditions. Subsequent studies of the Rio Grande system will need to address these reservoir inflow issues.

ANALYSIS OF EXTENDED DROUGHT PERIOD

Using the historical data base for the Amistad-Falcon ROM for the period from January, 1995 through March, 1998, the potential effects on water availability of an extended drought through the year 2000 have been analyzed by assuming that hydrologic and demand conditions during the balance of 1998 (April through December) and during all of the years 1999 and 2000 would be the same as those which occurred during 1995. The year-1995 hydrologic conditions have been selected for purposes of extending the current drought in these analyses since the 1995 annual inflows to the reservoirs represent the lowest, and most critical, levels of flow that have occurred during the current drought period (see Table 1).

FIGURE 4
SIMULATED 1945-1997 MONTHLY STORAGE IN AMISTAD RESERVOIR FOR THE UNITED STATES AND MEXICO WITH HISTORICAL INFLOWS AND FIRM ANNUAL YIELD DEMANDS

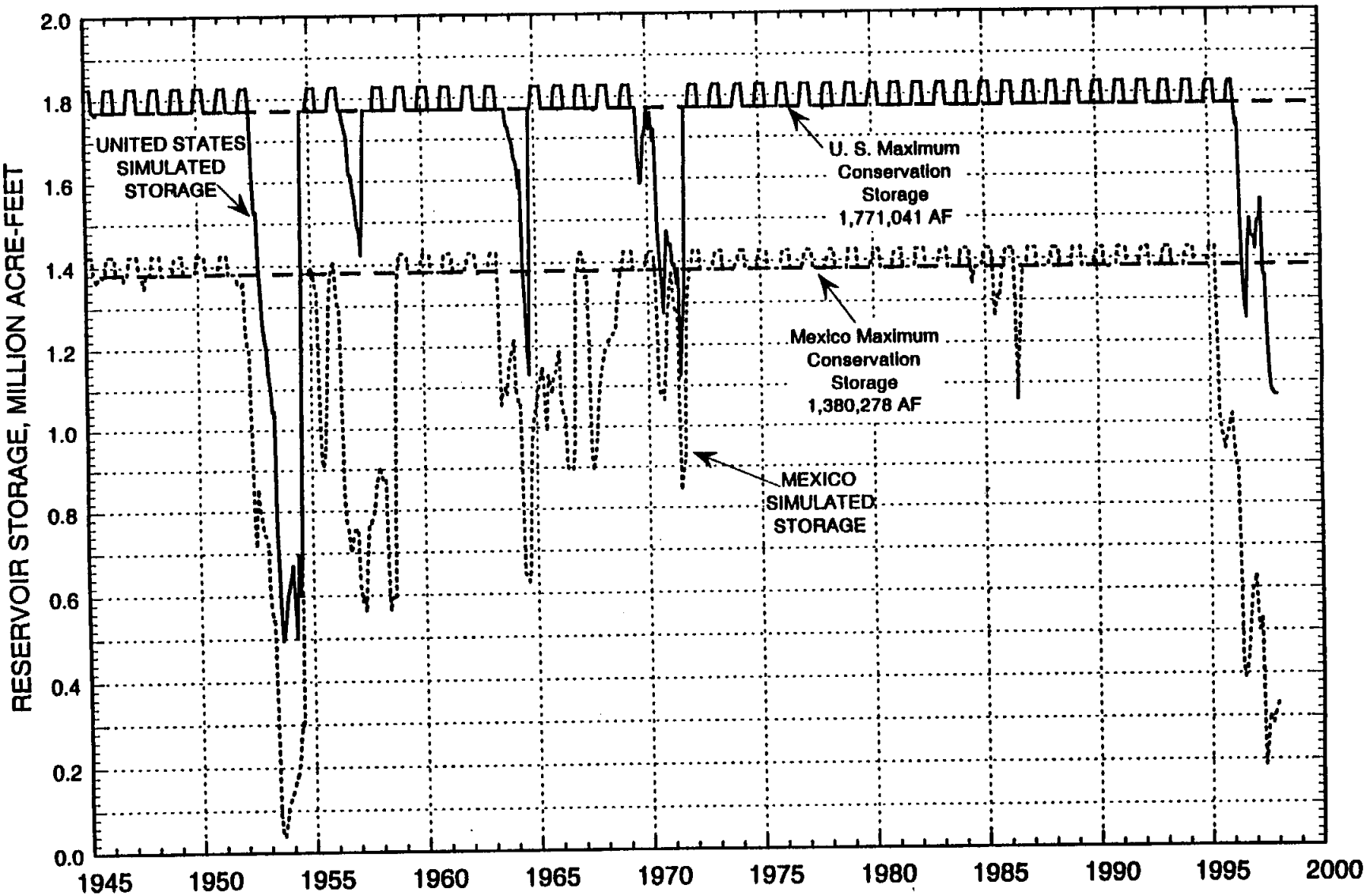


FIGURE 5
SIMULATED 1945-1997 MONTHLY STORAGE IN FALCON RESERVOIR FOR THE UNITED STATES AND MEXICO WITH HISTORICAL INFLOWS AND FIRM ANNUAL YIELD DEMANDS

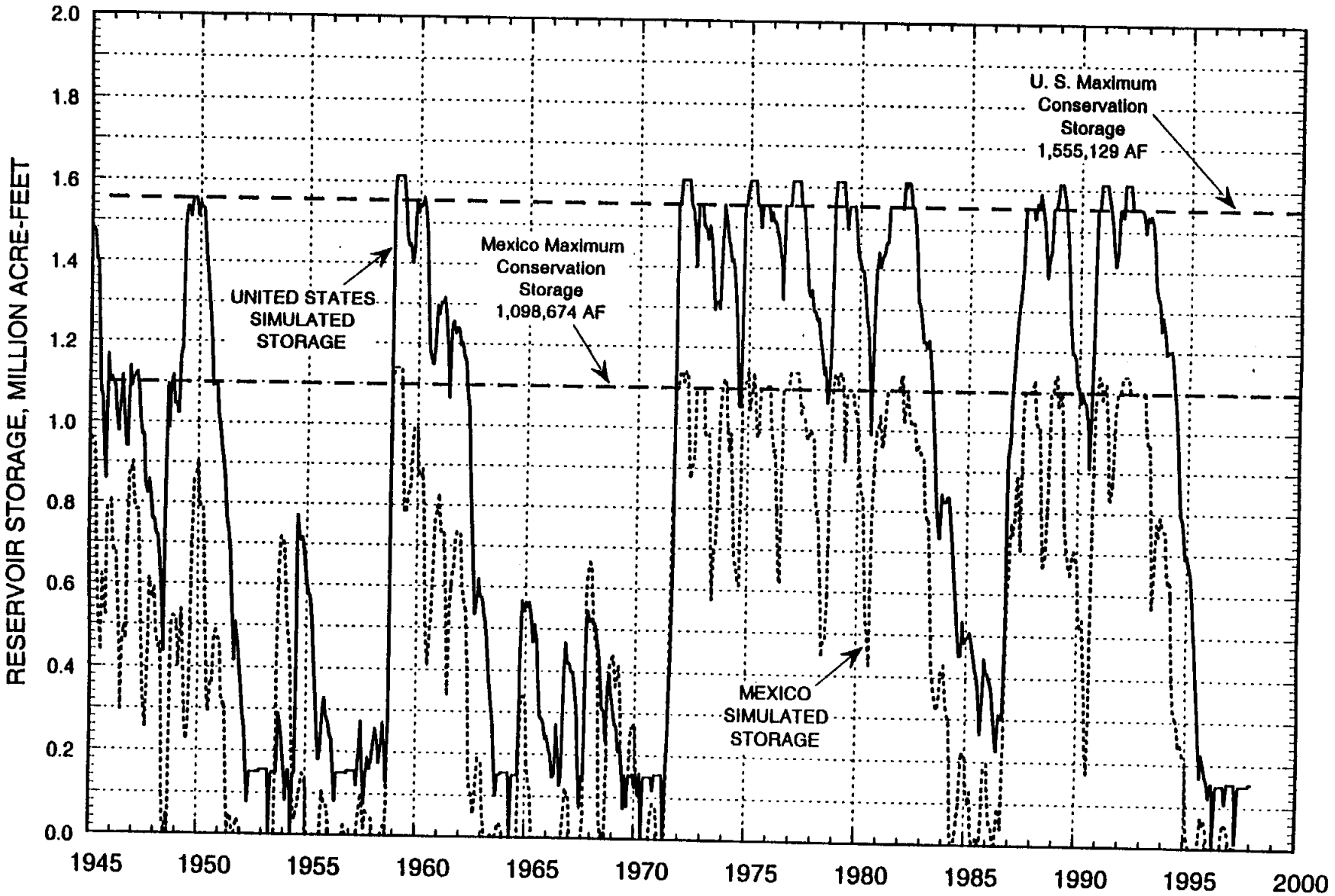


TABLE 1 HISTORICAL ANNUAL UNITED STATES AND MEXICAN INFLOWS TO AMISTAD AND FALCON RESERVOIRS

(Acre-Feet)

YEAR	UNITED STATES INFLOWS			MEXICAN INFLOWS			INFLOWS RANKED IN DESCENDING ORDER				
	Above Amistad Reservoir	Below Amistad Reservoir	Total Annual Inflows	Above Amistad Reservoir	Below Amistad Reservoir	Total Annual Inflows	Year	Total U. S. Inflows	RANK	Year	Total Mexican Inflows
1945	1,163,203	285,000	1,448,203	883,389	278,000	1,161,389	1971	3,984,106	1	1971	3,794,270
1946	1,212,854	506,000	1,718,854	909,841	521,000	1,430,841	1954	3,970,792	2	1958	3,501,723
1947	973,130	426,000	1,399,130	669,063	371,000	1,040,063	1974	3,317,228	3	1981	2,668,850
1948	1,454,024	595,000	2,049,024	507,768	702,000	1,209,768	1958	3,257,139	4	1976	2,467,178
1949	1,666,097	783,000	2,449,097	1,042,898	442,000	1,484,898	1981	2,882,903	5	1978	2,318,497
1950	1,093,569	248,000	1,341,569	786,227	128,000	914,227	1976	2,669,234	6	1990	2,226,809
1951	743,512	371,000	1,114,512	404,486	326,000	730,486	1990	2,495,386	7	1991	2,215,339
1952	644,293	92,000	736,293	428,901	64,000	492,901	1949	2,449,097	8	1987	1,952,463
1953	505,469	380,000	885,469	222,231	1,003,000	1,225,231	1987	2,428,644	9	1992	1,906,695
1954	3,764,424	206,368	3,970,792	788,961	325,559	1,114,520	1991	2,336,391	10	1988	1,761,635
1955	1,161,083	262,728	1,423,811	677,209	344,411	1,021,620	1957	2,304,200	11	1986	1,748,591
1956	562,134	146,131	708,265	296,764	153,390	450,154	1978	2,299,662	12	1975	1,662,148
1957	1,670,650	633,550	2,304,200	564,144	727,886	1,292,030	1986	2,264,727	13	1979	1,566,850
1958	1,969,349	1,287,790	3,257,139	1,567,841	1,933,882	3,501,723	1992	2,220,265	14	1974	1,517,152
1959	1,400,966	413,263	1,814,229	667,730	489,555	1,157,285	1964	2,152,091	15	1949	1,484,898
1960	1,183,084	304,220	1,487,304	848,707	307,596	1,156,303	1948	2,049,024	16	1972	1,473,295
1961	1,173,210	438,643	1,611,853	624,584	583,960	1,208,544	1988	2,009,094	17	1967	1,467,261
1962	906,681	222,588	1,129,269	511,070	240,095	751,165	1975	1,974,648	18	1946	1,430,841
1963	770,142	259,995	1,030,137	481,290	307,161	788,451	1972	1,876,700	19	1973	1,420,827
1964	1,673,626	478,465	2,152,091	672,900	548,188	1,221,088	1979	1,839,699	20	1966	1,420,305
1965	1,039,969	334,430	1,374,399	489,720	350,059	839,779	1959	1,814,229	21	1980	1,361,638
1966	1,318,285	391,422	1,709,707	1,003,086	417,219	1,420,305	1980	1,738,551	22	1957	1,292,030
1967	954,207	713,220	1,667,427	523,436	943,825	1,467,261	1946	1,718,854	23	1953	1,225,231
1968	991,330	294,637	1,285,967	841,232	382,091	1,223,323	1966	1,709,707	24	1968	1,223,323
1969	843,864	346,676	1,190,540	705,083	382,759	1,087,842	1967	1,667,427	25	1964	1,221,088
1970	844,695	297,120	1,141,815	620,385	283,218	903,603	1977	1,627,565	26	1948	1,209,768
1971	1,783,089	2,201,017	3,984,106	692,998	3,101,272	3,794,270	1973	1,625,856	27	1961	1,208,544
1972	1,307,088	569,612	1,876,700	802,803	670,492	1,473,295	1961	1,611,853	28	1945	1,161,389
1973	918,028	707,828	1,625,856	679,907	740,920	1,420,827	1960	1,487,304	29	1959	1,157,285
1974	3,029,423	287,805	3,317,228	1,211,470	305,682	1,517,152	1985	1,467,746	30	1960	1,156,303
1975	1,284,972	689,676	1,974,648	748,604	913,544	1,662,148	1982	1,458,930	31	1985	1,146,181
1976	1,607,050	1,062,184	2,669,234	773,967	1,693,211	2,467,178	1945	1,448,203	32	1954	1,114,520
1977	1,163,283	464,282	1,627,565	550,896	554,875	1,105,771	1993	1,431,890	33	1977	1,105,771
1978	1,743,638	556,024	2,299,662	1,517,216	801,281	2,318,497	1955	1,423,811	34	1969	1,087,842
1979	1,275,063	564,636	1,839,699	878,202	688,648	1,566,850	1947	1,399,130	35	1947	1,040,063
1980	1,329,313	409,238	1,738,551	817,103	544,535	1,361,638	1965	1,374,399	36	1955	1,021,620
1981	1,888,274	994,629	2,882,903	1,238,430	1,430,420	2,668,850	1950	1,341,569	37	1984	1,018,808
1982	1,118,780	340,150	1,458,930	664,349	338,840	1,003,189	1989	1,333,316	38	1993	1,018,709
1983	910,765	342,907	1,253,672	497,472	291,291	788,763	1984	1,320,549	39	1982	1,003,189
1984	1,086,407	234,142	1,320,549	775,321	243,487	1,018,808	1968	1,285,967	40	1950	914,227
1985	1,043,484	424,262	1,467,746	682,379	463,802	1,146,181	1983	1,253,672	41	1970	903,603
1986	1,887,478	377,249	2,264,727	1,208,462	540,129	1,748,591	1994	1,219,854	42	1989	874,095
1987	1,797,750	630,894	2,428,644	1,203,973	748,490	1,952,463	1969	1,190,540	43	1965	839,779
1988	1,469,121	539,973	2,009,094	929,864	831,771	1,761,635	1996	1,184,139	44	1983	788,763
1989	1,055,062	278,254	1,333,316	589,071	285,024	874,095	1997	1,177,454	45	1963	788,451
1990	2,076,817	418,569	2,495,386	1,728,668	498,141	2,226,809	1970	1,141,815	46	1962	751,165
1991	2,027,658	308,733	2,336,391	1,892,590	322,749	2,215,339	1962	1,129,269	47	1994	744,394
1992	1,702,861	517,404	2,220,265	1,283,085	623,610	1,906,695	1951	1,114,512	48	1951	730,486
1993	1,181,767	250,123	1,431,890	788,586	230,123	1,018,709	1995	1,113,964	49	1996	701,431
1994	924,654	295,200	1,219,854	488,813	255,581	744,394	1963	1,030,137	50	1997	641,400
1995	895,126	218,838	1,113,964	387,891	240,841	628,732	1953	885,469	51	1995	628,732
1996	956,466	227,673	1,184,139	441,577	259,854	701,431	1952	736,293	52	1952	492,901
1997	951,291	226,163	1,177,454	398,567	242,833	641,400	1956	708,265	53	1956	450,154

As indicated by the figures in the following table, the use of the year-1995 demands for the United States for the extended drought analyses (for the balance of 1998 and all of 1999 and 2000) represents overall water usage that is slightly less than that which was experienced in the Middle and Lower Rio Grande basins on an average during the five years or so prior to 1996. For Mexico, the year-1995 demands are considerably less, which generally reflects the overall limited supply of water that was actually available for Mexico from Amistad and Falcon Reservoirs during 1995.

	YEAR-1995 DEMANDS Acre-Feet/Year	AVERAGE DEMANDS Acre-Feet/Year
UNITED STATES		
Domestic-Municipal-Industrial Uses	135,306	159,000
Irrigation Uses	1,112,925	1,205,000
MEXICO		
Total Uses	841,576	1,290,000

Results from the ROM simulations for the extended drought conditions are presented in Figures 6 and 7 in terms of the end-of-month simulated storage amounts in Amistad and Falcon Reservoirs for the United States and for Mexico, respectively. As shown, under the assumed influence of year-1995 inflows and demands, the amounts of water stored in the reservoirs for both countries beyond March, 1998, generally exhibit a gradually declining trend through the year 2000. Seasonal fluctuations in the monthly storage amounts in response to varying inflows and demands, however, are evident. The total amount of water stored in both reservoirs for the United States reaches a minimum of about 570,000 acre-feet in April, 2000, and the storage in both reservoirs for Mexico drops to almost zero during April and May of the same year.

A similar, but more pronounced, falling storage trend also is exhibited by the variations in the monthly simulated total quantities of United States water in the irrigation water rights accounts that are plotted in Figure 8 for the 1995-2000 analysis period. Monthly changes in the amount of stored water allocated to the irrigation accounts are simulated in the ROM in response to specified monthly irrigation demands and the simulated amount of available United States usable storage in the reservoirs after deductions for the domestic-municipal-industrial (D-M-I) reserve and the operating reserve in accordance with TNRCC rules. Positive and negative allocations of stored water to and from the irrigation pool also are made monthly pursuant to the TNRCC rules. As indicated on the plot in Figure 8, the simulated amount of water in the irrigation accounts gradually declines through the year 2000 under the influence of the assumed year-1995 extended drought conditions. Actual shortages with respect to the specified year-1995 United States irrigation demands occur during May and July of 1999 and 2000. The magnitudes of these

FIGURE 6
SIMULATED 1995-2000 MONTHLY UNITED STATES STORAGE
IN AMISTAD AND FALCON RESERVOIRS WITH EXTENDED DROUGHT CONDITIONS

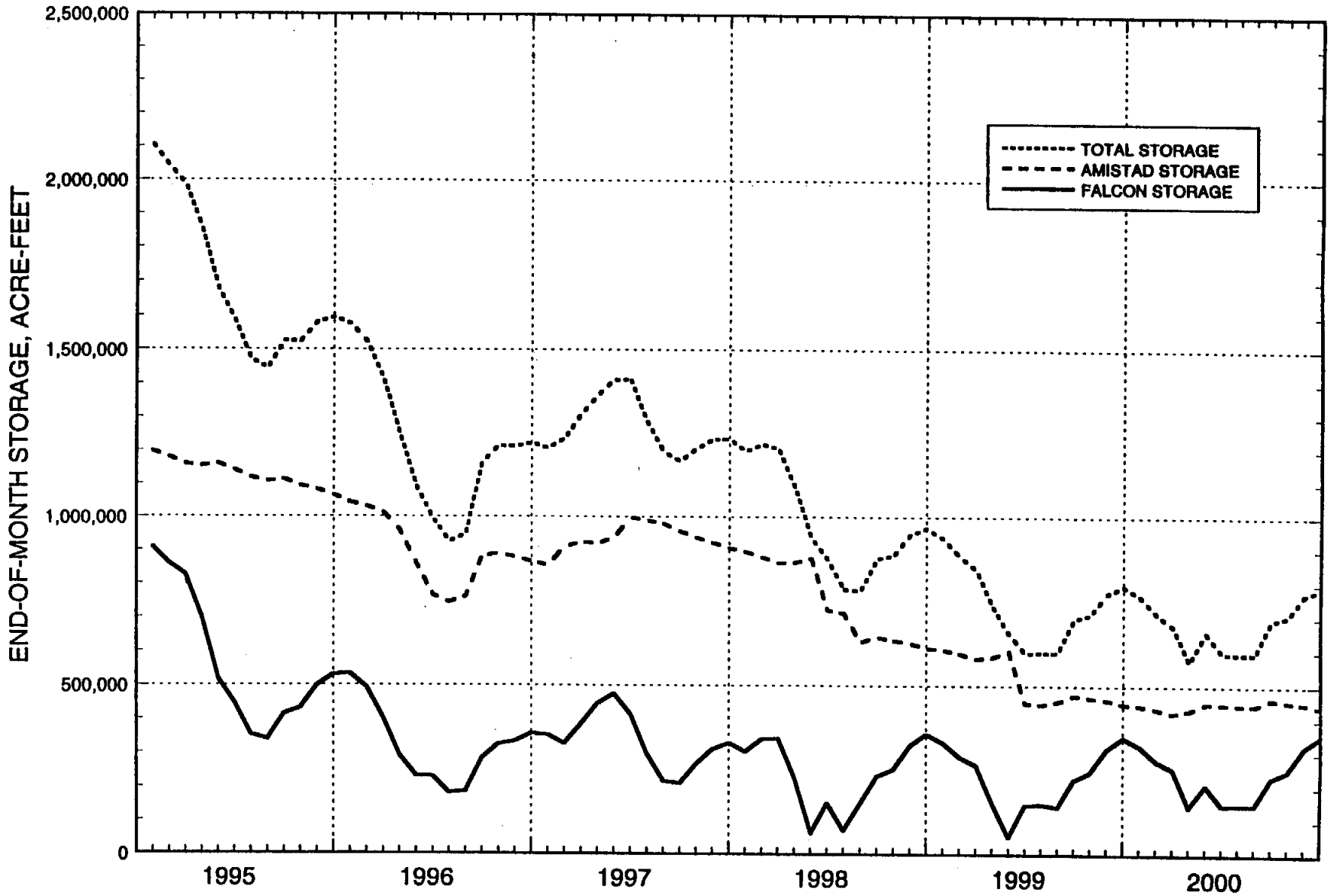


FIGURE 7
SIMULATED 1995-2000 MONTHLY MEXICO STORAGE
IN AMISTAD AND FALCON RESERVOIRS WITH EXTENDED DROUGHT CONDITIONS

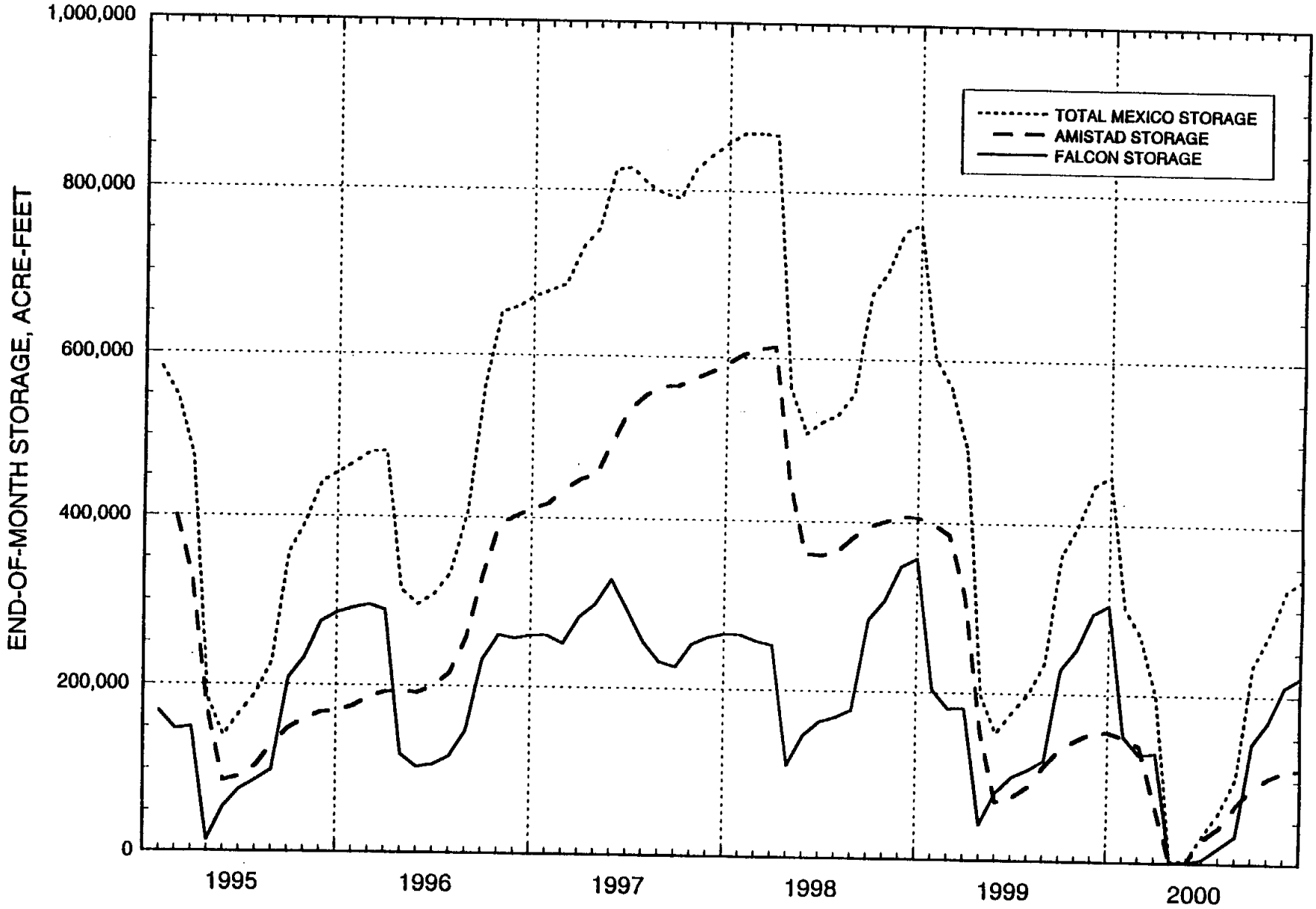
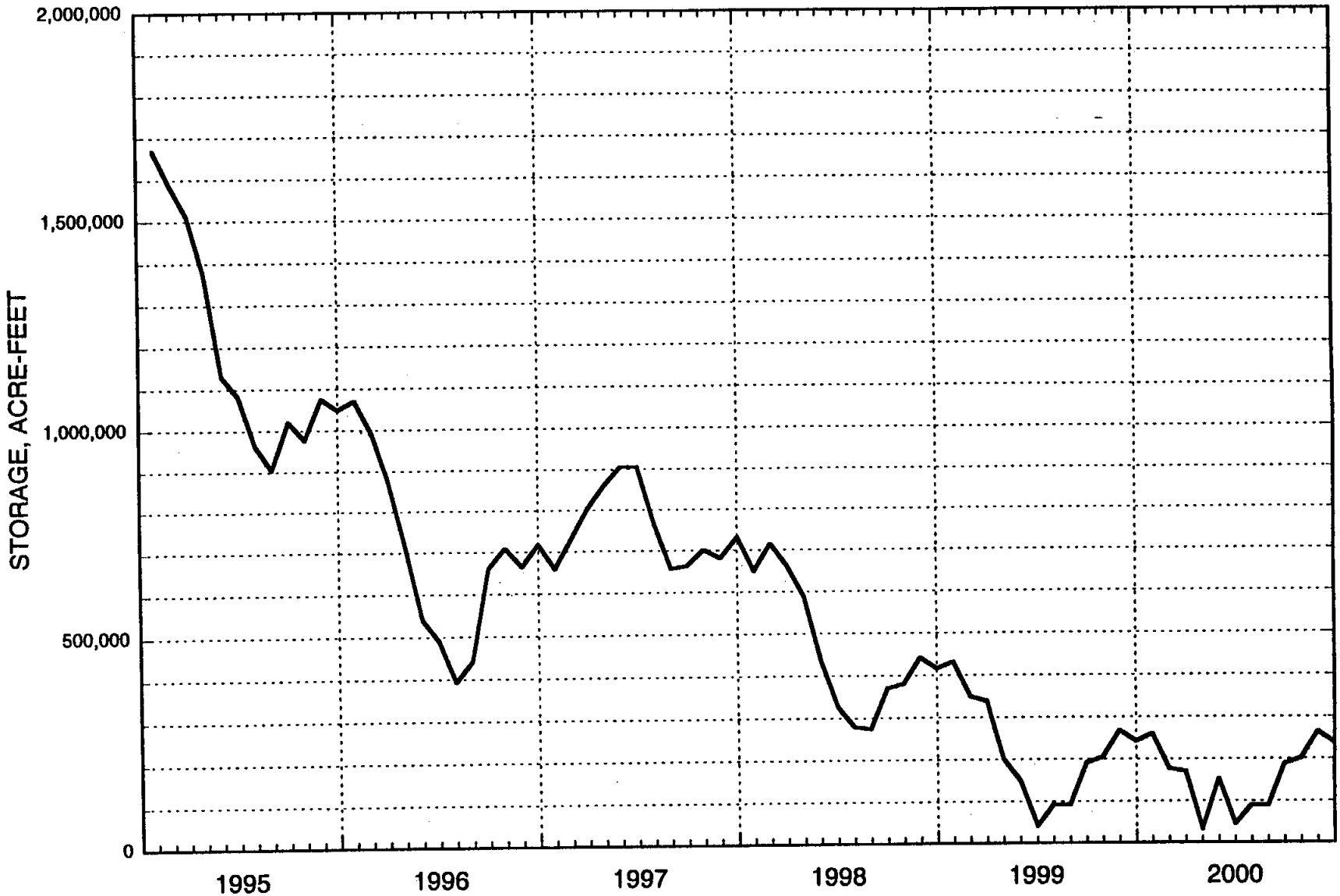


FIGURE 8
SIMULATED 1995-2000 UNITED STATES IRRIGATION ACCOUNT BALANCE
FOR EXTENDED DROUGHT CONDITIONS



shortages are noted on the bar chart in Figure 9, which shows the monthly total irrigation demands for the United States as specified in the ROM for the 1995-2000 extended drought period.

It should be noted that, as expected, no shortages in the specified D-M-I demands for the United States are indicated by the ROM results from the 1995-2000 extended drought simulation. The current operating rules regarding the D-M-I reserve provide adequate protection for the municipal water demands. Results from the simulation, however, do indicate shortages in the specified year-1995 demands for Mexico during April and May of the year 2000.

A copy of the printed output from the Amistad-Falcon ROM for the 1995-2000 extended drought simulation is contained in Attachment 3.

ANALYSIS OF MUNICIPAL-ONLY WATER DELIVERIES

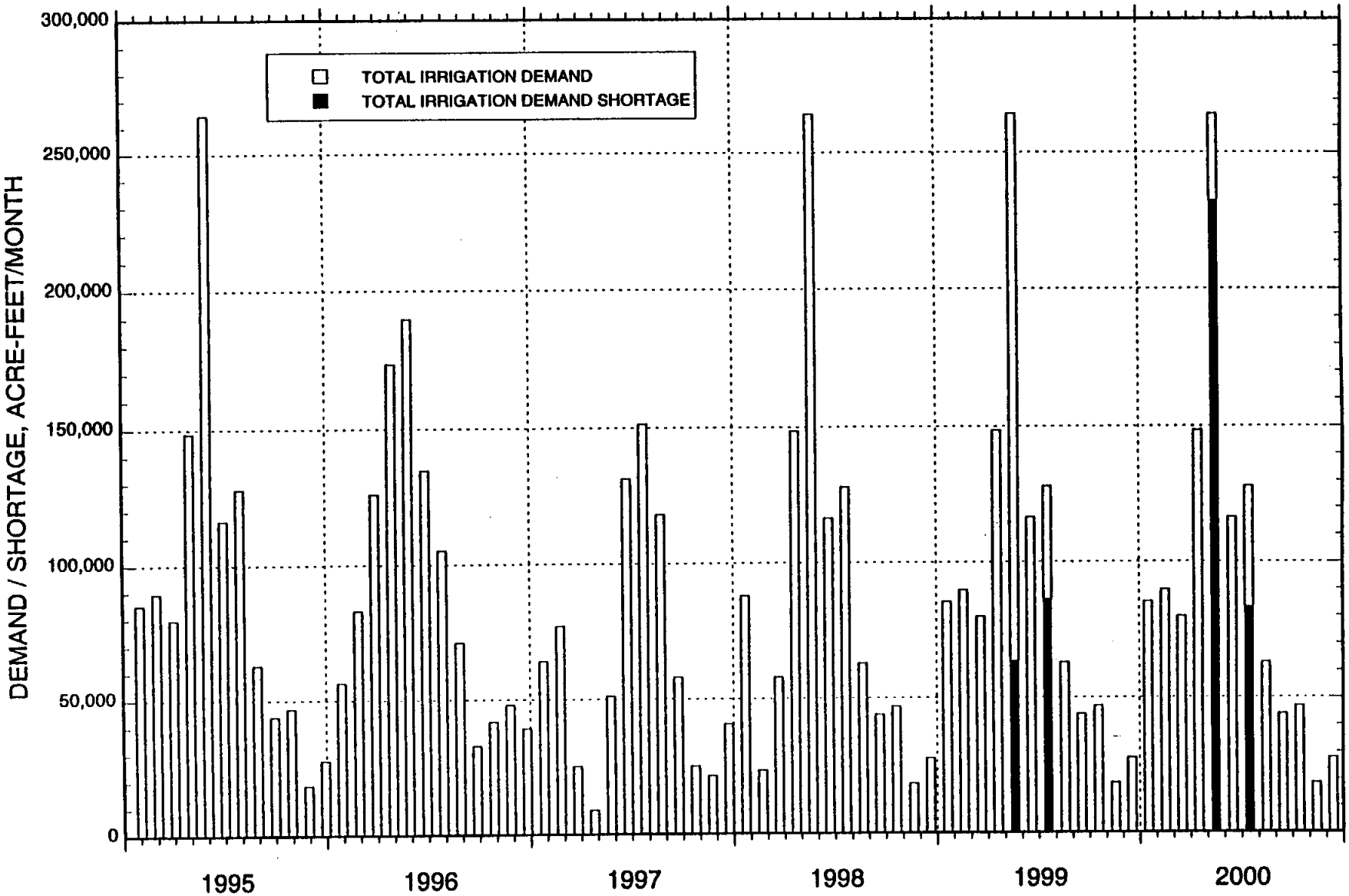
For examining water availability and the various losses associated with supplying municipal water from Falcon Reservoir to municipal water users in the Lower Rio Grande Valley in the absence of irrigation water deliveries, the Amistad-Falcon ROM also has been applied. For this purpose, the same ROM data set described above for the 1995-2000 extended drought simulation has been used, except that, for the years 1999 and 2000, all United States irrigation demands above and below Falcon Reservoir have been set equal to zero and the United States municipal demands for the Lower Valley have been set equal to the year-2000 projected demands for Cameron, Willacy and Hidalgo Counties as developed in the LRGIWRP-II study and for Starr County as reported by the Texas Water Development Board (TWDB)[4]. In addition to the municipal water demands specified in the model, the corresponding water losses due to evaporation, seepage and other factors within the irrigation district delivery systems used to convey the municipal water from the river diversion points to the municipal users also have been estimated and accounted for in the ROM. Similarly, the channel losses in the river between Falcon Reservoir and the points of diversion also have been simulated and incorporated into the required releases from the reservoir.

Modified ROM Network

For these simulations, the existing Amistad-Falcon ROM network has been extended downstream to include specific river reaches and water demand and loss centers along the Lower Rio Grande. For the United States portion of the model, five reaches of the river have been delineated for describing river channel losses. These reaches are identified on the map of the

[4] Projected demands corresponding to "expected conservation" conditions as incorporated in the 1997 Texas Water Plan, Water for Texas document and as provided by Mr. Norman Alford of the TWDB have been used.

FIGURE 9
SIMULATED 1995-2000 UNITED STATES MONTHLY IRRIGATION DEMANDS AND SHORTAGES
FOR EXTENDED DROUGHT SIMULATION



four-county Lower Rio Grande region in Figure 10. Also, six additional nodes have been defined for describing the geographical distribution of United States municipal demands along the river between Falcon Reservoir and the city of Brownsville. For Mexico, two additional nodes have been defined in the ROM network to account for the water demands associated with Mexico's Anzalduas Canal (at Anzalduas Dam) and the city of Matamoros.

The expanded link-node network for the Amistad-Falcon ROM, including the Lower Rio Grande, is shown on the schematic in Figure 11. The additional nodes for the United States municipal demands and river channel losses along the Lower Rio Grande are indicated, as are those for the Mexico demands at Anzalduas Canal and Matamoros. Also shown are the priority numbers assigned to each node in the model. These priorities define the order in which the specified demands and reservoir storage are satisfied during periods of water shortage, with a value of one being the highest priority. Independent sets of priorities are used for each country.

Projected Municipal Water Demands

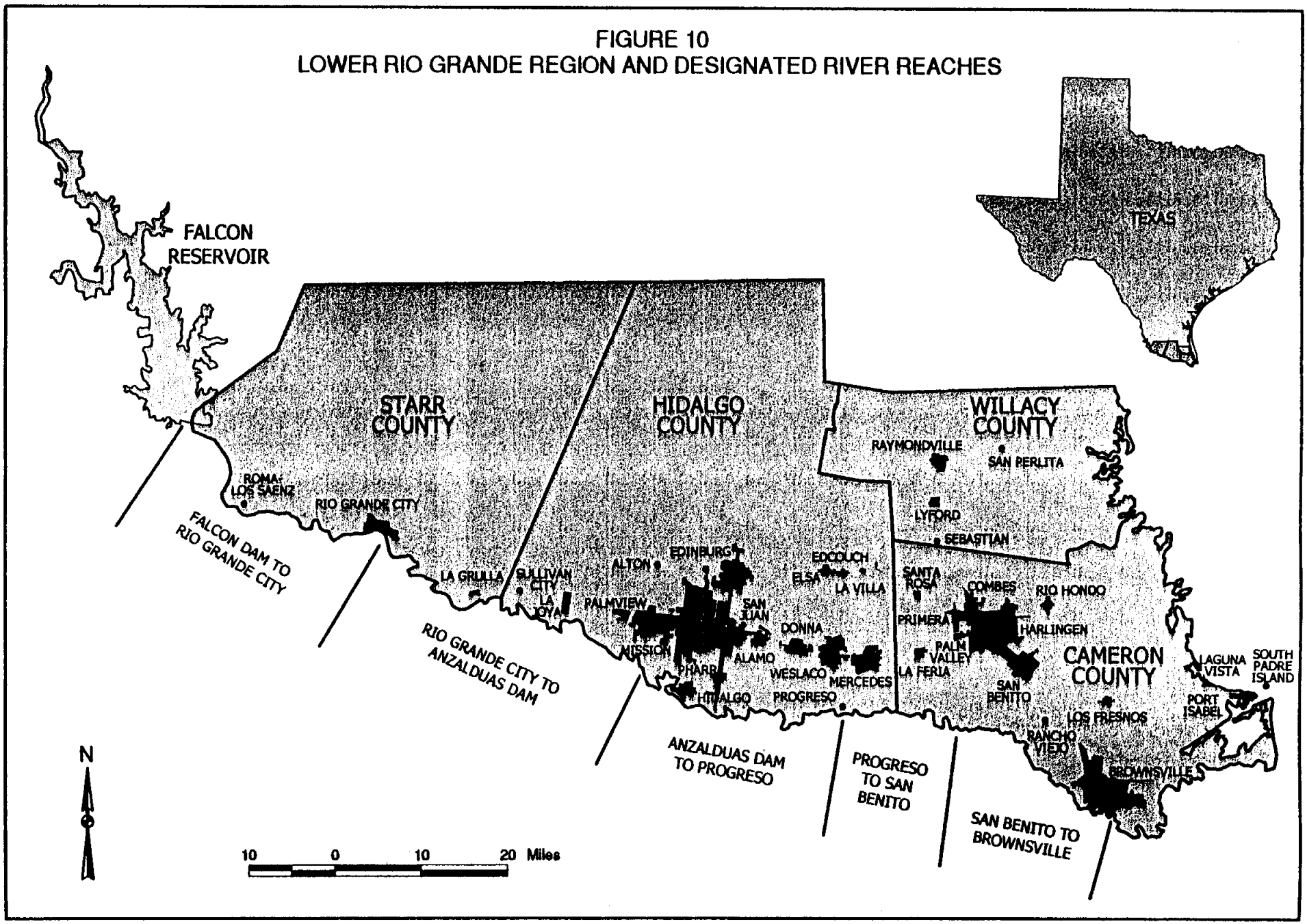
The projected year-2000 municipal demands for the United States water users in the Lower Valley have been distributed among the different nodes in the revised model based on geographical location and available information regarding which cities divert water directly from the river and which irrigation districts deliver river water to which cities. Table 2 summarizes the distribution of the year-2000 United States municipal water demands among the different river reaches and model nodes (Nodes 9, 11, 14, 16, 18 and 20). The various cities assigned to specific reaches and nodes in the ROM are listed in the table, and the corresponding sums of the year-2000 municipal water demands associated with each node are indicated. The locations of these cities within the four-county Lower Rio Grande region are shown on the map in Figure 10.

Also included in Table 2 are the water demands for Mexico that have been assigned to the nodes representing the Anzalduas Canal (Node 12) and the city of Matamoros and other Mexican water users in the Lower Rio Grande Valley below Anzalduas Dam (Node 19). The annual demand for the Anzalduas Canal node is based on the actual year-1995 canal diversions as reported by the IBWC during periods when irrigation usage by Mexico was minimal. For the city of Matamoros and other Lower Rio Grande Mexican water users that divert their water directly from the Rio Grande, the annual demand in Table 2 reflects the actual 1995 releases of Mexico's water from Anzalduas Reservoir during non-irrigation periods.

Estimated Irrigation District Delivery System Losses

For purposes of estimating seepage, evaporation and other losses that are typically experienced when United States water is conveyed through the irrigation district delivery systems in the

FIGURE 10
LOWER RIO GRANDE REGION AND DESIGNATED RIVER REACHES



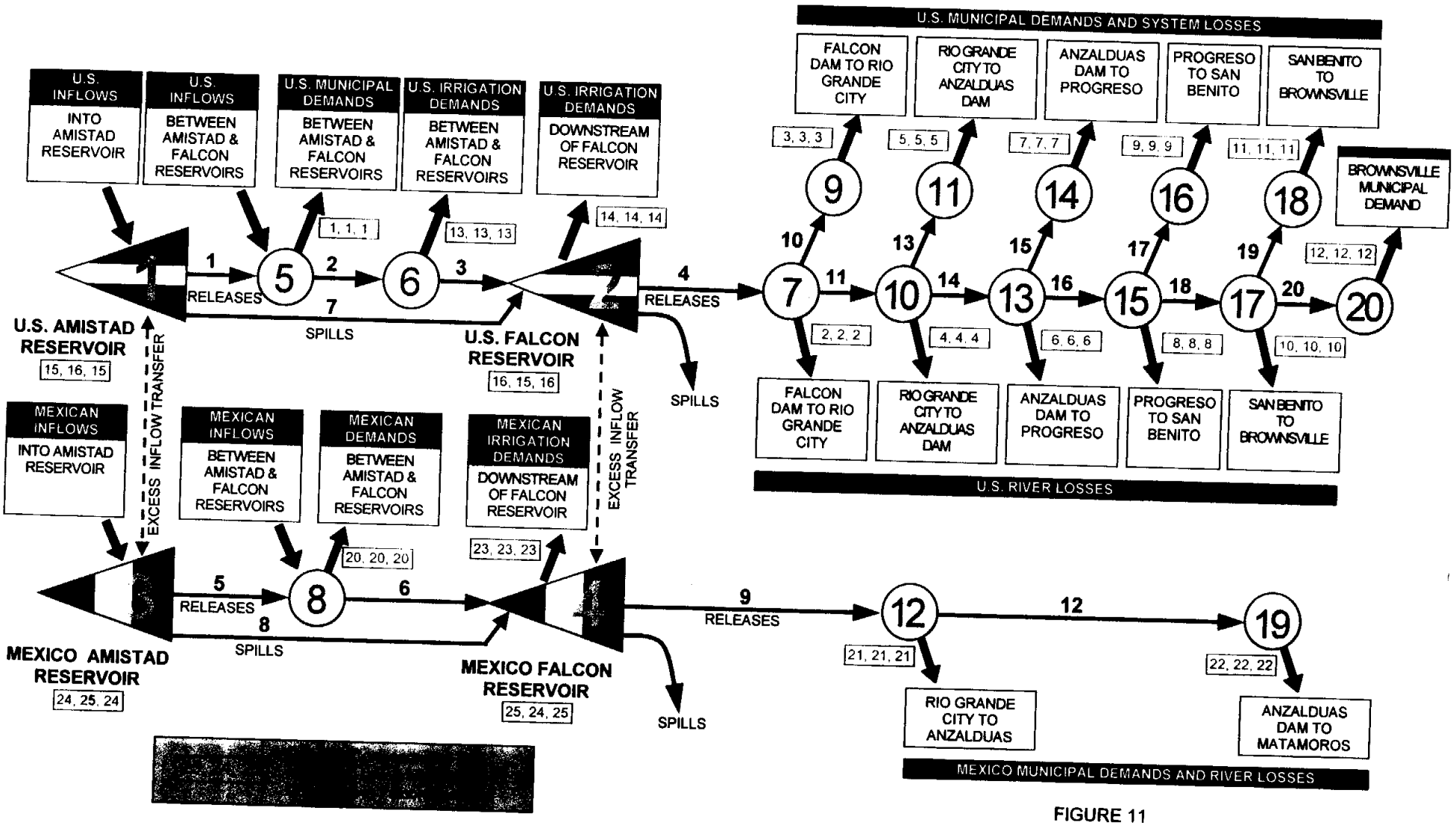


FIGURE 11

LINK-NODE NETWORK
FOR AMISTAD-FALCON RESERVOIR OPERATIONS MODEL

TABLE 2
DISTRIBUTION OF PROJECTED WATER DEMANDS
AND ASSOCIATED IRRIGATION DISTRICT DELIVERY SYSTEM LOSSES

ROM NODE NO.	REACH / NODE DESCRIPTION	PROJECTED YEAR-2000 WATER DEMANDS Acre-Feet	IRRIGATION DISTRICT DELIVERY SYSTEM CONVEYANCE LOSSES		
			15% Acre-Feet	20% Acre-Feet	25% Acre-Feet
9	Falcon Dam to Rio Grande City Rio Grande City* Roma/Los Saenz	5,032	351	469	586
11	Rio Grande City to Anzalduas Dam La Grulla Starr County - Other Sullivan City La Joya Palmview Alton Mission Hidalgo County - Other	47,997	7,200	9,599	11,999
14	Anzalduas Dam to Progreso Hidalgo McAllen Edinburg Pharr San Juan Alamo Donna Elsa Edcouch La Villa Weslaco Progreso	55,698	8,355	11,140	13,925

* Since raw water deliveries to Rio Grande City are diverted directly from the Rio Grande, no conveyance losses have been assigned to its projected year-2000 water demand (2,689 ac-ft).

TABLE 2, cont'd.
DISTRIBUTION OF PROJECTED WATER DEMANDS
AND ASSOCIATED IRRIGATION DISTRICT DELIVERY SYSTEM LOSSES

ROM NODE NO.	REACH / NODE DESCRIPTION	PROJECTED YEAR-2000 WATER DEMANDS Acre-Feet	IRRIGATION DISTRICT DELIVERY SYSTEM CONVEYANCE LOSSES 15% Acre-Feet	20% Acre-Feet	25% Acre-Feet
16	Progreso to San Benito Mercedes San Perlita Raymondville Lyford Sebastion Willacy County - Other La Feria Santa Rosa Palm Valley Primera Combes Harlingen Rio Honda San Benito	31,225	4,684	6,245	7,806
18	San Benito to Brownsville Rancho Viejo Los Fresnos Laguna Vista Port Isabel South Padre Island Cameron County - Other	19,245	2,887	3,849	4,811
20	Brownsville*	27,000	0	0	0
TOTAL UNITED STATES DEMANDS AND SYSTEM LOSSES		186,198	23,476	31,302	39,127
12	Mexico Anzalduas Canal*	230,051	0	0	0
19	Matamoros and Other Users*	43,447	0	0	0
TOTAL MEXICO DEMANDS AND SYSTEM LOSSES		273,498	0	0	0

* Since raw water deliveries to Brownsville, the Anzalduas Canal, and Matamoros are diverted directly from the Rio Grande, no conveyance losses have been assigned to their respective water demands.

Lower Rio Grande Valley, information compiled and analyzed during the LRGIWRP-II Study has been used. Estimates of the average water losses for individual irrigation districts, expressed as percentages of the amounts of water diverted from the river into the individual systems, have been developed as part of the LRGIWRP-II Study.

The LRGIWRP-II Study has concluded that, as an overall average, about 20 percent of the total amount of water diverted from the river by all of the districts is typically lost and not actually delivered to water users. For purposes of this investigation, the 20-percent loss rate also has been assumed to be an appropriate average value for estimating the quantities of municipal water that potentially could be lost through the irrigation district delivery systems without irrigation carrying water. However, in order to provide for some level of variation in these estimated loss quantities, values of 15 percent and 25 percent also have been incorporated into the analyses.

It should be noted that these levels of percentage loss rates for the irrigation district delivery systems under conditions with only municipal water being conveyed through the systems are strictly estimates. Values for these loss rates on the order of 20 percent have not been verified with any field measurements or actual system data because such data and information are not known to exist for conditions similar to those which would occur with only municipal water being delivered.

The historical average values of loss rates on the order of 20 percent for the irrigation district systems very likely were derived from actual data and observations that represent normal conditions when the systems are fully charged with water. Hence, the 20-percent loss rate reflects total seepage and evaporation losses from all components (canals, pipelines, and storage reservoirs) of the district systems when full irrigation and municipal deliveries are being made. With only municipal water being delivered, it is reasonable to expect that only the essential canals and pipelines within each district system will be used to convey the municipal water; hence, the quantities of the associated losses should be less than those that normally would occur if all of the canals and pipelines were being used to convey water. The question that remains unanswered is whether the losses from the essential canals and pipelines that would be used to convey the municipal water would still be on the order of 20 percent of the quantity of municipal water being conveyed. In some cases, these losses certainly could be higher than 20 percent because the essential canals and pipelines would likely include the largest components, i. e., those with the largest surface area and wetted perimeter, that are located nearest the river within a given irrigation district system. However, it is also likely that these largest components of a given irrigation district system would be those that probably have been improved and possibly lined to minimize losses. These offsetting factors suggest that assuming average loss rates on the order of 20 percent for the irrigation district delivery systems may be appropriate even when only municipal water is being conveyed.

The resulting amounts of water losses associated with the conveyance of United States municipal water through the irrigation district delivery systems are listed in Table 2 for each of the nodes in the revised ROM network where the Lower Rio Grande municipal water demands are assigned. Three columns of figures are presented corresponding to the three different assumed percentages for conveyance losses (15, 20 and 25 percent). For those entities that divert water directly from the river (Rio Grande City, Brownsville, Anzalduas Canal and Matamoros), no conveyance losses are indicated.

Estimated River Channel Losses

An analysis of historical monthly streamflow records for gages located along the Lower Rio Grande has been made in an attempt to quantify historical channel losses from the river under flow conditions similar to those that might occur during extreme drought periods when only municipal water deliveries would be made from Falcon Reservoir. For this purpose, historical monthly streamflow and diversion data have been examined for the period from 1960 through 1997[5] for each of the river reaches as previously identified on the map of the Lower Rio Grande in Figure 10. Using these data, months during which the historical flows in the Lower Rio Grande were of the same general magnitude as those that might be expected during future periods when only municipal water deliveries would be made from Falcon Reservoir have been identified. The general ranges of these flow conditions by reach of the river have been inferred from the projected demands and associated conveyance losses that are summarized by reach in Table 2. Based on these quantities, with an assumed adjustment of ten percent to account for anticipated river channel losses, the estimated ranges of monthly flow in the various reaches of the river that have been used for purposes of screening the historical flow records to identify periods with flows that are generally consistent with those expected to occur with only municipal or non-irrigation water deliveries are indicated below:

River Reach	Acre-Feet/Month
Falcon Dam to Rio Grande City	42,000 - 45,000
Rio Grande City to Anzalduas Dam	40,000 - 43,000
Anzalduas Dam to Progreso	16,000 - 18,000
Progreso to San Benito	10,000 - 12,000
San Benito to Brownsville	8,000 - 10,000

While these flow ranges have been used to provide guidance with respect to the selection of historical data sets for evaluating river channel losses, flow conditions somewhat outside of these

[5] Last year for which published and unpublished streamflow and diversion records are available from the IBWC.

ranges actually have been used in the analyses to provide a broader perspective of loss variations. For the selected historical monthly data sets, water balance analyses have been performed for each of the reaches to quantify monthly losses or gains. Gains often occur as the result of inflows to the river during runoff periods. For the water balance analyses, the gaged monthly streamflows at the upstream and downstream ends of each reach and the corresponding gaged incremental tributary inflows and reported diversions have been used.

The resulting monthly percentage losses and gains, calculated based on the flow at the upstream end of each reach, have been determined, and plots of these percentage loss/gain amounts versus the flow at the downstream end of each reach have been developed to provide general trends in the river channel loss variations. These plots are presented in Figures 12 through 16 for each of the five reaches of the river. While the data shown on these plots exhibit considerable variations with flow, the indicated loss percentages, nonetheless, do provide general estimates of the level of losses that might be expected, and these values have been used with the flow ranges listed above to establish the following average and high percentage loss rates for each of the reaches.

River Reach	Average Loss Rate	High Loss Rate
Falcon Dam to Rio Grande City	4 %	7 %
Rio Grande City to Anzalduas Dam	5 %	7 %
Anzalduas Dam to Progreso	2 %	4 %
Progreso to San Benito	2 %	7 %
San Benito to Brownsville	8 %	10 %

A special routine for applying the river channel loss rates listed above to the simulated flows of each country in the different reaches of the Lower Rio Grande in order to account for and quantify the river channel losses below Falcon Reservoir has been incorporated into the ROM program, and simulations using the modified ROM network shown in Figure 11 have been made for the 1995-2000 period. For these simulations, the following input conditions have been specified in the model:

1. Actual historical monthly inflows and demands have been used for both the United States and Mexico for the period from January, 1995 through March, 1998.

2. For the period April, 1998 through December, 2000, the monthly inflows for both the United States and Mexico have been set equal to the corresponding monthly inflows for 1995.

3. For the period April, 1998 through December, 1998, all of the monthly demands for both the United States and Mexico have been set equal to the corresponding monthly demands for 1995.

FIGURE 12
HISTORICAL PERCENTAGE CHANNEL LOSSES AND GAINS ALONG THE LOWER RIO GRANDE
FOR THE REACH BETWEEN FALCON DAM AND RIO GRANDE CITY

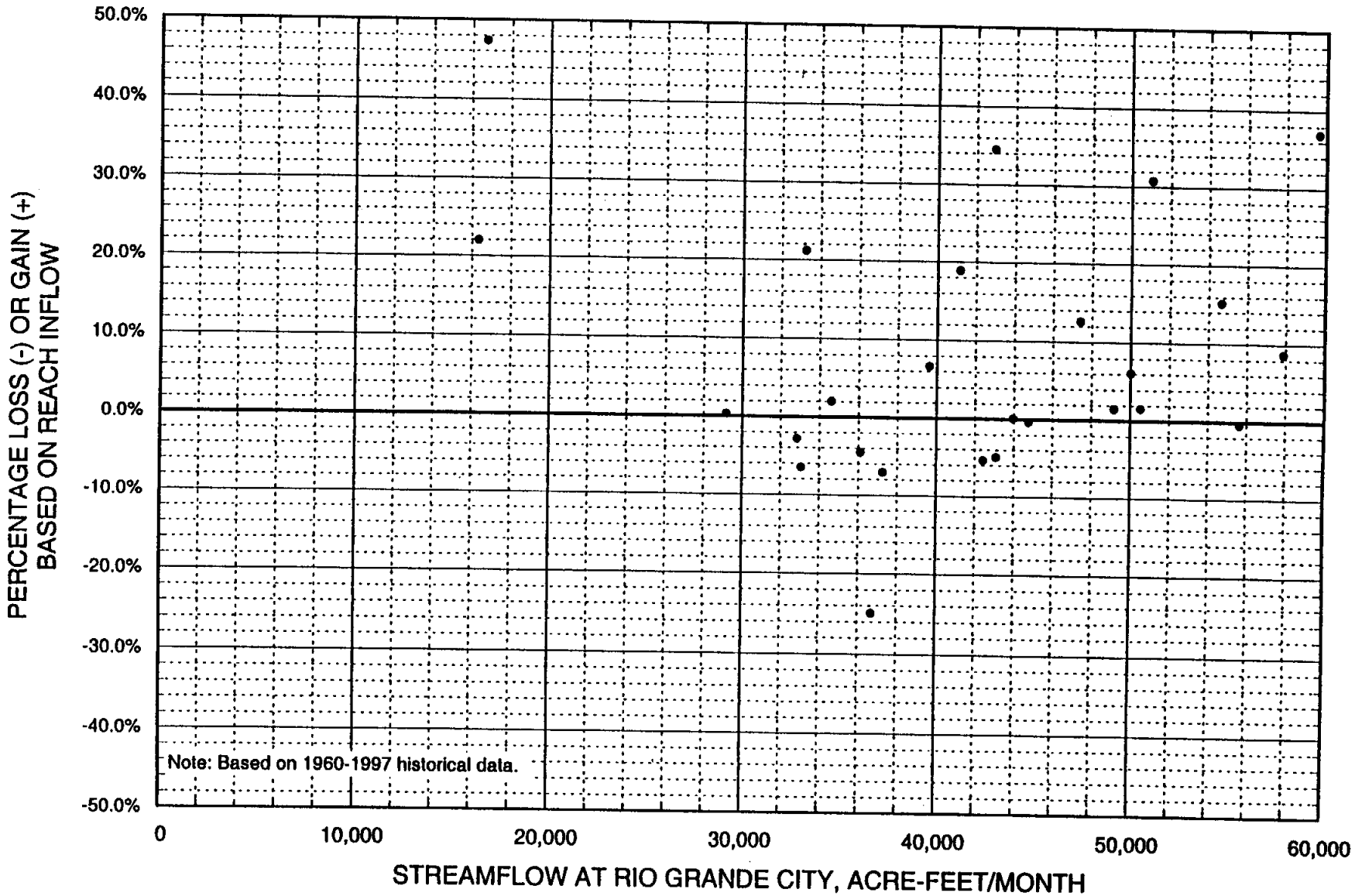


FIGURE 13
HISTORICAL PERCENTAGE CHANNEL LOSSES AND GAINS ALONG THE LOWER RIO GRANDE
FOR THE REACH BETWEEN RIO GRANDE CITY AND ANZALDUAS DAM

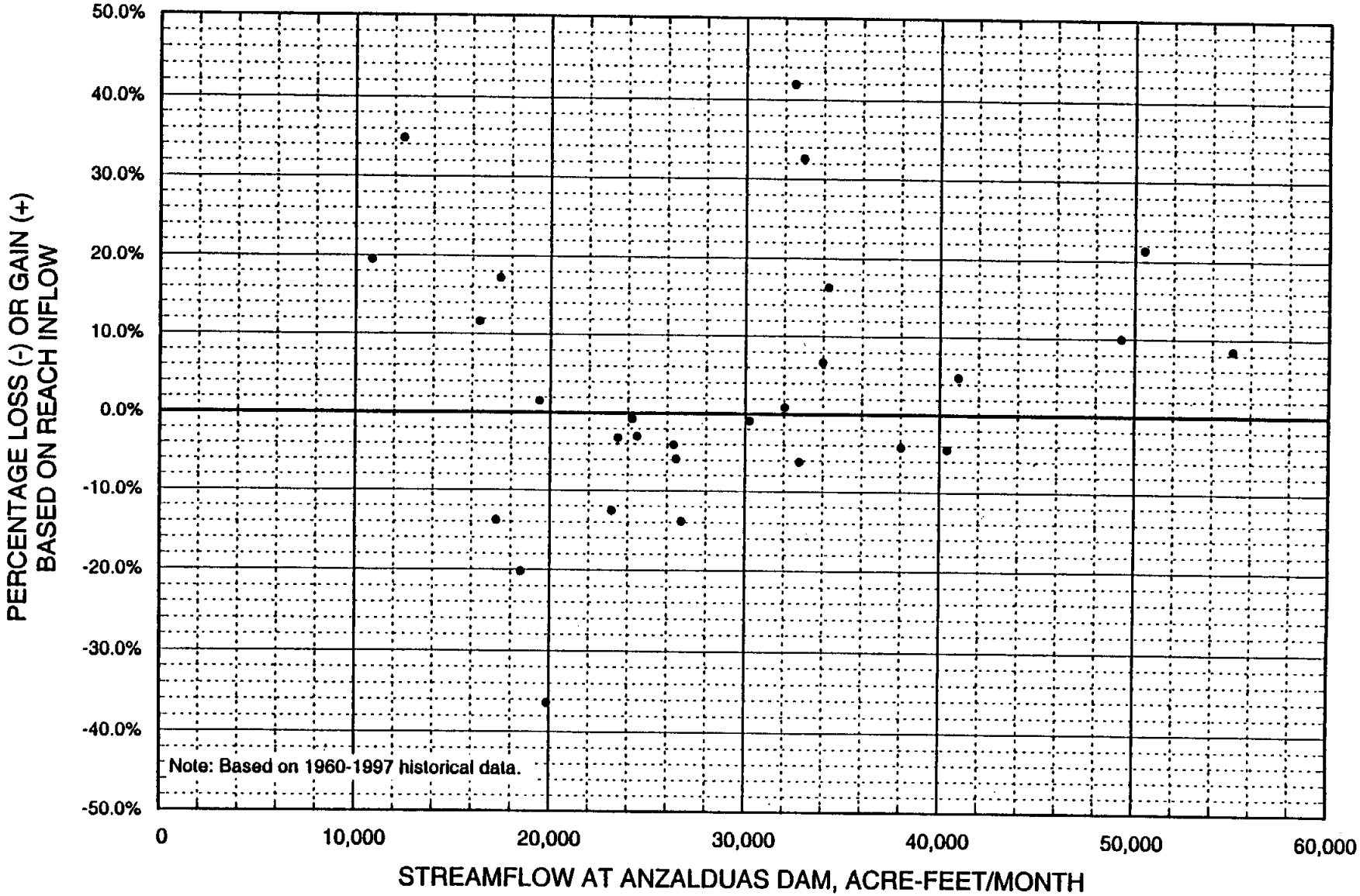


FIGURE 14
HISTORICAL PERCENTAGE CHANNEL LOSSES AND GAINS ALONG THE LOWER RIO GRANDE
FOR THE REACH BETWEEN ANZALDUAS DAM AND PROGRESO

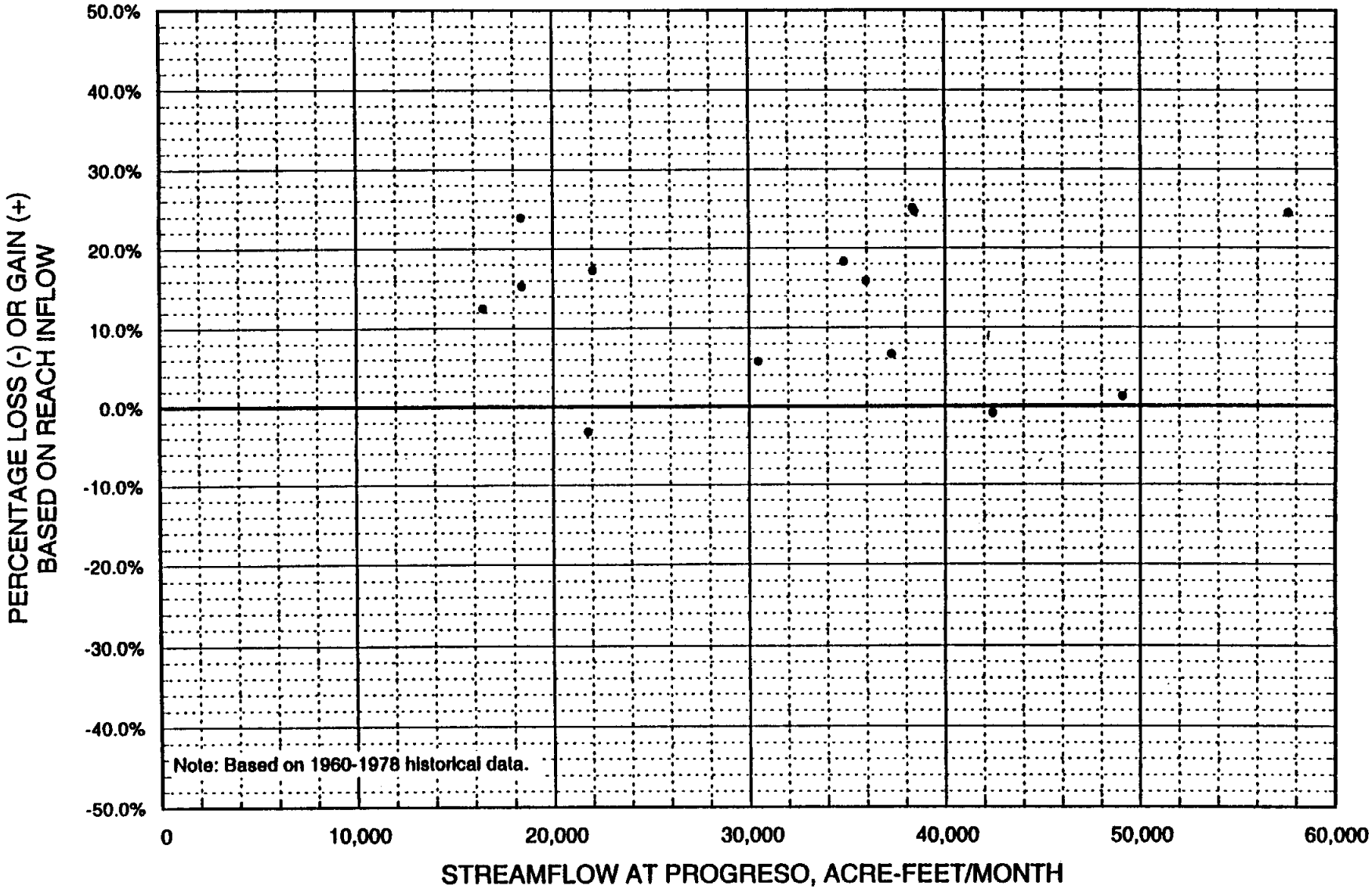


FIGURE 15
HISTORICAL PERCENTAGE CHANNEL LOSSES AND GAINS ALONG THE LOWER RIO GRANDE
FOR THE REACH BETWEEN PROGRESO AND SAN BENITO

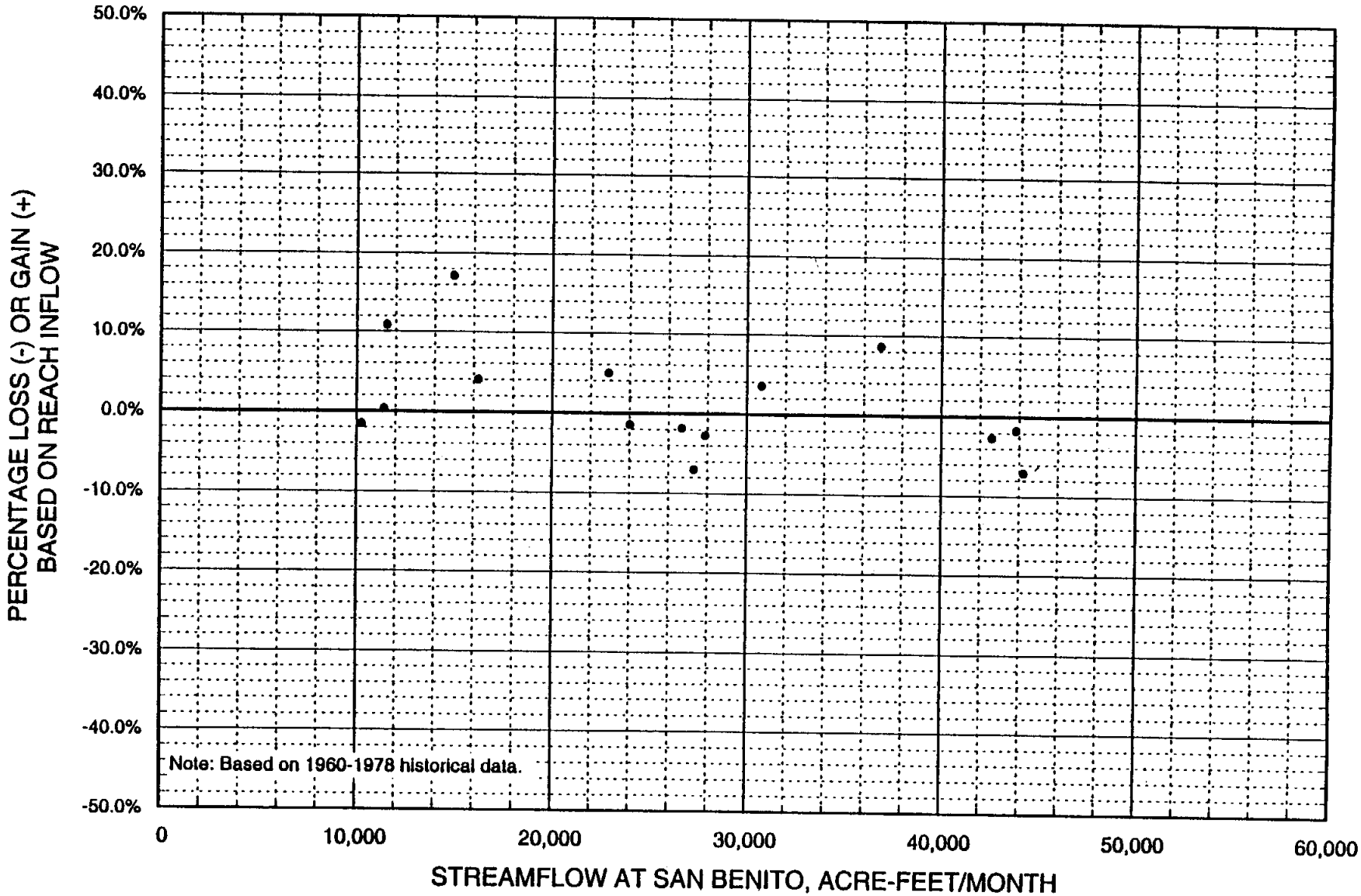
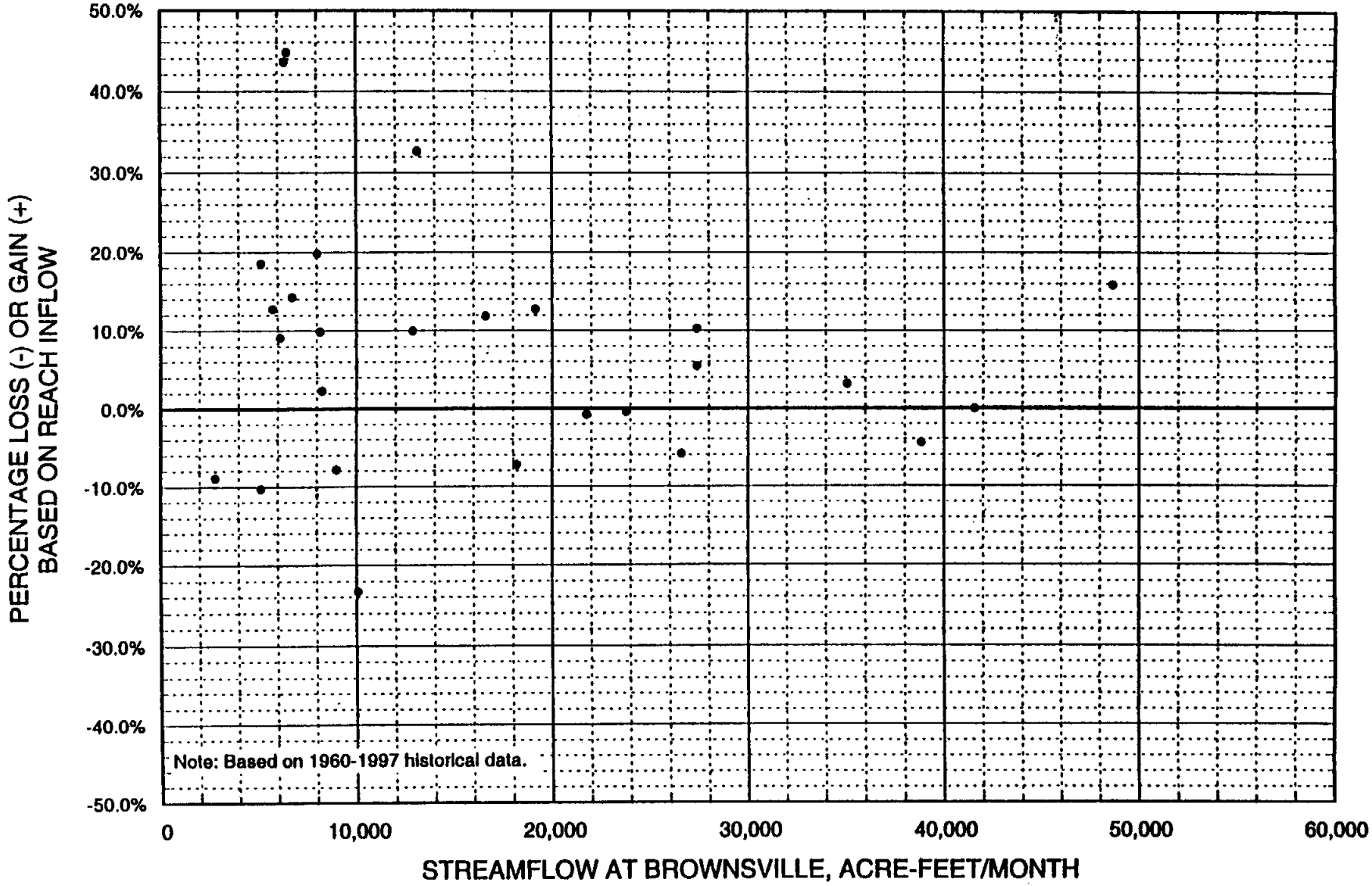


FIGURE 16
HISTORICAL PERCENTAGE CHANNEL LOSSES AND GAINS ALONG THE LOWER RIO GRANDE
FOR THE REACH BETWEEN SAN BENITO AND BROWNSVILLE



4. For the period January, 1999 through December, 2000, the monthly municipal demands for the United States between Amistad and Falcon Reservoirs have been set equal to the corresponding United States monthly municipal diversions[6] for 1995.

5. For the period January, 1999 through December, 2000, the monthly total demands for Mexico between Amistad and Falcon Reservoirs have been set equal to the corresponding Mexico monthly municipal diversions[7] for 1995.

6. For the period January, 1999 through December, 2000, the monthly municipal demands for the United States below Falcon Reservoir have been set equal to the year-2000 projected demands as developed in the LRGIWRP-II study for Cameron, Willacy and Hidalgo Counties or as reported by the Texas Water Development Board (TWDB) for Starr County as listed in Table 2.

7. For the period January, 1999 through December, 2000, the monthly demands for Mexico at the Anzalduas Canal below Falcon Reservoir have been set equal to the actual year-1995 canal diversions during periods when irrigation usage by Mexico was minimal, and for the city of Matamoros and other water users that divert their water directly from the Rio Grande below Anzalduas Reservoir, the annual demands have been set equal to the actual 1995 releases of Mexico's water from Anzalduas Reservoir during non-irrigation periods as listed in Table 2.

8. For the period January, 1999 through December, 2000, the monthly irrigation demands for both the United States and Mexico below Falcon Reservoir have been set equal to zero.

With these input conditions, six different operations of the modified ROM have been made corresponding to the three sets of irrigation district delivery system loss rates (15%, 20% and 25%) and the two sets of river channel loss rates (average and high). A sample set of output from these simulations is contained in Attachment 4 for the case with average river losses and 20-percent irrigation district delivery system losses. All of the resulting river channel losses as simulated with the ROM for each of the five river reaches along the Lower Rio Grande are summarized in Table 3 in terms of United States water and in Table 4 for Mexican water. These river channel losses reflect the municipal-only demand conditions as specified in the model for the years 1999 and 2000; hence, they are representative of the river channel losses that might be expected below Falcon Reservoir during extreme drought periods when no irrigation water is released from the reservoir. As indicated in the tables, between 13 and 21 percent of the municipal water released from the reservoir for the United States potentially could be lost along the river, with Mexico's losses ranging between 11 and 17 percent. The differences between the

[6] Eagle Pass, Del Mar/Laredo, Laredo Power Plant, San Ygnacio, Rio Bravo, Zapata and Falcon Village.
[7] Cd. Acuna, Piedras Negras, Nuevo Laredo and Nuevo Cd. Guerrero.

TABLE 3
ESTIMATED ANNUAL UNITED STATES RIVER LOSSES BY REACH IN THE LOWER RIO GRANDE

REACH DESCRIPTON	RIVER LOSSES IN ACRE-FEET AS SIMULATED WITH AMISTAD-FALCON ROM WITH FLOWS ALONG THE RIVER CORRESPONDING TO MUNICIPAL-ONLY DEMANDS WITH VARYING LEVELS OF IRRIGATION DISTRICT DELIVERY SYSTEM LOSSES AND AVERAGE AND HIGH RIVER LOSS CONDITIONS						
	AVERAGE RIVER LOSSES				HIGH RIVER LOSSES		
	RIVER LOSS RATE	ASSUMED IRRIGATION DISTRICT DELIVERY SYSTEM LOSS RATE			RIVER LOSS RATE	ASSUMED IRRIGATION DISTRICT DELIVERY SYSTEM LOSS RATE		
		15%	20%	25%		15%	20%	25%
Falcon Dam to Rio Grande City	4%	9,584	9,949	10,292	7%	18,467	19,171	19,821
Rio Grande City to Anzalduas Dam	5%	11,233	11,666	12,069	7%	16,798	17,443	18,040
Anzalduas Dam to Progreso	2%	3,161	3,277	3,384	4%	6,718	6,963	7,184
Progreso to San Benito	2%	1,817	1,878	1,924	7%	6,805	7,024	7,203
San Benito to Brownsville	8%	4,266	4,350	4,433	10%	5,454	5,561	5,669
TOTAL RIVER LOSSES	13%	30,061	31,120	32,102	21%	54,242	56,162	57,917

Note: All loss rates are expressed as a percentage of the total quantity of flow entering a particular river reach or irrigation district delivery system.

TABLE 4
ESTIMATED ANNUAL MEXICAN RIVER LOSSES BY REACH IN THE LOWER RIO GRANDE

REACH DESCRIPTON	RIVER LOSSES IN ACRE-FEET AS SIMULATED WITH AMISTAD-FALCON ROM WITH FLOWS ALONG THE RIVER CORRESPONDING TO MUNICIPAL-ONLY DEMANDS WITH VARYING LEVELS OF IRRIGATION DISTRICT DELIVERY SYSTEM LOSSES AND AVERAGE AND HIGH RIVER LOSS CONDITIONS						
	AVERAGE RIVER LOSSES				HIGH RIVER LOSSES		
	RIVER LOSS RATE	ASSUMED IRRIGATION DISTRICT DELIVERY SYSTEM LOSS RATE			RIVER LOSS RATE	ASSUMED IRRIGATION DISTRICT DELIVERY SYSTEM LOSS RATE		
		15%	20%	25%		15%	20%	25%
Falcon Dam to Rio Grande City	4%	12,246	12,249	12,245	7%	22,999	22,996	22,998
Rio Grande City to Anzalduas Dam	5%	14,697	14,696	14,698	7%	21,388	21,386	21,388
Anzalduas Dam to Progreso	2%	986	984	982	4%	2,163	2,164	2,165
Progreso to San Benito	2%	964	962	963	7%	3,634	3,632	3,631
San Benito to Brownsville	8%	3,779	3,780	3,780	10%	4,827	4,829	4,828
TOTAL RIVER LOSSES	11%	32,672	32,671	32,668	17%	55,011	55,007	55,010

Note: All loss rates are expressed as a percentage of the total quantity of flow entering a particular river reach or irrigation district delivery system.

river loss rates for the two countries are the result of allocating the total losses in a given reach based on the proportional amount of water that each country has flowing in the reach.

Estimated Total Water Losses

The total amount of water that must be released at any one time from Falcon Reservoir in order to satisfy United States municipal demands in the Lower Rio Grande Valley without the benefit of irrigation carrying water is equal to the sum of the individual demands themselves plus the estimated losses associated with the irrigation district delivery systems plus the estimated losses along the river channel. These quantities in acre-feet are summarized in Table 5 for United States water based on the results from the ROM simulations for each of the six combinations of assumed irrigation district delivery system loss rates (15%, 20% and 25%) and river channel loss rates (average and high). At the bottom of the table, the corresponding total loss rates for the entire United States Lower Rio Grande water delivery system (river channel plus irrigation districts) are presented as percentages of the total municipal demands as specified in the analyses (projected year-2000 demands) and as percentages of the total releases from Falcon Reservoir required to meet these demands. These loss rates suggest that between 29 and 52 percent of the total United States municipal water demands below Falcon Reservoir can be expected to be lost either along the river channel or through the irrigation district delivery systems, which means that an additional 29 to 52 percent of the municipal demands must be released from Falcon Reservoir in order for the full amount of the municipal demands to be satisfied, i. e., at the water treatment plant headgates. Or stated another way, for every acre-foot of United States water that is released from Falcon Reservoir to meet downstream municipal demands without the benefit of irrigation carrying water, between 22 and 34 percent can be expected to be lost either along the river channel or through the irrigation district delivery systems.

Corresponding results for Mexico based on the ROM simulations are summarized in Table 6. The indicated total loss rates for Mexico (12 to 20 percent of total demands or 11 to 17 percent of Falcon releases) are considerably less than those for the United States because they do not reflect any conveyance losses within Mexico's internal water delivery system, for example, along the Anzalduas Canal. These total loss rates reflect only river channel losses. The corresponding river channel loss rates for the United States based on Falcon Reservoir releases are comparable and range between 13 and 21 percent (see Table 3).

Water Availability With Municipal-Only Deliveries

As expected, without irrigation demands on the Amistad-Falcon reservoir system, the results from the ROM simulations indicate that the storage in the two reservoirs for both the United States and Mexico increases, even under the extended drought-condition inflows of 1995. These

TABLE 5
SUMMARY OF UNITED STATES WATER LOSSES IN THE LOWER RIO GRANDE
FOR U. S. YEAR-2000 MUNICIPAL-ONLY WATER DELIVERIES WITHOUT IRRIGATION CARRYING WATER
AND YEAR-1995 NON-IRRIGATION WATER DELIVERIES FOR MEXICO

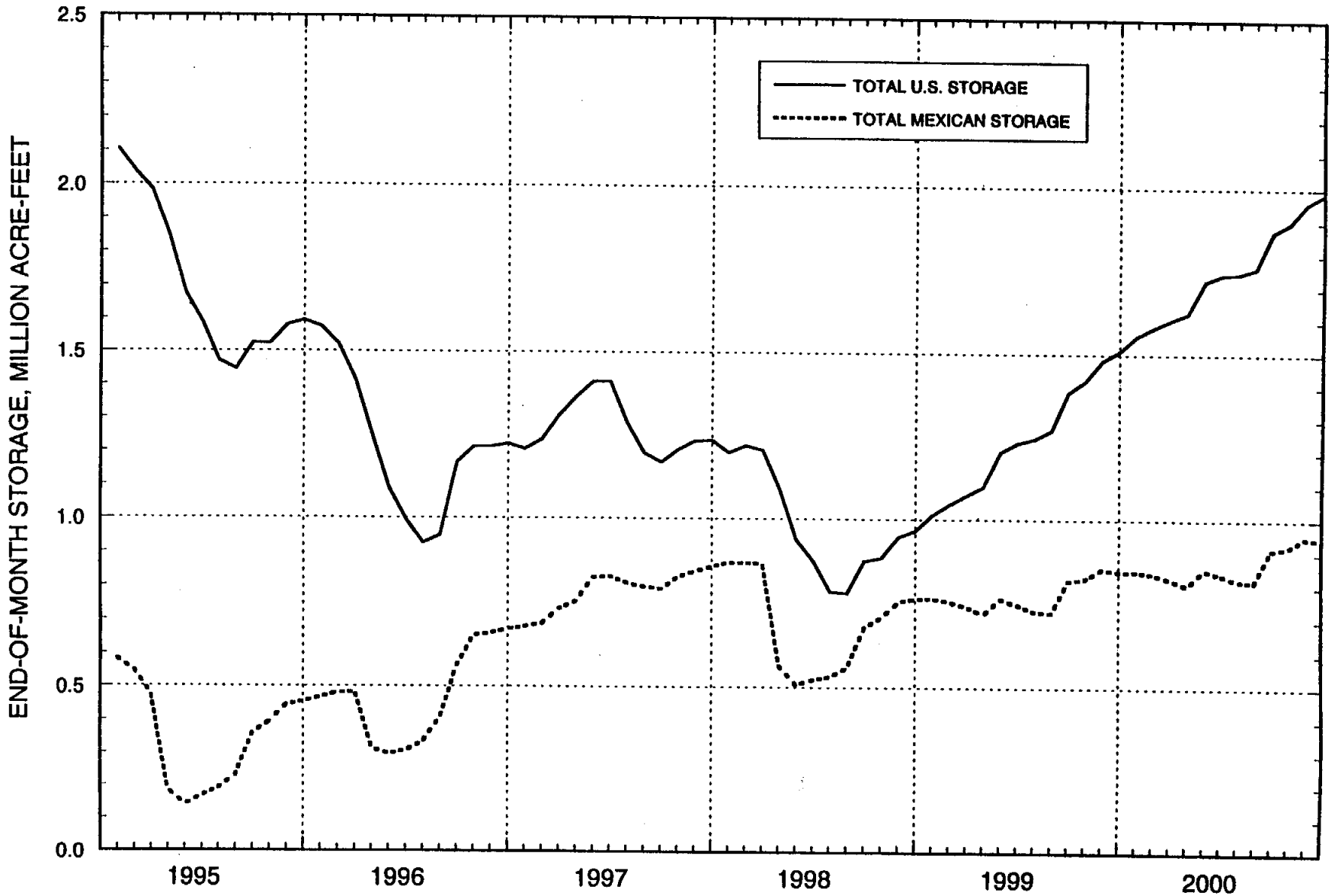
PARAMETER	AVERAGE RIVER LOSSES			HIGH RIVER LOSSES		
	ASSUMED IRRIGATION DISTRICT DELIVERY SYSTEM LOSS RATE			ASSUMED IRRIGATION DISTRICT DELIVERY SYSTEM LOSS RATE		
	15%	20%	25%	15%	20%	25%
U. S. MUNICIPAL DEMANDS	186,198	186,198	186,198	186,198	186,198	186,198
U. S. IRRIGATION DISTRICT DELIVERY SYSTEM LOSSES	23,476	31,302	39,127	23,476	31,302	39,127
U. S. RIVER LOSSES	30,061	31,120	32,102	54,242	56,162	57,917
U. S. IRRIGATION DISTRICT SYSTEM AND RIVER LOSSES	53,537	62,422	71,229	77,718	87,464	97,044
TOTAL LOSS RATES BASED ON U. S. DEMANDS	29%	34%	38%	42%	47%	52%
TOTAL LOSS RATES BASED ON U. S. FALCON RELEASES	22%	25%	28%	29%	32%	34%

TABLE 6
SUMMARY OF MEXICO WATER LOSSES IN THE LOWER RIO GRANDE
FOR U. S. YEAR-2000 MUNICIPAL-ONLY WATER DELIVERIES WITHOUT IRRIGATION CARRYING WATER
AND YEAR-1995 NON-IRRIGATION WATER DELIVERIES FOR MEXICO

PARAMETER	AVERAGE RIVER LOSSES			HIGH RIVER LOSSES		
	ASSUMED IRRIGATION DISTRICT DELIVERY SYSTEM LOSS RATE			ASSUMED IRRIGATION DISTRICT DELIVERY SYSTEM LOSS RATE		
	15%	20%	25%	15%	20%	25%
MEXICO MUNICIPAL DEMANDS	273,499	273,499	273,499	273,499	273,499	273,499
MEXICO IRRIGATION DISTRICT DELIVERY SYSTEM LOSSES	0	0	0	0	0	0
MEXICO RIVER LOSSES	32,672	32,671	32,668	55,011	55,007	55,010
MEXICO IRRIGATION DISTRICT SYSTEM AND RIVER LOSSES	32,672	32,671	32,668	55,011	55,007	55,010
TOTAL LOSS RATES BASED ON MEXICO DEMANDS	12%	12%	12%	20%	20%	20%
TOTAL LOSS RATES BASED ON MEXICO FALCON RELEASES	11%	11%	11%	17%	17%	17%

gradual and steady increases in the simulated storage amounts for the United States and Mexico during 1999 and 2000, after the irrigation demands have been set equal to zero, are illustrated on the plot in Figure 17. These trends occur, of course, because the municipal demands that have been specified in the model for purposes of these analyses are substantially less than the normal irrigation demands that must be satisfied with water from the reservoirs. This suggests that if the inflows to the reservoirs continue over the next two years or so at levels consistent with those that occurred during 1995 (the driest year of the current drought period), municipal demands can continue to be fully satisfied with water from the reservoirs, and irrigation demands very likely will have to be substantially curtailed, but not reduced to zero. Releases from Falcon Reservoir to satisfy downstream municipal demands will, of course, have to include additional carrying water (29 to 52 percent of the demands) to offset losses along the river channel and within the irrigation district delivery systems used to convey the water from the river to the municipalities.

FIGURE 17
SIMULATED 1995-2000 MONTHLY STORAGE FOR THE UNITED STATES AND MEXICO
WITH MUNICIPAL-ONLY DELIVERIES, AVERAGE RIVER LOSSES AND 20% IRRIGATION DISTRICT LOSSES



ATTACHMENT 1

LIST OF DATA REQUESTED FROM IBWC
FOR EXTENDING THE AMISTAD-FALCON DATA BASE

R. J. BRANDES COMPANY
Consulting in Water Resources

SENT VIA FACSIMILE

August 21, 1998

International Boundary and Water Commission
United States Section
4171 N. Mesa, Suite C-310
El Paso, Texas 73302-1441

Attention: Mr. Ken Rakestraw

SUBJECT: Request for Rio Grande Data

Dear Mr. Rakestraw:

The Texas Water Development Board, in association with the Texas Natural Resource Conservation Commission, the Rio Grande Watermaster, and local water interests in the Lower and Middle Rio Grande Valley, is initiating an investigation of potential water availability from Amistad and Falcon Reservoirs for Rio Grande water users under continued drought conditions and alternative demand scenarios. As part of this effort, we want to update the data input file for the Amistad-Falcon Reservoir Operations Model and make an analysis of low-flow water losses in the river and in some of the irrigation district delivery systems. Data from IBWC describing historical Rio Grande streamflows, inflows, diversions, reservoir releases, and return flows for selected periods will be essential for much of this work.

Attached is a list of the data we would like to request from your office. Many of these data files are the same as those you previously provided us for earlier years. We now would like to update our files to the most current period for which data are available, hopefully through 1997 and possibly part of 1998.

We appreciate very much your assistance with this request. Please give me a call if you have any questions or if you need any additional information from me. Thank you in advance.

Yours truly,
R. J. BRANDES COMPANY

Robert J. Brandes, P. E., Ph. D.

cc: Ms. Carolyn Brittin, TWDB
Ms. Cindy Martinez, TNRCC Rio Grande Watermaster

9011 Mountain Ridge Dr., Suite 100
Austin, Texas 78759

Telephone: 512/343-1070
Facsimile: 512/343-1083

IBWC DATA REQUIRED FOR EXTENSION OF DATA BASE FOR AMISTAD-FALCON RESERVOIR OPERATIONS MODEL AND FOR ANALYZING LOW-FLOW SYSTEM LOSSES

R. J. Brandes Company
August 21, 1998

A. The following pre-published data files are requested from the IBWC for the period January 1, 1997, through the most recent month for which such data are available. The names of these data files as referenced herein are the same as those used in the IBWC Annual Water Bulletins. These data files for years prior to 1997 previously were provided to RJBCO by IBWC.

1. Diversions from the Rio Grande, Maverick Canal at Mile 13, by month

2. Return Flow to the Rio Grande from Maverick Canal at Maverick Power Plant, by month

3. Return Flow to the Rio Grande from Maverick Irrigation District Above Eagle Pass, by month

4. Return Flow to the Rio Grande from Maverick Irrigation District Below Eagle Pass, by month

5. Municipal and Industrial Water Users in the United States, by month (specifically Eagle Pass, Del Mar, Laredo, Laredo Power Station, Rio Bravo, San Ygnacio, New Zapata and Falcon Village)

6. Municipal and Industrial Water Users in Mexico, by month (specifically Ciudad Acuna, Piedras Negras, Nuevo Laredo and Nueva Cd. Guerrero)

7. Stored Water in Large Reservoirs of the Rio Grande Basin - International Amistad Reservoir, end of month

8. Stored Water in Large Reservoirs of the Rio Grande Basin - International Falcon Reservoir, end of month

9. Rainfall on the Rio Grande Watershed - In the United States, by month (specifically Buoy No. 11, Devils Lake, Amistad Dam, Zapata Station and Falcon Dam stations)

10. Evaporation in the Rio Grande Basin - In the United States, by month (specifically Amistad and Falcon Dam stations, and Martin King Ranch)

11. Evaporation in the Rio Grande Basin - In Mexico, by month (specifically Nueva Ciudad Guerrero)

B. The following unpublished data files are requested from the IBWC for the period January 1, 1997, through the most recent month for which such data are available. These unpublished data for years prior to 1997 previously were provided to RJBCO by IBWC.

1. U. S. Inflows to Amistad Reservoir, by month
2. Mexican Inflows to Amistad Reservoir, by month
3. U. S. Inflows between Amistad and Falcon Reservoirs, by month
4. Mexican Inflows between Amistad and Falcon Reservoirs, by month
5. U. S. Unpublished Diversions between Amistad and Falcon Reservoirs, by month (these do not include municipal or Maverick Canal diversions)
6. Mexican Unpublished Diversions between Amistad and Falcon Reservoirs, by month (these do not include municipal or Maverick Canal diversions)
7. U. S. Releases from Amistad Reservoir, by month
8. Mexican Releases from Amistad Reservoir, by month
9. U. S. Releases from Falcon Reservoir, by month
10. Mexican Releases from Falcon Reservoir, by month

C. The following pre-published data files are requested from the IBWC for the period January 1, 1996, through the most recent month for which such data are available. The names of these data files as referenced herein are the same as those used in the IBWC Annual Water Bulletins. These data files for years prior to 1996 have been obtained by RJBCO from the published IBWC Annual Water Bulletins.

1. Rio Grande below Falcon Dam near Falcon, Texas and Nueva Cd. Guerrero, Tamaulipas, by month
2. Rio Alamo at Cd. Mier, Tamaulipas, by month
3. Rio San Juan at Camargo, Tamaulipas, by month
4. Contributions to the Rio Grande from the Lower Rio San Juan Irrigation District, Falcon Dam to Rio Grande City, by month
5. Diversions from the Rio Grande, United States Side, Falcon Dam to Rio Grande City, by month

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6. Rio Grande at Rio Grande City, Texas, near Camargo, Tamaulipas, by month

7. Contributions to the Rio Grande from the Lower Rio San Juan Irrigation District, Rio Grande City to Anzalduas Dam, by month

8. Diversions from the Rio Grande, United States Side, Rio Grande City to Anzalduas Dam, by month

9. Diversions from the Rio Grande, Anzalduas Canal near Reynosa, Tamaulipas, by month

10. Rio Grande below Anzalduas Dam near Reynosa, Tamaulipas, and Mission, Texas, by month

11. Rio Grande Floodway Discharges, Lower Rio Grande Valley, on the United States Side, by month

12. Rio Grande Floodway Discharges, Lower Rio Grande Valley, on the Mexico Side, by month

13. Diversions from the Rio Grande, United States Side, Anzalduas Dam to Progreso, by month

14. Diversions from the Rio Grande, United States Side, Progreso to San Benito, by month

15. Rio Grande near San Benito, Texas, and Ramirez, Tamaulipas, by month

16. Diversions from the Rio Grande, United States Side, San Benito to Brownsville, by month

17. Rio Grande near Brownsville, Texas, and Matamoros, Tamaulipas, by month

18. Rio Grande at Del Rio, Texas, and Ciudad Acuna, Coahuila, by month

19. Rio Grande near El Indio, Texas, and Villa Guerrero, Coahuila, by month

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ATTACHMENT 2

OUTPUT FROM AMISTAD-FALCON ROM
FOR 1995-1998 SIMULATION OF HISTORICAL CONDITIONS

RIVER BASIN SIMULATION PROGRAM - TEXAS WATER DEVELOPMENT BOARD
ADAPTED AND MODIFIED FOR AMISTAD AND FALCON RESERVOIRS IN THE RIO GRANDE BASIN
INCLUDING U.S. / MEXICO WATER ACCOUNTING AND TNRCC OPERATING RULES
R. J. BRANDES COMPANY FEB. 1999

DATE: 3- 4-1999
TIME: 10:11:40
FILE: USMX98G2

CURRENT 1995-1998 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS
TEST ROM SIMULATION WITH ACTUAL MONTHLY DEMANDS AND AMISTAD RESERVOIR RELEASES

NUMBER OF NODES = 8
NUMBER OF RESERVOIRS = 4
NUMBER OF LINKS = 8
NUMBER OF RIVER REACHES = 8
CALENDAR YEAR OPERATION STARTS = 1995
NUMBER OF YEARS TO SIMULATE = 4
NUMBER OF DEMAND NODES = 8
NUMBER OF SPILL NODES = 2
NUMBER OF INDIVIDUAL WATER RIGHTS = 3

SYSTEM NODE CHARACTERISTICS

NODE NO.	NODE NAME	CAPACITIES FLOOD (AC-FT)	CONSERV (AC-FT)	MINIMUM (AC-FT)	STARTING (AC-FT)	YEARLY DEMAND (AC-FT)
1	U.S. AMISTAD	1827241	1771041	1771	1205614	0
2	U.S. FALCON	1613729	1555129	1555	937652	0
3	MEX AMISTAD	1424078	1380278	1380	420666	0
4	MEX FALCON	1140074	1098674	1099	320826	0
5	U.S.MRG MUNI	0	0	0	0	0
6	U.S.MRG IRRI	0	0	0	0	0
7	U.S.LRG IRRI	0	0	0	0	0
8	MEX MRG M&IR	0	0	0	0	0

NOTE: FLOOD POOL IS AVAILABLE FOR CONSERVATION STORAGE DURING NOVEMBER-APRIL NON-HURRICANE SEASON

SYSTEM LINK CONFIGURATION

LINK NO.	FROM NODE	TO NODE	MAX. CAPACITY (AC-FT/MON)	MIN. CAPACITY (AC-FT/MON)
1	1	5	9000000	0
2	5	6	9000000	0
3	6	2	9000000	0
4	2	7	9000000	0
5	3	8	9000000	0
6	8	4	9000000	0
7	1	2	9000000	0
8	3	4	9000000	0

CURRENT 1995-1998 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

MINIMUM MONTHLY U. S. OPERATIONAL RELEASES FROM AMISTAD RESERVOIR (AC-FT)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1995	67452	61300	69425	58726	69665	69639	68000	66034	66317	65061	63354	66114
1996	65689	54830	57313	89764	154787	147757	63930	64243	60874	60473	61433	68800
1997	64640	58319	62144	60255	60575	60054	66254	61276	61043	65115	56042	59831
1998	63522	58757	66518	58726	69665	69639	68000	66034	66317	65061	63354	66114

MINIMUM MONTHLY MEXICO OPERATIONAL RELEASES FROM AMISTAD RESERVOIR (AC-FT)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1995	32953	29947	92837	177441	120667	21894	21502	21083	21229	20803	20346	21311
1996	14911	10155	11408	13681	14033	11206	11605	11731	11288	11433	11727	12102
1997	12467	11266	12073	11750	12073	9615	8590	10221	8233	8635	7729	8295
1998	8748	8082	10257	177441	120667	21894	21502	21083	21229	20803	20346	21311

CURRENT 1995-1998 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

U.S. SPILL RESERVOIR NODE: 2

MEXICO SPILL RESERVOIR NODE: 4

U.S. 'MODERATE' STORAGE CONDITION DEFINED AS 9.65 TO 75.00 PERCENT OF FALCON U.S. CONSERVATION CAPACITY

MEXICO 'MODERATE' STORAGE CONDITION DEFINED AS 10.00 TO 75.00 PERCENT OF FALCON MEXICAN CONSERVATION CAPACITY

NODE MONTHLY DEMAND DISTRIBUTIONS AND DEMAND PRIORITIES

NODE NO.	MONTHLY FRACTIONS OF ANNUAL DEMAND												PRIORITIES		
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MOD	LO	HI
1	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	20	20	20
2	.0720	.0666	.0777	.0894	.0866	.0900	.1004	.1038	.0850	.0803	.0744	.0738	2	2	2
3	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	20	20	20
4	.1620	.0649	.0243	.2413	.2651	.0653	.0295	.0592	.0227	.0344	.0121	.0192	6	6	6
5	.0611	.0610	.0760	.0826	.0892	.0961	.1086	.1108	.0880	.0851	.0724	.0691	1	1	1
6	.0425	.0409	.0927	.1020	.0835	.1039	.1186	.1366	.0807	.0809	.0666	.0511	3	3	3
7	.0747	.0441	.0780	.1437	.1342	.1266	.1063	.0967	.0571	.0593	.0402	.0391	4	4	4
8	.0785	.0727	.0745	.0849	.0799	.0830	.0915	.0910	.0896	.0860	.0825	.0859	5	5	5

RESERVOIR MONTHLY STORAGE TARGETS AND STORAGE PRIORITIES

RESERVOIR NO.		DESIRED MONTHLY STORAGE LEVEL (PERCENT OF MAXI MUM STORAGE CAPACITY)												PRIORITIES
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
1	MOD	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	10
	LO	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	11
	HI	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	10
2	MOD	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	11
	LO	9.650	9.650	9.650	9.650	9.650	9.650	9.650	9.650	9.650	9.650	9.650	9.650	10
	HI	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	11
3	MOD	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	12
	LO	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	13
	HI	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	12
4	MOD	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	13
	LO	.100	.100	.100	.100	.100	.100	.100	.100	.100	.100	.100	.100	12
	HI	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	13

CURRENT 1995-1998 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

STAGE-AREA-CAPACITY RELATIONSHIPS FOR TOTAL STORAGE IN AMISTAD AND FALCON RESERVOIRS

	AMISTAD RESERVOIR			FALCON RESERVOIR		
POINT NO.	STAGE (FT MSL)	AREA (AC)	CAPACITY (AC-FT)	STAGE (FT MSL)	AREA (AC)	CAPACITY (AC-FT)
1	930.0	0	0	203.3	0	0
2	945.0	5	1	203.4	35	57
3	946.5	87	294	205.1	195	235
4	948.2	180	823	206.7	425	735
5	949.1	237	1180	207.3	539	1050
6	950.1	297	1684	208.3	727	1670
7	951.4	376	2782	210.0	1100	3158
8	961.3	1045	13873	214.9	1559	9631
9	971.1	1843	33110	219.8	2202	18806
10	981.0	2770	59404	224.7	3526	32732
11	990.8	3823	93556	229.7	5169	54000
12	1000.7	5004	138573	234.6	6531	82799
13	1010.5	6314	195568	239.5	8061	118624
14	1020.3	7722	264663	242.8	10341	148482
15	1030.2	9758	350120	244.4	11654	166516
16	1040.0	12751	458690	249.3	15894	234115
17	1049.9	16734	605456	254.3	20562	323644
18	1059.7	21627	790919	259.2	25677	437240
19	1069.6	27399	1029250	264.1	30775	576159
20	1079.4	34051	1328996	269.0	36184	740751
21	1089.2	41702	1699411	274.0	42448	933844
22	1094.2	45665	1911714	278.9	48929	1158684
23	1099.1	49658	2142942	282.2	53474	1326587
24	1104.0	53679	2393700	285.4	58443	1509829
25	1108.9	57729	2664077	288.7	65021	1712296
26	1115.5	63173	3055670	292.0	70235	1935151
27	1117.0	64438	3151319	295.3	74804	2172702
28	1118.8	65915	3265037	298.6	82000	2429861
29	1122.0	68671	3483939	301.2	87181	2653803
30	1131.9	77013	4199954	305.1	93809	3008297

SUMMARY OF TEXAS WATER RIGHTS IN MIDDLE AND LOWER RIO GRANDE AND MAXIMUM STORAGE ALLOCATIONS IN AMISTAD AND FALCON RESERVOIRS

TOTAL DOMESTIC, MUNICIPAL AND INDUSTRIAL WATER RIGHTS	(AC-FT/YR):	271579
TOTAL IRRIGATION & MINING WATER RIGHTS ON MIDDLE RIO GRANDE	(AC-FT/YR):	181530
CLASS A IRRIGATION & MINING WATER RIGHTS ON MIDDLE RIO GRANDE	(AC-FT/YR):	162803
CLASS B IRRIGATION & MINING WATER RIGHTS ON MIDDLE RIO GRANDE	(AC-FT/YR):	18727
TOTAL IRRIGATION & MINING WATER RIGHTS ON LOWER RIO GRANDE	(AC-FT/YR):	1696228
CLASS A IRRIGATION & MINING WATER RIGHTS ON LOWER RIO GRANDE	(AC-FT/YR):	1500719
CLASS B IRRIGATION & MINING WATER RIGHTS ON LOWER RIO GRANDE	(AC-FT/YR):	195509
MAXIMUM STORAGE CAPACITY IN AMISTAD-FALCON D-M-I POOL	(AC-FT):	225000
MAXIMUM STORAGE CAPACITY IN AMISTAD-FALCON IRRIGATION POOL	(AC-FT):	2647639
TOTAL RESERVOIR DEAD STORAGE USED IN WATER RIGHTS ACCOUNTING	(AC-FT):	4600
MAXIMUM STORAGE CAPACITY ALLOTTED TO OPERATING RESERVE	(AC-FT):	380000
MAXIMUM USABLE STORAGE AVAILABLE FOR WATER RIGHTS ACCOUNTING	(AC-FT):	3321570
TOTAL IRRIGATION & MINING ACCOUNT BALANCE AT BEGINNING OF SIMULATION	(AC-FT):	1747743

CURRENT 1995-1998 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 1 CALENDAR YEAR 1995

RESERVOIR NO. 1 U.S. AMISTAD MAX FLOOD POOL: 1827241 MAX CONSERVATION POOL: 1771041 DEAD POOL: 1771

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	67892	67892	0	67452	40024	. .31	9210	1497	0	5251	0	0	1196844	1827241
2	56680	56680	0	61300	39539	.44	12961	1574	0	5100	0	0	1179263	1827241
3	61812	61812	0	69425	38240	.47	13711	1813	0	5363	0	0	1157939	1827241
4	75819	75819	0	58726	35594	.77	22555	2167	0	12485	0	0	1152477	1771041
5	101801	101801	0	69665	33050	.87	25881	2451	0	10532	0	0	1158732	1771041
6	79903	79903	0	69639	32022	.99	29437	2463	0	9950	0	0	1139559	1771041
7	80026	80026	0	68000	31759	1.17	34210	2503	0	9481	0	0	1117375	1771041
8	89329	89329	0	66034	31814	1.18	33991	2402	0	12808	0	0	1106679	1771041
9	95852	95852	0	66317	32247	.86	24652	1956	0	6404	0	0	1111562	1771041
10	66988	66988	0	65061	32434	.74	21056	2185	0	3923	0	0	1092433	1771041
11	62195	62195	0	63354	32323	.34	9549	2053	0	1728	0	0	1081725	1827241
12	56829	56829	0	66114	32107	.32	8877	1497	0	6219	0	0	1063563	1827241
ANNUAL	895126	895126	0	791087			246090	24561	0	89244	0	0		

RESERVOIR NO. 2 U.S. FALCON MAX FLOOD POOL: 1613729 MAX CONSERVATION POOL: 1555129 DEAD POOL: 1555

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	7832	68536	0	88713	49162	.26	10102	8653	0	80060	0	0	907373	1210297
2	7386	62012	0	99170	45545	.29	11203	14554	0	84616	0	0	859012	1210297
3	2433	64682	0	82787	44087	.42	15739	8368	0	74419	0	0	825168	1210297
4	0	44074	0	146118	39526	.68	24274	10116	0	136002	0	0	698850	1166347
5	57403	114085	0	273384	32924	.73	22771	19233	0	254151	0	0	516780	1166347
6	8711	65937	0	114796	29688	.80	20940	8356	0	106440	0	0	446981	1166347
7	1299	57315	0	131401	27287	.87	19741	12953	0	118448	0	0	353154	1166347
8	3501	54325	0	56968	25719	.61	12370	6731	0	50237	0	0	338141	1166347
9	73473	131430	0	44108	29056	.58	11965	6530	0	37578	0	0	413498	1166347
10	17386	76339	0	49647	32954	.43	9312	6620	0	43027	0	0	430878	1166347
11	33696	93269	0	20644	35429	.25	5730	3677	0	16967	0	0	497773	1210297
12	5718	64116	0	26690	37904	.20	4909	4954	0	21736	0	0	530290	1210297
ANNUAL	218838	896120	0	1134426			169056	110745	0	1023681	0	0		

RESERVOIR NO. 3 MEX AMISTAD MAX FLOOD POOL: 1424078 MAX CONSERVATION POOL: 1380278 DEAD POOL: 1380

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	28687	28687	0	32953	40024	.31	3197	6435	0	0	0	0	413203	1424078
2	21287	21287	0	29947	39539	.44	4436	6547	0	0	0	0	400107	1424078
3	23319	23319	0	92837	38240	.47	4262	9564	0	0	0	0	326327	1424078
4	26625	26625	0	177441	35594	.77	4852	10222	0	0	0	0	170659	1380278
5	38768	38768	0	120667	33050	.87	2873	11766	0	0	0	0	85887	1035209
6	29252	29252	0	21894	32022	.99	2265	5998	0	0	0	0	90980	1035209
7	37006	37006	0	21502	31759	1.17	2948	5967	0	0	0	0	103536	1035209
8	49855	49855	0	21083	31814	1.18	3550	6047	0	0	0	0	128758	1035209
9	43976	43976	0	21229	32247	.86	3080	5890	0	0	0	0	148425	1035209
10	35154	35154	0	20803	32434	.74	2945	6568	0	0	0	0	159831	1380278
11	30206	30206	0	20346	32323	.34	1441	6128	0	0	0	0	168250	1424078
12	23756	23756	0	21311	32107	.32	1397	5901	0	0	0	0	169298	1424078
ANNUAL	387891	387891	0	602013			37246	87033	0	0	0	0		

CURRENT 1995-1998 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 1 CALENDAR YEAR 1995

RESERVOIR NO. 4 MEX FALCON MAX FLOOD POOL: 1140074 MAX CONSERVATION POOL: 1098674 DEAD POOL: 1099

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	3906	30424	0	179835	49162	.26	2680	179835	0	0	0	0	168735	855056
2	3825	27225	0	46531	45545	.29	2005	46531	0	0	0	0	147424	855056
3	0	83273	0	78080	44087	.42	2778	78080	0	0	0	0	149839	855056
4	0	167219	0	300801	39526	.68	2604	300801	0	0	0	0	13653	824006
5	58914	167815	0	126402	32924	.73	1264	126402	0	0	0	0	53802	1099
6	10260	26156	0	1605	29688	.80	2810	1605	0	0	0	0	75543	1099
7	3913	19448	0	4452	27287	.87	3999	4452	0	0	0	0	86540	1099
8	5330	20366	0	4630	25719	.61	3319	4630	0	0	0	0	98957	1099
9	98882	114221	0	245	29056	.58	4887	245	0	0	0	0	208046	1099
10	18370	32605	0	3266	32954	.43	4858	3266	0	0	0	0	232527	824006
11	33717	47935	0	2976	35429	.25	3127	2976	0	0	0	0	274359	855056
12	3724	19134	0	5720	37904	.20	2672	5720	0	0	0	0	285101	855056
ANNUAL	240841	755821	0	754543			37003	754543	0	0	0	0		

MONTHLY FLOWS IN SYSTEM LINKS (ACRE-FEET)

MONTH / LINK NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1	67452	61300	69425	58726	69665	69639	68000	66034	66317	65061	63354	66114	65918
2	73787	67112	70045	56559	124617	75887	66796	67133	137834	80262	94997	70335	82108
3	68536	62012	64682	44074	114085	65937	57315	54325	131430	76339	93269	64116	74672
4	80060	84616	74419	136002	254151	106440	118448	50237	37578	43027	16967	21736	85301
5	32953	29947	92837	177441	120667	21894	21502	21083	21229	20803	20346	21311	50161
6	30424	27225	83273	167219	167815	26156	19448	20366	114221	32605	47935	19134	62979
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0

ALLOCATION OF U.S. WATER IN AMISTAD AND FALCON RESERVOIRS PURSUANT TO TNRCC RIO GRANDE RULES

MONTH	INITIAL USABLE STORAGE	TOTAL WTRSHED INFLOWS	TOTAL D-M-I DEMANDS	TOTAL IRRIG DEMANDS	TOTAL SYSTEM SHORTAGE	TOTAL RESERVR EVAP	END-MON USABLE STORAGE	o/o CONS POOL	D-M-I RESERVE STORAGE	OPRATNG RESERVE STORAGE	EXCESS USABLE STORAGE	IRRIG ACCOUNT ALLOCAT	IRRIG RIVER DIVERSN	IRRIG ACCOUNT BALANCE	o/o IRRIG POOL
1	2138666	75724	10150	85311	0	19312	2099617	63.3	225000	205780	0	0	78906	1668837	63.0
2	2099617	64066	16128	89716	0	24164	2033675	61.3	225000	222784	0	0	82946	1585891	59.9
3	2033675	64245	10181	79782	0	29450	1978507	59.6	225000	241444	0	0	73828	1512063	57.1
4	1978507	75819	12283	148487	0	46829	1846727	55.7	225000	247270	0	0	137606	1374457	51.9
5	1846727	159204	21684	264683	0	48652	1670912	50.4	225000	275000	40805	0	244350	1130107	42.7
6	1670912	88614	10819	116390	0	50377	1581940	47.7	225000	275000	0	59707	107874	1081940	40.9
7	1581940	81325	15456	127929	0	53951	1465929	44.2	225000	275000	2442	0	118453	963487	36.4
8	1465929	92830	9133	63045	0	46361	1440220	43.4	225000	275000	35759	0	59026	904461	34.2
9	1440220	169325	8486	43982	0	36617	1520460	45.9	225000	275000	0	156974	40975	1020460	38.5
10	1520460	84374	8805	46950	0	30368	1518711	45.8	225000	275000	41758	0	43507	976953	36.9
11	1518711	95891	5730	18695	0	15279	1574898	47.5	225000	275000	0	115282	17337	1074898	40.6
12	1574898	62547	6451	27955	0	13786	1589253	47.9	225000	275000	40571	0	26216	1048682	39.6

CURRENT 1995-1998 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 2 CALENDAR YEAR 1996

RESERVOIR NO. 1 U.S. AMISTAD MAX FLOOD POOL: 1827241 MAX CONSERVATION POOL: 1771041 DEAD POOL: 1771

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	55280	55280	0	65689	31748	.41	11185	1667	0	6010	0	0	1041969	1827241
2	55444	55444	0	54830	31565	.46	12362	1839	0	5005	0	0	1030221	1827241
3	54797	54797	0	57313	31414	.62	16429	2112	0	12205	0	0	1011276	1827241
4	60455	60455	0	89764	30710	.89	22850	2398	0	9892	0	0	959117	1771041
5	77853	77853	0	154787	29000	1.01	24162	2775	0	10583	0	0	858021	1771041
6	82278	82278	0	147757	26867	1.29	27915	2653	0	10499	0	0	764627	1771041
7	69082	69082	0	63930	25768	1.30	26260	2730	0	11511	0	0	743519	1771041
8	101372	101372	0	64243	26413	1.01	20292	2192	0	14169	0	0	760356	1771041
9	194441	194441	0	60874	29307	.57	12297	1739	0	6629	0	0	881626	1771041
10	83591	83591	0	60473	32222	.70	16016	2018	0	6244	0	0	888728	1771041
11	61439	61439	0	61433	32994	.39	8881	2232	0	5387	0	0	879853	1827241
12	60434	60434	0	68800	32944	.27	6068	1495	0	3839	0	0	865419	1827241
ANNUAL	956466	956466	0	949893			204717	25850	0	101973	0	0		

RESERVOIR NO. 2 U.S. FALCON MAX FLOOD POOL: 1613729 MAX CONSERVATION POOL: 1555129 DEAD POOL: 1555

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	7807	65819	0	56026	38743	.28	7037	5465	0	50561	0	0	533046	1210297
2	10255	58241	0	91433	38266	.34	8280	13419	0	78014	0	0	491574	1210297
3	4586	47582	0	126657	36095	.51	11136	12802	0	113855	0	0	401363	1210297
4	0	77474	0	175864	29808	.67	12564	12175	0	163689	0	0	290409	1166347
5	5213	146642	0	192879	22753	.81	12912	13569	0	179310	0	0	231260	1166347
6	10551	145156	0	134130	21119	.87	12603	9763	0	124367	0	0	229683	1166347
7	18724	68413	0	103864	20252	.99	12967	10263	0	93601	0	0	181265	1166347
8	30928	78810	0	64732	20194	.69	8110	7648	0	57084	0	0	187233	1166347
9	82151	134657	0	31055	25114	.56	7786	4598	0	26457	0	0	283049	1166347
10	36792	89003	0	41219	29814	.39	6421	5496	0	35723	0	0	324412	1166347
11	12953	66767	0	52009	31151	.34	5927	9263	0	42746	0	0	333243	1210297
12	7713	71179	0	43750	31670	.24	4343	8122	0	35628	0	0	356329	1210297
ANNUAL	227673	1049743	0	1113618			110086	112583	0	1001035	0	0		

RESERVOIR NO. 3 MEX AMISTAD MAX FLOOD POOL: 1424078 MAX CONSERVATION POOL: 1380278 DEAD POOL: 1380

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	23037	23037	0	14911	31748	.41	1832	6176	0	0	0	0	175592	1424078
2	22888	22888	0	10155	31565	.46	2158	5978	0	0	0	0	186167	1424078
3	20943	20943	0	11408	31414	.62	3048	6963	0	0	0	0	192654	1424078
4	19311	19311	0	13681	30710	.89	4482	9743	0	0	0	0	193802	1380278
5	17171	17171	0	14033	29000	1.01	5128	9445	0	0	0	0	191812	1380278
6	26255	26255	0	11206	26867	1.29	6743	6740	0	0	0	0	200118	1035209
7	34280	34280	0	11605	25768	1.30	7238	7105	0	0	0	0	215555	1035209
8	60233	60233	0	11731	26413	1.01	6385	6903	0	0	0	0	257672	1380278
9	88867	88867	0	11288	29307	.57	4408	6209	0	0	0	0	330843	1380278
10	79094	79094	0	11433	32222	.70	6539	6593	0	0	0	0	391965	1380278
11	25897	25897	0	11727	32994	.39	3987	6045	0	0	0	0	402148	1424078
12	23601	23601	0	12102	32944	.27	2827	5486	0	0	0	0	410820	1424078
ANNUAL	441577	441577	0	145280			54775	83386	0	0	0	0		

CURRENT 1995-1998 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 2 CALENDAR YEAR 1996

RESERVOIR NO. 4 MEX FALCON MAX FLOOD POOL: 1140074 MAX CONSERVATION POOL: 1098674 DEAD POOL: 1099

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	6958	15693	0	6132	38743	.28	3811	6132	0	0	0	0	290851	855056
2	9093	13270	0	4994	38266	.34	4730	4994	0	0	0	0	294397	855056
3	4786	9231	0	7634	36095	.51	7272	7634	0	0	0	0	288722	855056
4	0	3938	0	166134	29808	.67	7407	166134	0	0	0	0	119119	824006
5	12781	17369	0	27162	22753	.81	5518	27162	0	0	0	0	103808	824006
6	20695	25161	0	15935	21119	.87	5771	15935	0	0	0	0	107263	1099
7	27018	31518	0	14526	20252	.99	7082	14526	0	0	0	0	117173	1099
8	40713	45541	0	9411	20194	.69	5824	9411	0	0	0	0	147479	824006
9	88400	93479	0	2981	25114	.56	6278	2981	0	0	0	0	231699	824006
10	33031	37871	0	3603	29814	.39	5206	3603	0	0	0	0	260761	824006
11	11824	17506	0	16832	31151	.34	4664	16832	0	0	0	0	256771	855056
12	4555	11171	0	4263	31670	.24	3258	4263	0	0	0	0	260421	855056
ANNUAL	259854	321748	0	279607			66821	279607	0	0	0	0		

MONTHLY FLOWS IN SYSTEM LINKS (ACRE-FEET)

LINK NO. \ MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1	65689	54830	57313	89764	154787	147757	63930	64243	60874	60473	61433	68800	79153
2	71829	63246	59787	87366	157225	155655	79924	92979	141286	95247	72154	75018	95971
3	65819	58241	47582	77474	146642	145156	68413	78810	134657	89003	66767	71179	87473
4	50561	78014	113855	163689	179310	124367	93601	57084	26457	35723	42746	35628	83414
5	14911	10155	11408	13681	14033	11206	11605	11731	11288	11433	11727	12102	12101
6	15693	13270	9231	3938	17369	25161	31518	45541	93479	37871	17506	11171	26805
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0

ALLOCATION OF U.S. WATER IN AMISTAD AND FALCON RESERVOIRS PURSUANT TO TNRCC RIO GRANDE RULES

MONTH	INITIAL USABLE STORAGE	TOTAL WTRSHED INFLOWS	TOTAL D-M-I DEMANDS	TOTAL IRRIG DEMANDS	TOTAL SYSTEM SHORTAGE	TOTAL RESERVR EVAP	END-MON USABLE STORAGE	o/o CONS POOL	D-M-I RESERVE STORAGE	OPRATNG RESERVE STORAGE	EXCESS USABLE STORAGE	IRRIG ACCOUNT ALLOCAT	IRRIG RIVER DIVERSN	IRRIG ACCOUNT BALANCE	o/o IRRIG POOL
1	1589253	63087	7132	56571	0	18222	1570415	47.4	225000	275000	0	74259	52526	1070415	40.4
2	1570415	65699	15258	83019	0	20642	1517195	45.8	225000	275000	23557	0	76777	993638	37.5
3	1517195	59383	14914	126060	0	27565	1408039	42.5	225000	275000	31352	0	116951	876687	33.1
4	1408039	60455	14573	173581	0	35414	1244926	37.6	225000	275000	28724	0	160485	716202	27.1
5	1244926	83066	16344	189893	0	37074	1084681	32.7	225000	275000	44027	0	175548	540654	20.4
6	1084681	92829	12416	134866	0	40518	989710	29.9	225000	275000	0	73972	124916	489710	18.5
7	989710	87806	12993	105112	0	39227	920184	27.8	225000	275000	28097	0	97623	392087	14.8
8	920184	132300	9840	71253	0	28402	942989	28.5	225000	275000	0	117588	66686	442989	16.7
9	942989	276592	6337	33086	0	20083	1160075	35.0	225000	275000	0	248055	30969	660075	24.9
10	1160075	120383	7514	41967	0	22437	1208540	36.5	225000	275000	0	87574	39109	708540	26.8
11	1208540	74392	11495	48133	0	14808	1208496	36.5	225000	275000	44669	0	44713	663827	25.1
12	1208496	68147	9617	39467	0	10411	1217148	36.7	225000	275000	0	89937	36616	717148	27.1

CURRENT 1995-1998 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 3 CALENDAR YEAR 1997

RESERVOIR NO. 1 U.S. AMISTAD MAX FLOOD POOL: 1827241 MAX CONSERVATION POOL: 1771041 DEAD POOL: 1771

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	59322	59322	0	64640	32834	.26	5761	1497	0	1942	0	0	854340	1827241
2	118427	118427	0	58319	33582	.26	5884	1434	0	2165	0	0	908564	1827241
3	90033	90033	0	62144	34651	.53	12391	1642	0	3424	0	0	924062	1827241
4	67334	67334	0	60255	34968	.51	11968	1652	0	2915	0	0	919173	1771041
5	91328	91328	0	60575	35591	.58	13645	2113	0	6923	0	0	936281	1771041
6	140637	140637	0	60054	37223	.82	19901	2187	0	4252	0	0	996963	1771041
7	84279	84279	0	66254	38349	1.05	26012	3024	0	11159	0	0	988976	1771041
8	79060	79060	0	61276	38461	1.13	27725	2971	0	15894	0	0	979035	1771041
9	60896	60896	0	61043	38251	.92	22227	2327	0	7611	0	0	956661	1771041
10	60700	60700	0	65115	37926	.59	13979	1950	0	4186	0	0	938267	1771041
11	48598	48598	0	56042	37757	.35	8152	1997	0	3939	0	0	922671	1827241
12	50678	50678	0	59831	37627	.30	6873	1490	0	5195	0	0	906645	1827241
ANNUAL	951292	951292	0	735548			174518	24284	0	69605	0	0		

RESERVOIR NO. 2 U.S. FALCON MAX FLOOD POOL: 1613729 MAX CONSERVATION POOL: 1555129 DEAD POOL: 1555

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	7272	68473	0	68998	32048	.21	3876	6730	0	62268	0	0	351928	1210297
2	12931	67651	0	87928	31420	.27	4832	12904	0	75024	0	0	326819	1210297
3	32382	89460	0	24607	32309	.39	7195	2487	0	22120	0	0	384477	1210297
4	19377	75065	0	6836	35014	.35	7212	473	0	6363	0	0	445494	1166347
5	37055	88594	0	47712	37209	.53	11747	3357	0	44355	0	0	474629	1166347
6	38075	91690	0	137165	36594	.71	15320	9984	0	127181	0	0	413834	1166347
7	3660	55731	0	155599	32496	.93	17086	15338	0	140261	0	0	296880	1166347
8	6298	48709	0	115882	27984	.91	13074	13691	0	102191	0	0	216633	1166347
9	10209	61314	0	59374	25873	.62	7746	8790	0	50584	0	0	210827	1166347
10	26869	85848	0	24558	27176	.37	5026	3274	0	21284	0	0	267091	1166347
11	18221	68327	0	21890	29635	.21	3295	3899	0	17991	0	0	310233	1210297
12	13812	66958	0	43805	30970	.28	4759	8131	0	35674	0	0	328627	1210297
ANNUAL	226161	867820	0	794354			101168	89058	0	705296	0	0		

RESERVOIR NO. 3 MEX AMISTAD MAX FLOOD POOL: 1424078 MAX CONSERVATION POOL: 1380278 DEAD POOL: 1380

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	22128	22128	0	12467	32834	.26	2776	4222	0	0	0	0	417705	1424078
2	31542	31542	0	11266	33582	.26	2847	3974	0	0	0	0	435134	1424078
3	31264	31264	0	12073	34651	.53	5974	4865	0	0	0	0	448351	1424078
4	24422	24422	0	11750	34968	.51	5866	4280	0	0	0	0	455157	1380278
5	60387	60387	0	12073	35591	.58	6998	4789	0	0	0	0	496473	1380278
6	59218	59218	0	9615	37223	.82	10622	4982	0	0	0	0	535454	1380278
7	40161	40161	0	8590	38349	1.05	14254	5635	0	0	0	0	552771	1380278
8	37395	37395	0	10221	38461	1.13	15736	7592	0	0	0	0	564209	1380278
9	21742	21742	0	8233	38251	.92	12964	5481	0	0	0	0	564754	1380278
10	25799	25799	0	8635	37926	.59	8397	4902	0	0	0	0	573521	1380278
11	21632	21632	0	7729	37757	.35	5063	4809	0	0	0	0	582361	1424078
12	22878	22878	0	8295	37627	.30	4415	5308	0	0	0	0	592529	1424078
ANNUAL	398568	398568	0	120947			95912	60839	0	0	0	0		

CURRENT 1995-1998 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 3 CALENDAR YEAR 1997

RESERVOIR NO. 4 MEX FALCON MAX FLOOD POOL: 1140074 MAX CONSERVATION POOL: 1098674 DEAD POOL: 1099

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	2713	10958	0	7394	32048	.21	2854	7394	0	0	0	0	261131	855056
2	7665	14957	0	20768	31420	.27	3651	20768	0	0	0	0	251669	855056
3	36555	43763	0	7313	32309	.39	5406	7313	0	0	0	0	282713	855056
4	17408	24878	0	4952	35014	.35	5043	4952	0	0	0	0	297596	824006
5	39881	47165	0	9789	37209	.53	7974	9789	0	0	0	0	326998	824006
6	42399	47032	0	72026	36594	.71	10662	72026	0	0	0	0	291342	824006
7	8118	11073	0	34287	32496	.93	13135	34287	0	0	0	0	254993	824006
8	7910	10539	0	21435	27984	.91	12391	21435	0	0	0	0	231706	824006
9	12731	15483	0	12877	25873	.62	8295	12877	0	0	0	0	226017	824006
10	33052	36785	0	5548	27176	.37	5029	5548	0	0	0	0	252225	824006
11	21197	24117	0	12748	29635	.21	2928	12748	0	0	0	0	260666	855056
12	13204	16191	0	8274	30970	.28	3913	8274	0	0	0	0	264670	855056
ANNUAL	242833	302941	0	217411			81281	217411	0	0	0	0		

MONTHLY FLOWS IN SYSTEM LINKS (ACRE-FEET)

MONTH LINK NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1	64640	58319	62144	60255	60575	60054	66254	61276	61043	65115	56042	59831	61289
2	70415	69816	92884	77980	95517	95942	66890	64603	68925	90034	72266	72153	78113
3	68473	67651	89460	75065	88594	91690	55731	48709	61314	85848	68327	66958	72313
4	62268	75024	22120	6363	44355	127181	140261	102191	50584	21284	17991	35674	58770
5	12467	11266	12073	11750	12073	9615	8590	10221	8233	8635	7729	8295	10074
6	10958	14957	43763	24878	47165	47032	11073	10539	15483	36785	24117	16191	25240
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0

ALLOCATION OF U.S. WATER IN AMISTAD AND FALCON RESERVOIRS PURSUANT TO TNRCC RIO GRANDE RULES

MONTH	INITIAL USABLE STORAGE	TOTAL WTRSHED INFLOWS	TOTAL D-M-I DEMANDS	TOTAL IRRIG DEMANDS	TOTAL SYSTEM SHORTAGE	TOTAL RESERVR EVAP	END-MON USABLE STORAGE	o/o CONS POOL	D-M-I RESERVE STORAGE	OPRATNG RESERVE STORAGE	EXCESS USABLE STORAGE	IRRIG ACCOUNT ALLOCAT	IRRIG RIVER DIVERSN	IRRIG ACCOUNT BALANCE	o/o IRRIG POOL
1	1217148	66594	8227	64210	0	9637	1201668	36.3	225000	275000	43748	0	59228	657920	24.8
2	1201668	131358	14338	77189	0	10716	1230783	37.1	225000	275000	0	144050	71187	730783	27.6
3	1230783	122415	4129	25544	0	19586	1303939	39.3	225000	275000	0	96930	23774	803939	30.4
4	1303939	86711	2125	9278	0	19180	1360067	41.0	225000	275000	0	64896	8768	860067	32.5
5	1360067	128383	5470	51278	0	25392	1406310	42.4	225000	275000	0	93972	47729	906310	34.2
6	1406310	178712	12171	131433	0	35221	1406197	42.4	225000	275000	0	121145	121258	906197	34.2
7	1406197	87939	18362	151420	0	43098	1281256	38.7	225000	275000	15258	0	140199	765998	28.9
8	1281256	85358	16662	118085	0	40799	1191068	35.9	225000	275000	34979	0	109909	656089	24.8
9	1191068	71105	11117	58195	0	29973	1162888	35.1	225000	275000	0	60947	54148	662888	25.0
10	1162888	87569	5224	25470	0	19005	1200758	36.2	225000	275000	0	61637	23767	700758	26.5
11	1200758	66819	5896	21930	0	11447	1228304	37.1	225000	275000	48036	0	20490	680268	25.7
12	1228304	64490	9621	40869	0	11632	1230672	37.1	225000	275000	0	88419	38015	730672	27.6

CURRENT 1995-1998 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 4 CALENDAR YEAR 1998

RESERVOIR NO. 1 U.S. AMISTAD MAX FLOOD POOL: 1827241 MAX CONSERVATION POOL: 1771041 DEAD POOL: 1771

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	58433	58433	0	63522	37561	.31	6996	1586	0	3912	0	0	894560	1827241
2	51428	51428	0	58757	37465	.38	8448	1471	0	3251	0	0	878783	1827241
3	66714	66714	0	66518	37234	.75	16394	1784	0	5055	0	0	862585	1827241
4	75819	75819	0	58726	35431	.77	16862	2167	0	12485	0	0	862816	1771041
5	101801	101801	0	69665	32878	.87	19482	2451	0	10532	0	0	875470	1771041
6	79903	79903	0	212584	30285	.99	20659	2463	0	9950	0	0	722130	1328281
7	80026	80026	0	68000	28497	1.17	22163	2503	0	9481	0	0	711993	1771041
8	89329	89329	0	153034	27682	1.18	20992	2402	0	12808	0	0	627296	1328281
9	95852	95852	0	66317	27239	.86	14541	1956	0	6404	0	0	642290	1771041
10	66988	66988	0	65061	27527	.74	12536	2185	0	3923	0	0	631681	1771041
11	62195	62195	0	63354	27475	.34	5683	2053	0	1728	0	0	624839	1827241
12	56829	56829	0	66114	27285	.32	5263	1497	0	6219	0	0	610291	1827241
ANNUAL	885317	885317	0	1011652			170019	24518	0	85748	0	0		

RESERVOIR NO. 2 U.S. FALCON MAX FLOOD POOL: 1613729 MAX CONSERVATION POOL: 1555129 DEAD POOL: 1555

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	15363	73387	0	93010	30926	.31	5220	9072	0	83938	0	0	303784	1210297
2	12548	66583	0	24166	30997	.34	5823	3547	0	20619	0	0	340378	1210297
3	10153	69832	0	58894	31451	.46	8284	5953	0	52941	0	0	343032	1210297
4	0	44074	0	146118	26839	.68	11149	10116	0	136002	0	0	229839	1166347
5	57403	114085	0	273384	18100	.73	7011	19233	0	254151	0	0	63529	1166347
6	8711	208882	0	114796	17412	.80	5701	8356	0	106440	0	0	151914	150070
7	1299	57315	0	131401	18189	.87	6355	12953	0	118448	0	0	71473	1166347
8	3501	141325	0	56968	18550	.61	4423	6731	0	50237	0	0	151407	150070
9	73473	131430	0	44108	25029	.58	6584	6530	0	37578	0	0	232145	1166347
10	17386	76339	0	49647	29372	.43	5697	6620	0	43027	0	0	253140	1166347
11	33696	93269	0	20644	32032	.25	3748	3677	0	16967	0	0	322017	1210297
12	5718	64116	0	26690	34555	.20	3390	4954	0	21736	0	0	356053	1210297
ANNUAL	239251	1140637	0	1039826			73385	97742	0	942084	0	0		

RESERVOIR NO. 3 MEX AMISTAD MAX FLOOD POOL: 1424078 MAX CONSERVATION POOL: 1380278 DEAD POOL: 1380

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	24980	24980	0	8748	37561	.31	4648	4814	0	0	0	0	604113	1424078
2	20862	20862	0	8082	37465	.38	5789	4430	0	0	0	0	611104	1424078
3	24405	24405	0	10257	37234	.75	11531	4868	0	0	0	0	613721	1424078
4	26625	26625	0	177441	35431	.77	10420	10222	0	0	0	0	452485	1380278
5	38768	38768	0	120667	32878	.87	9122	11766	0	0	0	0	361464	1380278
6	29252	29252	0	21894	30285	.99	9323	5998	0	0	0	0	359499	1380278
7	37006	37006	0	21502	28497	1.17	11178	5967	0	0	0	0	363825	1380278
8	49855	49855	0	21083	27682	1.18	11673	6047	0	0	0	0	380924	1380278
9	43976	43976	0	21229	27239	.86	8885	5890	0	0	0	0	394786	1380278
10	35154	35154	0	20803	27527	.74	7834	6568	0	0	0	0	401303	1380278
11	30206	30206	0	20346	27475	.34	3658	6128	0	0	0	0	407505	1424078
12	23756	23756	0	21311	27285	.32	3468	5901	0	0	0	0	406482	1424078
ANNUAL	384845	384845	0	473363			97529	78599	0	0	0	0		

CURRENT 1995-1998 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 4 CALENDAR YEAR 1998

RESERVOIR NO. 4 MEX FALCON MAX FLOOD POOL: 1140074 MAX CONSERVATION POOL: 1098674 DEAD POOL: 1099

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	13771	17705	0	13586	30926	.31	4367	13586	0	0	0	0	264422	855056
2	11090	14742	0	17196	30997	.34	4716	17196	0	0	0	0	257252	855056
3	9301	14690	0	12937	31451	.46	6183	12937	0	0	0	0	252822	855056
4	0	167219	0	300801	26839	.68	7102	300801	0	0	0	0	112138	824006
5	58914	167815	0	126402	18100	.73	6202	126402	0	0	0	0	147349	824006
6	10260	26156	0	1605	17412	.80	8229	1605	0	0	0	0	163671	824006
7	3913	19448	0	4452	18189	.87	9469	4452	0	0	0	0	169198	824006
8	5330	20366	0	4630	18550	.61	6892	4630	0	0	0	0	178042	824006
9	98882	114221	0	245	25029	.58	7933	245	0	0	0	0	284085	824006
10	18370	32605	0	3266	29372	.43	6933	3266	0	0	0	0	306491	824006
11	33717	47935	0	2976	32032	.25	4260	2976	0	0	0	0	347190	855056
12	3724	19134	0	5720	34555	.20	3521	5720	0	0	0	0	357083	855056
ANNUAL	267272	662036	0	493816			75807	493816	0	0	0	0		

MONTHLY FLOWS IN SYSTEM LINKS (ACRE-FEET)

MONTH LINK NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1	63522	58757	66518	58726	69665	69639	68000	66034	66317	65061	63354	66114	65136
2	77299	69834	74887	56559	124617	75887	66796	67133	137834	80262	94997	70335	83031
3	73387	66583	69832	44074	114085	65937	57315	54325	131430	76339	93269	64116	75886
4	83938	20619	52941	136002	254151	106440	118448	50237	37578	43027	16967	21736	78501
5	8748	8082	10257	177441	120667	21894	21502	21083	21229	20803	20346	21311	39440
6	17705	14742	14690	167219	167815	26156	19448	20366	114221	32605	47935	19134	55164
7	0	0	0	0	0	142945	0	87000	0	0	0	0	19162
8	0	0	0	0	0	0	0	0	0	0	0	0	0

ALLOCATION OF U.S. WATER IN AMISTAD AND FALCON RESERVOIRS PURSUANT TO TNRCC RIO GRANDE RULES

MONTH	INITIAL USABLE STORAGE	TOTAL WTRSHED INFLOWS	TOTAL D-M-I DEMANDS	TOTAL IRRIG DEMANDS	TOTAL SYSTEM SHORTAGE	TOTAL RESERVR EVAP	END-MON USABLE STORAGE	o/o CONS POOL	D-M-I RESERVE STORAGE	OPRATNG RESERVE STORAGE	EXCESS USABLE STORAGE	IRRIG ACCOUNT ALLOCAT	IRRIG RIVER DIVERSN	IRRIG ACCOUNT BALANCE	o/o IRRIG POOL
1	1230672	73796	10658	87850	0	12216	1193744	36.0	225000	275000	44206	0	81134	649538	24.5
2	1193744	63976	5018	23870	0	14271	1214561	36.7	225000	275000	0	87243	22220	714561	27.0
3	1214561	76867	7737	57996	0	24678	1201017	36.2	225000	275000	40216	0	53760	660801	25.0
4	1201017	75819	12283	148487	0	28011	1088055	32.9	225000	275000	0	64860	137606	588055	22.2
5	1088055	159204	21684	264683	0	26493	934399	28.2	225000	275000	0	90694	244350	434399	16.4
6	934399	88614	10819	116390	0	26360	869444	26.3	225000	275000	42919	0	107874	326525	12.3
7	869444	81325	15456	127929	0	28518	778866	23.6	225000	275000	0	70794	118453	278866	10.5
8	778866	92830	9133	63045	0	25415	774103	23.4	225000	275000	0	54263	59026	274103	10.4
9	774103	169325	8486	43982	0	21125	869835	26.3	225000	275000	0	136707	40975	369835	14.0
10	869835	84374	8805	46950	0	18233	880221	26.6	225000	275000	0	53893	43507	380221	14.4
11	880221	95891	5730	18695	0	9431	942256	28.5	225000	275000	0	79372	17337	442256	16.7
12	942256	62547	6451	27955	0	8653	961744	29.1	225000	275000	45704	0	26216	416040	15.7

CURRENT 1995-1998 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION PERIOD TOTAL SUMMARY FOR NODE 1 U.S. AMISTAD

YEAR	INITIAL STORAGE	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	YEAREND STORAGE	MINIMUM STORAGE
1995	1205614	895126	895126	0	791087	246090	24561	0	89244	0	0	1063563	1063563
1996	1063563	956466	956466	0	949893	204717	25850	0	101973	0	0	865419	743519
1997	865419	951292	951292	0	735548	174518	24284	0	69605	0	0	906645	854340
1998	906645	885317	885317	0	1011652	170019	24518	0	85748	0	0	610291	610291

CURRENT 1995-1998 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION PERIOD TOTAL SUMMARY FOR NODE 2 U.S. FALCON

YEAR	INITIAL STORAGE	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	YEAREND STORAGE	MINIMUM STORAGE
1995	937652	218838	896120	0	1134426	169056	110745	0	1023681	0	0	530290	338141
1996	530290	227673	1049743	0	1113618	110086	112583	0	1001035	0	0	356329	181265
1997	356329	226161	867820	0	794354	101168	89058	0	705296	0	0	328627	210827
1998	328627	239251	1140637	0	1039826	73385	97742	0	942084	0	0	356053	63529

CURRENT 1995-1998 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION PERIOD TOTAL SUMMARY FOR NODE 3 MEX AMISTAD

YEAR	INITIAL STORAGE	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	YEAREND STORAGE	MINIMUM STORAGE
1995	420666	387891	387891	0	602013	37246	87033	0	0	0	0	169298	85887
1996	169298	441577	441577	0	145280	54775	83386	0	0	0	0	410820	175592
1997	410820	398568	398568	0	120947	95912	60839	0	0	0	0	592529	417705
1998	592529	384845	384845	0	473363	97529	78599	0	0	0	0	406482	359499

CURRENT 1995-1998 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION PERIOD TOTAL SUMMARY FOR NODE 4 MEX FALCON

YEAR	INITIAL STORAGE	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	YEAREND STORAGE	MINIMUM STORAGE
1995	320826	240841	755821	0	754543	37003	754543	0	0	0	0	285101	13653
1996	285101	259854	321748	0	279607	66821	279607	0	0	0	0	260421	103808
1997	260421	242833	302941	0	217411	81281	217411	0	0	0	0	264670	226017
1998	264670	267272	662036	0	493816	75807	493816	0	0	0	0	357083	112138

ATTACHMENT 3

OUTPUT FROM AMISTAD-FALCON ROM
FOR 1995-2000 SIMULATION OF EXTENDED DROUGHT CONDITIONS

RIVER BASIN SIMULATION PROGRAM - TEXAS WATER DEVELOPMENT BOARD
ADAPTED AND MODIFIED FOR AMISTAD AND FALCON RESERVOIRS IN THE RIO GRANDE BASIN
INCLUDING U.S. / MEXICO WATER ACCOUNTING AND TNRCC OPERATING RULES
R. J. BRANDES COMPANY FEB. 1999

DATE: 3- 4-1999
TIME: 10:24:16
FILE: USMX9500

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS
TEST ROM SIMULATION WITH ACTUAL MONTHLY DEMANDS AND AMISTAD RESERVOIR RELEASES

NUMBER OF NODES = 8 NUMBER OF RESERVOIRS = 4

NUMBER OF LINKS = 8 NUMBER OF RIVER REACHES = 8

CALENDAR YEAR OPERATION STARTS = 1995 NUMBER OF YEARS TO SIMULATE = 6

NUMBER OF DEMAND NODES = 8 NUMBER OF SPILL NODES = 2

NUMBER OF INDIVIDUAL WATER RIGHTS = 3

SYSTEM NODE CHARACTERISTICS

NODE NO.	NODE NAME	CAPACITIES FLOOD (AC-FT)	CONSERV (AC-FT)	MINIMUM (AC-FT)	STARTING (AC-FT)	YEARLY DEMAND (AC-FT)
1	U.S. AMISTAD	1827241	1771041	1771	1205614	0
2	U.S. FALCON	1613729	1555129	1555	937652	0
3	MEX AMISTAD	1424078	1380278	1380	420666	0
4	MEX FALCON	1140074	1098674	1099	320826	0
5	U.S.MRG MUNI	0	0	0	0	0
6	U.S.MRG IRRI	0	0	0	0	0
7	U.S.LRG IRRI	0	0	0	0	0
8	MEX MRG M&IR	0	0	0	0	0

NOTE: FLOOD POOL IS AVAILABLE FOR CONSERVATION STORAGE DURING NOVEMBER-APRIL NON-HURRICANE SEASON

SYSTEM LINK CONFIGURATION

LINK NO.	FROM NODE	TO NODE	MAX. CAPACITY (AC-FT/MON)	MIN. CAPACITY (AC-FT/MON)
1	1	5	9000000	0
2	5	6	9000000	0
3	6	2	9000000	0
4	2	7	9000000	0
5	3	8	9000000	0
6	8	4	9000000	0
7	1	2	9000000	0
8	3	4	9000000	0

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

MINIMUM MONTHLY U. S. OPERATIONAL RELEASES FROM AMISTAD RESERVOIR (AC-FT)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1995	67452	61300	69425	58726	69665	69639	68000	66034	66317	65061	63354	66114
1996	65689	54830	57313	89764	154787	147757	63930	64243	60874	60473	61433	68800
1997	64640	58319	62144	60255	60575	60054	66254	61276	61043	65115	56042	59831
1998	63522	58757	66518	58726	69665	69639	68000	66034	66317	65061	63354	66114
1999	67452	61300	69425	58726	69665	69639	68000	66034	66317	65061	63354	66114
2000	67452	61300	69425	58726	69665	69639	68000	66034	66317	65061	63354	66114

MINIMUM MONTHLY MEXICO OPERATIONAL RELEASES FROM AMISTAD RESERVOIR (AC-FT)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1995	32953	29947	92837	177441	120667	21894	21502	21083	21229	20803	20346	21311
1996	14911	10155	11408	13681	14033	11206	11605	11731	11288	11433	11727	12102
1997	12467	11266	12073	11750	12073	9615	8590	10221	8233	8635	7729	8295
1998	8748	8082	10257	177441	120667	21894	21502	21083	21229	20803	20346	21311
1999	32953	29947	92837	177441	120667	21894	21502	21083	21229	20803	20346	21311
2000	32953	29947	92837	177441	120667	21894	21502	21083	21229	20803	20346	21311

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

U.S. SPILL RESERVOIR NODE: 2

MEXICO SPILL RESERVOIR NODE: 4

U.S. 'MODERATE' STORAGE CONDITION DEFINED AS 9.65 TO 75.00 PERCENT OF FALCON U.S. CONSERVATION CAPACITY

MEXICO 'MODERATE' STORAGE CONDITION DEFINED AS 10.00 TO 75.00 PERCENT OF FALCON MEXICAN CONSERVATION CAPACITY

NODE MONTHLY DEMAND DISTRIBUTIONS AND DEMAND PRIORITIES

NODE NO.	MONTHLY FRACTIONS OF ANNUAL DEMAND												PRIORITIES		
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MOD	LO	HI
1	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	20	20	20
2	.0720	.0666	.0777	.0894	.0866	.0900	.1004	.1038	.0850	.0803	.0744	.0738	2	2	2
3	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	20	20	20
4	.1620	.0649	.0243	.2413	.2651	.0653	.0295	.0592	.0227	.0344	.0121	.0192	6	6	6
5	.0611	.0610	.0760	.0826	.0892	.0961	.1086	.1108	.0880	.0851	.0724	.0691	1	1	1
6	.0425	.0409	.0927	.1020	.0835	.1039	.1186	.1366	.0807	.0809	.0666	.0511	3	3	3
7	.0747	.0441	.0780	.1437	.1342	.1266	.1063	.0967	.0571	.0593	.0402	.0391	4	4	4
8	.0785	.0727	.0745	.0849	.0799	.0830	.0915	.0910	.0896	.0860	.0825	.0859	5	5	5

RESERVOIR MONTHLY STORAGE TARGETS AND STORAGE PRIORITIES

RESERVOIR NO.		DESIRED MONTHLY STORAGE LEVEL (PERCENT OF MAXI MUM STORAGE CAPACITY)												PRIORITIES
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
1	MOD	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	10
	LO	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	11
	HI	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	10
2	MOD	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	11
	LO	9.650	9.650	9.650	9.650	9.650	9.650	9.650	9.650	9.650	9.650	9.650	9.650	10
	HI	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	11
3	MOD	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	12
	LO	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	13
	HI	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	12
4	MOD	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	13
	LO	.100	.100	.100	.100	.100	.100	.100	.100	.100	.100	.100	.100	12
	HI	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	13

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

STAGE-AREA-CAPACITY RELATIONSHIPS FOR TOTAL STORAGE IN AMISTAD AND FALCON RESERVOIRS

	AMISTAD RESERVOIR			FALCON RESERVOIR		
POINT NO.	STAGE (FT MSL)	AREA (AC)	CAPACITY (AC-FT)	STAGE (FT MSL)	AREA (AC)	CAPACITY (AC-FT)
1	930.0	0	0	203.3	0	0
2	945.0	5	1	203.4	35	57
3	946.5	87	294	205.1	195	235
4	948.2	180	823	206.7	425	735
5	949.1	237	1180	207.3	539	1050
6	950.1	297	1684	208.3	727	1670
7	951.4	376	2782	210.0	1100	3158
8	961.3	1045	13873	214.9	1559	9631
9	971.1	1843	33110	219.8	2202	18806
10	981.0	2770	59404	224.7	3526	32732
11	990.8	3823	93556	229.7	5169	54000
12	1000.7	5004	138573	234.6	6531	82799
13	1010.5	6314	195568	239.5	8061	118624
14	1020.3	7722	264663	242.8	10341	148482
15	1030.2	9758	350120	244.4	11654	166516
16	1040.0	12751	458690	249.3	15894	234115
17	1049.9	16734	605456	254.3	20562	323644
18	1059.7	21627	790919	259.2	25677	437240
19	1069.6	27399	1029250	264.1	30775	576159
20	1079.4	34051	1328996	269.0	36184	740751
21	1089.2	41702	1699411	274.0	42448	933844
22	1094.2	45665	1911714	278.9	48929	1158684
23	1099.1	49658	2142942	282.2	53474	1326587
24	1104.0	53679	2393700	285.4	58443	1509829
25	1108.9	57729	2664077	288.7	65021	1712296
26	1115.5	63173	3055670	292.0	70235	1935151
27	1117.0	64438	3151319	295.3	74804	2172702
28	1118.8	65915	3265037	298.6	82000	2429861
29	1122.0	68671	3483939	301.2	87181	2653803
30	1131.9	77013	4199954	305.1	93809	3008297

SUMMARY OF TEXAS WATER RIGHTS IN MIDDLE AND LOWER RIO GRANDE AND MAXIMUM STORAGE ALLOCATIONS IN AMISTAD AND FALCON RESERVOIRS

TOTAL DOMESTIC, MUNICIPAL AND INDUSTRIAL WATER RIGHTS	(AC-FT/YR):	271579
TOTAL IRRIGATION & MINING WATER RIGHTS ON MIDDLE RIO GRANDE	(AC-FT/YR):	181530
CLASS A IRRIGATION & MINING WATER RIGHTS ON MIDDLE RIO GRANDE	(AC-FT/YR):	162803
CLASS B IRRIGATION & MINING WATER RIGHTS ON MIDDLE RIO GRANDE	(AC-FT/YR):	18727
TOTAL IRRIGATION & MINING WATER RIGHTS ON LOWER RIO GRANDE	(AC-FT/YR):	1696228
CLASS A IRRIGATION & MINING WATER RIGHTS ON LOWER RIO GRANDE	(AC-FT/YR):	1500719
CLASS B IRRIGATION & MINING WATER RIGHTS ON LOWER RIO GRANDE	(AC-FT/YR):	195509
MAXIMUM STORAGE CAPACITY IN AMISTAD-FALCON D-M-I POOL	(AC-FT):	225000
MAXIMUM STORAGE CAPACITY IN AMISTAD-FALCON IRRIGATION POOL	(AC-FT):	2647639
TOTAL RESERVOIR DEAD STORAGE USED IN WATER RIGHTS ACCOUNTING	(AC-FT):	4600
MAXIMUM STORAGE CAPACITY ALLOTTED TO OPERATING RESERVE	(AC-FT):	380000
MAXIMUM USABLE STORAGE AVAILABLE FOR WATER RIGHTS ACCOUNTING	(AC-FT):	3321570
TOTAL IRRIGATION & MINING ACCOUNT BALANCE AT BEGINNING OF SIMULATION	(AC-FT):	1747743

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 1 CALENDAR YEAR 1995

RESERVOIR NO. 1 U.S. AMISTAD MAX FLOOD POOL: 1827241 MAX CONSERVATION POOL: 1771041 DEAD POOL: 1771

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	67892	67892	0	67452	40024	.31	9210	1497	0	5251	0	0	1196844	1827241
2	56680	56680	0	61300	39539	.44	12961	1574	0	5100	0	0	1179263	1827241
3	61812	61812	0	69425	38240	.47	13711	1813	0	5363	0	0	1157939	1827241
4	75819	75819	0	58726	35594	.77	22555	2167	0	12485	0	0	1152477	1771041
5	101801	101801	0	69665	33050	.87	25881	2451	0	10532	0	0	1158732	1771041
6	79903	79903	0	69639	32022	.99	29437	2463	0	9950	0	0	1139559	1771041
7	80026	80026	0	68000	31759	1.17	34210	2503	0	9481	0	0	1117375	1771041
8	89329	89329	0	66034	31814	1.18	33991	2402	0	12808	0	0	1106679	1771041
9	95852	95852	0	66317	32247	.86	24652	1956	0	6404	0	0	1111562	1771041
10	66988	66988	0	65061	32434	.74	21056	2185	0	3923	0	0	1092433	1771041
11	62195	62195	0	63354	32323	.34	9549	2053	0	1728	0	0	1081725	1827241
12	56829	56829	0	66114	32107	.32	8877	1497	0	6219	0	0	1063563	1827241
ANNUAL	895126	895126	0	791087			246090	24561	0	89244	0	0		

RESERVOIR NO. 2 U.S. FALCON MAX FLOOD POOL: 1613729 MAX CONSERVATION POOL: 1555129 DEAD POOL: 1555

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	7832	68536	0	88713	49162	.26	10102	8653	0	80060	0	0	907373	1210297
2	7386	62012	0	99170	45545	.29	11203	14554	0	84616	0	0	859012	1210297
3	2433	64682	0	82787	44087	.42	15739	8368	0	74419	0	0	825168	1210297
4	0	44074	0	146118	39526	.68	24274	10116	0	136002	0	0	698850	1166347
5	57403	114085	0	273384	32924	.73	22771	19233	0	254151	0	0	516780	1166347
6	8711	65937	0	114796	29688	.80	20940	8356	0	106440	0	0	446981	1166347
7	1299	57315	0	131401	27287	.87	19741	12953	0	118448	0	0	353154	1166347
8	3501	54325	0	56968	25719	.61	12370	6731	0	50237	0	0	338141	1166347
9	73473	131430	0	44108	29056	.58	11965	6530	0	37578	0	0	413498	1166347
10	17386	76339	0	49647	32954	.43	9312	6620	0	43027	0	0	430878	1166347
11	33696	93269	0	20644	35429	.25	5730	3677	0	16967	0	0	497773	1210297
12	5718	64116	0	26690	37904	.20	4909	4954	0	21736	0	0	530290	1210297
ANNUAL	218838	896120	0	1134426			169056	110745	0	1023681	0	0		

RESERVOIR NO. 3 MEX AMISTAD MAX FLOOD POOL: 1424078 MAX CONSERVATION POOL: 1380278 DEAD POOL: 1380

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	28687	28687	0	32953	40024	.31	3197	6435	0	0	0	0	413203	1424078
2	21287	21287	0	29947	39539	.44	4436	6547	0	0	0	0	400107	1424078
3	23319	23319	0	92837	38240	.47	4262	9564	0	0	0	0	326327	1424078
4	26625	26625	0	177441	35594	.77	4852	10222	0	0	0	0	170659	1380278
5	38768	38768	0	120667	33050	.87	2873	11766	0	0	0	0	85887	1035209
6	29252	29252	0	21894	32022	.99	2265	5998	0	0	0	0	90980	1035209
7	37006	37006	0	21502	31759	1.17	2948	5967	0	0	0	0	103536	1035209
8	49855	49855	0	21083	31814	1.18	3550	6047	0	0	0	0	128758	1035209
9	43976	43976	0	21229	32247	.86	3080	5890	0	0	0	0	148425	1035209
10	35154	35154	0	20803	32434	.74	2945	6568	0	0	0	0	159831	1380278
11	30206	30206	0	20346	32323	.34	1441	6128	0	0	0	0	168250	1424078
12	23756	23756	0	21311	32107	.32	1397	5901	0	0	0	0	169298	1424078
ANNUAL	387891	387891	0	602013			37246	87033	0	0	0	0		

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 1 CALENDAR YEAR 1995

RESERVOIR NO. 4 MEX FALCON MAX FLOOD POOL: 1140074 MAX CONSERVATION POOL: 1098674 DEAD POOL: 1099

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	3906	30424	0	179835	49162	.26	2680	179835	0	0	0	0	168735	855056
2	3825	27225	0	46531	45545	.29	2005	46531	0	0	0	0	147424	855056
3	0	83273	0	78080	44087	.42	2778	78080	0	0	0	0	149839	855056
4	0	167219	0	300801	39526	.68	2604	300801	0	0	0	0	13653	824006
5	58914	167815	0	126402	32924	.73	1264	126402	0	0	0	0	53802	1099
6	10260	26156	0	1605	29688	.80	2810	1605	0	0	0	0	75543	1099
7	3913	19448	0	4452	27287	.87	3999	4452	0	0	0	0	86540	1099
8	5330	20366	0	4630	25719	.61	3319	4630	0	0	0	0	98957	1099
9	98882	114221	0	245	29056	.58	4887	245	0	0	0	0	208046	1099
10	18370	32605	0	3266	32954	.43	4858	3266	0	0	0	0	232527	824006
11	33717	47935	0	2976	35429	.25	3127	2976	0	0	0	0	274359	855056
12	3724	19134	0	5720	37904	.20	2672	5720	0	0	0	0	285101	855056
ANNUAL	240841	755821	0	754543			37003	754543	0	0	0	0		

MONTHLY FLOWS IN SYSTEM LINKS (ACRE-FEET)

MONTH LINK NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1	67452	61300	69425	58726	69665	69639	68000	66034	66317	65061	63354	66114	65918
2	73787	67112	70045	56559	124617	75887	66796	67133	137834	80262	94997	70335	82108
3	68536	62012	64682	44074	114085	65937	57315	54325	131430	76339	93269	64116	74672
4	80060	84616	74419	136002	254151	106440	118448	50237	37578	43027	16967	21736	85301
5	32953	29947	92837	177441	120667	21894	21502	21083	21229	20803	20346	21311	50161
6	30424	27225	83273	167219	167815	26156	19448	20366	114221	32605	47935	19134	62979
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0

ALLOCATION OF U.S. WATER IN AMISTAD AND FALCON RESERVOIRS PURSUANT TO TNRCC RIO GRANDE RULES

MONTH	INITIAL USABLE STORAGE	TOTAL WTRSHED INFLOWS	TOTAL D-M-I DEMANDS	TOTAL IRRIG DEMANDS	TOTAL SYSTEM SHORTAGE	TOTAL RESERVR EVAP	END-MON USABLE STORAGE	o/o CONS POOL	D-M-I RESERVE STORAGE	OPRATNG RESERVE STORAGE	EXCESS USABLE STORAGE	IRRIG ACCOUNT ALLOCAT	IRRIG RIVER DIVERSN	IRRIG ACCOUNT BALANCE	o/o IRRIG POOL
1	2138666	75724	10150	85311	0	19312	2099617	63.3	225000	205780	0	0	78906	1668837	63.0
2	2099617	64066	16128	89716	0	24164	2033675	61.3	225000	222784	0	0	82946	1585891	59.9
3	2033675	64245	10181	79782	0	29450	1978507	59.6	225000	241444	0	0	73828	1512063	57.1
4	1978507	75819	12283	148487	0	46829	1846727	55.7	225000	247270	0	0	137606	1374457	51.9
5	1846727	159204	21684	264683	0	48652	1670912	50.4	225000	275000	40805	0	244350	1130107	42.7
6	1670912	88614	10819	116390	0	50377	1581940	47.7	225000	275000	0	59707	107874	1081940	40.9
7	1581940	81325	15456	127929	0	53951	1465929	44.2	225000	275000	2442	0	118453	963487	36.4
8	1465929	92830	9133	63045	0	46361	1440220	43.4	225000	275000	35759	0	59026	904461	34.2
9	1440220	169325	8486	43982	0	36617	1520460	45.9	225000	275000	0	156974	40975	1020460	38.5
10	1520460	84374	8805	46950	0	30368	1518711	45.8	225000	275000	41758	0	43507	976953	36.9
11	1518711	95891	5730	18695	0	15279	1574898	47.5	225000	275000	0	115282	17337	1074898	40.6
12	1574898	62547	6451	27955	0	13786	1589253	47.9	225000	275000	40571	0	26216	1048682	39.6

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 2 CALENDAR YEAR 1996

RESERVOIR NO. 1 U.S. AMISTAD MAX FLOOD POOL: 1827241 MAX CONSERVATION POOL: 1771041 DEAD POOL: 1771

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	55280	55280	0	65689	31748	.41	11185	1667	0	6010	0	0	1041969	1827241
2	55444	55444	0	54830	31565	.46	12362	1839	0	5005	0	0	1030221	1827241
3	54797	54797	0	57313	31414	.62	16429	2112	0	12205	0	0	1011276	1827241
4	60455	60455	0	89764	30710	.89	22850	2398	0	9892	0	0	959117	1771041
5	77853	77853	0	154787	29000	1.01	24162	2775	0	10583	0	0	858021	1771041
6	82278	82278	0	147757	26867	1.29	27915	2653	0	10499	0	0	764627	1771041
7	69082	69082	0	63930	25768	1.30	26260	2730	0	11511	0	0	743519	1771041
8	101372	101372	0	64243	26413	1.01	20292	2192	0	14169	0	0	760356	1771041
9	194441	194441	0	60874	29307	.57	12297	1739	0	6629	0	0	881626	1771041
10	83591	83591	0	60473	32222	.70	16016	2018	0	6244	0	0	888728	1771041
11	61439	61439	0	61433	32994	.39	8881	2232	0	5387	0	0	879853	1827241
12	60434	60434	0	68800	32944	.27	6068	1495	0	3839	0	0	865419	1827241
ANNUAL	956466	956466	0	949893			204717	25850	0	101973	0	0		

RESERVOIR NO. 2 U.S. FALCON MAX FLOOD POOL: 1613729 MAX CONSERVATION POOL: 1555129 DEAD POOL: 1555

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	7807	65819	0	56026	38743	.28	7037	5465	0	50561	0	0	533046	1210297
2	10255	58241	0	91433	38266	.34	8280	13419	0	78014	0	0	491574	1210297
3	4586	47582	0	126657	36095	.51	11136	12802	0	113855	0	0	401363	1210297
4	0	77474	0	175864	29808	.67	12564	12175	0	163689	0	0	290409	1166347
5	5213	146642	0	192879	22753	.81	12912	13569	0	179310	0	0	231260	1166347
6	10551	145156	0	134130	21119	.87	12603	9763	0	124367	0	0	229683	1166347
7	18724	68413	0	103864	20252	.99	12967	10263	0	93601	0	0	181265	1166347
8	30928	78810	0	64732	20194	.69	8110	7648	0	57084	0	0	187233	1166347
9	82151	134657	0	31055	25114	.56	7786	4598	0	26457	0	0	283049	1166347
10	36792	89003	0	41219	29814	.39	6421	5496	0	35723	0	0	324412	1166347
11	12953	66767	0	52009	31151	.34	5927	9263	0	42746	0	0	333243	1210297
12	7713	71179	0	43750	31670	.24	4343	8122	0	35628	0	0	356329	1210297
ANNUAL	227673	1049743	0	1113618			110086	112583	0	1001035	0	0		

RESERVOIR NO. 3 MEX AMISTAD MAX FLOOD POOL: 1424078 MAX CONSERVATION POOL: 1380278 DEAD POOL: 1380

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	23037	23037	0	14911	31748	.41	1832	6176	0	0	0	0	175592	1424078
2	22888	22888	0	10155	31565	.46	2158	5978	0	0	0	0	186167	1424078
3	20943	20943	0	11408	31414	.62	3048	6963	0	0	0	0	192654	1424078
4	19311	19311	0	13681	30710	.89	4482	9743	0	0	0	0	193802	1380278
5	17171	17171	0	14033	29000	1.01	5128	9445	0	0	0	0	191812	1380278
6	26255	26255	0	11206	26867	1.29	6743	6740	0	0	0	0	200118	1035209
7	34280	34280	0	11605	25768	1.30	7238	7105	0	0	0	0	215555	1035209
8	60233	60233	0	11731	26413	1.01	6385	6903	0	0	0	0	257672	1380278
9	88867	88867	0	11288	29307	.57	4408	6209	0	0	0	0	330843	1380278
10	79094	79094	0	11433	32222	.70	6539	6593	0	0	0	0	391965	1380278
11	25897	25897	0	11727	32994	.39	3987	6045	0	0	0	0	402148	1424078
12	23601	23601	0	12102	32944	.27	2827	5486	0	0	0	0	410820	1424078
ANNUAL	441577	441577	0	145280			54775	83386	0	0	0	0		

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 2 CALENDAR YEAR 1996

RESERVOIR NO. 4 MEX FALCON MAX FLOOD POOL: 1140074 MAX CONSERVATION POOL: 1098674 DEAD POOL: 1099

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	6958	15693	0	6132	38743	.28	3811	6132	0	0	0	0	290851	855056
2	9093	13270	0	4994	38266	.34	4730	4994	0	0	0	0	294397	855056
3	4786	9231	0	7634	36095	.51	7272	7634	0	0	0	0	288722	855056
4	0	3938	0	166134	29808	.67	7407	166134	0	0	0	0	119119	824006
5	12781	17369	0	27162	22753	.81	5518	27162	0	0	0	0	103808	824006
6	20695	25161	0	15935	21119	.87	5771	15935	0	0	0	0	107263	1099
7	27018	31518	0	14526	20252	.99	7082	14526	0	0	0	0	117173	1099
8	40713	45541	0	9411	20194	.69	5824	9411	0	0	0	0	147479	824006
9	88400	93479	0	2981	25114	.56	6278	2981	0	0	0	0	231699	824006
10	33031	37871	0	3603	29814	.39	5206	3603	0	0	0	0	260761	824006
11	11824	17506	0	16832	31151	.34	4664	16832	0	0	0	0	256771	855056
12	4555	11171	0	4263	31670	.24	3258	4263	0	0	0	0	260421	855056
ANNUAL	259854	321748	0	279607			66821	279607	0	0	0	0		

MONTHLY FLOWS IN SYSTEM LINKS (ACRE-FEET)

MONTH LINK NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1	65689	54830	57313	89764	154787	147757	63930	64243	60874	60473	61433	68800	79153
2	71829	63246	59787	87366	157225	155655	79924	92979	141286	95247	72154	75018	95971
3	65819	58241	47582	77474	146642	145156	68413	78810	134657	89003	66767	71179	87473
4	50561	78014	113855	163689	179310	124367	93601	57084	26457	35723	42746	35628	83414
5	14911	10155	11408	13681	14033	11206	11605	11731	11288	11433	11727	12102	12101
6	15693	13270	9231	3938	17369	25161	31518	45541	93479	37871	17506	11171	26805
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0

ALLOCATION OF U.S. WATER IN AMISTAD AND FALCON RESERVOIRS PURSUANT TO TNRCC RIO GRANDE RULES

MONTH	INITIAL USABLE STORAGE	TOTAL WTRSHED INFLOWS	TOTAL D-M-I DEMANDS	TOTAL IRRIG DEMANDS	TOTAL SYSTEM SHORTAGE	TOTAL RESERVR EVAP	END-MON USABLE STORAGE	o/o CONS POOL	D-M-I RESERVE STORAGE	OPRATNG RESERVE STORAGE	EXCESS USABLE STORAGE	IRRIG ACCOUNT ALLOCAT	IRRIG RIVER DIVERSN	IRRIG ACCOUNT BALANCE	o/o IRRIG POOL
1	1589253	63087	7132	56571	0	18222	1570415	47.4	225000	275000	0	74259	52526	1070415	40.4
2	1570415	65699	15258	83019	0	20642	1517195	45.8	225000	275000	23557	0	76777	993638	37.5
3	1517195	59383	14914	126060	0	27565	1408039	42.5	225000	275000	31352	0	116951	876687	33.1
4	1408039	60455	14573	173581	0	35414	1244926	37.6	225000	275000	28724	0	160485	716202	27.1
5	1244926	83066	16344	189893	0	37074	1084681	32.7	225000	275000	44027	0	175548	540654	20.4
6	1084681	92829	12416	134866	0	40518	989710	29.9	225000	275000	0	73972	124916	489710	18.5
7	989710	87806	12993	105112	0	39227	920184	27.8	225000	275000	28097	0	97623	392087	14.8
8	920184	132300	9840	71253	0	28402	942989	28.5	225000	275000	0	117588	66686	442989	16.7
9	942989	276592	6337	33086	0	20083	1160075	35.0	225000	275000	0	248055	30969	660075	24.9
10	1160075	120383	7514	41967	0	22437	1208540	36.5	225000	275000	0	87574	39109	708540	26.8
11	1208540	74392	11495	48133	0	14808	1208496	36.5	225000	275000	44669	0	44713	663827	25.1
12	1208496	68147	9617	39467	0	10411	1217148	36.7	225000	275000	0	89937	36616	717148	27.1

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 3 CALENDAR YEAR 1997

RESERVOIR NO. 1 U.S. AMISTAD MAX FLOOD POOL: 1827241 MAX CONSERVATION POOL: 1771041 DEAD POOL: 1771

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	59322	59322	0	64640	32834	.26	5761	1497	0	1942	0	0	854340	1827241
2	118427	118427	0	58319	33582	.26	5884	1434	0	2165	0	0	908564	1827241
3	90033	90033	0	62144	34651	.53	12391	1642	0	3424	0	0	924062	1827241
4	67334	67334	0	60255	34968	.51	11968	1652	0	2915	0	0	919173	1771041
5	91328	91328	0	60575	35591	.58	13645	2113	0	6923	0	0	936281	1771041
6	140637	140637	0	60054	37223	.82	19901	2187	0	4252	0	0	996963	1771041
7	84279	84279	0	66254	38349	1.05	26012	3024	0	11159	0	0	988976	1771041
8	79060	79060	0	61276	38461	1.13	27725	2971	0	15894	0	0	979035	1771041
9	60896	60896	0	61043	38251	.92	22227	2327	0	7611	0	0	956661	1771041
10	60700	60700	0	65115	37926	.59	13979	1950	0	4186	0	0	938267	1771041
11	48598	48598	0	56042	37757	.35	8152	1997	0	3939	0	0	922671	1827241
12	50678	50678	0	59831	37627	.30	6873	1490	0	5195	0	0	906645	1827241
ANNUAL	951292	951292	0	735548			174518	24284	0	69605	0	0		

RESERVOIR NO. 2 U.S. FALCON MAX FLOOD POOL: 1613729 MAX CONSERVATION POOL: 1555129 DEAD POOL: 1555

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	7272	68473	0	68998	32048	.21	3876	6730	0	62268	0	0	351928	1210297
2	12931	67651	0	87928	31420	.27	4832	12904	0	75024	0	0	326819	1210297
3	32382	89460	0	24607	32309	.39	7195	2487	0	22120	0	0	384477	1210297
4	19377	75065	0	6836	35014	.35	7212	473	0	6363	0	0	445494	1166347
5	37055	88594	0	47712	37209	.53	11747	3357	0	44355	0	0	474629	1166347
6	38075	91690	0	137165	36594	.71	15320	9984	0	127181	0	0	413834	1166347
7	3660	55731	0	155599	32496	.93	17086	15338	0	140261	0	0	296880	1166347
8	6298	48709	0	115882	27984	.91	13074	13691	0	102191	0	0	216633	1166347
9	10209	61314	0	59374	25873	.62	7746	8790	0	50584	0	0	210827	1166347
10	26869	85848	0	24558	27176	.37	5026	3274	0	21284	0	0	267091	1166347
11	18221	68327	0	21890	29635	.21	3295	3899	0	17991	0	0	310233	1210297
12	13812	66958	0	43805	30970	.28	4759	8131	0	35674	0	0	328627	1210297
ANNUAL	226161	867820	0	794354			101168	89058	0	705296	0	0		

RESERVOIR NO. 3 MEX AMISTAD MAX FLOOD POOL: 1424078 MAX CONSERVATION POOL: 1380278 DEAD POOL: 1380

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	22128	22128	0	12467	32834	.26	2776	4222	0	0	0	0	417705	1424078
2	31542	31542	0	11266	33582	.26	2847	3974	0	0	0	0	435134	1424078
3	31264	31264	0	12073	34651	.53	5974	4865	0	0	0	0	448351	1424078
4	24422	24422	0	11750	34968	.51	5866	4280	0	0	0	0	455157	1380278
5	60387	60387	0	12073	35591	.58	6998	4789	0	0	0	0	496473	1380278
6	59218	59218	0	9615	37223	.82	10622	4982	0	0	0	0	535454	1380278
7	40161	40161	0	8590	38349	1.05	14254	5635	0	0	0	0	552771	1380278
8	37395	37395	0	10221	38461	1.13	15736	7592	0	0	0	0	564209	1380278
9	21742	21742	0	8233	38251	.92	12964	5481	0	0	0	0	564754	1380278
10	25799	25799	0	8635	37926	.59	8397	4902	0	0	0	0	573521	1380278
11	21632	21632	0	7729	37757	.35	5063	4809	0	0	0	0	582361	1424078
12	22878	22878	0	8295	37627	.30	4415	5308	0	0	0	0	592529	1424078
ANNUAL	398568	398568	0	120947			95912	60839	0	0	0	0		

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 3 CALENDAR YEAR 1997

RESERVOIR NO. 4 MEX FALCON MAX FLOOD POOL: 1140074 MAX CONSERVATION POOL: 1098674 DEAD POOL: 1099

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	2713	10958	0	7394	32048	.21	2854	7394	0	0	0	0	261131	855056
2	7665	14957	0	20768	31420	.27	3651	20768	0	0	0	0	251669	855056
3	36555	43763	0	7313	32309	.39	5406	7313	0	0	0	0	282713	855056
4	17408	24878	0	4952	35014	.35	5043	4952	0	0	0	0	297596	824006
5	39881	47165	0	9789	37209	.53	7974	9789	0	0	0	0	326998	824006
6	42399	47032	0	72026	36594	.71	10662	72026	0	0	0	0	291342	824006
7	8118	11073	0	34287	32496	.93	13135	34287	0	0	0	0	254993	824006
8	7910	10539	0	21435	27984	.91	12391	21435	0	0	0	0	231706	824006
9	12731	15483	0	12877	25873	.62	8295	12877	0	0	0	0	226017	824006
10	33052	36785	0	5548	27176	.37	5029	5548	0	0	0	0	252225	824006
11	21197	24117	0	12748	29635	.21	2928	12748	0	0	0	0	260666	855056
12	13204	16191	0	8274	30970	.28	3913	8274	0	0	0	0	264670	855056
ANNUAL	242833	302941	0	217411			81281	217411	0	0	0	0		

MONTHLY FLOWS IN SYSTEM LINKS (ACRE-FEET)

MONTH LINK NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1	64640	58319	62144	60255	60575	60054	66254	61276	61043	65115	56042	59831	61289
2	70415	69816	92884	77980	95517	95942	66890	64603	68925	90034	72266	72153	78113
3	68473	67651	89460	75065	88594	91690	55731	48709	61314	85848	68327	66958	72313
4	62268	75024	22120	6363	44355	127181	140261	102191	50584	21284	17991	35674	58770
5	12467	11266	12073	11750	12073	9615	8590	10221	8233	8635	7729	8295	10074
6	10958	14957	43763	24878	47165	47032	11073	10539	15483	36785	24117	16191	25240
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0

ALLOCATION OF U.S. WATER IN AMISTAD AND FALCON RESERVOIRS PURSUANT TO TNRCC RIO GRANDE RULES

MONTH	INITIAL USABLE STORAGE	TOTAL WTRSHED INFLOWS	TOTAL D-M-I DEMANDS	TOTAL IRRIG DEMANDS	TOTAL SYSTEM SHORTAGE	TOTAL RESERVR EVAP	END-MON USABLE STORAGE	o/o CONS POOL	D-M-I RESERVE STORAGE	OPRATNG RESERVE STORAGE	EXCESS USABLE STORAGE	IRRIG ACCOUNT ALLOCAT	IRRIG RIVER DIVERSN	IRRIG ACCOUNT BALANCE	o/o IRRIG POOL
1	1217148	66594	8227	64210	0	9637	1201668	36.3	225000	275000	43748	0	59228	657920	24.8
2	1201668	131358	14338	77189	0	10716	1230783	37.1	225000	275000	0	144050	71187	730783	27.6
3	1230783	122415	4129	25544	0	19586	1303939	39.3	225000	275000	0	96930	23774	803939	30.4
4	1303939	86711	2125	9278	0	19180	1360067	41.0	225000	275000	0	64896	8768	860067	32.5
5	1360067	128383	5470	51278	0	25392	1406310	42.4	225000	275000	0	93972	47729	906310	34.2
6	1406310	178712	12171	131433	0	35221	1406197	42.4	225000	275000	0	121145	121258	906197	34.2
7	1406197	87939	18362	151420	0	43098	1281256	38.7	225000	275000	15258	0	140199	765998	28.9
8	1281256	85358	16662	118085	0	40799	1191068	35.9	225000	275000	34979	0	109909	656089	24.8
9	1191068	71105	11117	58195	0	29973	1162888	35.1	225000	275000	0	60947	54148	662888	25.0
10	1162888	87569	5224	25470	0	19005	1200758	36.2	225000	275000	0	61637	23767	700758	26.5
11	1200758	66819	5896	21930	0	11447	1228304	37.1	225000	275000	48036	0	20490	680268	25.7
12	1228304	64490	9621	40869	0	11632	1230672	37.1	225000	275000	0	88419	38015	730672	27.6

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 4 CALENDAR YEAR 1998

RESERVOIR NO. 1 U.S. AMISTAD MAX FLOOD POOL: 1827241 MAX CONSERVATION POOL: 1771041 DEAD POOL: 1771

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	58433	58433	0	63522	37561	.31	6996	1586	0	3912	0	0	894560	1827241
2	51428	51428	0	58757	37465	.38	8448	1471	0	3251	0	0	878783	1827241
3	66714	66714	0	66518	37234	.75	16394	1784	0	5055	0	0	862585	1827241
4	75819	75819	0	58726	35431	.77	16862	2167	0	12485	0	0	862816	1771041
5	101801	101801	0	69665	32878	.87	19482	2451	0	10532	0	0	875470	1771041
6	79903	79903	0	212584	30285	.99	20659	2463	0	9950	0	0	722130	1328281
7	80026	80026	0	68000	28497	1.17	22163	2503	0	9481	0	0	711993	1771041
8	89329	89329	0	153034	27682	1.18	20992	2402	0	12808	0	0	627296	1328281
9	95852	95852	0	66317	27239	.86	14541	1956	0	6404	0	0	642290	1771041
10	66988	66988	0	65061	27527	.74	12536	2185	0	3923	0	0	631681	1771041
11	62195	62195	0	63354	27475	.34	5683	2053	0	1728	0	0	624839	1827241
12	56829	56829	0	66114	27285	.32	5263	1497	0	6219	0	0	610291	1827241
ANNUAL	885317	885317	0	1011652			170019	24518	0	85748	0	0		

RESERVOIR NO. 2 U.S. FALCON MAX FLOOD POOL: 1613729 MAX CONSERVATION POOL: 1555129 DEAD POOL: 1555

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	15363	73387	0	93010	30926	.31	5220	9072	0	83938	0	0	303784	1210297
2	12548	66583	0	24166	30997	.34	5823	3547	0	20619	0	0	340378	1210297
3	10153	69832	0	58894	31451	.46	8284	5953	0	52941	0	0	343032	1210297
4	0	44074	0	146118	26839	.68	11149	10116	0	136002	0	0	229839	1166347
5	57403	114085	0	273384	18100	.73	7011	19233	0	254151	0	0	63529	1166347
6	8711	208882	0	114796	17412	.80	5701	8356	0	106440	0	0	151914	150070
7	1299	57315	0	131401	18189	.87	6355	12953	0	118448	0	0	71473	1166347
8	3501	141325	0	56968	18550	.61	4423	6731	0	50237	0	0	151407	150070
9	73473	131430	0	44108	25029	.58	6584	6530	0	37578	0	0	232145	1166347
10	17386	76339	0	49647	29372	.43	5697	6620	0	43027	0	0	253140	1166347
11	33696	93269	0	20644	32032	.25	3748	3677	0	16967	0	0	322017	1210297
12	5718	64116	0	26690	34555	.20	3390	4954	0	21736	0	0	356053	1210297
ANNUAL	239251	1140637	0	1039826			73385	97742	0	942084	0	0		

RESERVOIR NO. 3 MEX AMISTAD MAX FLOOD POOL: 1424078 MAX CONSERVATION POOL: 1380278 DEAD POOL: 1380

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	24980	24980	0	8748	37561	.31	4648	4814	0	0	0	0	604113	1424078
2	20862	20862	0	8082	37465	.38	5789	4430	0	0	0	0	611104	1424078
3	24405	24405	0	10257	37234	.75	11531	4868	0	0	0	0	613721	1424078
4	26625	26625	0	177441	35431	.77	10420	10222	0	0	0	0	452485	1380278
5	38768	38768	0	120667	32878	.87	9122	11766	0	0	0	0	361464	1380278
6	29252	29252	0	21894	30285	.99	9323	5998	0	0	0	0	359499	1380278
7	37006	37006	0	21502	28497	1.17	11178	5967	0	0	0	0	363825	1380278
8	49855	49855	0	21083	27682	1.18	11673	6047	0	0	0	0	380924	1380278
9	43976	43976	0	21229	27239	.86	8885	5890	0	0	0	0	394786	1380278
10	35154	35154	0	20803	27527	.74	7834	6568	0	0	0	0	401303	1380278
11	30206	30206	0	20346	27475	.34	3658	6128	0	0	0	0	407505	1424078
12	23756	23756	0	21311	27285	.32	3468	5901	0	0	0	0	406482	1424078
ANNUAL	384845	384845	0	473363			97529	78599	0	0	0	0		

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 4 CALENDAR YEAR 1998

RESERVOIR NO. 4 MEX FALCON MAX FLOOD POOL: 1140074 MAX CONSERVATION POOL: 1098674 DEAD POOL: 1099

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	13771	17705	0	13586	30926	.31	4367	13586	0	0	0	0	264422	855056
2	11090	14742	0	17196	30997	.34	4716	17196	0	0	0	0	257252	855056
3	9301	14690	0	12937	31451	.46	6183	12937	0	0	0	0	252822	855056
4	0	167219	0	300801	26839	.68	7102	300801	0	0	0	0	112138	824006
5	58914	167815	0	126402	18100	.73	6202	126402	0	0	0	0	147349	824006
6	10260	26156	0	1605	17412	.80	8229	1605	0	0	0	0	163671	824006
7	3913	19448	0	4452	18189	.87	9469	4452	0	0	0	0	169198	824006
8	5330	20366	0	4630	18550	.61	6892	4630	0	0	0	0	178042	824006
9	98882	114221	0	245	25029	.58	7933	245	0	0	0	0	284085	824006
10	18370	32605	0	3266	29372	.43	6933	3266	0	0	0	0	306491	824006
11	33717	47935	0	2976	32032	.25	4260	2976	0	0	0	0	347190	855056
12	3724	19134	0	5720	34555	.20	3521	5720	0	0	0	0	357083	855056
ANNUAL	267272	662036	0	493816			75807	493816	0	0	0	0		

MONTHLY FLOWS IN SYSTEM LINKS (ACRE-FEET)

MONTH LINK NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1	63522	58757	66518	58726	69665	69639	68000	66034	66317	65061	63354	66114	65136
2	77299	69834	74887	56559	124617	75887	66796	67133	137834	80262	94997	70335	83031
3	73387	66583	69832	44074	114085	65937	57315	54325	131430	76339	93269	64116	75886
4	83938	20619	52941	136002	254151	106440	118448	50237	37578	43027	16967	21736	78501
5	8748	8082	10257	177441	120667	21894	21502	21083	21229	20803	20346	21311	39440
6	17705	14742	14690	167219	167815	26156	19448	20366	114221	32605	47935	19134	55164
7	0	0	0	0	0	142945	0	87000	0	0	0	0	19162
8	0	0	0	0	0	0	0	0	0	0	0	0	0

ALLOCATION OF U.S. WATER IN AMISTAD AND FALCON RESERVOIRS PURSUANT TO TNRCC RIO GRANDE RULES

MONTH	INITIAL USABLE STORAGE	TOTAL WTRSHED INFLOWS	TOTAL D-M-I DEMANDS	TOTAL IRRIG DEMANDS	TOTAL SYSTEM SHORTAGE	TOTAL RESERVR EVAP	END-MON USABLE STORAGE	o/o CONS POOL	D-M-I RESERVE STORAGE	OPRATNG RESERVE STORAGE	EXCESS USABLE STORAGE	IRRIG ACCOUNT ALLOCAT	IRRIG RIVER DIVERSN	IRRIG ACCOUNT BALANCE	o/o IRRIG POOL
1	1230672	73796	10658	87850	0	12216	1193744	36.0	225000	275000	44206	0	81134	649538	24.5
2	1193744	63976	5018	23870	0	14271	1214561	36.7	225000	275000	0	87243	22220	714561	27.0
3	1214561	76867	7737	57996	0	24678	1201017	36.2	225000	275000	40216	0	53760	660801	25.0
4	1201017	75819	12283	148487	0	28011	1088055	32.9	225000	275000	0	64860	137606	588055	22.2
5	1088055	159204	21684	264683	0	26493	934399	28.2	225000	275000	0	90694	244350	434399	16.4
6	934399	88614	10819	116390	0	26360	869444	26.3	225000	275000	42919	0	107874	326525	12.3
7	869444	81325	15456	127929	0	28518	778866	23.6	225000	275000	0	70794	118453	278866	10.5
8	778866	92830	9133	63045	0	25415	774103	23.4	225000	275000	0	54263	59026	274103	10.4
9	774103	169325	8486	43982	0	21125	869835	26.3	225000	275000	0	136707	40975	369835	14.0
10	869835	84374	8805	46950	0	18233	880221	26.6	225000	275000	0	53893	43507	380221	14.4
11	880221	95891	5730	18695	0	9431	942256	28.5	225000	275000	0	79372	17337	442256	16.7
12	942256	62547	6451	27955	0	8653	961744	29.1	225000	275000	45704	0	26216	416040	15.7

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 5 CALENDAR YEAR 1999

RESERVOIR NO. 1 U.S. AMISTAD MAX FLOOD POOL: 1827241 MAX CONSERVATION POOL: 1771041 DEAD POOL: 1771

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	67892	67892	0	67452	26949	.31	5026	1497	0	5251	0	0	605705	1827241
2	56680	56680	0	61300	26500	.44	7050	1574	0	5100	0	0	594035	1827241
3	61812	61812	0	69425	25121	.47	7405	1813	0	5363	0	0	579017	1827241
4	75819	75819	0	58726	22217	.77	12201	2167	0	12485	0	0	583909	1771041
5	101801	101801	0	69665	19401	.87	14164	2451	0	10532	2531	0	601881	1771041
6	79903	79903	0	219394	16558	.99	14366	2463	0	9950	0	0	448024	1328281
7	80026	80026	0	68000	14683	1.17	14485	2503	0	9481	6393	0	445565	1328281
8	89329	89329	0	66034	15286	1.18	14697	2402	0	12808	0	0	454163	1771041
9	95852	95852	0	66317	16267	.86	11021	1956	0	6404	0	0	472677	1328281
10	66988	66988	0	65061	16835	.74	9586	2185	0	3923	0	0	465018	1771041
11	62195	62195	0	63354	16925	.34	4341	2053	0	1728	0	0	459518	1827241
12	56829	56829	0	66114	16802	.32	4005	1497	0	6219	0	0	446228	1827241
ANNUAL	895126	895126	0	940842			118347	24561	0	89244	8924	0		

RESERVOIR NO. 2 U.S. FALCON MAX FLOOD POOL: 1613729 MAX CONSERVATION POOL: 1555129 DEAD POOL: 1555

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	7832	68536	0	88713	32352	.26	4632	8653	0	80060	0	0	331244	1210297
2	7386	62012	0	99170	28084	.29	5023	14554	0	84616	0	0	289063	1210297
3	2433	64682	0	82787	26458	.42	6705	8368	0	74419	0	0	264253	1210297
4	0	44074	0	146118	20462	.68	9026	10116	0	136002	0	0	153183	1166347
5	57403	116616	0	212296	11587	.73	5247	19233	0	254151	61088	0	52256	1166347
6	8711	215692	0	114796	13232	.80	5520	8356	0	106440	0	0	147632	150070
7	1299	63708	0	51528	16998	.87	8654	12953	0	118448	79873	0	151158	150070
8	3501	54325	0	56968	17386	.61	5928	6731	0	50237	0	0	142587	1166347
9	73473	131430	0	44108	22118	.58	6552	6530	0	37578	0	0	223357	150070
10	17386	76339	0	49647	27050	.43	5730	6620	0	43027	0	0	244319	1166347
11	33696	93269	0	20644	29885	.25	3773	3677	0	16967	0	0	313171	1210297
12	5718	64116	0	26690	32516	.20	3413	4954	0	21736	0	0	347184	1210297
ANNUAL	218838	1054799	0	993465			70203	110745	0	1023681	140961	0		

RESERVOIR NO. 3 MEX AMISTAD MAX FLOOD POOL: 1424078 MAX CONSERVATION POOL: 1380278 DEAD POOL: 1380

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	28687	28687	0	32953	26949	.31	3328	6435	0	0	0	0	398888	1424078
2	21287	21287	0	29947	26500	.44	4610	6547	0	0	0	0	385618	1424078
3	23319	23319	0	92837	25121	.47	4402	9564	0	0	0	0	311698	1424078
4	26625	26625	0	177441	22217	.77	4906	10222	0	0	0	0	155976	1380278
5	38768	38768	0	120667	19401	.87	2715	11766	0	0	0	0	71362	1035209
6	29252	29252	0	21894	16558	.99	2026	5998	0	0	0	0	76694	1035209
7	37006	37006	0	21502	14683	1.17	2694	5967	0	0	0	0	89504	1035209
8	49855	49855	0	21083	15286	1.18	3340	6047	0	0	0	0	114936	1380278
9	43976	43976	0	21229	16267	.86	2969	5890	0	0	0	0	134714	1380278
10	35154	35154	0	20803	16835	.74	2872	6568	0	0	0	0	146193	1380278
11	30206	30206	0	20346	16925	.34	1413	6128	0	0	0	0	154640	1424078
12	23756	23756	0	21311	16802	.32	1372	5901	0	0	0	0	155713	1424078
ANNUAL	387891	387891	0	602013			36647	87033	0	0	0	0		

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 5 CALENDAR YEAR 1999

RESERVOIR NO. 4 MEX FALCON MAX FLOOD POOL: 1140074 MAX CONSERVATION POOL: 1098674 DEAD POOL: 1099

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	3906	30424	0	179835	32352	.26	3780	179835	0	0	0	0	203892	855056
2	3825	27225	0	46531	28084	.29	3121	46531	0	0	0	0	181465	855056
3	0	83273	0	78080	26458	.42	4407	78080	0	0	0	0	182251	855056
4	0	167219	0	300801	20462	.68	4888	300801	0	0	0	0	43781	824006
5	58914	167815	0	126402	11587	.73	3212	126402	0	0	0	0	81982	1099
6	10260	26156	0	1605	13232	.80	5066	1605	0	0	0	0	101467	1099
7	3913	19448	0	4452	16998	.87	6134	4452	0	0	0	0	110329	1099
8	5330	20366	0	4630	17386	.61	4677	4630	0	0	0	0	121388	824006
9	98882	114221	0	245	22118	.58	6276	245	0	0	0	0	229088	824006
10	18370	32605	0	3266	27050	.43	5901	3266	0	0	0	0	252526	824006
11	33717	47935	0	2976	29885	.25	3698	2976	0	0	0	0	293787	855056
12	3724	19134	0	5720	32516	.20	3090	5720	0	0	0	0	304111	855056
ANNUAL	240841	755821	0	754543			54250	754543	0	0	0	0		

MONTHLY FLOWS IN SYSTEM LINKS (ACRE-FEET)

MONTH LINK NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1	67452	61300	69425	58726	69665	69639	68000	66034	66317	65061	63354	66114	65918
2	73787	67112	70045	56559	124617	75887	66796	67133	137834	80262	94997	70335	82108
3	68536	62012	64682	44074	116616	65937	63708	54325	131430	76339	93269	64116	75416
4	80060	84616	74419	136002	193063	106440	38575	50237	37578	43027	16967	21736	73554
5	32953	29947	92837	177441	120667	21894	21502	21083	21229	20803	20346	21311	50161
6	30424	27225	83273	167219	167815	26156	19448	20366	114221	32605	47935	19134	62979
7	0	0	0	0	0	149755	0	0	0	0	0	0	12479
8	0	0	0	0	0	0	0	0	0	0	0	0	0

ALLOCATION OF U.S. WATER IN AMISTAD AND FALCON RESERVOIRS PURSUANT TO TNRCC RIO GRANDE RULES

MONTH	INITIAL USABLE STORAGE	TOTAL WTRSHED INFLOWS	TOTAL D-M-I DEMANDS	TOTAL IRRIG DEMANDS	TOTAL SYSTEM SHORTAGE	TOTAL RESERVR EVAP	END-MON USABLE STORAGE	o/o CONS POOL	D-M-I RESERVE STORAGE	OPRATNG RESERVE STORAGE	EXCESS USABLE STORAGE	IRRIG ACCOUNT ALLOCAT	IRRIG RIVER DIVERSN	IRRIG ACCOUNT BALANCE	o/o IRRIG POOL
1	961744	75724	10150	85311	0	9658	932349	28.2	225000	275000	0	95215	78906	432349	16.3
2	932349	64066	16128	89716	0	12073	878498	26.5	225000	275000	29095	0	82946	349403	13.2
3	878498	64245	10181	79782	0	14110	838670	25.4	225000	275000	0	63095	73828	338670	12.8
4	838670	75819	12283	148487	0	21227	732492	22.2	225000	275000	31428	0	137606	201064	7.6
5	732492	159204	21684	264683	63619	19411	649537	19.7	225000	275000	0	134091	185618	149537	5.6
6	649537	88614	10819	116390	0	19886	591056	17.9	225000	275000	49393	0	107874	41663	1.6
7	591056	81325	15456	127929	86266	23139	592123	17.9	225000	275000	0	89037	38577	92123	3.5
8	592123	92830	9133	63045	0	20625	592150	17.9	225000	275000	0	59053	59026	92150	3.5
9	592150	169325	8486	43982	0	17573	691434	20.9	225000	275000	0	140259	40975	191434	7.2
10	691434	84374	8805	46950	0	15316	704737	21.3	225000	275000	0	56810	43507	204737	7.7
11	704737	95891	5730	18695	0	8114	768089	23.2	225000	275000	0	80689	17337	268089	10.1
12	768089	62547	6451	27955	0	7418	788812	23.9	225000	275000	46939	0	26216	241873	9.1

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 6 CALENDAR YEAR 2000

RESERVOIR NO. 1 U.S. AMISTAD MAX FLOOD POOL: 1827241 MAX CONSERVATION POOL: 1771041 DEAD POOL: 1771

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	67892	67892	0	67452	16517	.31	3810	1497	0	5251	0	0	442858	1827241
2	56680	56680	0	61300	16119	.44	5328	1574	0	5100	0	0	432910	1827241
3	61812	61812	0	69425	14703	.47	5552	1813	0	5363	0	0	419745	1827241
4	75819	75819	0	58726	12756	.77	9070	2167	0	12485	0	0	427768	1771041
5	101801	101801	0	69665	12234	.87	10610	2451	0	10532	9229	0	449294	1328281
6	79903	79903	0	69639	12882	.99	12333	2463	0	9950	0	0	447225	1771041
7	80026	80026	0	68786	13382	1.17	14477	2503	0	9481	6167	0	443988	1328281
8	89329	89329	0	74856	13897	1.18	14534	2402	0	12808	0	0	443927	1328281
9	95852	95852	0	66317	14798	.86	10800	1956	0	6404	0	0	462662	1328281
10	66988	66988	0	65061	15401	.74	9402	2185	0	3923	0	0	455187	1771041
11	62195	62195	0	63354	15514	.34	4259	2053	0	1728	0	0	449769	1827241
12	56829	56829	0	66114	15400	.32	3926	1497	0	6219	0	0	436558	1827241
ANNUAL	895126	895126	0	800695			104101	24561	0	89244	15396	0		

RESERVOIR NO. 2 U.S. FALCON MAX FLOOD POOL: 1613729 MAX CONSERVATION POOL: 1555129 DEAD POOL: 1555

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	7832	68536	0	88713	30276	.26	4684	8653	0	80060	0	0	322323	1210297
2	7386	62012	0	99170	25846	.29	5109	14554	0	84616	0	0	280056	1210297
3	2433	64682	0	82787	23928	.42	6751	8368	0	74419	0	0	255200	1210297
4	0	44074	0	146118	17565	.68	8961	10116	0	136002	0	0	144195	1166347
5	57403	123314	0	50669	12324	.73	8939	19233	0	254151	222715	0	207901	150070
6	8711	65937	0	114796	12585	.80	9910	8356	0	106440	0	0	149132	1166347
7	1299	64268	0	54360	11273	.87	9094	12953	0	118448	77041	0	149946	150070
8	3501	63147	0	56968	12252	.61	6362	6731	0	50237	0	0	149763	150070
9	73473	131430	0	44108	18215	.58	7198	6530	0	37578	0	0	229887	150070
10	17386	76339	0	49647	23860	.43	6208	6620	0	43027	0	0	250371	1166347
11	33696	93269	0	20644	27069	.25	4054	3677	0	16967	0	0	318942	1210297
12	5718	64116	0	26690	29926	.20	3635	4954	0	21736	0	0	352733	1210297
ANNUAL	218838	921124	0	834670			80905	110745	0	1023681	299756	0		

RESERVOIR NO. 3 MEX AMISTAD MAX FLOOD POOL: 1424078 MAX CONSERVATION POOL: 1380278 DEAD POOL: 1380

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	28687	28687	0	32953	16517	.31	1310	6435	0	0	0	0	150137	1424078
2	21287	21287	0	29947	16119	.44	1764	6547	0	0	0	0	139713	1424078
3	23319	23319	0	92837	14703	.47	1358	9564	0	0	0	0	68837	1424078
4	26625	26625	0	93286	12756	.77	752	10222	0	0	0	0	1424	1380278
5	38768	38768	0	38793	12234	.87	34	11766	0	0	0	0	1365	1035209
6	29252	29252	0	1023	12882	.99	420	5998	0	0	0	0	29174	1035209
7	37006	37006	0	21502	13382	1.17	1180	5967	0	0	0	0	43498	1035209
8	49855	49855	0	21083	13897	1.18	1864	6047	0	0	0	0	70406	1035209
9	43976	43976	0	21229	14798	.86	1926	5890	0	0	0	0	91227	1035209
10	35154	35154	0	20803	15401	.74	1995	6568	0	0	0	0	103583	1380278
11	30206	30206	0	20346	15514	.34	1016	6128	0	0	0	0	112427	1424078
12	23756	23756	0	21311	15400	.32	1002	5901	0	0	0	0	113870	1424078
ANNUAL	387891	387891	0	415113			14621	87033	0	0	0	0		

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION YEAR 6 CALENDAR YEAR 2000

RESERVOIR NO. 4 MEX FALCON MAX FLOOD POOL: 1140074 MAX CONSERVATION POOL: 1098674 DEAD POOL: 1099

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	3906	30424	0	179835	30276	.26	3188	179835	0	0	0	0	151512	855056
2	3825	27225	0	46531	25846	.29	2386	46531	0	0	0	0	129820	855056
3	0	83273	0	78080	23928	.42	3299	78080	0	0	0	0	131714	855056
4	0	83064	0	210571	17565	.68	2983	300801	90230	0	0	0	1224	824006
5	58914	85941	0	86028	12324	.73	58	126402	40374	0	0	0	1079	1099
6	10260	5285	0	1605	12585	.80	158	1605	0	0	0	0	4601	1099
7	3913	19448	0	4452	11273	.87	714	4452	0	0	0	0	18883	1099
8	5330	20366	0	4630	12252	.61	1112	4630	0	0	0	0	33507	1099
9	98882	114221	0	245	18215	.58	3367	245	0	0	0	0	144116	1099
10	18370	32605	0	3266	23860	.43	4052	3266	0	0	0	0	169403	824006
11	33717	47935	0	2976	27069	.25	2713	2976	0	0	0	0	211649	855056
12	3724	19134	0	5720	29926	.20	2350	5720	0	0	0	0	222713	855056
ANNUAL	240841	568921	0	623939			26380	754543	130604	0	0	0		

MONTHLY FLOWS IN SYSTEM LINKS (ACRE-FEET)

MONTH LINK NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1	67452	61300	69425	58726	69665	69639	68000	66034	66317	65061	63354	66114	65918
2	73787	67112	70045	56559	124617	75887	66796	67133	137834	80262	94997	70335	82108
3	68536	62012	64682	44074	123314	65937	63482	54325	131430	76339	93269	64116	75955
4	80060	84616	74419	136002	31436	106440	41407	50237	37578	43027	16967	21736	60321
5	32953	29947	92837	51627	1068	1023	21502	21083	21229	20803	20346	21311	27972
6	30424	27225	83273	41405	48216	5285	19448	20366	114221	32605	47935	19134	40790
7	0	0	0	0	0	0	786	8822	0	0	0	0	800
8	0	0	0	41659	37725	0	0	0	0	0	0	0	6614

ALLOCATION OF U.S. WATER IN AMISTAD AND FALCON RESERVOIRS PURSUANT TO TNRCC RIO GRANDE RULES

MONTH	INITIAL USABLE STORAGE	TOTAL WTRSHED INFLOWS	TOTAL D-M-I DEMANDS	TOTAL IRRIG DEMANDS	TOTAL SYSTEM SHORTAGE	TOTAL RESERVR EVAP	END-MON USABLE STORAGE	o/o CONS POOL	D-M-I RESERVE STORAGE	OPRATNG RESERVE STORAGE	EXCESS USABLE STORAGE	IRRIG ACCOUNT ALLOCAT	IRRIG RIVER DIVERSN	IRRIG ACCOUNT BALANCE	o/o IRRIG POOL
1	788812	75724	10150	85311	0	8494	760581	23.0	225000	275000	0	97614	78906	260581	9.8
2	760581	64066	16128	89716	0	10437	708366	21.4	225000	275000	30731	0	82946	177635	6.7
3	708366	64245	10181	79782	0	12303	670345	20.3	225000	275000	0	66538	73828	170345	6.4
4	670345	75819	12283	148487	0	18031	567363	17.2	225000	275000	34624	0	137606	32739	1.2
5	567363	159204	21684	264683	231944	19549	652595	19.8	225000	275000	0	150080	30224	152595	5.8
6	652595	88614	10819	116390	0	22243	591757	17.9	225000	275000	47036	0	107874	44721	1.7
7	591757	81325	15456	127929	83208	23571	589334	17.9	225000	275000	0	86021	41408	89334	3.4
8	589334	92830	9133	63045	0	20896	589090	17.8	225000	275000	0	58782	59026	89090	3.4
9	589090	169325	8486	43982	0	17998	687949	20.8	225000	275000	0	139834	40975	187949	7.1
10	687949	84374	8805	46950	0	15610	700958	21.2	225000	275000	0	56516	43507	200958	7.6
11	700958	95891	5730	18695	0	8313	764111	23.1	225000	275000	0	80490	17337	264111	10.0
12	764111	62547	6451	27955	0	7561	784691	23.7	225000	275000	46796	0	26216	237895	9.0

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION PERIOD TOTAL SUMMARY FOR NODE 1 U.S. AMISTAD

YEAR	INITIAL STORAGE	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	YEAREND STORAGE	MINIMUM STORAGE
1995	1205614	895126	895126	0	791087	246090	24561	0	89244	0	0	1063563	1063563
1996	1063563	956466	956466	0	949893	204717	25850	0	101973	0	0	865419	743519
1997	865419	951292	951292	0	735548	174518	24284	0	69605	0	0	906645	854340
1998	906645	885317	885317	0	1011652	170019	24518	0	85748	0	0	610291	610291
1999	610291	895126	895126	0	940842	118347	24561	0	89244	8924	0	446228	445565
2000	446228	895126	895126	0	800695	104101	24561	0	89244	15396	0	436558	419745

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION PERIOD TOTAL SUMMARY FOR NODE 2 U.S. FALCON

YEAR	INITIAL STORAGE	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	YEAREND STORAGE	MINIMUM STORAGE
1995	937652	218838	896120	0	1134426	169056	110745	0	1023681	0	0	530290	338141
1996	530290	227673	1049743	0	1113618	110086	112583	0	1001035	0	0	356329	181265
1997	356329	226161	867820	0	794354	101168	89058	0	705296	0	0	328627	210827
1998	328627	239251	1140637	0	1039826	73385	97742	0	942084	0	0	356053	63529
1999	356053	218838	1054799	0	993465	70203	110745	0	1023681	140961	0	347184	52256
2000	347184	218838	921124	0	834670	80905	110745	0	1023681	299756	0	352733	144195

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION PERIOD TOTAL SUMMARY FOR NODE 3 MEX AMISTAD

YEAR	INITIAL STORAGE	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	YEAREND STORAGE	MINIMUM STORAGE
1995	420666	387891	387891	0	602013	37246	87033	0	0	0	0	169298	85887
1996	169298	441577	441577	0	145280	54775	83386	0	0	0	0	410820	175592
1997	410820	398568	398568	0	120947	95912	60839	0	0	0	0	592529	417705
1998	592529	384845	384845	0	473363	97529	78599	0	0	0	0	406482	359499
1999	406482	387891	387891	0	602013	36647	87033	0	0	0	0	155713	71362
2000	155713	387891	387891	0	415113	14621	87033	0	0	0	0	113870	1365

CURRENT 1995-2000 AND EXTENDED 1998 DROUGHT SIMULATION WITH 1995 CONDITIONS

SIMULATION PERIOD TOTAL SUMMARY FOR NODE 4 MEX FALCON

YEAR	INITIAL STORAGE	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	YEAREND STORAGE	MINIMUM STORAGE
1995	320826	240841	755821	0	754543	37003	754543	0	0	0	0	285101	13653
1996	285101	259854	321748	0	279607	66821	279607	0	0	0	0	260421	103808
1997	260421	242833	302941	0	217411	81281	217411	0	0	0	0	264670	226017
1998	264670	267272	662036	0	493816	75807	493816	0	0	0	0	357083	112138
1999	357083	240841	755821	0	754543	54250	754543	0	0	0	0	304111	43781
2000	304111	240841	568921	0	623939	26380	754543	130604	0	0	0	222713	1079

ATTACHMENT 4

OUTPUT FROM AMISTAD-FALCON ROM FOR 1995-2000 SIMULATION OF MUNICIPAL-ONLY WATER DELIVERY CONDITIONS WITH AVERAGE RIVER LOSSES AND 20% IRRIGATION DISTRICT CONVEYANCE LOSSES

RIVER BASIN SIMULATION PROGRAM - TEXAS WATER DEVELOPMENT BOARD
ADAPTED AND MODIFIED FOR AMISTAD AND FALCON RESERVOIRS IN THE RIO GRANDE BASIN
INCLUDING U.S. / MEXICO WATER ACCOUNTING AND TNRCC OPERATING RULES
R. J. BRANDES COMPANY FEB. 1999

DATE: 3- 3-1999
TIME: 8:56:42
FILE: UM95H99B

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

NUMBER OF NODES = 20 NUMBER OF RESERVOIRS = 4

NUMBER OF LINKS = 20 NUMBER OF RIVER REACHES = 20

CALENDAR YEAR OPERATION STARTS = 1995 NUMBER OF YEARS TO SIMULATE = 6

NUMBER OF DEMAND NODES = 20 NUMBER OF SPILL NODES = 2

NUMBER OF INDIVIDUAL WATER RIGHTS = 3

SYSTEM NODE CHARACTERISTICS

NODE NO.	NODE NAME	CAPACITIES				YEARLY
		FLOOD (AC-FT)	CONSERV (AC-FT)	MINIMUM (AC-FT)	STARTING (AC-FT)	DEMAND (AC-FT)
1	U.S. AMISTAD	1827241	1771041	1771	1205614	0
2	U.S. FALCON	1613729	1555129	1555	937652	0
3	MEX. AMISTAD	1424078	1380278	1380	420666	0
4	MEX. FALCON	1140074	1098674	1099	320826	0
5	U.S.MRG MUNI	0	0	0	0	0
6	U.S.MRG IRRI	0	0	0	0	0
7	FA-RGC RVLOS	0	0	0	0	0
8	MEX MRG MUNI	0	0	0	0	0
9	FA-RGC D-M-I	0	0	0	0	0
10	RGC-AZ RVLOS	0	0	0	0	0
11	RGC-AZ D-M-I	0	0	0	0	0
12	ANZALD CANAL	0	0	0	0	0
13	AZ-PRG RVLOS	0	0	0	0	0
14	AZ-PRG D-M-I	0	0	0	0	0
15	PRG-SB RVLOS	0	0	0	0	0
16	PRG-SB D-M-I	0	0	0	0	0
17	SB-BRN RVLOS	0	0	0	0	0
18	SB-BRN D-M-I	0	0	0	0	0
19	MATAMOROS	0	0	0	0	0
20	BROWNSVILLE	0	0	0	0	0

NOTE: FLOOD POOL IS AVAILABLE FOR CONSERVATION STORAGE DURING NOVEMBER-APRIL NON-HURRICANE SEASON

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SYSTEM LINK CONFIGURATION AND CHANNEL STREAMFLOW LOSSES BY MODEL REACH AS PERCENTAGE OF UPSTREAM FLOW

LINK NO.	FROM NODE	TO NODE	MAX. CAPACITY (AC-FT/MON)	MIN. CAPACITY (AC-FT/MON)	PERCENTAGE LOSS
1	1	5	9000000	0	.00
2	5	6	9000000	0	.00
3	6	2	9000000	0	.00
4	2	7	9000000	0	4.00
5	3	8	9000000	0	.00
6	8	4	9000000	0	.00
7	1	2	9000000	0	.00
8	3	4	9000000	0	.00
9	4	12	9000000	0	.00
10	7	9	9000000	0	.00
11	7	10	9000000	0	5.00
12	12	19	9000000	0	.00
13	10	11	9000000	0	.00
14	10	13	9000000	0	2.00
15	13	14	9000000	0	.00
16	13	15	9000000	0	2.00
17	15	16	9000000	0	.00
18	15	17	9000000	0	8.00
19	17	18	9000000	0	.00
20	17	20	9000000	0	.00

MINIMUM MONTHLY U. S. OPERATIONAL RELEASES FROM AMISTAD RESERVOIR IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1995	67452	61300	69425	58726	69665	69639	68000	66034	66317	65061	63354	66114
1996	65689	54830	57313	89764	154787	147757	63930	64243	60874	60473	61433	68800
1997	64640	58319	62144	60255	60575	60054	66254	61276	61043	65115	56042	59831
1998	63522	58757	66518	58726	69665	69639	68000	66034	66317	65061	63354	66114
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0

MINIMUM MONTHLY MEXICO OPERATIONAL RELEASES FROM AMISTAD RESERVOIR IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1995	32953	29947	92837	177441	120667	21894	21502	21083	21229	20803	20346	21311
1996	14911	10155	11408	13681	14033	11206	11605	11731	11288	11433	11727	12102
1997	12467	11266	12073	11750	12073	9615	8590	10221	8233	8635	7729	8295
1998	8748	8082	10257	177441	120667	21894	21502	21083	21229	20803	20346	21311
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

U.S. SPILL RESERVOIR NODE: 2

MEXICO SPILL RESERVOIR NODE: 4

U.S. 'MODERATE' STORAGE CONDITION DEFINED AS 9.65 TO 75.00 PERCENT OF FALCON U.S. CONSERVATION CAPACITY

MEXICO 'MODERATE' STORAGE CONDITION DEFINED AS 10.00 TO 75.00 PERCENT OF FALCON MEXICAN CONSERVATION CAPACITY

NODE MONTHLY DEMAND DISTRIBUTIONS AND DEMAND PRIORITIES

NODE NO.	MONTHLY FRACTIONS OF ANNUAL DEMAND												PRIORITIES		
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MOD	LO	HI
1	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	30	30	30
2	.0720	.0666	.0777	.0894	.0866	.0900	.1004	.1038	.0850	.0803	.0744	.0738	14	14	14
3	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	30	30	30
4	.1620	.0649	.0243	.2413	.2651	.0653	.0295	.0592	.0227	.0344	.0121	.0192	23	23	23
5	.0611	.0610	.0760	.0826	.0892	.0961	.1086	.1108	.0880	.0851	.0724	.0691	1	1	1
6	.0425	.0409	.0927	.1020	.0835	.1039	.1186	.1366	.0807	.0809	.0666	.0511	13	13	13
7	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	2	2	2
8	.0785	.0727	.0745	.0849	.0799	.0830	.0915	.0910	.0896	.0860	.0825	.0859	20	20	20
9	.0687	.0689	.0788	.0840	.0878	.0919	.1005	.1053	.0841	.0827	.0750	.0723	3	3	3
10	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	4	4	4
11	.0687	.0689	.0788	.0840	.0878	.0919	.1005	.1053	.0841	.0827	.0750	.0723	5	5	5
12	.0687	.0689	.0788	.0840	.0878	.0919	.1005	.1053	.0841	.0827	.0750	.0723	21	21	21
13	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	6	6	6
14	.0687	.0689	.0788	.0840	.0878	.0919	.1005	.1053	.0841	.0827	.0750	.0723	7	7	7
15	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	8	8	8
16	.0687	.0689	.0788	.0840	.0878	.0919	.1005	.1053	.0841	.0827	.0750	.0723	9	9	9
17	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	10	10	10
18	.0687	.0689	.0788	.0840	.0878	.0919	.1005	.1053	.0841	.0827	.0750	.0723	11	11	11
19	.0687	.0689	.0788	.0840	.0878	.0919	.1005	.1053	.0841	.0827	.0750	.0723	22	22	22
20	.0687	.0689	.0788	.0840	.0878	.0919	.1005	.1053	.0841	.0827	.0750	.0723	12	12	12

RESERVOIR MONTHLY STORAGE TARGETS AND STORAGE PRIORITIES

RESERVOIR NO.		DESIRED MONTHLY STORAGE LEVEL (PERCENT OF MAXI MUM STORAGE CAPACITY)												PRIORITIES
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
1	MOD	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	15
	LO	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	16
	HI	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	15
2	MOD	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	16
	LO	9.650	9.650	9.650	9.650	9.650	9.650	9.650	9.650	9.650	9.650	9.650	9.650	15
	HI	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	16
3	MOD	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	24
	LO	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	25
	HI	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	24
4	MOD	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	25
	LO	.100	.100	.100	.100	.100	.100	.100	.100	.100	.100	.100	.100	24
	HI	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	25

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

STAGE-AREA-CAPACITY RELATIONSHIPS FOR TOTAL STORAGE IN AMISTAD AND FALCON RESERVOIRS

	AMISTAD RESERVOIR			FALCON RESERVOIR		
POINT NO.	STAGE (FT MSL)	AREA (AC)	CAPACITY (AC-FT)	STAGE (FT MSL)	AREA (AC)	CAPACITY (AC-FT)
1	930.0	0	0	203.3	0	0
2	945.0	5	1	203.4	35	57
3	946.5	87	294	205.1	195	235
4	948.2	180	823	206.7	425	735
5	949.1	237	1180	207.3	539	1050
6	950.1	297	1684	208.3	727	1670
7	951.4	376	2782	210.0	1100	3158
8	961.3	1045	13873	214.9	1559	9631
9	971.1	1843	33110	219.8	2202	18806
10	981.0	2770	59404	224.7	3526	32732
11	990.8	3823	93556	229.7	5169	54000
12	1000.7	5004	138573	234.6	6531	82799
13	1010.5	6314	195568	239.5	8061	118624
14	1020.3	7722	264663	242.8	10341	148482
15	1030.2	9758	350120	244.4	11654	166516
16	1040.0	12751	458690	249.3	15894	234115
17	1049.9	16734	605456	254.3	20562	323644
18	1059.7	21627	790919	259.2	25677	437240
19	1069.6	27399	1029250	264.1	30775	576159
20	1079.4	34051	1328996	269.0	36184	740751
21	1089.2	41702	1699411	274.0	42448	933844
22	1094.2	45665	1911714	278.9	48929	1158684
23	1099.1	49658	2142942	282.2	53474	1326587
24	1104.0	53679	2393700	285.4	58443	1509829
25	1108.9	57729	2664077	288.7	65021	1712296
26	1115.5	63173	3055670	292.0	70235	1935151
27	1117.0	64438	3151319	295.3	74804	2172702
28	1118.8	65915	3265037	298.6	82000	2429861
29	1122.0	68671	3483939	301.2	87181	2653803
30	1131.9	77013	4199954	305.1	93809	3008297

SUMMARY OF TEXAS WATER RIGHTS IN MIDDLE AND LOWER RIO GRANDE AND
MAXIMUM STORAGE ALLOCATIONS IN AMISTAD AND FALCON RESERVOIRS

TOTAL DOMESTIC, MUNICIPAL AND INDUSTRIAL WATER RIGHTS	(AC-FT/YR):	271579
TOTAL IRRIGATION & MINING WATER RIGHTS ON MIDDLE RIO GRANDE	(AC-FT/YR):	181530
CLASS A IRRIGATION & MINING WATER RIGHTS ON MIDDLE RIO GRANDE	(AC-FT/YR):	162803
CLASS B IRRIGATION & MINING WATER RIGHTS ON MIDDLE RIO GRANDE	(AC-FT/YR):	18727
TOTAL IRRIGATION & MINING WATER RIGHTS ON LOWER RIO GRANDE	(AC-FT/YR):	1696228
CLASS A IRRIGATION & MINING WATER RIGHTS ON LOWER RIO GRANDE	(AC-FT/YR):	1500719
CLASS B IRRIGATION & MINING WATER RIGHTS ON LOWER RIO GRANDE	(AC-FT/YR):	195509
MAXIMUM STORAGE CAPACITY IN AMISTAD-FALCON D-M-I POOL	(AC-FT):	225000
MAXIMUM STORAGE CAPACITY IN AMISTAD-FALCON IRRIGATION POOL	(AC-FT):	2647639
TOTAL RESERVOIR DEAD STORAGE USED IN WATER RIGHTS ACCOUNTING	(AC-FT):	4600
MAXIMUM STORAGE CAPACITY ALLOTTED TO OPERATING RESERVE	(AC-FT):	380000
MAXIMUM USABLE STORAGE AVAILABLE FOR WATER RIGHTS ACCOUNTING	(AC-FT):	3321570
TOTAL IRRIGATION & MINING ACCOUNT BALANCE AT BEGINNING OF SIMULATION	(AC-FT):	1747743

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 1 CALENDAR YEAR 1995

RESERVOIR NO. 1 U.S. AMISTAD MAX FLOOD POOL: 1827241 MAX CONSERVATION POOL: 1771041 DEAD POOL: 1771

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	D-M-I SHORTAGE	IRRIG DEMANDS	IRRIG SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	67892	67892	0	67452	40024	.31	9210	1497	0	5251	0	0	1196844	1827241
2	56680	56680	0	61300	39539	.44	12961	1574	0	5100	0	0	1179263	1827241
3	61812	61812	0	69425	38240	.47	13711	1813	0	5363	0	0	1157939	1827241
4	75819	75819	0	58726	35594	.77	22555	2167	0	12485	0	0	1152477	1771041
5	101801	101801	0	69665	33050	.87	25881	2451	0	10532	0	0	1158732	1771041
6	79903	79903	0	69639	32022	.99	29437	2463	0	9950	0	0	1139559	1771041
7	80026	80026	0	68000	31759	1.17	34210	2503	0	9481	0	0	1117375	1771041
8	89329	89329	0	66034	31814	1.18	33991	2402	0	12808	0	0	1106679	1771041
9	95852	95852	0	66317	32247	.86	24652	1956	0	6404	0	0	1111562	1771041
10	66988	66988	0	65061	32434	.74	21056	2185	0	3923	0	0	1092433	1771041
11	62195	62195	0	63354	32323	.34	9549	2053	0	1728	0	0	1081725	1827241
12	56829	56829	0	66114	32107	.32	8877	1497	0	6219	0	0	1063563	1827241
ANNUAL	895126	895126	0	791087			246090	24561	0	89244	0	0		

RESERVOIR NO. 2 U.S. FALCON MAX FLOOD POOL: 1613729 MAX CONSERVATION POOL: 1555129 DEAD POOL: 1555

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	D-M-I SHORTAGE	IRRIG DEMANDS	IRRIG SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	7832	68536	0	88713	49162	.26	10102	8653	0	80060	0	0	907373	1210297
2	7386	62012	0	99170	45545	.29	11203	14554	0	84616	0	0	859012	1210297
3	2433	64682	0	82787	44087	.42	15739	8368	0	74419	0	0	825168	1210297
4	0	44074	0	146118	39526	.68	24274	10116	0	136002	0	0	698850	1166347
5	57403	114085	0	273384	32924	.73	22771	19233	0	254151	0	0	516780	1166347
6	8711	65937	0	114796	29688	.80	20940	8356	0	106440	0	0	446981	1166347
7	1299	57315	0	131401	27287	.87	19741	12953	0	118448	0	0	353154	1166347
8	3501	54325	0	56968	25719	.61	12370	6731	0	50237	0	0	338141	1166347
9	73473	131430	0	44108	29056	.58	11965	6530	0	37578	0	0	413498	1166347
10	17386	76339	0	49647	32954	.43	9312	6620	0	43027	0	0	430878	1166347
11	33696	93269	0	20644	35429	.25	5730	3677	0	16967	0	0	497773	1210297
12	5718	64116	0	26690	37904	.20	4909	4954	0	21736	0	0	530290	1210297
ANNUAL	218838	896120	0	1134426			169056	110745	0	1023681	0	0		

SPECIFIED UNITED STATES LOSSES AND DEMANDS FOR NODES DOWNSTREAM OF FALCON RESERVOIR IN ACRE-FEET

MONTH	FAL-RGC RIVER LOSSES	FAL-RGC D-M-I DEMANDS	RGC-ANZ RIVER LOSSES	RGC-ANZ D-M-I DEMANDS	ANZ-PRG RIVER LOSSES	ANZ-PRG D-M-I DEMANDS	PRG-SBN RIVER LOSSES	PRG-SBN D-M-I DEMANDS	SBN-BRN RIVER LOSSES	SBN-BRN D-M-I DEMANDS	BROWNSV D-M-I DEMANDS	SUM OF US D-M-I DEMANDS	SUM OF US CHAN LOSSES
1	0	0	0	0	0	0	0	0	0	0	8653	8653	0
2	0	0	0	0	0	0	0	0	0	0	14554	14554	0
3	0	0	0	0	0	0	0	0	0	0	8368	8368	0
4	0	0	0	0	0	0	0	0	0	0	10116	10116	0
5	0	0	0	0	0	0	0	0	0	0	19233	19233	0
6	0	0	0	0	0	0	0	0	0	0	8356	8356	0
7	0	0	0	0	0	0	0	0	0	0	12953	12953	0
8	0	0	0	0	0	0	0	0	0	0	6731	6731	0
9	0	0	0	0	0	0	0	0	0	0	6530	6530	0
10	0	0	0	0	0	0	0	0	0	0	6620	6620	0
11	0	0	0	0	0	0	0	0	0	0	3677	3677	0
12	0	0	0	0	0	0	0	0	0	0	4954	4954	0
ANNUAL	0	0	0	0	0	0	0	0	0	0	110745	110745	0

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 1 CALENDAR YEAR 1995

RESERVOIR NO. 3 MEX. AMISTAD MAX FLOOD POOL: 1424078 MAX CONSERVATION POOL: 1380278 DEAD POOL: 1380

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	MUN&IRR SHORTAGE	OTHER DEMANDS	OTHER SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	28687	28687	0	32953	40024	.31	3197	6435	0	0	0	0	413203	1424078
2	21287	21287	0	29947	39539	.44	4436	6547	0	0	0	0	400107	1424078
3	23319	23319	0	92837	38240	.47	4262	9564	0	0	0	0	326327	1424078
4	26625	26625	0	177441	35594	.77	4852	10222	0	0	0	0	170659	1380278
5	38768	38768	0	120667	33050	.87	2873	11766	0	0	0	0	85887	1035208
6	29252	29252	0	21894	32022	.99	2265	5998	0	0	0	0	90980	1035208
7	37006	37006	0	21502	31759	1.17	2948	5967	0	0	0	0	103536	1035208
8	49855	49855	0	21083	31814	1.18	3550	6047	0	0	0	0	128758	1035208
9	43976	43976	0	21229	32247	.86	3080	5890	0	0	0	0	148425	1035208
10	35154	35154	0	20803	32434	.74	2945	6568	0	0	0	0	159831	1380278
11	30206	30206	0	20346	32323	.34	1441	6128	0	0	0	0	168250	1424078
12	23756	23756	0	21311	32107	.32	1397	5901	0	0	0	0	169298	1424078
ANNUAL	387891	387891	0	602013			37246	87033	0	0	0	0		

RESERVOIR NO. 4 MEX. FALCON MAX FLOOD POOL: 1140074 MAX CONSERVATION POOL: 1098674 DEAD POOL: 1099

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	IRRIGA SHORTAGE	OTHER DEMANDS	OTHER SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	3906	30424	0	179835	49162	.26	2680	0	0	179835	0	0	168735	855055
2	3825	27225	0	46531	45545	.29	2005	0	0	46531	0	0	147424	855055
3	0	83273	0	78080	44087	.42	2778	0	0	78080	0	0	149839	855055
4	0	167219	0	300801	39526	.68	2604	0	0	300801	0	0	13653	824005
5	58914	167815	0	126402	32924	.73	1264	0	0	126402	0	0	53802	1099
6	10260	26156	0	1605	29688	.80	2810	0	0	1605	0	0	75543	1099
7	3913	19448	0	4452	27287	.87	3999	0	0	4452	0	0	86540	1099
8	5330	20366	0	4630	25719	.61	3319	0	0	4630	0	0	98957	1099
9	98882	114221	0	245	29056	.58	4887	0	0	245	0	0	208046	1099
10	18370	32605	0	3266	32954	.43	4858	0	0	3266	0	0	232527	824005
11	33717	47935	0	2976	35429	.25	3127	0	0	2976	0	0	274359	855055
12	3724	19134	0	5720	37904	.20	2672	0	0	5720	0	0	285101	855055
ANNUAL	240841	755821	0	754543			37003	0	0	754543	0	0		

SPECIFIED MEXICO LOSSES AND DEMANDS FOR NODES DOWNSTREAM OF FALCON RESERVOIR IN ACRE-FEET

MONTH	FAL-RGC RIVER LOSSES	RGC-ANZ RIVER LOSSES	MEXICO ANZALDU DIVERSN	ANZ-PRG RIVER LOSSES	PRG-SBN RIVER LOSSES	SBN-BRN RIVER LOSSES	MEXICO MAT ETC DEMANDS	SUM OF MEXICO DEMANDS	SUM OF MX CHAN LOSSES
1	0	0	179835	0	0	0	0	179835	0
2	0	0	46531	0	0	0	0	46531	0
3	0	0	78080	0	0	0	0	78080	0
4	0	0	300801	0	0	0	0	300801	0
5	0	0	126402	0	0	0	0	126402	0
6	0	0	1605	0	0	0	0	1605	0
7	0	0	4452	0	0	0	0	4452	0
8	0	0	4630	0	0	0	0	4630	0
9	0	0	245	0	0	0	0	245	0
10	0	0	3266	0	0	0	0	3266	0
11	0	0	2976	0	0	0	0	2976	0
12	0	0	5720	0	0	0	0	5720	0
ANNUAL	0	0	754543	0	0	0	0	754543	0

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 1 CALENDAR YEAR 1995

MONTHLY FLOWS IN SYSTEM LINKS (ACRE-FEET)

MONTH LINK NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1	67452	61300	69425	58726	69665	69639	68000	66034	66317	65061	63354	66114	65918
2	73787	67112	70045	56559	124617	75887	66796	67133	137834	80262	94997	70335	82108
3	68536	62012	64682	44074	114085	65937	57315	54325	131430	76339	93269	64116	74672
4	8653	14554	8368	10116	19233	8356	12953	6731	6530	6620	3677	4954	9223
5	32953	29947	92837	177441	120667	21894	21502	21083	21229	20803	20346	21311	50161
6	30424	27225	83273	167219	167815	26156	19448	20366	114221	32605	47935	19134	62979
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0
9	179835	46531	78080	300801	126402	1605	4452	4630	245	3266	2976	5720	62873
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	8653	14554	8368	10116	19233	8356	12953	6731	6530	6620	3677	4954	9223
12	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0
14	8653	14554	8368	10116	19233	8356	12953	6731	6530	6620	3677	4954	9223
15	0	0	0	0	0	0	0	0	0	0	0	0	0
16	8653	14554	8368	10116	19233	8356	12953	6731	6530	6620	3677	4954	9223
17	0	0	0	0	0	0	0	0	0	0	0	0	0
18	8653	14554	8368	10116	19233	8356	12953	6731	6530	6620	3677	4954	9223
19	0	0	0	0	0	0	0	0	0	0	0	0	0
20	8653	14554	8368	10116	19233	8356	12953	6731	6530	6620	3677	4954	9223

ALLOCATION OF U.S. WATER IN AMISTAD AND FALCON RESERVOIRS PURSUANT TO TNRCC RIO GRANDE RULES

MONTH	INITIAL USABLE STORAGE	TOTAL WTRSHED INFLOWS	TOTAL D-M-I DEMANDS	TOTAL IRRIG DEMANDS	TOTAL SYSTEM SHORTAGE	TOTAL RESERVR EVAP	END-MON USABLE STORAGE	o/o CONS POOL	D-M-I RESERVE STORAGE	OPRATNG RESERVE STORAGE	EXCESS USABLE STORAGE	IRRIG ACCOUNT ALLOCAT	IRRIG RIVER DIVERSN	IRRIG ACCOUNT BALANCE	o/o IRRIG POOL
1	2138666	75724	10150	85311	0	19312	2099617	63.3	225000	205780	0	0	78906	1668837	63.0
2	2099617	64066	16128	89716	0	24164	2033675	61.3	225000	222784	0	0	82946	1585891	59.9
3	2033675	64245	10181	79782	0	29450	1978507	59.6	225000	241444	0	0	73828	1512063	57.1
4	1978507	75819	12283	148487	0	46829	1846727	55.7	225000	247270	0	0	137606	1374457	51.9
5	1846727	159204	21684	264683	0	48652	1670912	50.4	225000	275000	40805	0	244350	1130107	42.7
6	1670912	88614	10819	116390	0	50377	1581940	47.7	225000	275000	0	59707	107874	1081940	40.9
7	1581940	81325	15456	127929	0	53951	1465929	44.2	225000	275000	2442	0	118453	963487	36.4
8	1465929	92830	9133	63045	0	46361	1440220	43.4	225000	275000	35759	0	59026	904461	34.2
9	1440220	169325	8486	43982	0	36617	1520460	45.9	225000	275000	0	156974	40975	1020460	38.5
10	1520460	84374	8805	46950	0	30368	1518711	45.8	225000	275000	41758	0	43507	976953	36.9
11	1518711	95891	5730	18695	0	15279	1574898	47.5	225000	275000	0	115282	17337	1074898	40.6
12	1574898	62547	6451	27955	0	13786	1589253	47.9	225000	275000	40571	0	26216	1048682	39.6

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 2 CALENDAR YEAR 1996

RESERVOIR NO. 1 U.S. AMISTAD MAX FLOOD POOL: 1827241 MAX CONSERVATION POOL: 1771041 DEAD POOL: 1771

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	D-M-I SHORTAGE	IRRIG DEMANDS	IRRIG SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	55280	55280	0	65689	31748	.41	11185	1667	0	6010	0	0	1041969	1827241
2	55444	55444	0	54830	31565	.46	12362	1839	0	5005	0	0	1030221	1827241
3	54797	54797	0	57313	31414	.62	16429	2112	0	12205	0	0	1011276	1827241
4	60455	60455	0	89764	30710	.89	22850	2398	0	9892	0	0	959117	1771041
5	77853	77853	0	154787	29000	1.01	24162	2775	0	10583	0	0	858021	1771041
6	82278	82278	0	147757	26867	1.29	27915	2653	0	10499	0	0	764627	1771041
7	69082	69082	0	63930	25768	1.30	26260	2730	0	11511	0	0	743519	1771041
8	101372	101372	0	64243	26413	1.01	20292	2192	0	14169	0	0	760356	1771041
9	194441	194441	0	60874	29307	.57	12297	1739	0	6629	0	0	881626	1771041
10	83591	83591	0	60473	32222	.70	16016	2018	0	6244	0	0	888728	1771041
11	61439	61439	0	61433	32994	.39	8881	2232	0	5387	0	0	879853	1827241
12	60434	60434	0	68800	32944	.27	6068	1495	0	3839	0	0	865419	1827241
ANNUAL	956466	956466	0	949893			204717	25850	0	101973	0	0		

RESERVOIR NO. 2 U.S. FALCON MAX FLOOD POOL: 1613729 MAX CONSERVATION POOL: 1555129 DEAD POOL: 1555

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	D-M-I SHORTAGE	IRRIG DEMANDS	IRRIG SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	7807	65819	0	56026	38743	.28	7037	5465	0	50561	0	0	533046	1210297
2	10255	58241	0	91433	38266	.34	8280	13419	0	78014	0	0	491574	1210297
3	4586	47582	0	126657	36095	.51	11136	12802	0	113855	0	0	401363	1210297
4	0	77474	0	175864	29808	.67	12564	12175	0	163689	0	0	290409	1166347
5	5213	146642	0	192879	22753	.81	12912	13569	0	179310	0	0	231260	1166347
6	10551	145156	0	134130	21119	.87	12603	9763	0	124367	0	0	229683	1166347
7	18724	68413	0	103864	20252	.99	12967	10263	0	93601	0	0	181265	1166347
8	30928	78810	0	64732	20194	.69	8110	7648	0	57084	0	0	187233	1166347
9	82151	134657	0	31055	25114	.56	7786	4598	0	26457	0	0	283049	1166347
10	36792	89003	0	41219	29814	.39	6421	5496	0	35723	0	0	324412	1166347
11	12953	66767	0	52009	31151	.34	5927	9263	0	42746	0	0	333243	1210297
12	7713	71179	0	43750	31670	.24	4343	8122	0	35628	0	0	356329	1210297
ANNUAL	227673	1049743	0	1113618			110086	112583	0	1001035	0	0		

SPECIFIED UNITED STATES LOSSES AND DEMANDS FOR NODES DOWNSTREAM OF FALCON RESERVOIR IN ACRE-FEET

MONTH	FAL-RGC RIVER LOSSES	FAL-RGC D-M-I DEMANDS	RGC-ANZ RIVER LOSSES	RGC-ANZ D-M-I DEMANDS	ANZ-PRG RIVER LOSSES	ANZ-PRG D-M-I DEMANDS	PRG-SBN RIVER LOSSES	PRG-SBN D-M-I DEMANDS	SBN-BRN RIVER LOSSES	SBN-BRN D-M-I DEMANDS	BROWNSV D-M-I DEMANDS	SUM OF US D-M-I DEMANDS	SUM OF US CHAN LOSSES
1	0	0	0	0	0	0	0	0	0	0	5465	5465	0
2	0	0	0	0	0	0	0	0	0	0	13419	13419	0
3	0	0	0	0	0	0	0	0	0	0	12802	12802	0
4	0	0	0	0	0	0	0	0	0	0	12175	12175	0
5	0	0	0	0	0	0	0	0	0	0	13569	13569	0
6	0	0	0	0	0	0	0	0	0	0	9763	9763	0
7	0	0	0	0	0	0	0	0	0	0	10263	10263	0
8	0	0	0	0	0	0	0	0	0	0	7648	7648	0
9	0	0	0	0	0	0	0	0	0	0	4598	4598	0
10	0	0	0	0	0	0	0	0	0	0	5496	5496	0
11	0	0	0	0	0	0	0	0	0	0	9263	9263	0
12	0	0	0	0	0	0	0	0	0	0	8122	8122	0
ANNUAL	0	0	0	0	0	0	0	0	0	0	112583	112583	0

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 2 CALENDAR YEAR 1996

RESERVOIR NO. 3 MEX. AMISTAD MAX FLOOD POOL: 1424078 MAX CONSERVATION POOL: 1380278 DEAD POOL: 1380

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	MUN&IRR SHORTAGE	OTHER DEMANDS	OTHER SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	23037	23037	0	14911	31748	.41	1832	6176	0	0	0	0	175592	1424078
2	22888	22888	0	10155	31565	.46	2158	5978	0	0	0	0	186167	1424078
3	20943	20943	0	11408	31414	.62	3048	6963	0	0	0	0	192654	1424078
4	19311	19311	0	13681	30710	.89	4482	9743	0	0	0	0	193802	1380278
5	17171	17171	0	14033	29000	1.01	5128	9445	0	0	0	0	191812	1380278
6	26255	26255	0	11206	26867	1.29	6743	6740	0	0	0	0	200118	1035208
7	34280	34280	0	11605	25768	1.30	7238	7105	0	0	0	0	215555	1035208
8	60233	60233	0	11731	26413	1.01	6385	6903	0	0	0	0	257672	1380278
9	88867	88867	0	11288	29307	.57	4408	6209	0	0	0	0	330843	1380278
10	79094	79094	0	11433	32222	.70	6539	6593	0	0	0	0	391965	1380278
11	25897	25897	0	11727	32994	.39	3987	6045	0	0	0	0	402148	1424078
12	23601	23601	0	12102	32944	.27	2827	5486	0	0	0	0	410820	1424078
ANNUAL	441577	441577	0	145280			54775	83386	0	0	0	0		

RESERVOIR NO. 4 MEX. FALCON MAX FLOOD POOL: 1140074 MAX CONSERVATION POOL: 1098674 DEAD POOL: 1099

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	IRRIGA SHORTAGE	OTHER DEMANDS	OTHER SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	6958	15693	0	6132	38743	.28	3811	0	0	6132	0	0	290851	855055
2	9093	13270	0	4994	38266	.34	4730	0	0	4994	0	0	294397	855055
3	4786	9231	0	7634	36095	.51	7272	0	0	7634	0	0	288722	855055
4	0	3938	0	166134	29808	.67	7407	0	0	166134	0	0	119119	824005
5	12781	17369	0	27162	22753	.81	5518	0	0	27162	0	0	103808	824005
6	20695	25161	0	15935	21119	.87	5771	0	0	15935	0	0	107263	1099
7	27018	31518	0	14526	20252	.99	7082	0	0	14526	0	0	117173	1099
8	40713	45541	0	9411	20194	.69	5824	0	0	9411	0	0	147479	824005
9	88400	93479	0	2981	25114	.56	6278	0	0	2981	0	0	231699	824005
10	33031	37871	0	3603	29814	.39	5206	0	0	3603	0	0	260761	824005
11	11824	17506	0	16832	31151	.34	4664	0	0	16832	0	0	256771	855055
12	4555	11171	0	4263	31670	.24	3258	0	0	4263	0	0	260421	855055
ANNUAL	259854	321748	0	279607			66821	0	0	279607	0	0		

SPECIFIED MEXICO LOSSES AND DEMANDS FOR NODES DOWNSTREAM OF FALCON RESERVOIR IN ACRE-FEET

MONTH	FAL-RGC RIVER LOSSES	RGC-ANZ RIVER LOSSES	MEXICO ANZALDU DIVERSN	ANZ-PRG RIVER LOSSES	PRG-SBN RIVER LOSSES	SBN-BRN RIVER LOSSES	MEXICO MAT ETC DEMANDS	SUM OF MEXICO DEMANDS	SUM OF MX CHAN LOSSES
1	0	0	6132	0	0	0	0	6132	0
2	0	0	4994	0	0	0	0	4994	0
3	0	0	7634	0	0	0	0	7634	0
4	0	0	166134	0	0	0	0	166134	0
5	0	0	27162	0	0	0	0	27162	0
6	0	0	15935	0	0	0	0	15935	0
7	0	0	14526	0	0	0	0	14526	0
8	0	0	9411	0	0	0	0	9411	0
9	0	0	2981	0	0	0	0	2981	0
10	0	0	3603	0	0	0	0	3603	0
11	0	0	16832	0	0	0	0	16832	0
12	0	0	4263	0	0	0	0	4263	0
ANNUAL	0	0	279607	0	0	0	0	279607	0

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 2 CALENDAR YEAR 1996

MONTHLY FLOWS IN SYSTEM LINKS (ACRE-FEET)

MONTH LINK NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1	65689	54830	57313	89764	154787	147757	63930	64243	60874	60473	61433	68800	79153
2	71829	63246	59787	87366	157225	155655	79924	92979	141286	95247	72154	75018	95971
3	65819	58241	47582	77474	146642	145156	68413	78810	134657	89003	66767	71179	87473
4	5465	13419	12802	12175	13569	9763	10263	7648	4598	5496	9263	8122	9376
5	14911	10155	11408	13681	14033	11206	11605	11731	11288	11433	11727	12102	12101
6	15693	13270	9231	3938	17369	25161	31518	45541	93479	37871	17506	11171	26805
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0
9	6132	4994	7634	166134	27162	15935	14526	9411	2981	3603	16832	4263	23296
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	5465	13419	12802	12175	13569	9763	10263	7648	4598	5496	9263	8122	9376
12	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0
14	5465	13419	12802	12175	13569	9763	10263	7648	4598	5496	9263	8122	9376
15	0	0	0	0	0	0	0	0	0	0	0	0	0
16	5465	13419	12802	12175	13569	9763	10263	7648	4598	5496	9263	8122	9376
17	0	0	0	0	0	0	0	0	0	0	0	0	0
18	5465	13419	12802	12175	13569	9763	10263	7648	4598	5496	9263	8122	9376
19	0	0	0	0	0	0	0	0	0	0	0	0	0
20	5465	13419	12802	12175	13569	9763	10263	7648	4598	5496	9263	8122	9376

ALLOCATION OF U.S. WATER IN AMISTAD AND FALCON RESERVOIRS PURSUANT TO TNRCC RIO GRANDE RULES

MONTH	INITIAL USABLE STORAGE	TOTAL WTRSHED INFLOWS	TOTAL D-M-I DEMANDS	TOTAL IRRIG DEMANDS	TOTAL SYSTEM SHORTAGE	TOTAL RESERVR EVAP	END-MON USABLE STORAGE	o/o CONS POOL	D-M-I RESERVE STORAGE	OPRATNG RESERVE STORAGE	EXCESS USABLE STORAGE	IRRIG ACCOUNT ALLOCAT	IRRIG RIVER DIVERSN	IRRIG ACCOUNT BALANCE	o/o IRRIG POOL
1	1589253	63087	7132	56571	0	18222	1570415	47.4	225000	275000	0	74259	52526	1070415	40.4
2	1570415	65699	15258	83019	0	20642	1517195	45.8	225000	275000	23557	0	76777	993638	37.5
3	1517195	59383	14914	126060	0	27565	1408039	42.5	225000	275000	31352	0	116951	876687	33.1
4	1408039	60455	14573	173581	0	35414	1244926	37.6	225000	275000	28724	0	160485	716202	27.1
5	1244926	83066	16344	189893	0	37074	1084681	32.7	225000	275000	44027	0	175548	540654	20.4
6	1084681	92829	12416	134866	0	40518	989710	29.9	225000	275000	0	73972	124916	489710	18.5
7	989710	87806	12993	105112	0	39227	920184	27.8	225000	275000	28097	0	97623	392087	14.8
8	920184	132300	9840	71253	0	28402	942989	28.5	225000	275000	0	117588	66686	442989	16.7
9	942989	276592	6337	33086	0	20083	1160075	35.0	225000	275000	0	248055	30969	660075	24.9
10	1160075	120383	7514	41967	0	22437	1208540	36.5	225000	275000	0	87574	39109	708540	26.8
11	1208540	74392	11495	48133	0	14808	1208496	36.5	225000	275000	44669	0	44713	663827	25.1
12	1208496	68147	9617	39467	0	10411	1217148	36.7	225000	275000	0	89937	36616	717148	27.1

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 3 CALENDAR YEAR 1997

RESERVOIR NO. 1 U.S. AMISTAD MAX FLOOD POOL: 1827241 MAX CONSERVATION POOL: 1771041 DEAD POOL: 1771

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	D-M-I SHORTAGE	IRRIG DEMANDS	IRRIG SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	59322	59322	0	64640	32834	.26	5761	1497	0	1942	0	0	854340	1827241
2	118427	118427	0	58319	33582	.26	5884	1434	0	2165	0	0	908564	1827241
3	90033	90033	0	62144	34651	.53	12391	1642	0	3424	0	0	924062	1827241
4	67334	67334	0	60255	34968	.51	11968	1652	0	2915	0	0	919173	1771041
5	91328	91328	0	60575	35591	.58	13645	2113	0	6923	0	0	936281	1771041
6	140637	140637	0	60054	37223	.82	19901	2187	0	4252	0	0	996963	1771041
7	84279	84279	0	66254	38349	1.05	26012	3024	0	11159	0	0	988976	1771041
8	79060	79060	0	61276	38461	1.13	27725	2971	0	15894	0	0	979035	1771041
9	60896	60896	0	61043	38251	.92	22227	2327	0	7611	0	0	956661	1771041
10	60700	60700	0	65115	37926	.59	13979	1950	0	4186	0	0	938267	1771041
11	48598	48598	0	56042	37757	.35	8152	1997	0	3939	0	0	922671	1827241
12	50678	50678	0	59831	37627	.30	6873	1490	0	5195	0	0	906645	1827241
ANNUAL	951292	951292	0	735548			174518	24284	0	69605	0	0		

RESERVOIR NO. 2 U.S. FALCON MAX FLOOD POOL: 1613729 MAX CONSERVATION POOL: 1555129 DEAD POOL: 1555

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	D-M-I SHORTAGE	IRRIG DEMANDS	IRRIG SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	7272	68473	0	68998	32048	.21	3876	6730	0	62268	0	0	351928	1210297
2	12931	67651	0	87928	31420	.27	4832	12904	0	75024	0	0	326819	1210297
3	32382	89460	0	24607	32309	.39	7195	2487	0	22120	0	0	384477	1210297
4	19377	75065	0	6836	35014	.35	7212	473	0	6363	0	0	445494	1166347
5	37055	88594	0	47712	37209	.53	11747	3357	0	44355	0	0	474629	1166347
6	38075	91690	0	137165	36594	.71	15320	9984	0	127181	0	0	413834	1166347
7	3660	55731	0	155599	32496	.93	17086	15338	0	140261	0	0	296880	1166347
8	6298	48709	0	115882	27984	.91	13074	13691	0	102191	0	0	216633	1166347
9	10209	61314	0	59374	25873	.62	7746	8790	0	50584	0	0	210827	1166347
10	26869	85848	0	24558	27176	.37	5026	3274	0	21284	0	0	267091	1166347
11	18221	68327	0	21890	29635	.21	3295	3899	0	17991	0	0	310233	1210297
12	13812	66958	0	43805	30970	.28	4759	8131	0	35674	0	0	328627	1210297
ANNUAL	226161	867820	0	794354			101168	89058	0	705296	0	0		

SPECIFIED UNITED STATES LOSSES AND DEMANDS FOR NODES DOWNSTREAM OF FALCON RESERVOIR IN ACRE-FEET

MONTH	FAL-RGC RIVER LOSSES	FAL-RGC D-M-I DEMANDS	RGC-ANZ RIVER LOSSES	RGC-ANZ D-M-I DEMANDS	ANZ-PRG RIVER LOSSES	ANZ-PRG D-M-I DEMANDS	PRG-SBN RIVER LOSSES	PRG-SBN D-M-I DEMANDS	SBN-BRN RIVER LOSSES	SBN-BRN D-M-I DEMANDS	BROWNSV D-M-I DEMANDS	SUM OF US D-M-I DEMANDS	SUM OF US CHAN LOSSES
1	0	0	0	0	0	0	0	0	0	0	6730	6730	0
2	0	0	0	0	0	0	0	0	0	0	12904	12904	0
3	0	0	0	0	0	0	0	0	0	0	2487	2487	0
4	0	0	0	0	0	0	0	0	0	0	473	473	0
5	0	0	0	0	0	0	0	0	0	0	3357	3357	0
6	0	0	0	0	0	0	0	0	0	0	9984	9984	0
7	0	0	0	0	0	0	0	0	0	0	15338	15338	0
8	0	0	0	0	0	0	0	0	0	0	13691	13691	0
9	0	0	0	0	0	0	0	0	0	0	8790	8790	0
10	0	0	0	0	0	0	0	0	0	0	3274	3274	0
11	0	0	0	0	0	0	0	0	0	0	3899	3899	0
12	0	0	0	0	0	0	0	0	0	0	8131	8131	0
ANNUAL	0	0	0	0	0	0	0	0	0	0	89058	89058	0

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 3 CALENDAR YEAR 1997

RESERVOIR NO. 3 MEX. AMISTAD MAX FLOOD POOL: 1424078 MAX CONSERVATION POOL: 1380278 DEAD POOL: 1380

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	MUN&IRR SHORTAGE	OTHER DEMANDS	OTHER SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	22128	22128	0	12467	32834	.26	2776	4222	0	0	0	0	417705	1424078
2	31542	31542	0	11266	33582	.26	2847	3974	0	0	0	0	435134	1424078
3	31264	31264	0	12073	34651	.53	5974	4865	0	0	0	0	448351	1424078
4	24422	24422	0	11750	34968	.51	5866	4280	0	0	0	0	455157	1380278
5	60387	60387	0	12073	35591	.58	6998	4789	0	0	0	0	496473	1380278
6	59218	59218	0	9615	37223	.82	10622	4982	0	0	0	0	535454	1380278
7	40161	40161	0	8590	38349	1.05	14254	5635	0	0	0	0	552771	1380278
8	37395	37395	0	10221	38461	1.13	15736	7592	0	0	0	0	564209	1380278
9	21742	21742	0	8233	38251	.92	12964	5481	0	0	0	0	564754	1380278
10	25799	25799	0	8635	37926	.59	8397	4902	0	0	0	0	573521	1380278
11	21632	21632	0	7729	37757	.35	5063	4809	0	0	0	0	582361	1424078
12	22878	22878	0	8295	37627	.30	4415	5308	0	0	0	0	592529	1424078
ANNUAL	398568	398568	0	120947			95912	60839	0	0	0	0		

RESERVOIR NO. 4 MEX. FALCON MAX FLOOD POOL: 1140074 MAX CONSERVATION POOL: 1098674 DEAD POOL: 1099

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	IRRIGA SHORTAGE	OTHER DEMANDS	OTHER SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	2713	10958	0	7394	32048	.21	2854	0	0	7394	0	0	261131	855055
2	7665	14957	0	20768	31420	.27	3651	0	0	20768	0	0	251669	855055
3	36555	43763	0	7313	32309	.39	5406	0	0	7313	0	0	282713	855055
4	17408	24878	0	4952	35014	.35	5043	0	0	4952	0	0	297596	824005
5	39881	47165	0	9789	37209	.53	7974	0	0	9789	0	0	326998	824005
6	42399	47032	0	72026	36594	.71	10662	0	0	72026	0	0	291342	824005
7	8118	11073	0	34287	32496	.93	13135	0	0	34287	0	0	254993	824005
8	7910	10539	0	21435	27984	.91	12391	0	0	21435	0	0	231706	824005
9	12731	15483	0	12877	25873	.62	8295	0	0	12877	0	0	226017	824005
10	33052	36785	0	5548	27176	.37	5029	0	0	5548	0	0	252225	824005
11	21197	24117	0	12748	29635	.21	2928	0	0	12748	0	0	260666	855055
12	13204	16191	0	8274	30970	.28	3913	0	0	8274	0	0	264670	855055
ANNUAL	242833	302941	0	217411			81281	0	0	217411	0	0		

SPECIFIED MEXICO LOSSES AND DEMANDS FOR NODES DOWNSTREAM OF FALCON RESERVOIR IN ACRE-FEET

MONTH	FAL-RGC RIVER LOSSES	RGC-ANZ RIVER LOSSES	MEXICO ANZALDU DIVERSN	ANZ-PRG RIVER LOSSES	PRG-SBN RIVER LOSSES	SBN-BRN RIVER LOSSES	MEXICO MAT ETC DEMANDS	SUM OF MEXICO DEMANDS	SUM OF MX CHAN LOSSES
1	0	0	7394	0	0	0	0	7394	0
2	0	0	20768	0	0	0	0	20768	0
3	0	0	7313	0	0	0	0	7313	0
4	0	0	4952	0	0	0	0	4952	0
5	0	0	9789	0	0	0	0	9789	0
6	0	0	72026	0	0	0	0	72026	0
7	0	0	34287	0	0	0	0	34287	0
8	0	0	21435	0	0	0	0	21435	0
9	0	0	12877	0	0	0	0	12877	0
10	0	0	5548	0	0	0	0	5548	0
11	0	0	12748	0	0	0	0	12748	0
12	0	0	8274	0	0	0	0	8274	0
ANNUAL	0	0	217411	0	0	0	0	217411	0

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 3 CALENDAR YEAR 1997

MONTHLY FLOWS IN SYSTEM LINKS (ACRE-FEET)

MONTH LINK NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1	64640	58319	62144	60255	60575	60054	66254	61276	61043	65115	56042	59831	61289
2	70415	69816	92884	77980	95517	95942	66890	64603	68925	90034	72266	72153	78113
3	68473	67651	89460	75065	88594	91690	55731	48709	61314	85848	68327	66958	72313
4	6730	12904	2487	473	3357	9984	15338	13691	8790	3274	3899	8131	7415
5	12467	11266	12073	11750	12073	9615	8590	10221	8233	8635	7729	8295	10074
6	10958	14957	43763	24878	47165	47032	11073	10539	15483	36785	24117	16191	25240
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0
9	7394	20768	7313	4952	9789	72026	34287	21435	12877	5548	12748	8274	18113
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	6730	12904	2487	473	3357	9984	15338	13691	8790	3274	3899	8131	7415
12	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0
14	6730	12904	2487	473	3357	9984	15338	13691	8790	3274	3899	8131	7415
15	0	0	0	0	0	0	0	0	0	0	0	0	0
16	6730	12904	2487	473	3357	9984	15338	13691	8790	3274	3899	8131	7415
17	0	0	0	0	0	0	0	0	0	0	0	0	0
18	6730	12904	2487	473	3357	9984	15338	13691	8790	3274	3899	8131	7415
19	0	0	0	0	0	0	0	0	0	0	0	0	0
20	6730	12904	2487	473	3357	9984	15338	13691	8790	3274	3899	8131	7415

ALLOCATION OF U.S. WATER IN AMISTAD AND FALCON RESERVOIRS PURSUANT TO TNRCC RIO GRANDE RULES

MONTH	INITIAL USABLE STORAGE	TOTAL WTRSHED INFLOWS	TOTAL D-M-I DEMANDS	TOTAL IRRIG DEMANDS	TOTAL SYSTEM SHORTAGE	TOTAL RESERVR EVAP	END-MON USABLE STORAGE	o/o CONS POOL	D-M-I RESERVE STORAGE	OPRATNG RESERVE STORAGE	EXCESS USABLE STORAGE	IRRIG ACCOUNT ALLOCAT	IRRIG RIVER DIVERSN	IRRIG ACCOUNT BALANCE	o/o IRRIG POOL
1	1217148	66594	8227	64210	0	9637	1201668	36.3	225000	275000	43748	0	59228	657920	24.8
2	1201668	131358	14338	77189	0	10716	1230783	37.1	225000	275000	0	144050	71187	730783	27.6
3	1230783	122415	4129	25544	0	19586	1303939	39.3	225000	275000	0	96930	23774	803939	30.4
4	1303939	86711	2125	9278	0	19180	1360067	41.0	225000	275000	0	64896	8768	860067	32.5
5	1360067	128383	5470	51278	0	25392	1406310	42.4	225000	275000	0	93972	47729	906310	34.2
6	1406310	178712	12171	131433	0	35221	1406197	42.4	225000	275000	0	121145	121258	906197	34.2
7	1406197	87939	18362	151420	0	43098	1281256	38.7	225000	275000	15258	0	140199	765998	28.9
8	1281256	85358	16662	118085	0	40799	1191068	35.9	225000	275000	34979	0	109909	656089	24.8
9	1191068	71105	11117	58195	0	29973	1162888	35.1	225000	275000	0	60947	54148	662888	25.0
10	1162888	87569	5224	25470	0	19005	1200758	36.2	225000	275000	0	61637	23767	700758	26.5
11	1200758	66819	5896	21930	0	11447	1228304	37.1	225000	275000	48036	0	20490	680268	25.7
12	1228304	64490	9621	40869	0	11632	1230672	37.1	225000	275000	0	88419	38015	730672	27.6

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 4 CALENDAR YEAR 1998

RESERVOIR NO. 1 U.S. AMISTAD MAX FLOOD POOL: 1827241 MAX CONSERVATION POOL: 1771041 DEAD POOL: 1771

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	D-M-I SHORTAGE	IRRIG DEMANDS	IRRIG SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	58433	58433	0	63522	37561	.31	6996	1586	0	3912	0	0	894560	1827241
2	51428	51428	0	58757	37465	.38	8448	1471	0	3251	0	0	878783	1827241
3	66714	66714	0	66518	37234	.75	16394	1784	0	5055	0	0	862585	1827241
4	75819	75819	0	58726	35431	.77	16862	2167	0	12485	0	0	862816	1771041
5	101801	101801	0	69665	32878	.87	19482	2451	0	10532	0	0	875470	1771041
6	79903	79903	0	212584	30285	.99	20659	2463	0	9950	0	0	722130	1328281
7	80026	80026	0	68000	28497	1.17	22163	2503	0	9481	0	0	711993	1771041
8	89329	89329	0	153034	27682	1.18	20992	2402	0	12808	0	0	627296	1328281
9	95852	95852	0	66317	27239	.86	14541	1956	0	6404	0	0	642290	1771041
10	66988	66988	0	65061	27527	.74	12536	2185	0	3923	0	0	631681	1771041
11	62195	62195	0	63354	27475	.34	5683	2053	0	1728	0	0	624839	1827241
12	56829	56829	0	66114	27285	.32	5263	1497	0	6219	0	0	610291	1827241
ANNUAL	885317	885317	0	1011652			170019	24518	0	85748	0	0		

RESERVOIR NO. 2 U.S. FALCON MAX FLOOD POOL: 1613729 MAX CONSERVATION POOL: 1555129 DEAD POOL: 1555

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	D-M-I SHORTAGE	IRRIG DEMANDS	IRRIG SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	15363	73387	0	93010	30926	.31	5220	9072	0	83938	0	0	303784	1210297
2	12548	66583	0	24166	30997	.34	5823	3547	0	20619	0	0	340378	1210297
3	10153	69832	0	58894	31451	.46	8284	5953	0	52941	0	0	343032	1210297
4	0	44074	0	146118	26839	.68	11149	10116	0	136002	0	0	229839	1166347
5	57403	114085	0	273384	18100	.73	7011	19233	0	254151	0	0	63529	1166347
6	8711	208882	0	114796	17412	.80	5701	8356	0	106440	0	0	151914	150070
7	1299	57315	0	131401	18189	.87	6355	12953	0	118448	0	0	71473	1166347
8	3501	141325	0	56968	18550	.61	4423	6731	0	50237	0	0	151407	150070
9	73473	131430	0	44108	25029	.58	6584	6530	0	37578	0	0	232145	1166347
10	17386	76339	0	49647	29372	.43	5697	6620	0	43027	0	0	253140	1166347
11	33696	93269	0	20644	32032	.25	3748	3677	0	16967	0	0	322017	1210297
12	5718	64116	0	26690	34555	.20	3390	4954	0	21736	0	0	356053	1210297
ANNUAL	239251	1140637	0	1039826			73385	97742	0	942084	0	0		

SPECIFIED UNITED STATES LOSSES AND DEMANDS FOR NODES DOWNSTREAM OF FALCON RESERVOIR IN ACRE-FEET

MONTH	FAL-RGC RIVER LOSSES	FAL-RGC D-M-I DEMANDS	RGC-ANZ RIVER LOSSES	RGC-ANZ D-M-I DEMANDS	ANZ-PRG RIVER LOSSES	ANZ-PRG D-M-I DEMANDS	PRG-SBN RIVER LOSSES	PRG-SBN D-M-I DEMANDS	SBN-BRN RIVER LOSSES	SBN-BRN D-M-I DEMANDS	BROWNSV D-M-I DEMANDS	SUM OF US D-M-I DEMANDS	SUM OF US CHAN LOSSES
1	0	0	0	0	0	0	0	0	0	0	9072	9072	0
2	0	0	0	0	0	0	0	0	0	0	3547	3547	0
3	0	0	0	0	0	0	0	0	0	0	5953	5953	0
4	0	0	0	0	0	0	0	0	0	0	10116	10116	0
5	0	0	0	0	0	0	0	0	0	0	19233	19233	0
6	0	0	0	0	0	0	0	0	0	0	8356	8356	0
7	0	0	0	0	0	0	0	0	0	0	12953	12953	0
8	0	0	0	0	0	0	0	0	0	0	6731	6731	0
9	0	0	0	0	0	0	0	0	0	0	6530	6530	0
10	0	0	0	0	0	0	0	0	0	0	6620	6620	0
11	0	0	0	0	0	0	0	0	0	0	3677	3677	0
12	0	0	0	0	0	0	0	0	0	0	4954	4954	0
ANNUAL	0	0	0	0	0	0	0	0	0	0	97742	97742	0

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 4 CALENDAR YEAR 1998

RESERVOIR NO. 3 MEX. AMISTAD MAX FLOOD POOL: 1424078 MAX CONSERVATION POOL: 1380278 DEAD POOL: 1380

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	MUN&IRR SHORTAGE	OTHER DEMANDS	OTHER SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	24980	24980	0	8748	37561	.31	4648	4814	0	0	0	0	604113	1424078
2	20862	20862	0	8082	37465	.38	5789	4430	0	0	0	0	611104	1424078
3	24405	24405	0	10257	37234	.75	11531	4868	0	0	0	0	613721	1424078
4	26625	26625	0	177441	35431	.77	10420	10222	0	0	0	0	452485	1380278
5	38768	38768	0	120667	32878	.87	9122	11766	0	0	0	0	361464	1380278
6	29252	29252	0	21894	30285	.99	9323	5998	0	0	0	0	359499	1380278
7	37006	37006	0	21502	28497	1.17	11178	5967	0	0	0	0	363825	1380278
8	49855	49855	0	21083	27682	1.18	11673	6047	0	0	0	0	380924	1380278
9	43976	43976	0	21229	27239	.86	8885	5890	0	0	0	0	394786	1380278
10	35154	35154	0	20803	27527	.74	7834	6568	0	0	0	0	401303	1380278
11	30206	30206	0	20346	27475	.34	3658	6128	0	0	0	0	407505	1424078
12	23756	23756	0	21311	27285	.32	3468	5901	0	0	0	0	406482	1424078
ANNUAL	384845	384845	0	473363			97529	78599	0	0	0	0		

RESERVOIR NO. 4 MEX. FALCON MAX FLOOD POOL: 1140074 MAX CONSERVATION POOL: 1098674 DEAD POOL: 1099

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	IRRIGA SHORTAGE	OTHER DEMANDS	OTHER SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	13771	17705	0	13586	30926	.31	4367	0	0	13586	0	0	264422	855055
2	11090	14742	0	17196	30997	.34	4716	0	0	17196	0	0	257252	855055
3	9301	14690	0	12937	31451	.46	6183	0	0	12937	0	0	252822	855055
4	0	167219	0	300801	26839	.68	7102	0	0	300801	0	0	112138	824005
5	58914	167815	0	126402	18100	.73	6202	0	0	126402	0	0	147349	824005
6	10260	26156	0	1605	17412	.80	8229	0	0	1605	0	0	163671	824005
7	3913	19448	0	4452	18189	.87	9469	0	0	4452	0	0	169198	824005
8	5330	20366	0	4630	18550	.61	6892	0	0	4630	0	0	178042	824005
9	98882	114221	0	245	25029	.58	7933	0	0	245	0	0	284085	824005
10	18370	32605	0	3266	29372	.43	6933	0	0	3266	0	0	306491	824005
11	33717	47935	0	2976	32032	.25	4260	0	0	2976	0	0	347190	855055
12	3724	19134	0	5720	34555	.20	3521	0	0	5720	0	0	357083	855055
ANNUAL	267272	662036	0	493816			75807	0	0	493816	0	0		

SPECIFIED MEXICO LOSSES AND DEMANDS FOR NODES DOWNSTREAM OF FALCON RESERVOIR IN ACRE-FEET

MONTH	FAL-RGC RIVER LOSSES	RGC-ANZ RIVER LOSSES	MEXICO ANZALDU DIVERSN	ANZ-PRG RIVER LOSSES	PRG-SBN RIVER LOSSES	SBN-BRN RIVER LOSSES	MEXICO MAT ETC DEMANDS	SUM OF MEXICO DEMANDS	SUM OF MX CHAN LOSSES
1	0	0	13586	0	0	0	0	13586	0
2	0	0	17196	0	0	0	0	17196	0
3	0	0	12937	0	0	0	0	12937	0
4	0	0	300801	0	0	0	0	300801	0
5	0	0	126402	0	0	0	0	126402	0
6	0	0	1605	0	0	0	0	1605	0
7	0	0	4452	0	0	0	0	4452	0
8	0	0	4630	0	0	0	0	4630	0
9	0	0	245	0	0	0	0	245	0
10	0	0	3266	0	0	0	0	3266	0
11	0	0	2976	0	0	0	0	2976	0
12	0	0	5720	0	0	0	0	5720	0
ANNUAL	0	0	493816	0	0	0	0	493816	0

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 4 CALENDAR YEAR 1998

MONTHLY FLOWS IN SYSTEM LINKS (ACRE-FEET)

MONTH LINK NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1	63522	58757	66518	58726	69665	69639	68000	66034	66317	65061	63354	66114	65136
2	77299	69834	74887	56559	124617	75887	66796	67133	137834	80262	94997	70335	83031
3	73387	66583	69832	44074	114085	65937	57315	54325	131430	76339	93269	64116	75886
4	9072	3547	5953	10116	19233	8356	12953	6731	6530	6620	3677	4954	8140
5	8748	8082	10257	177441	120667	21894	21502	21083	21229	20803	20346	21311	39440
6	17705	14742	14690	167219	167815	26156	19448	20366	114221	32605	47935	19134	55164
7	0	0	0	0	0	142945	0	87000	0	0	0	0	19162
8	0	0	0	0	0	0	0	0	0	0	0	0	0
9	13586	17196	12937	300801	126402	1605	4452	4630	245	3266	2976	5720	41147
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	9072	3547	5953	10116	19233	8356	12953	6731	6530	6620	3677	4954	8140
12	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0
14	9072	3547	5953	10116	19233	8356	12953	6731	6530	6620	3677	4954	8140
15	0	0	0	0	0	0	0	0	0	0	0	0	0
16	9072	3547	5953	10116	19233	8356	12953	6731	6530	6620	3677	4954	8140
17	0	0	0	0	0	0	0	0	0	0	0	0	0
18	9072	3547	5953	10116	19233	8356	12953	6731	6530	6620	3677	4954	8140
19	0	0	0	0	0	0	0	0	0	0	0	0	0
20	9072	3547	5953	10116	19233	8356	12953	6731	6530	6620	3677	4954	8140

ALLOCATION OF U.S. WATER IN AMISTAD AND FALCON RESERVOIRS PURSUANT TO TNRCC RIO GRANDE RULES

MONTH	INITIAL USABLE STORAGE	TOTAL WTRSHED INFLOWS	TOTAL D-M-I DEMANDS	TOTAL IRRIG DEMANDS	TOTAL SYSTEM SHORTAGE	TOTAL RESERVR EVAP	END-MON USABLE STORAGE	o/o CONS POOL	D-M-I RESERVE STORAGE	OPRATNG RESERVE STORAGE	EXCESS USABLE STORAGE	IRRIG ACCOUNT ALLOCAT	IRRIG RIVER DIVERSN	IRRIG ACCOUNT BALANCE	o/o IRRIG POOL
1	1230672	73796	10658	87850	0	12216	1193744	36.0	225000	275000	44206	0	81134	649538	24.5
2	1193744	63976	5018	23870	0	14271	1214561	36.7	225000	275000	0	87243	22220	714561	27.0
3	1214561	76867	7737	57996	0	24678	1201017	36.2	225000	275000	40216	0	53760	660801	25.0
4	1201017	75819	12283	148487	0	28011	1088055	32.9	225000	275000	0	64860	137606	588055	22.2
5	1088055	159204	21684	264683	0	26493	934399	28.2	225000	275000	0	90694	244350	434399	16.4
6	934399	88614	10819	116390	0	26360	869444	26.3	225000	275000	42919	0	107874	326525	12.3
7	869444	81325	15456	127929	0	28518	778866	23.6	225000	275000	0	70794	118453	278866	10.5
8	778866	92830	9133	63045	0	25415	774103	23.4	225000	275000	0	54263	59026	274103	10.4
9	774103	169325	8486	43982	0	21125	869835	26.3	225000	275000	0	136707	40975	369835	14.0
10	869835	84374	8805	46950	0	18233	880221	26.6	225000	275000	0	53893	43507	380221	14.4
11	880221	95891	5730	18695	0	9431	942256	28.5	225000	275000	0	79372	17337	442256	16.7
12	942256	62547	6451	27955	0	8653	961744	29.1	225000	275000	45704	0	26216	416040	15.7

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 5 CALENDAR YEAR 1999

RESERVOIR NO. 1 U.S. AMISTAD MAX FLOOD POOL: 1827241 MAX CONSERVATION POOL: 1771041 DEAD POOL: 1771

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	D-M-I SHORTAGE	IRRIG DEMANDS	IRRIG SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	67892	67892	0	0	28097	.31	5269	1497	0	0	0	0	672914	1827241
2	56680	56680	0	0	29792	.44	8038	1574	0	0	0	0	721556	1827241
3	61812	61812	0	0	31263	.47	9132	1813	0	0	0	0	774236	1827241
4	75819	75819	0	2167	32808	.77	15937	2167	0	0	0	0	831951	1771041
5	101801	101801	0	0	34772	.87	19368	2451	0	0	0	0	914384	1771041
6	79903	79903	0	0	36663	.99	23506	2463	0	0	0	0	970781	1771041
7	80026	80026	0	1204	38146	1.17	29096	2503	0	0	0	0	1020507	1771041
8	89329	89329	0	0	39828	1.18	30670	2402	0	0	0	0	1079166	1771041
9	95852	95852	0	0	41838	.86	23513	1956	0	0	0	0	1151505	1771041
10	66988	66988	0	0	43461	.74	21059	2185	0	0	0	0	1197434	1771041
11	62195	62195	0	0	44834	.34	9989	2053	0	0	0	0	1249640	1827241
12	56829	56829	0	0	46123	.32	9695	1497	0	0	0	0	1296774	1827241
ANNUAL	895126	895126	0	3371			205272	24561	0	0	0	0		

RESERVOIR NO. 2 U.S. FALCON MAX FLOOD POOL: 1613729 MAX CONSERVATION POOL: 1555129 DEAD POOL: 1555

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	D-M-I SHORTAGE	IRRIG DEMANDS	IRRIG SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	7832	6335	0	17098	34621	.26	4524	17098	0	0	0	0	340766	1210297
2	7386	5812	0	17148	33297	.29	4920	17148	0	0	0	0	324510	1210297
3	2433	620	0	19613	31700	.42	6865	19613	0	0	0	0	298652	1210297
4	0	0	0	20906	29549	.68	10476	20906	0	0	0	0	267270	1166347
5	57403	54952	0	21854	29046	.73	11152	21854	0	0	0	0	289216	1166347
6	8711	6248	0	22871	28633	.80	12158	22871	0	0	0	0	260435	1166347
7	1299	0	0	25015	26059	.87	12246	25015	0	0	0	0	223174	1166347
8	3501	1099	0	26207	22797	.61	7703	26207	0	0	0	0	190363	1166347
9	73473	71517	0	20933	23593	.58	7418	20933	0	0	0	0	233529	1166347
10	17386	15201	0	20583	25344	.43	5779	20583	0	0	0	0	222368	1166347
11	33696	31643	0	18668	25002	.25	3363	18668	0	0	0	0	231980	1210297
12	5718	4221	0	17994	24370	.20	2672	17994	0	0	0	0	215535	1210297
ANNUAL	218838	197648	0	248890			89276	248890	0	0	0	0		

SPECIFIED UNITED STATES LOSSES AND DEMANDS FOR NODES DOWNSTREAM OF FALCON RESERVOIR IN ACRE-FEET

MONTH	FAL-RGC RIVER LOSSES	FAL-RGC D-M-I DEMANDS	RGC-ANZ RIVER LOSSES	RGC-ANZ D-M-I DEMANDS	ANZ-PRG RIVER LOSSES	ANZ-PRG D-M-I DEMANDS	PRG-SBN RIVER LOSSES	PRG-SBN D-M-I DEMANDS	SBN-BRN RIVER LOSSES	SBN-BRN D-M-I DEMANDS	BROWNSV D-M-I DEMANDS	SUM OF US D-M-I DEMANDS	SUM OF US CHAN LOSSES
1	683	378	801	3957	225	4592	129	2593	299	1586	1855	14961	2137
2	685	379	804	3969	226	4605	129	2600	300	1591	1860	15004	2144
3	784	433	919	4539	258	5267	148	2974	343	1820	2128	17161	2452
4	836	462	980	4838	275	5614	158	3170	365	1940	2268	18292	2614
5	874	483	1024	5057	288	5868	165	3314	382	2028	2371	19121	2733
6	914	506	1072	5293	301	6142	172	3468	400	2122	2481	20012	2859
7	1000	553	1173	5790	329	6717	189	3793	437	2321	2713	21887	3128
8	1048	578	1229	6065	345	7039	198	3973	458	2431	2843	22929	3278
9	837	463	981	4844	276	5621	158	3174	366	1942	2271	18315	2618
10	823	455	965	4763	271	5527	155	3121	360	1910	2233	18009	2574
11	746	413	875	4320	246	5013	141	2831	326	1732	2025	16334	2334
12	719	398	843	4164	237	4832	136	2729	314	1670	1952	15745	2249
ANNUAL	9949	5501	11666	57599	3277	66837	1878	37740	4350	23093	27000	217770	31120

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 5 CALENDAR YEAR 1999

RESERVOIR NO. 3 MEX. AMISTAD MAX FLOOD POOL: 1424078 MAX CONSERVATION POOL: 1380278 DEAD POOL: 1380

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	MUN&IRR SHORTAGE	OTHER DEMANDS	OTHER SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	28687	28687	0	0	28097	.31	3441	2983	0	0	0	0	431728	1424078
2	21287	21287	0	0	29792	.44	5070	2462	0	0	0	0	447945	1424078
3	23319	23319	0	2735	31263	.47	5562	2735	0	0	0	0	462967	1424078
4	26625	26625	0	3494	32808	.77	9325	3494	0	0	0	0	476773	1380278
5	38768	38768	0	0	34772	.87	10884	4625	0	0	0	0	504657	1380278
6	29252	29252	0	0	36663	.99	12790	4395	0	0	0	0	521119	1380278
7	37006	37006	0	486	38146	1.17	15535	4399	0	0	0	0	542104	1380278
8	49855	49855	0	0	39828	1.18	16327	4386	0	0	0	0	575632	1380278
9	43976	43976	0	0	41838	.86	12468	4369	0	0	0	0	607140	1380278
10	35154	35154	0	0	43461	.74	11102	4644	0	0	0	0	631192	1380278
11	30206	30206	0	0	44834	.34	5255	4794	0	0	0	0	656143	1424078
12	23756	23756	0	961	46123	.32	5064	4685	0	0	0	0	673874	1424078
ANNUAL	387891	387891	0	7676			112823	47971	0	0	0	0		

RESERVOIR NO. 4 MEX. FALCON MAX FLOOD POOL: 1140074 MAX CONSERVATION POOL: 1098674 DEAD POOL: 1099

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	IRRIGA SHORTAGE	OTHER DEMANDS	OTHER SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	3906	923	0	21035	34621	.26	4477	0	0	21035	0	0	332494	855055
2	3825	1363	0	21094	33297	.29	4736	0	0	21094	0	0	308027	855055
3	0	0	0	24127	31700	.42	6449	0	0	24127	0	0	277451	855055
4	0	0	0	25719	29549	.68	9617	0	0	25719	0	0	242115	824005
5	58914	54289	0	26881	29046	.73	10052	0	0	26881	0	0	259471	824005
6	10260	5865	0	28139	28633	.80	10748	0	0	28139	0	0	226449	824005
7	3913	0	0	30769	26059	.87	10425	0	0	30769	0	0	185255	824005
8	5330	944	0	32238	22797	.61	6203	0	0	32238	0	0	147758	824005
9	98882	94513	0	25748	23593	.58	6266	0	0	25748	0	0	210257	824005
10	18370	13726	0	25319	25344	.43	5119	0	0	25319	0	0	193545	824005
11	33717	28923	0	22964	25002	.25	2887	0	0	22964	0	0	196617	855055
12	3724	0	0	22137	24370	.20	2202	0	0	22137	0	0	172278	855055
ANNUAL	240841	200546	0	306170			79181	0	0	306170	0	0		

SPECIFIED MEXICO LOSSES AND DEMANDS FOR NODES DOWNSTREAM OF FALCON RESERVOIR IN ACRE-FEET

MONTH	FAL-RGC RIVER LOSSES	RGC-ANZ RIVER LOSSES	MEXICO ANZALDU DIVERSN	ANZ-PRG RIVER LOSSES	PRG-SBN RIVER LOSSES	SBN-BRN RIVER LOSSES	MEXICO MAT ETC DEMANDS	SUM OF MEXICO DEMANDS	SUM OF MX CHAN LOSSES
1	842	1010	15805	68	66	259	2985	18790	2245
2	844	1012	15851	67	67	260	2993	18844	2250
3	965	1158	18128	78	76	298	3424	21552	2575
4	1029	1234	19324	83	81	318	3650	22974	2745
5	1075	1291	20198	86	84	332	3815	24013	2868
6	1126	1351	21142	91	89	347	3993	25135	3004
7	1231	1477	23120	99	96	380	4366	27486	3283
8	1289	1547	24224	104	101	398	4575	28799	3439
9	1030	1236	19347	82	81	318	3654	23001	2747
10	1013	1215	19025	81	80	312	3593	22618	2701
11	919	1102	17254	74	72	284	3259	20513	2451
12	886	1063	16633	71	69	274	3141	19774	2363
ANNUAL	12249	14696	230051	984	962	3780	43448	273499	32671

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 5 CALENDAR YEAR 1999

MONTHLY FLOWS IN SYSTEM LINKS (ACRE-FEET)

MONTH LINK NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1	0	0	0	2167	0	0	1204	0	0	0	0	0	280
2	6335	5812	620	0	54952	6248	0	1099	71517	15201	31643	4221	16464
3	6335	5812	620	0	54952	6248	0	1099	71517	15201	31643	4221	16464
4	17098	17148	19613	20906	21854	22871	25015	26207	20933	20583	18668	17994	20735
5	0	0	2735	3494	0	0	486	0	0	0	0	961	638
6	923	1363	0	0	54289	5865	0	944	94513	13726	28923	0	16708
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0
9	21035	21094	24127	25719	26881	28139	30769	32238	25748	25319	22964	22137	25507
10	378	379	433	462	483	506	553	578	463	455	413	398	454
11	16037	16084	18396	19608	20497	21451	23462	24581	19633	19305	17509	16877	19450
12	3378	3387	3876	4132	4317	4520	4941	5178	4135	4066	3689	3555	4092
13	3957	3969	4539	4838	5057	5293	5790	6065	4844	4763	4320	4164	4795
14	11279	11311	12938	13790	14416	15086	16499	17287	13808	13577	12314	11870	13676
15	4592	4605	5267	5614	5868	6142	6717	7039	5621	5527	5013	4832	5562
16	6462	6480	7413	7901	8260	8643	9453	9903	7911	7779	7055	6801	7833
17	2593	2600	2974	3170	3314	3468	3793	3973	3174	3121	2831	2729	3141
18	3740	3751	4291	4573	4781	5003	5471	5732	4579	4503	4083	3936	4531
19	1586	1591	1820	1940	2028	2122	2321	2431	1942	1910	1732	1670	1919
20	1855	1860	2128	2268	2371	2481	2713	2843	2271	2233	2025	1952	2245

ALLOCATION OF U.S. WATER IN AMISTAD AND FALCON RESERVOIRS PURSUANT TO TNRCC RIO GRANDE RULES

MONTH	INITIAL USABLE STORAGE	TOTAL WTRSHED INFLOWS	TOTAL D-M-I DEMANDS	TOTAL IRRIG DEMANDS	TOTAL SYSTEM SHORTAGE	TOTAL RESERVR EVAP	END-MON USABLE STORAGE	o/o CONS POOL	D-M-I RESERVE STORAGE	OPRATNG RESERVE STORAGE	EXCESS USABLE STORAGE	IRRIG ACCOUNT ALLOCAT	IRRIG RIVER DIVERSN	IRRIG ACCOUNT BALANCE	o/o IRRIG POOL
1	961744	75724	16458	0	0	9793	1009080	30.5	225000	275000	0	93040	0	509080	19.2
2	1009080	64066	16578	0	0	12958	1041466	31.4	225000	275000	32386	0	0	509080	19.2
3	1041466	64245	18974	0	0	15997	1068288	32.3	225000	275000	0	59208	0	568288	21.5
4	1068288	75819	20459	0	0	26413	1094621	33.0	225000	275000	26333	0	0	568288	21.5
5	1094621	159204	21572	0	0	30520	1199000	36.2	225000	275000	0	130712	0	699000	26.4
6	1199000	88614	22475	0	0	35664	1226616	37.0	225000	275000	27616	0	0	699000	26.4
7	1226616	81325	24390	0	0	41342	1239081	37.4	225000	275000	40081	0	0	699000	26.4
8	1239081	92830	25331	0	0	38373	1264929	38.2	225000	275000	0	65929	0	764929	28.9
9	1264929	169325	20271	0	0	30931	1380434	41.6	225000	275000	0	115505	0	880434	33.3
10	1380434	84374	20194	0	0	26838	1415202	42.7	225000	275000	34768	0	0	880434	33.3
11	1415202	95891	18387	0	0	13352	1477020	44.5	225000	275000	0	96586	0	977020	36.9
12	1477020	62547	17242	0	0	12367	1507709	45.5	225000	275000	30689	0	0	977020	36.9

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 6 CALENDAR YEAR 2000

RESERVOIR NO. 1 U.S. AMISTAD MAX FLOOD POOL: 1827241 MAX CONSERVATION POOL: 1771041 DEAD POOL: 1771

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	D-M-I SHORTAGE	IRRIG DEMANDS	IRRIG SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	67892	67892	0	0	47390	.31	9683	1497	0	0	0	0	1354983	1827241
2	56680	56680	0	0	48585	.44	14139	1574	0	0	0	0	1397524	1827241
3	61812	61812	0	0	49584	.47	15481	1813	0	0	0	0	1443855	1827241
4	75819	75819	0	2167	50527	.77	25989	2167	0	0	0	0	1491518	1771041
5	101801	101801	0	0	51757	.87	30245	2451	0	0	0	0	1563074	1328281
6	79903	79903	0	0	52978	.99	35382	2463	0	0	0	0	1607595	1771041
7	80026	80026	0	47376	53486	1.17	42116	2503	0	0	0	0	1598129	1328281
8	89329	89329	0	32287	53870	1.18	42409	2402	0	0	0	0	1612762	1328281
9	95852	95852	0	0	54885	.86	31382	1956	0	0	0	0	1677232	1328281
10	66988	66988	0	0	56034	.74	27584	2185	0	0	0	0	1716636	1771041
11	62195	62195	0	0	57035	.34	12899	2053	0	0	0	0	1765932	1827241
12	56829	56829	0	0	58017	.32	12365	1497	0	0	0	0	1810396	1827241
ANNUAL	895126	895126	0	81830			299674	24561	0	0	0	0		

RESERVOIR NO. 2 U.S. FALCON MAX FLOOD POOL: 1613729 MAX CONSERVATION POOL: 1555129 DEAD POOL: 1555

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	D-M-I DEMANDS	D-M-I SHORTAGE	IRRIG DEMANDS	IRRIG SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	7832	6335	0	17098	22624	.26	3320	17098	0	0	0	0	201452	1210297
2	7386	5812	0	17148	20960	.29	3547	17148	0	0	0	0	186569	1210297
3	2433	620	0	19613	18725	.42	4763	19613	0	0	0	0	162813	1210297
4	0	0	0	20906	15899	.68	6874	20906	0	0	0	0	135033	1166347
5	57403	54952	0	21854	15638	.73	7340	21854	0	0	0	0	160791	150070
6	8711	6248	0	22871	15567	.80	8076	22871	0	0	0	0	136092	1166347
7	1299	46172	0	25015	13293	.87	8549	25015	0	0	0	0	148700	150070
8	3501	33386	0	26207	11660	.61	6366	26207	0	0	0	0	149513	150070
9	73473	71517	0	20933	14176	.58	6817	20933	0	0	0	0	193280	150070
10	17386	15201	0	20583	16733	.43	5403	20583	0	0	0	0	182495	1166347
11	33696	31643	0	18668	16489	.25	3146	18668	0	0	0	0	192324	1210297
12	5718	4221	0	17994	15849	.20	2502	17994	0	0	0	0	176049	1210297
ANNUAL	218838	276107	0	248890			66703	248890	0	0	0	0		

SPECIFIED UNITED STATES LOSSES AND DEMANDS FOR NODES DOWNSTREAM OF FALCON RESERVOIR IN ACRE-FEET

MONTH	FAL-RGC RIVER LOSSES	FAL-RGC D-M-I DEMANDS	RGC-ANZ RIVER LOSSES	RGC-ANZ D-M-I DEMANDS	ANZ-PRG RIVER LOSSES	ANZ-PRG D-M-I DEMANDS	PRG-SBN RIVER LOSSES	PRG-SBN D-M-I DEMANDS	SBN-BRN RIVER LOSSES	SBN-BRN D-M-I DEMANDS	BROWNSV D-M-I DEMANDS	SUM OF US D-M-I DEMANDS	SUM OF US CHAN LOSSES
1	683	378	801	3957	225	4592	129	2593	299	1586	1855	14961	2137
2	685	379	804	3969	226	4605	129	2600	300	1591	1860	15004	2144
3	784	433	919	4539	258	5267	148	2974	343	1820	2128	17161	2452
4	836	462	980	4838	275	5614	158	3170	365	1940	2268	18292	2614
5	874	483	1024	5057	288	5868	165	3314	382	2028	2371	19121	2733
6	914	506	1072	5293	301	6142	172	3468	400	2122	2481	20012	2859
7	1000	553	1173	5790	329	6717	189	3793	437	2321	2713	21887	3128
8	1048	578	1229	6065	345	7039	198	3973	458	2431	2843	22929	3278
9	837	463	981	4844	276	5621	158	3174	366	1942	2271	18315	2618
10	823	455	965	4763	271	5527	155	3121	360	1910	2233	18009	2574
11	746	413	875	4320	246	5013	141	2831	326	1732	2025	16334	2334
12	719	398	843	4164	237	4832	136	2729	314	1670	1952	15745	2249
ANNUAL	9949	5501	11666	57599	3277	66837	1878	37740	4350	23093	27000	217770	31120

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 6 CALENDAR YEAR 2000

RESERVOIR NO. 3 MEX. AMISTAD MAX FLOOD POOL: 1424078 MAX CONSERVATION POOL: 1380278 DEAD POOL: 1380

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	MUN&IRR SHORTAGE	OTHER DEMANDS	OTHER SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	28687	28687	0	0	47390	.31	5008	2983	0	0	0	0	697553	1424078
2	21287	21287	0	0	48585	.44	7238	2462	0	0	0	0	711602	1424078
3	23319	23319	0	2735	49584	.47	7823	2735	0	0	0	0	724363	1424078
4	26625	26625	0	3494	50527	.77	12917	3494	0	0	0	0	734577	1035208
5	38768	38768	0	0	51757	.87	14784	4625	0	0	0	0	758561	1035208
6	29252	29252	0	0	52978	.99	17066	4395	0	0	0	0	770747	1035208
7	37006	37006	0	486	53486	1.17	20463	4399	0	0	0	0	786804	1035208
8	49855	49855	0	342	53870	1.18	21158	4386	0	0	0	0	815159	1035208
9	43976	43976	0	0	54885	.86	15819	4369	0	0	0	0	843316	1035208
10	35154	35154	0	0	56034	.74	13881	4644	0	0	0	0	864589	1035208
11	30206	30206	0	0	57035	.34	6493	4794	0	0	0	0	888302	1068058
12	23756	23756	0	961	58017	.32	6200	4685	0	0	0	0	904897	1068058
ANNUAL	387891	387891	0	8018			148850	47971	0	0	0	0		

RESERVOIR NO. 4 MEX. FALCON MAX FLOOD POOL: 1140074 MAX CONSERVATION POOL: 1098674 DEAD POOL: 1099

MONTH	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	SURFACE AREA	EVAP RATE	EVAP LOSS	MUN&IRR DEMANDS	IRRIGA SHORTAGE	OTHER DEMANDS	OTHER SHORTAGE	FLOOD SPILLS	END-MON STORAGE	TARGET STORAGE
1	3906	923	0	21035	22624	.26	2562	0	0	21035	0	0	149604	855055
2	3825	1363	0	21094	20960	.29	2531	0	0	21094	0	0	127342	855055
3	0	0	0	24127	18725	.42	3101	0	0	24127	0	0	100114	855055
4	0	0	0	25719	15899	.68	3937	0	0	25719	0	0	70458	1099
5	58914	54289	0	26881	15638	.73	4076	0	0	26881	0	0	93790	1099
6	10260	5865	0	28139	15567	.80	4378	0	0	28139	0	0	67138	1099
7	3913	0	0	30769	13293	.87	3016	0	0	30769	0	0	33353	1099
8	5330	1286	0	32238	11660	.61	747	0	0	32238	0	0	1654	1099
9	98882	94513	0	25748	14176	.58	1405	0	0	25748	0	0	69014	1099
10	18370	13726	0	25319	16733	.43	1792	0	0	25319	0	0	55629	1099
11	33717	28923	0	22964	16489	.25	976	0	0	22964	0	0	60612	1140
12	3724	0	0	22137	15849	.20	668	0	0	22137	0	0	37807	1140
ANNUAL	240841	200888	0	306170			29189	0	0	306170	0	0		

SPECIFIED MEXICO LOSSES AND DEMANDS FOR NODES DOWNSTREAM OF FALCON RESERVOIR IN ACRE-FEET

MONTH	FAL-RGC RIVER LOSSES	RGC-ANZ RIVER LOSSES	MEXICO ANZALDU DIVERSN	ANZ-PRG RIVER LOSSES	PRG-SBN RIVER LOSSES	SBN-BRN RIVER LOSSES	MEXICO MAT ETC DEMANDS	SUM OF MEXICO DEMANDS	SUM OF MX CHAN LOSSES
1	842	1010	15805	68	66	259	2985	18790	2245
2	844	1012	15851	67	67	260	2993	18844	2250
3	965	1158	18128	78	76	298	3424	21552	2575
4	1029	1234	19324	83	81	318	3650	22974	2745
5	1075	1291	20198	86	84	332	3815	24013	2868
6	1126	1351	21142	91	89	347	3993	25135	3004
7	1231	1477	23120	99	96	380	4366	27486	3283
8	1289	1547	24224	104	101	398	4575	28799	3439
9	1030	1236	19347	82	81	318	3654	23001	2747
10	1013	1215	19025	81	80	312	3593	22618	2701
11	919	1102	17254	74	72	284	3259	20513	2451
12	886	1063	16633	71	69	274	3141	19774	2363
ANNUAL	12249	14696	230051	984	962	3780	43448	273499	32671

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998
1995 HYDROLOGY AND YEAR 2000 D-M-I DEMANDS FOR 1999-2000; 20% SYSTEM LOSSES & AVG. RIVER LOSSES

SIMULATION YEAR 6 CALENDAR YEAR 2000

MONTHLY FLOWS IN SYSTEM LINKS (ACRE-FEET)

MONTH LINK NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1	0	0	0	2167	0	0	1204	0	0	0	0	0	280
2	6335	5812	620	0	54952	6248	0	1099	71517	15201	31643	4221	16464
3	6335	5812	620	0	54952	6248	0	1099	71517	15201	31643	4221	16464
4	17098	17148	19613	20906	21854	22871	25015	26207	20933	20583	18668	17994	20735
5	0	0	2735	3494	0	0	486	0	0	0	0	961	638
6	923	1363	0	0	54289	5865	0	944	94513	13726	28923	0	16708
7	0	0	0	0	0	0	46172	32287	0	0	0	0	6537
8	0	0	0	0	0	0	0	342	0	0	0	0	28
9	21035	21094	24127	25719	26881	28139	30769	32238	25748	25319	22964	22137	25507
10	378	379	433	462	483	506	553	578	463	455	413	398	454
11	16037	16084	18396	19608	20497	21451	23462	24581	19633	19305	17509	16877	19450
12	3378	3387	3876	4132	4317	4520	4941	5178	4135	4066	3689	3555	4092
13	3957	3969	4539	4838	5057	5293	5790	6065	4844	4763	4320	4164	4795
14	11279	11311	12938	13790	14416	15086	16499	17287	13808	13577	12314	11870	13676
15	4592	4605	5267	5614	5868	6142	6717	7039	5621	5527	5013	4832	5562
16	6462	6480	7413	7901	8260	8643	9453	9903	7911	7779	7055	6801	7833
17	2593	2600	2974	3170	3314	3468	3793	3973	3174	3121	2831	2729	3141
18	3740	3751	4291	4573	4781	5003	5471	5732	4579	4503	4083	3936	4531
19	1586	1591	1820	1940	2028	2122	2321	2431	1942	1910	1732	1670	1919
20	1855	1860	2128	2268	2371	2481	2713	2843	2271	2233	2025	1952	2245

ALLOCATION OF U.S. WATER IN AMISTAD AND FALCON RESERVOIRS PURSUANT TO TNRCC RIO GRANDE RULES

MONTH	INITIAL USABLE STORAGE	TOTAL WTRSHED INFLOWS	TOTAL D-M-I DEMANDS	TOTAL IRRIG DEMANDS	TOTAL SYSTEM SHORTAGE	TOTAL RESERVR EVAP	END-MON USABLE STORAGE	o/o CONS POOL	D-M-I RESERVE STORAGE	OPRATNG RESERVE STORAGE	EXCESS USABLE STORAGE	IRRIG ACCOUNT ALLOCAT	IRRIG RIVER DIVERSN	IRRIG ACCOUNT BALANCE	o/o IRRIG POOL
1	1507709	75724	16458	0	0	13003	1551835	46.8	225000	275000	0	74815	0	1051835	39.7
2	1551835	64066	16578	0	0	17686	1579493	47.6	225000	275000	27658	0	0	1051835	39.7
3	1579493	64245	18974	0	0	20244	1602068	48.3	225000	275000	0	50233	0	1102068	41.6
4	1602068	75819	20459	0	0	32863	1621951	48.9	225000	275000	19883	0	0	1102068	41.6
5	1621951	159204	21572	0	0	37585	1719265	51.8	225000	275000	0	117197	0	1219265	46.1
6	1719265	88614	22475	0	0	43458	1739087	52.4	225000	275000	19822	0	0	1219265	46.1
7	1739087	81325	24390	0	0	50665	1742229	52.5	225000	275000	22964	0	0	1219265	46.1
8	1742229	92830	25331	0	0	48775	1757675	53.0	225000	275000	38410	0	0	1219265	46.1
9	1757675	169325	20271	0	0	38199	1865912	56.2	225000	275000	0	146647	0	1365912	51.6
10	1865912	84374	20194	0	0	32987	1894531	57.1	225000	275000	28619	0	0	1365912	51.6
11	1894531	95891	18387	0	0	16045	1953656	58.9	225000	275000	0	87744	0	1453656	54.9
12	1953656	62547	17242	0	0	14867	1981845	59.7	225000	275000	28189	0	0	1453656	54.9

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998

SIMULATION PERIOD TOTAL SUMMARY FOR NODE 1 U.S. AMISTAD

YEAR	INITIAL STORAGE	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	YEAREND STORAGE	MINIMUM STORAGE
1995	1205614	895126	895126	0	791087	246090	24561	0	89244	0	0	1063563	1063563
1996	1063563	956466	956466	0	949893	204717	25850	0	101973	0	0	865419	743519
1997	865419	951292	951292	0	735548	174518	24284	0	69605	0	0	906645	854340
1998	906645	885317	885317	0	1011652	170019	24518	0	85748	0	0	610291	610291
1999	610291	895126	895126	0	3371	205272	24561	0	0	0	0	1296774	672914
2000	1296774	895126	895126	0	81830	299674	24561	0	0	0	0	1810396	1354983

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998

SIMULATION PERIOD TOTAL SUMMARY FOR NODE 2 U.S. FALCON

YEAR	INITIAL STORAGE	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	EVAP LOSS	D-M-I DEMANDS	SHORTAGE	IRRIG DEMANDS	SHORTAGE	FLOOD SPILLS	YEAREND STORAGE	MINIMUM STORAGE
1995	937652	218838	896120	0	1134426	169056	110745	0	1023681	0	0	530290	338141
1996	530290	227673	1049743	0	1113618	110086	112583	0	1001035	0	0	356329	181265
1997	356329	226161	867820	0	794354	101168	89058	0	705296	0	0	328627	210827
1998	328627	239251	1140637	0	1039826	73385	97742	0	942084	0	0	356053	63529
1999	356053	218838	197648	0	248890	89276	217770	0	0	0	0	215535	190363
2000	215535	218838	276107	0	248890	66703	217770	0	0	0	0	176049	135033

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998

SIMULATION PERIOD TOTAL SUMMARY FOR NODE 3 MEX. AMISTAD

YEAR	INITIAL STORAGE	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	YEAREND STORAGE	MINIMUM STORAGE
1995	420666	387891	387891	0	602013	37246	87033	0	0	0	0	169298	85887
1996	169298	441577	441577	0	145280	54775	83386	0	0	0	0	410820	175592
1997	410820	398568	398568	0	120947	95912	60839	0	0	0	0	592529	417705
1998	592529	384845	384845	0	473363	97529	78599	0	0	0	0	406482	359499
1999	406482	387891	387891	0	7676	112823	47971	0	0	0	0	673874	431728
2000	673874	387891	387891	0	8018	148850	47971	0	0	0	0	904897	697553

RUN B - ACTUAL HISTORICAL CONDITIONS FOR 1995-MAR 1998; 1995 CONDITIONS FOR APR-DEC 1998

SIMULATION PERIOD TOTAL SUMMARY FOR NODE 4 MEX. FALCON

YEAR	INITIAL STORAGE	WTRSHED INFLOWS	RESERVR INFLOWS	FLDWATR TRANSFR	DWNSTRM RELEASE	EVAP LOSS	MUN&IRR DEMANDS	SHORTAGE	OTHER DEMANDS	SHORTAGE	FLOOD SPILLS	YEAREND STORAGE	MINIMUM STORAGE
1995	320826	240841	755821	0	754543	37003	0	0	754543	0	0	285101	13653
1996	285101	259854	321748	0	279607	66821	0	0	279607	0	0	260421	103808
1997	260421	242833	302941	0	217411	81281	0	0	217411	0	0	264670	226017
1998	264670	267272	662036	0	493816	75807	0	0	493816	0	0	357083	112138
1999	357083	240841	200546	0	306170	79181	0	0	306170	0	0	172278	147758
2000	172278	240841	200888	0	306170	29189	0	0	306170	0	0	37807	1654

Report on Diversion Facilities on the Rio Grande That Deliver Water For Domestic, Municipal and Industrial Uses

Prepared By

Jo Jo White
General Manager
H&CCID No. 9

Bart Hines
General Manger
McAllen PUB

Wayne Halbert
General Manager
Harlingen ID

Cloice Whitley
General Manager
Harlingen Waterworks System

Sonny Hinojosa
General Manger
HCID No. 2

John Bruciak
General Manager
Brownsville PUB

March
1999

Lower Rio Grande Valley Development Council
311 N. 15th St.
McAllen, Texas 78501-4705

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March 1999

Lower Rio Grande Valley Development Council
311 N. 15th St.
McAllen, Texas 78501-4705

Report on Diversion Facilities on the Rio Grande That Deliver Water For Domestic, Municipal and Industrial Uses

The Lower Rio Grande Valley Development Council entered into a Research and Planning Fund Research Grant Contract with the Texas Water Development Board to assemble data on each irrigation district diversion facility on the Rio Grande that delivers water for domestic, municipal and industrial uses. The objective on the study was an analysis of the irrigation district diversion facilities on the Rio Grande to develop an opinion on whether municipal water supplies could be delivered when little or no irrigation water is being used.

The specific items in the Scope of Services were:

- Assemble available construction drawings showing the general plan and capacity of each diversion facility including existing weirs.
- Establish a committee of three irrigation district representatives and three municipal representatives to review the assembled drawings.
- Visit each critical diversion facility to observe the actual physical condition and take photographs.
- Prepared a written summary on each diversion facility.

The appointed committee consisted of the following individuals:

Irrigation Districts	Municipal
Jo Jo White	Bart Hines
Wayne Halbert	Cloice Whitley
Sonny Hinojosa	John Bruciak

Charles Greenwood, with the consulting engineering firm of Sigler, Winston, Greenwood and Associates, Inc., was responsible for assembling the available construction drawing. The available construction drawings to show the general plan and capacity of each diversion facility, including existing weirs, are presented in the attached Appendix A.

Committee Action

The committee met on January 11, 1999 at 2:00 P.M., in the offices of Sigler, Winston, Greenwood and Associates. The committee members present agreed that they did not believe it was necessary to visit each of the critical diversion facilities to observe the actual physical condition and to take photographs. After extensive discussion, the committee members present agreed to state in writing their opinions on the capability of the diversion facilities to deliver the domestic, municipal, and

industrial demands when there is little or no agricultural water in the Rio Grande. The written statements are included in Appendix B and a summary of the comments is presented below.

Summary of Comments

The main purpose of the report is in support of the investigation to determine the answer to two questions:

> If there is no agricultural water being discharged from Falcon Reservoir (only M&I water is being discharged), will the Rio Grande be capable of delivering water to each diversion structure?
>
> Is each irrigation district capable of diverting water from their diversion point to the cities?

From past history, the irrigation districts can and do divert water from the Rio Grande when there is no irrigation water being released. Obviously, the pumping efficiencies are negatively affected and the overall volumes to be pumped are limited. There are documented data (Rio Grande Watermaster and I.B.W.C.) that indicate the historical periods of time when little or no irrigation water was being released from Falcon Lake. The water being diverted from the river during these times was only municipal water. The assumption can be made from this documented history that irrigation districts will be able to physically pump water from the river even if the only remaining water in the Rio Grande is municipal water.

The diversion of water for city water supplies by the respective irrigation district is fairly well established due to the long term operation and the development that has grown up around most systems. These restrictions are going to make any changes impossible that would help in diverting more water or to provide any type of storage during drought periods.

The major water diverters (irrigation districts) along the Rio Grande, below Anzalduas Dam, have weirs downstream of their diversion points that maintain a minimum river elevation and create a pool of water that facilitates the diversion of water during low flow conditions.

Raising of the diversion weirs should be further evaluated, but such action may not be advisable. The increase in the weir height will affect the flood hydrology of the Rio Grande. The greater weir height will also cause a greater amount of backwater on land that may flood both the United States and Mexican shorelines. The additional height may also cause greater impoundment of water, with the related higher seepage and evapotranspiration losses.

The irrigation districts upstream of Anzalduas Dam utilize the pool created by the Dam, therefore, their ability to divert water for M&I purposes only should not change.

One solution for assuring a diversion structure is capable of pumping water to the canals for only M&I purposes would be dredging the Rio Grande diversion points.

Although the depletion of irrigation water in the reservoirs is unlikely, there will be individual irrigation districts that may exhaust their water right account. The problems encountered by these irrigation districts in 1998 was maintaining a charged canal system for a city that has no raw water storage reservoir.

Recommendations

All cities and /or water purveyors must be required to have control of, or contract to an irrigation district for, raw water storage for at least 20 to 30 days of supply. Raw water storage requirements should meet the maximum daily demand from the water treatment facility. The 20 to 30-day storage requirement should be a firm storage requirement and not be based on total volume of storage. If cities had a requirement to have 20 to 30 days of water supply in storage, it would greatly increase the efficiency in how the irrigation districts divert water. This would be the responsibility of the city and not the district since it would only benefit the city.

Several cities rely on the irrigation districts' canal system as their reservoir. This practice places an unnecessary burden on the irrigation districts. Cities should not take into account canals as storage facilities unless there are no taps to the canal prior to the city's diversion point. In other words, they can use that portion of the canal that serves solely their water treatment facility, if and only if, the irrigation district agrees to the concept. The storage could be contained through weirs or gates to meet that storage requirement. If an irrigation district has a storage structure at the present time, the district might explore to determine if the structure can be reworked to provide more storage, or to determine if there is a way that the city can put their own storage facility into operation. If the district has a storage structure presently, the district could work with the city to fund the needed repairs or enlargement of the facility.

To insure the continued pumping ability under low flow conditions, the following recommendations are made:

1. A study should be made on all existing Rio Grande weirs (and future installations) that could determine their positive impact on pumping conditions during low flows. Also, what could be done to increase the positive results of the weirs now in place.

2. Further study should be done on the aquatic weed infestation and its impact on low Rio Grande flows.

3. The water ordering mechanism now being used between the irrigation districts and the Rio Grande Watermaster needs to be investigated to determine what would best enhance the efficient delivery of water from the Falcon Lake if the situation ever arose where only municipal water was remaining in the reserves.

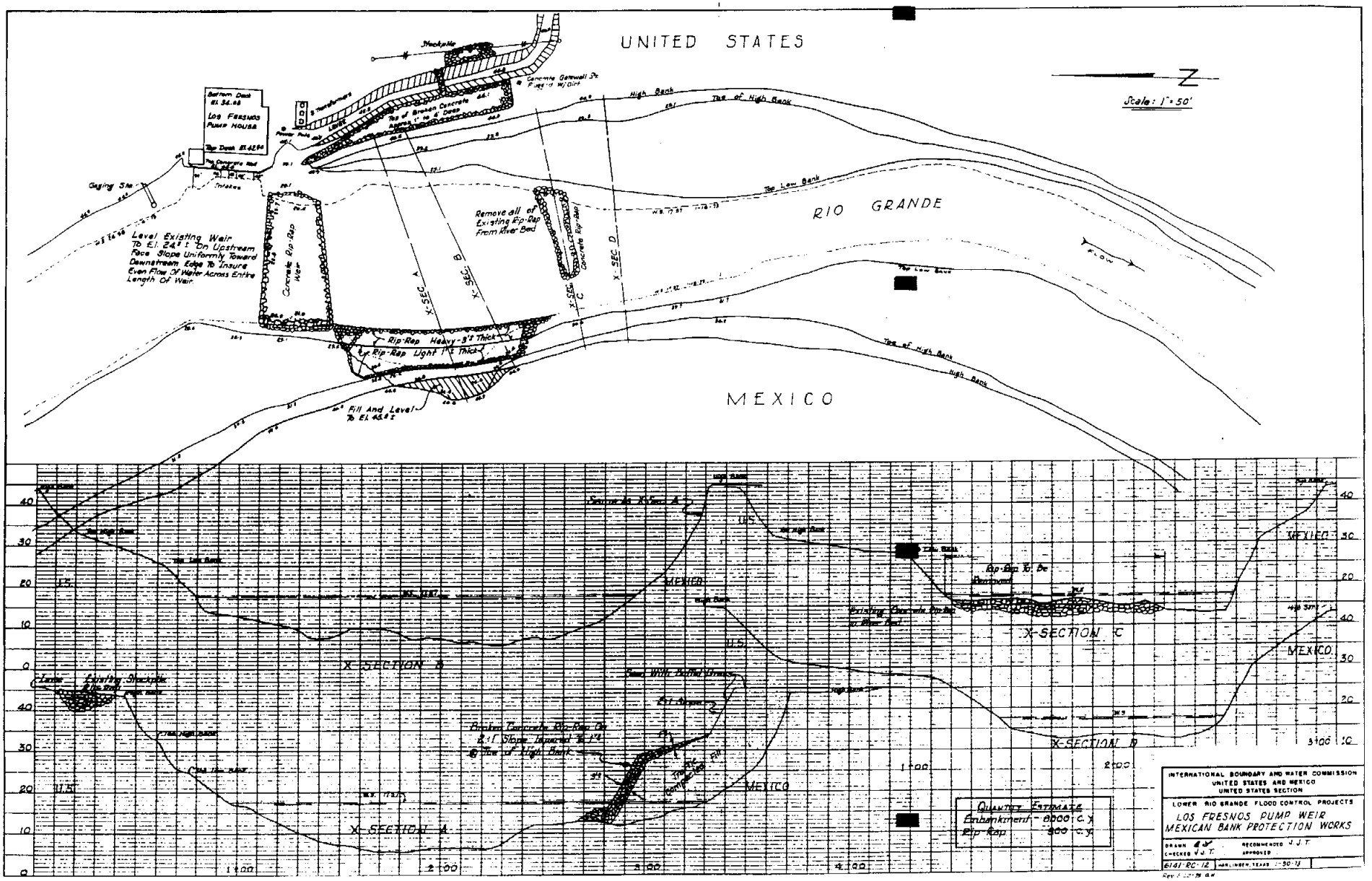
4. Additional measuring or gauging stations along the river could better monitor the river flow and could provide a higher level of operation. Efforts should be made to coordinate the activities

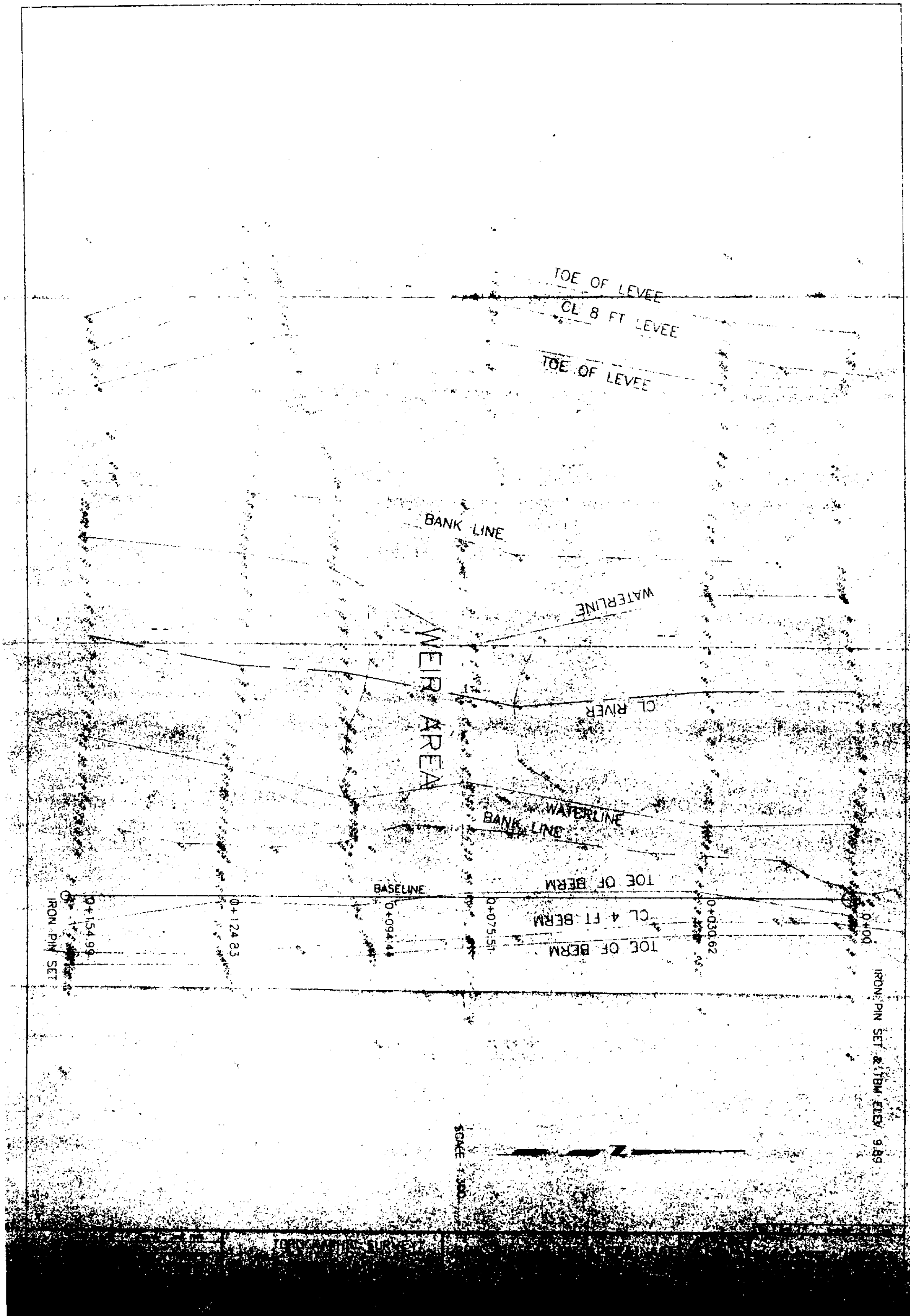
of all the agencies to assist in the funding of such a program.

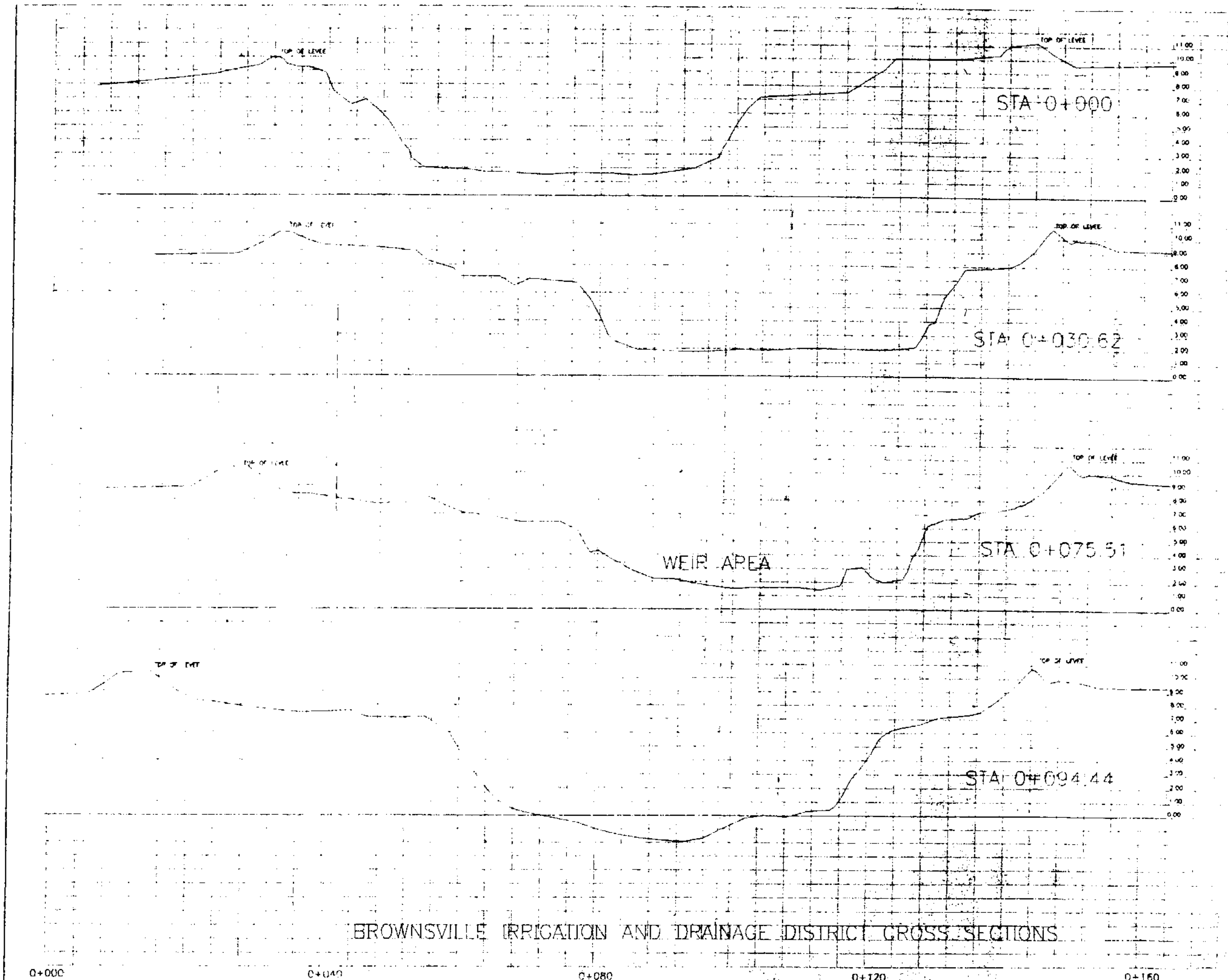
5. Negative environmental effects resulting from the low flows, such as potential fish or wildlife damage, need to be addresses by those water right holders (Texas Parks & Wildlife, U.S. fish & wildlife, etc.) who have the water reserves that could possibly alleviate these conditions. No other water right allocation holders should use their reserves for this purpose.

6. The cities can help themselves by either studying their water supply system themselves or hiring someone assess their needs and provide an answer for them. Many of the smaller towns have let their treatment and distribution systems and their water supply sources to their system deteriorate for so many years. These cities are in an almost impossible situation money wise to be able to provide any type of fix to these facilities.

Appendix A


UNITED STATES
MEXICO
RIO GRANDE
Scale: 1" = 50'
Los Fresnos Pump House
Gaging Sta.
Level Existing Weir To El. 24.1 ± On Upstream Face Slope Uniformly Toward Downstream Edge To Insure Even Flow Of Water Across Entire Length Of Weir
Concrete Rip-Rap Weir
Remove all of Existing Rip-Rap From River Bed
Concrete Rip-Rap
X-SEC. A
X-SEC. B
X-SEC. C
X-SEC. D
Rip-Rap Heavy - 3'-0" Thick
Rip-Rap Light 1'-0" Thick
Fill And Level To El. 42.2 ±
High Bank
Top of High Bank
Top Low Bank
X SECTION A
X-SECTION B
X-SECTION C
X-SECTION D
Existing Shackle
Broken Concrete Rip-Rap On 2:1 Slope Layered To 1'-0" @ Top of High Bank
Rip-Rap To Be Removed
Existing Concrete Rip-Rap In River Bed
Quantity Estimate
Embankment - 8000 c.y.
Rip Rap - 900 c.y.
INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO
UNITED STATES SECTION
LOWER RIO GRANDE FLOOD CONTROL PROJECTS
LOS FRESNOS PUMP WEIR
MEXICAN BANK PROTECTION WORKS
DRAWN
CHECKED V.J.T.
RECOMMENDED J.J.T.
APPROVED
6141-RC-12
HARLINGEN, TEXAS


TOE OF LEVEE
CL 8 FT LEVEE
TOE OF LEVEE
BANK LINE
WATERLINE
WEIR AREA
CL RIVER
WATERLINE
BANK LINE
TOE OF BERM
BASELINE
CL 4 FT BERM
TOE OF BERM
0+154.99
0+124.83
0+094.44
0+075.51
0+030.62
0+00
IRON PIN SET
IRON PIN SET & TBM ELEV. 9.89
N
SCALE 1:300
TOPOGRAPHIC SURVEY



HOLDAR-GOMEZ & ASSOCIATES
755 LAND O'LAKES DRIVE
BROWNSVILLE, TEXAS 78521
(210) 541-3650, FAX 546-9683

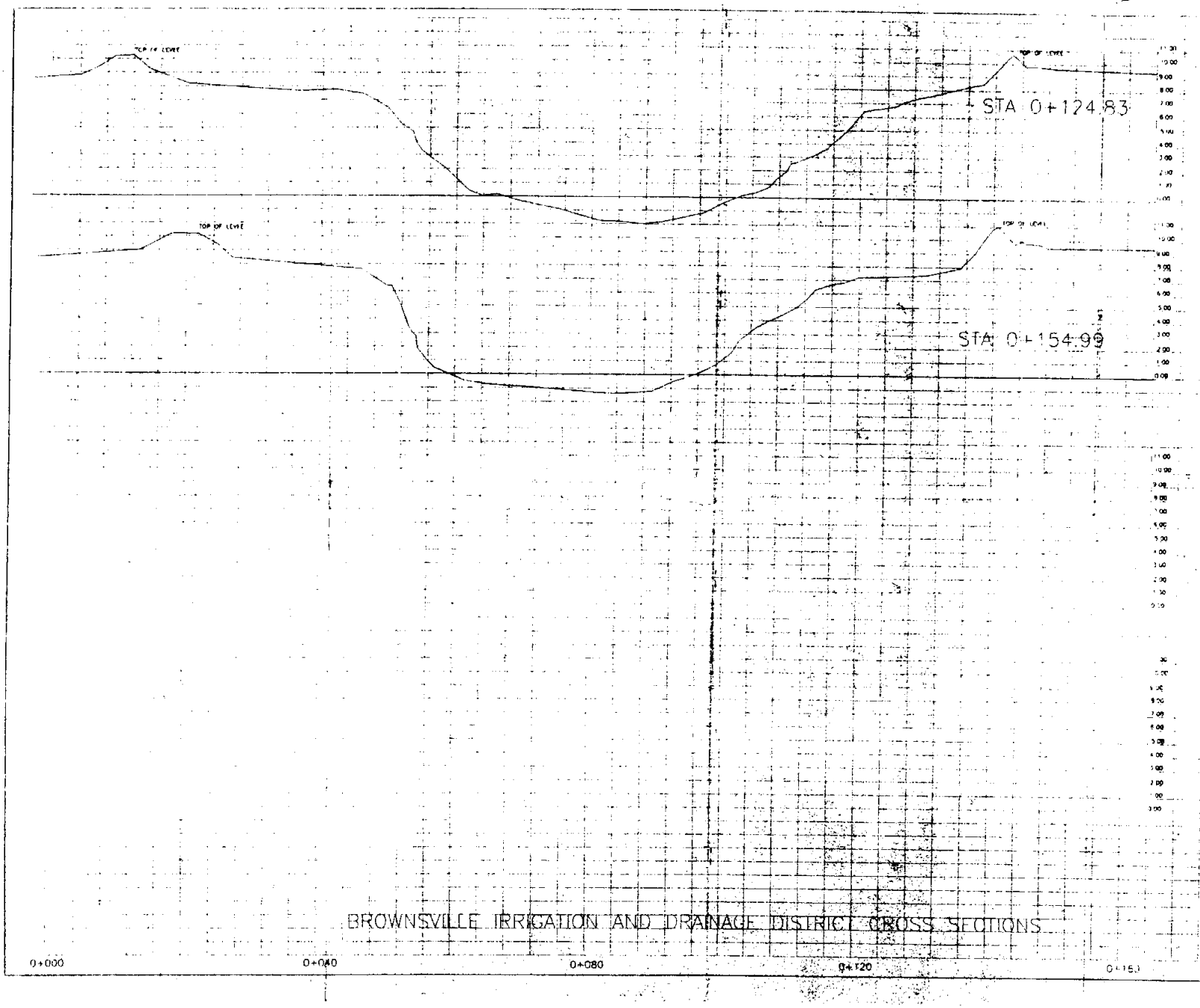
BPD IRR & DRAINAGE DIST

CAMERON COUNTY, TEXAS

TOPOGRAPHIC SURVEY
CROSS SECTIONS
STA 0+000 to STA 0+094.14

SCALE 1:200
DESIGNED BY H.H.
DRAWN BY H.H.
CHECKED BY H.H.
APPROVED BY A.H.
PROJECT No. 185-4

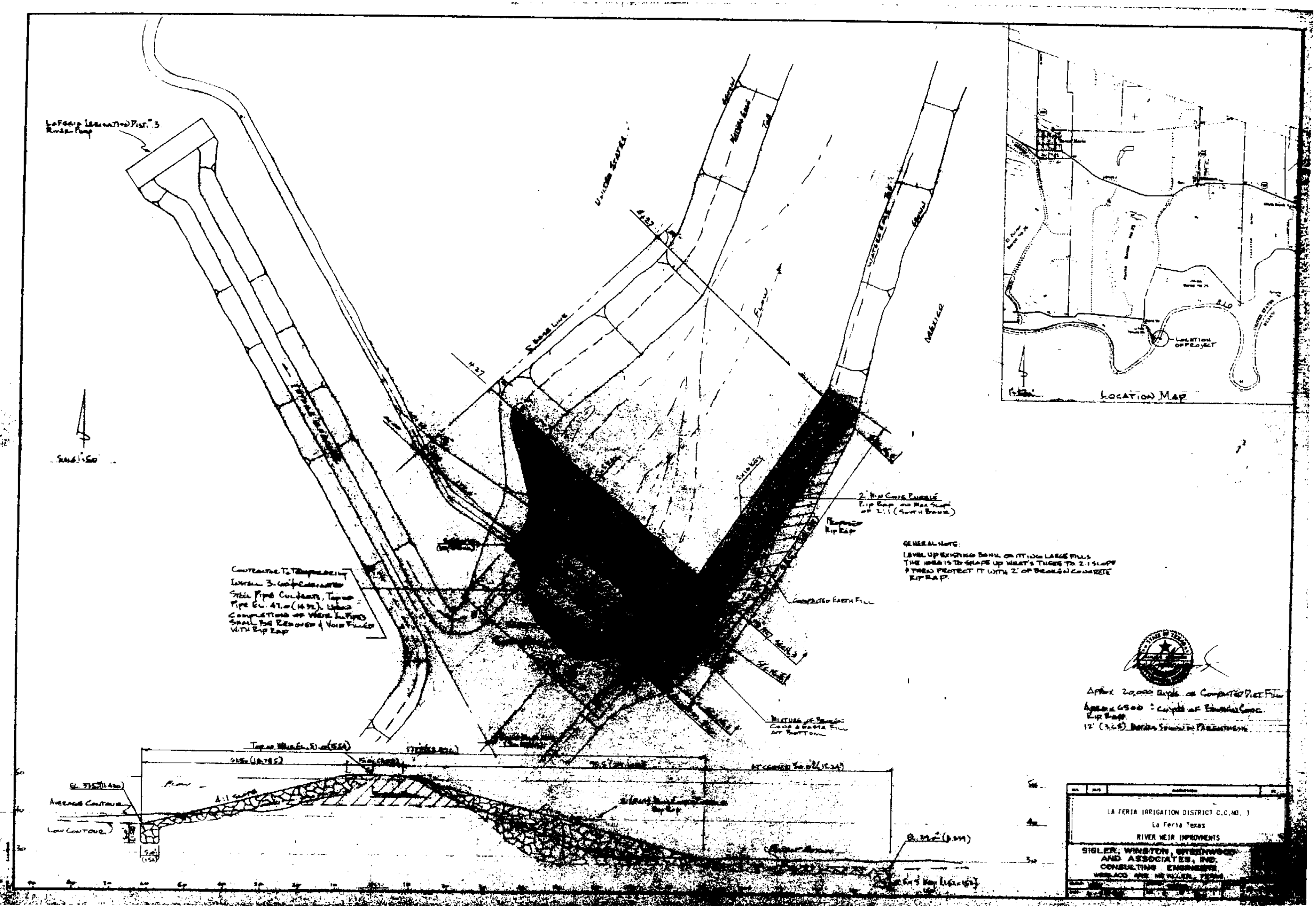
SHEET 2 OF 9

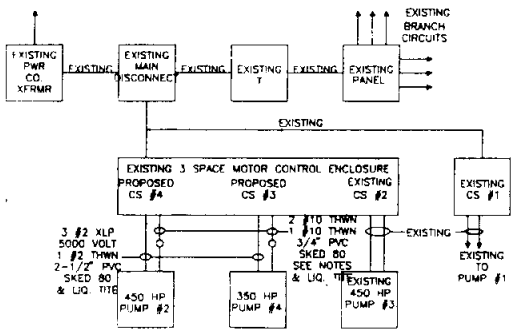

STA 0+124.83
STA 0+154.99
SCALE
1:200 Horizontal
1:100 VERTICAL
BRO IRR & DRAINAGE DIST.
TOPOGRAPHIC SURVEY
CROSS SECTIONS
BROWNSVILLE IRRIGATION AND DRAINAGE DISTRICT CROSS SECTIONS
0+000
0+040
0+080
0+120
0+160

LA FERIA IRRIGATION DISTRICT C.C. NO. 3

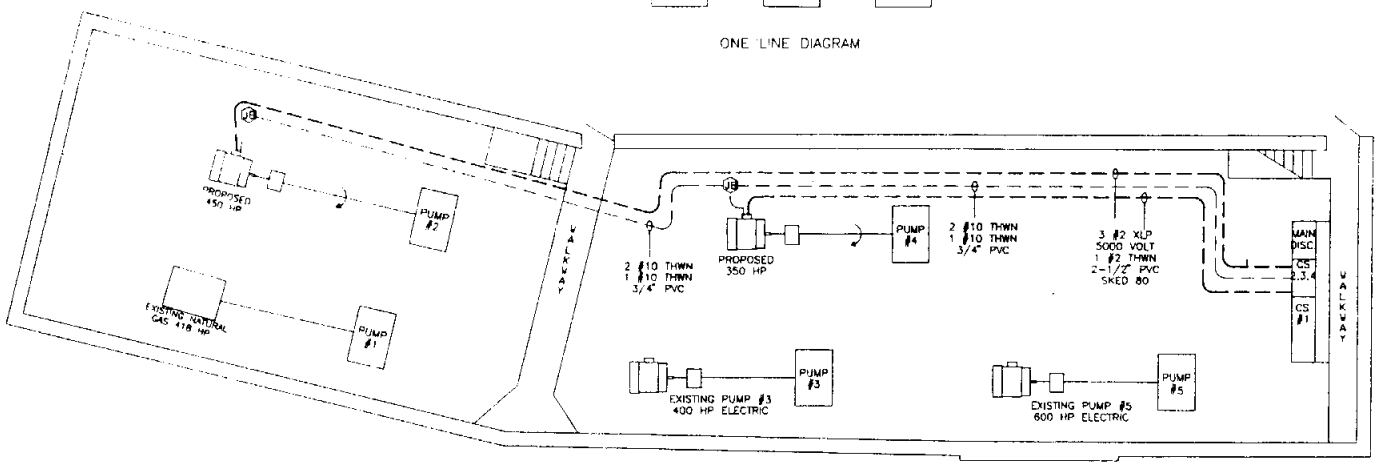
La Feria Weirs

RIVER WEIR IMPROVEMENTS


LaFeria Irrigation Dist. 3
River Pump
United States
Mexico
Flow
Scale 1:50
General Note:
Level up existing bank or fitting large fills. The idea is to shape up what's there to 2:1 slope & then protect it with 2' of broken concrete rip rap.
Compacted Earth Fill
Proposed Rip Rap
Location Map
Location of Project
Average Contour
Low Contour
4:1 Slope
LA FERIA IRRIGATION DISTRICT C.C.NO. 3
La Feria Texas
RIVER WEIR IMPROVEMENTS
SIGLER, WINSTON, GREENWOOD AND ASSOCIATES, INC.
CONSULTING ENGINEERS



ONE LINE DIAGRAM



2-22-90

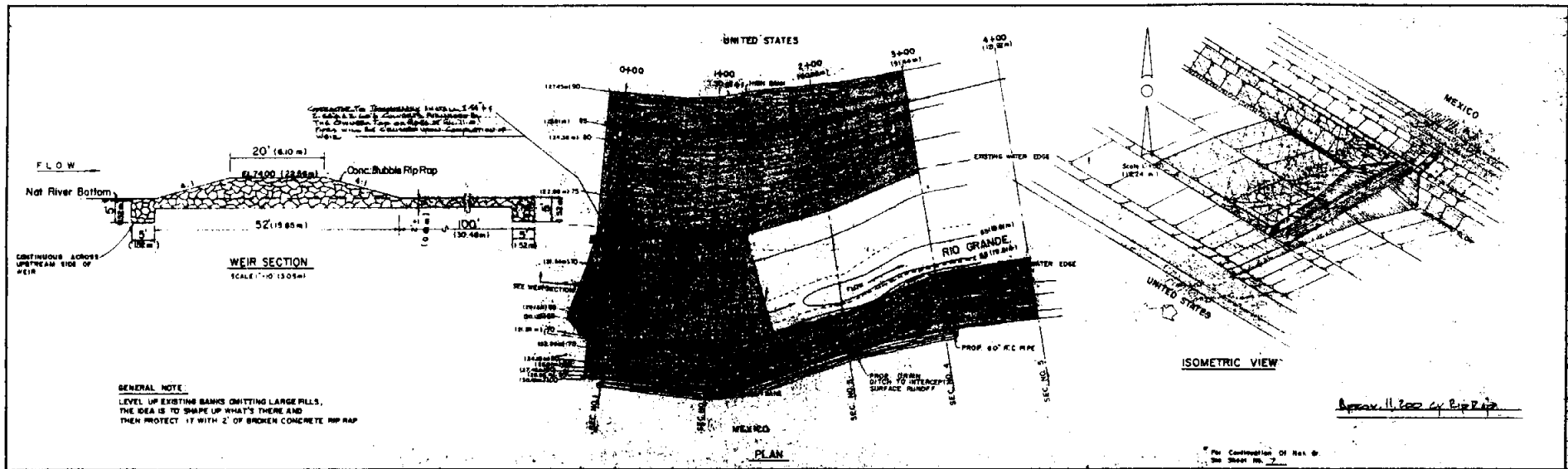
LA FERIA IRRIGATION DISTRICT CC #3
LA FERIA, TEXAS

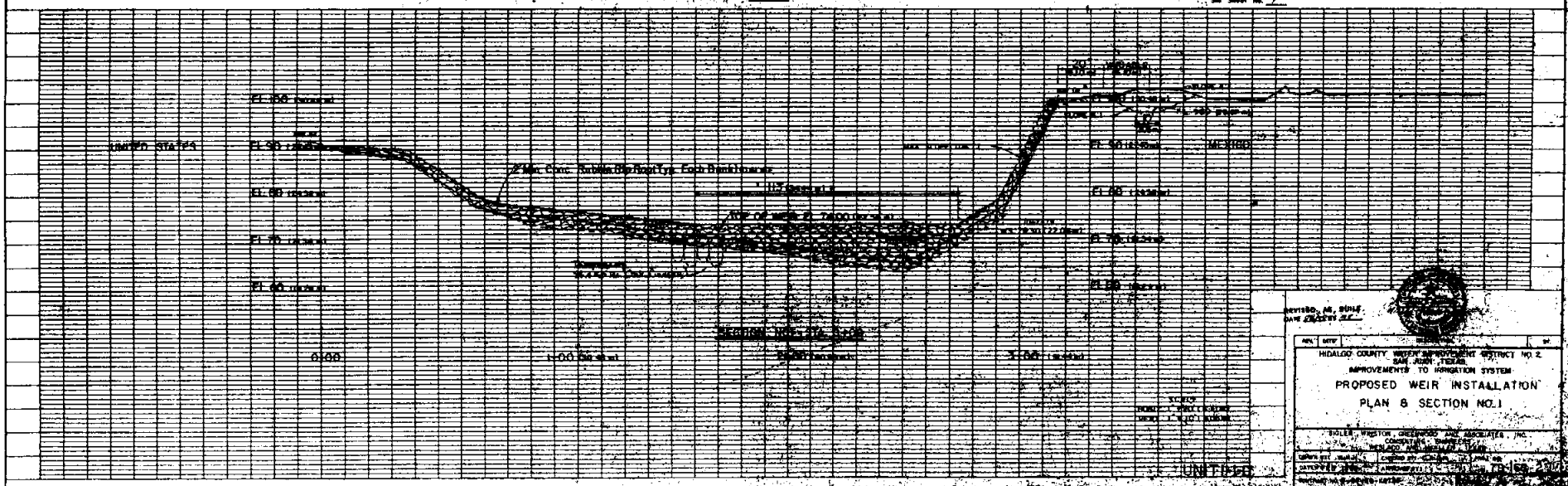
PROPOSED ELECTRIC PRIME MOVER INSTALLATION
PUMPS 2 AND 4
FIRST LIFT STATION

SIGLER, WINSTON, GREENWOOD AND ASSOCIATES, INC.
CONSULTING ENGINEERS
WESLACO AND MC ALLEN, TEXAS

DRAWN: LLL CHECKED: LLL
DATE: FEBRUARY 22, 1990
90-106

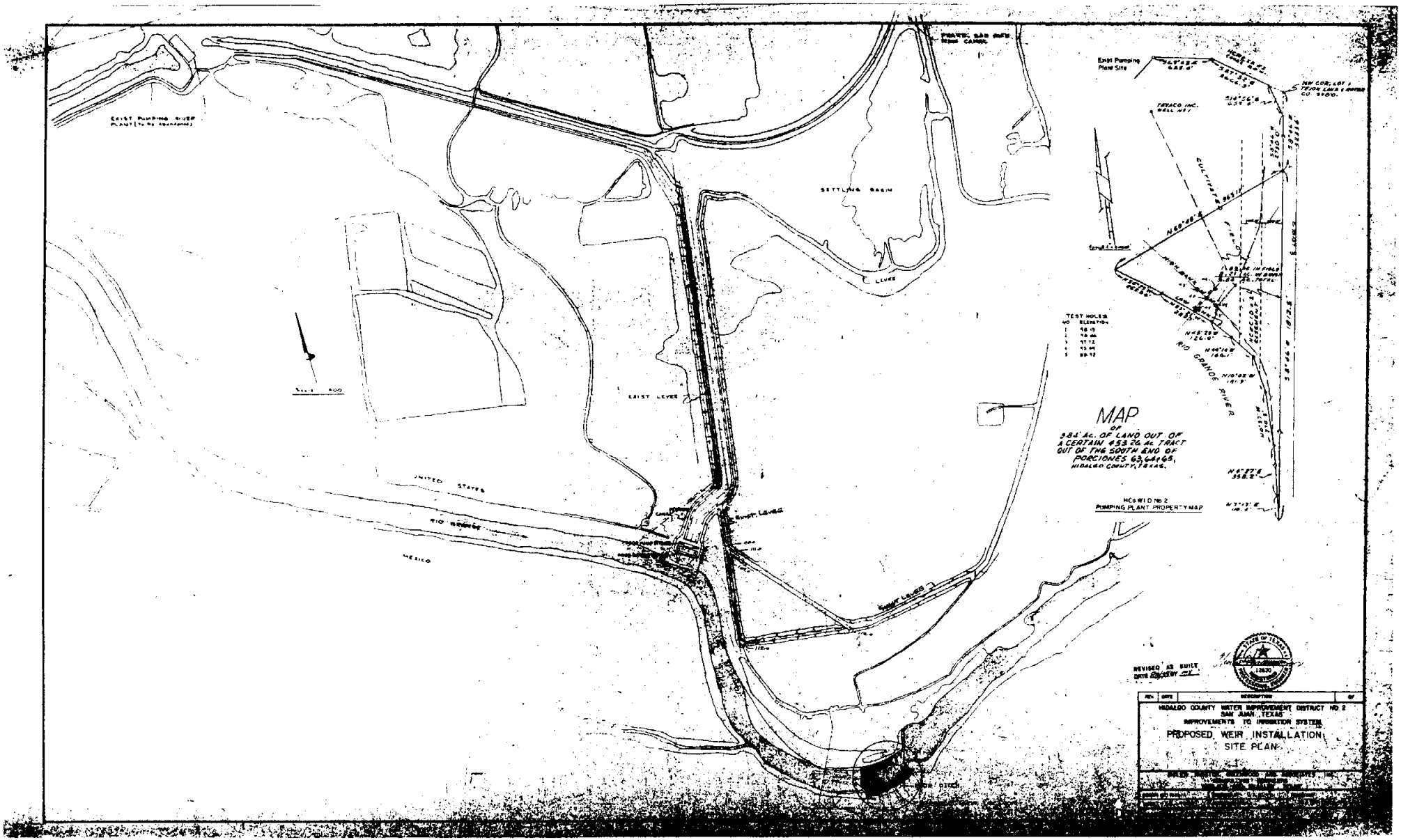
LA FERIA CSP #3

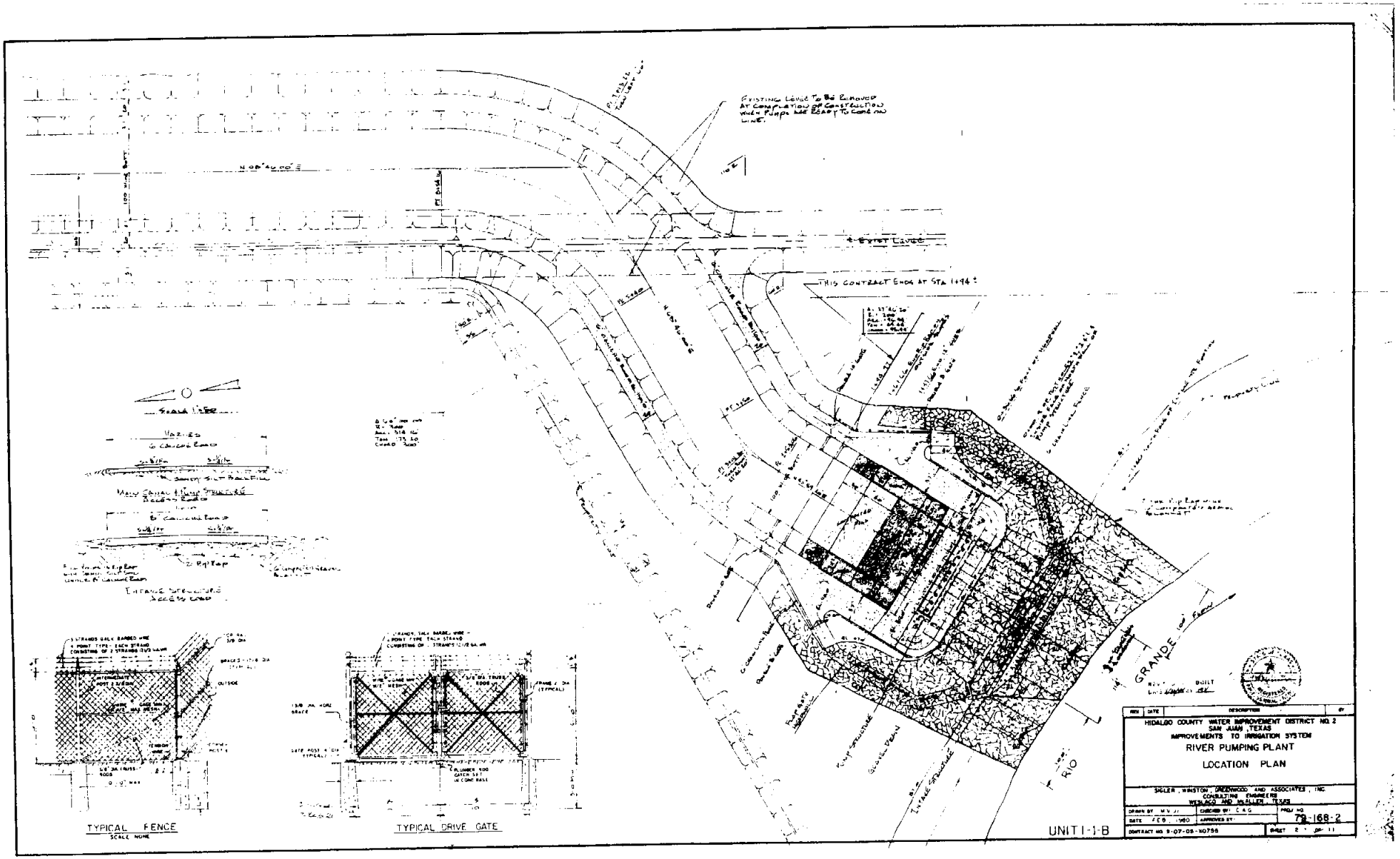




HIDALGO COUNTY IRRIGATION IMPROVEMENT DISTRICT NO. 2
SAN JUAN, TEXAS
IMPROVEMENTS TO IRRIGATION SYSTEM
PROPOSED WEIR INSTALLATION
PLAN & SECTION NO. 1

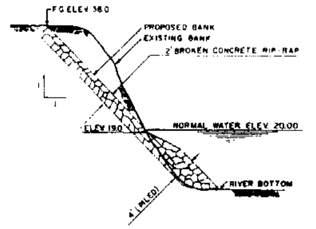
BIGLER, WINSTON, GREENWOOD AND ASSOCIATES, INC.
CONSULTING ENGINEERS
MCALLEN AND BROWNSVILLE, TEXAS


EXIST PUMPING RIVER PLANT (To be removed)
SETTLING BASIN
EXIST LEVEE
UNITED STATES
MEXICO
RIO GRANDE
Exist Pumping Plant Site
TEXACO INC. WELL NO 1
RIO GRANDE RIVER
TEST HOLES
NO ELEVATION
MAP
OF
38.4 AC. OF LAND OUT OF A CERTAIN 453.26 AC. TRACT OUT OF THE SOUTH END OF PORCIONES 63, 64 & 65, HIDALGO COUNTY, TEXAS.
H&HWID No 2
PUMPING PLANT PROPERTY MAP
REVISED AS BUILT
HIDALGO COUNTY WATER IMPROVEMENT DISTRICT NO 2
SAN JUAN, TEXAS
IMPROVEMENTS TO IRRIGATION SYSTEM
PROPOSED WEIR INSTALLATION
SITE PLAN


EXISTING LEVEE TO BE REMOVED AT COMPLETION OF CONSTRUCTION WHEN PUMPS ARE READY TO COME ON LINE.
THIS CONTRACT ENDS AT STA 1+94 ±
RIO GRANDE
TYPICAL FENCE
SCALE NONE
TYPICAL DRIVE GATE
UNIT 1-1-B
HIDALGO COUNTY WATER IMPROVEMENT DISTRICT NO. 2
SAN JUAN, TEXAS
IMPROVEMENTS TO IRRIGATION SYSTEM
RIVER PUMPING PLANT
LOCATION PLAN
SIGLER, WINSTON, DREDWOOD AND ASSOCIATES, INC.
CONSULTING ENGINEERS
WESLACO AND MCALLEN, TEXAS
DRAWN BY M.V.J.
CHECKED BY C.A.G.
PROJ NO 72-168-2
DATE FEB. 1980
APPROVED BY
CONTRACT NO. 9-07-05-40755
SHEET 2 OF 11

NOTES

1. APPROXIMATELY 300 CUBIC YARDS OF BROKEN CONCRETE PAVEMENT IS STOCKPILED AT THE PLANT SITE. THE CONTRACTOR, AT HIS OPTION, MAY USE THIS MATERIAL FOR THE RIVER BANK RIP RAP. CONTRACTOR TO VERIFY QUANTITY
2. EXISTING MEASUREMENT SHACK IS TO BE REMOVED, SALVAGED AND RELOCATED. DISCONNECT ALL UTILITIES AND RECONNECT AT THE NEW LOCATION. NEW LOCATION IS TO BE DESIGNATED BY OWNER.

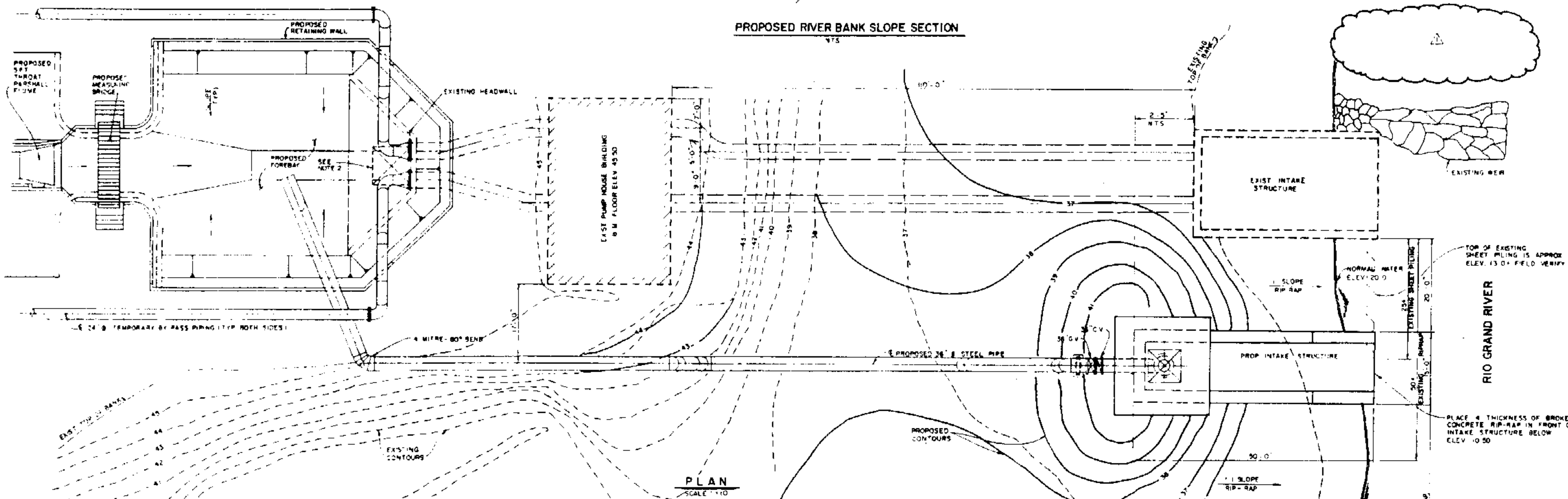


PROPOSED RIVER BANK SLOPE SECTION

NTS

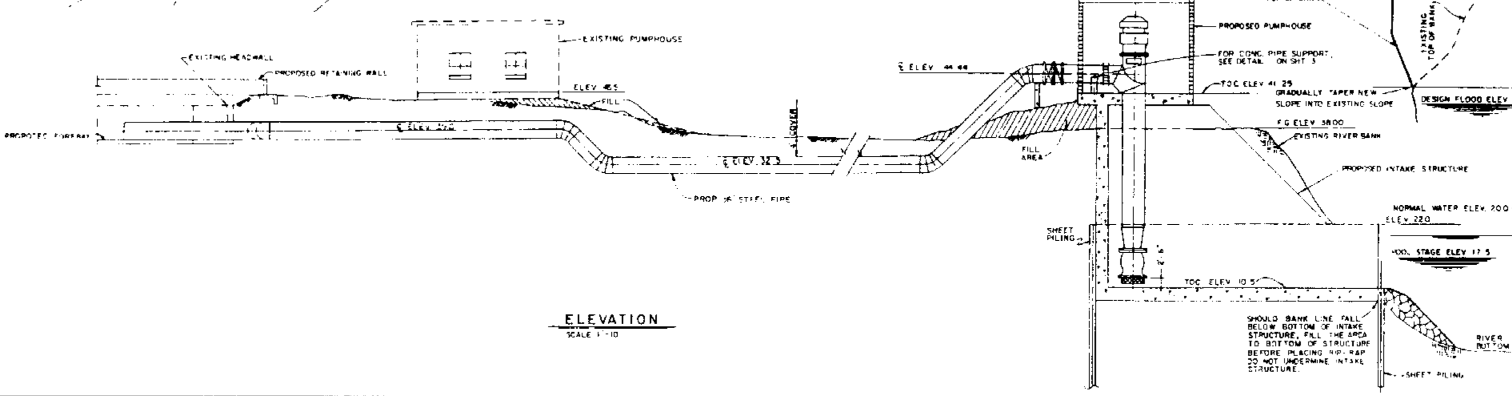
NOTE

NO FILL TO BE PLACED IN THE RIVER OR ON THE RIVER BANK. TWO FEET (2') OF BROKEN CONCRETE RIP-RAP TO BE PLACED ON THE SLOPE FROM ELEVATION 38.0 TO ELEVATION 19.0 WHERE THE RIP-RAP INCREASES IN THICKNESS TO FOUR FEET (4') AND EXTENDS TO RIVER BOTTOM.



PLAN

SCALE 1"=10'



ELEVATION

SCALE 1"=10'

NO.	DATE	REVISION	APPROV.
1	11-4-86	Deleted Note	

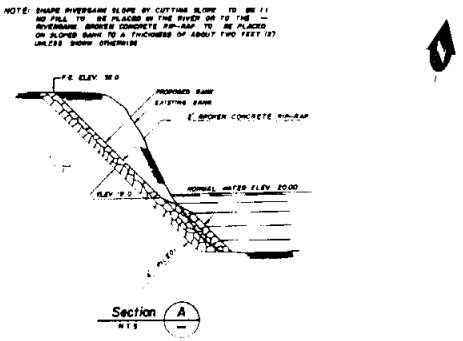
PUBLIC UTILITIES BOARD BROWNSVILLE, TX.
RIVER INTAKE PUMPING STATION

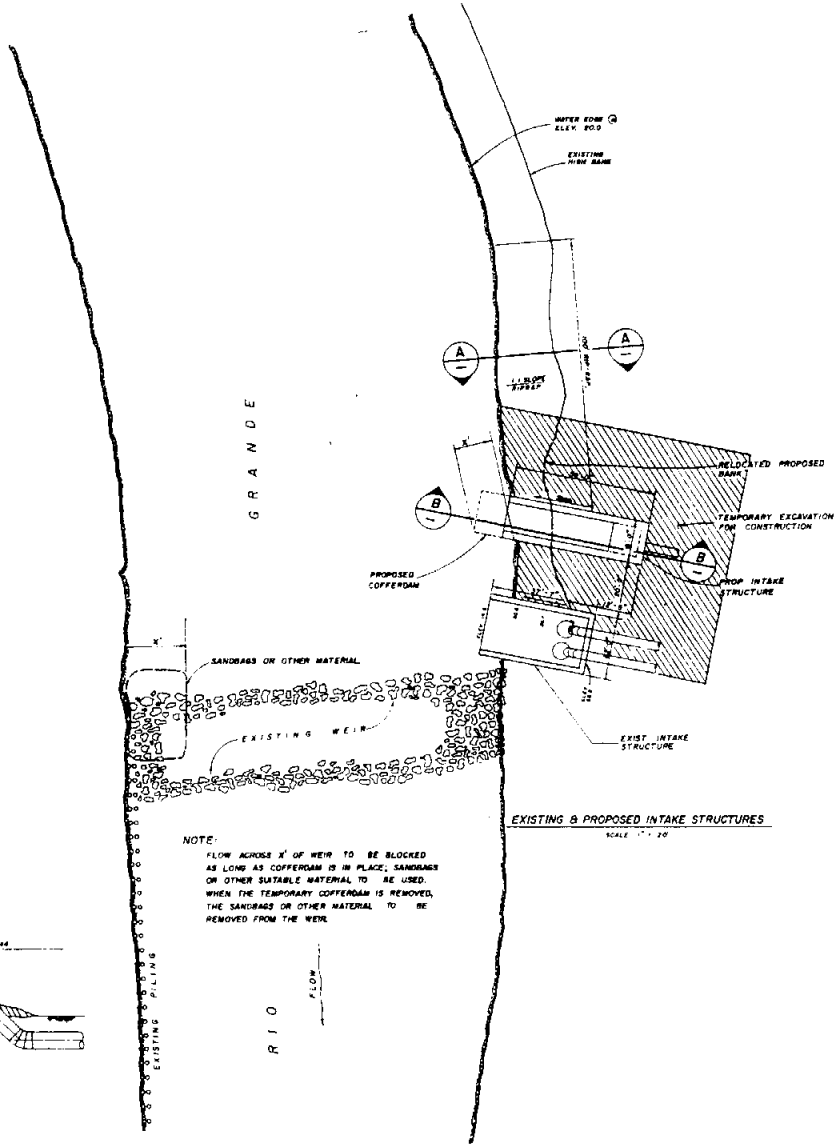
SITE PIPING AND GRADING

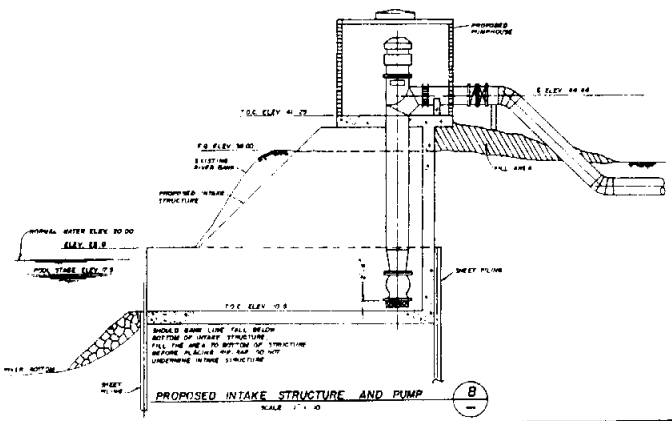
Turner Collie & Braden Inc.

Unit WILLIAMS	Scale AS SHOWN	Date AUGUST, 1986
Designed T.D.T.	Checked R.B.D.	Job No. 72-07202006
Drawn S.F.G.	Approved S.T.W.	Sheet 4 of 15

Addendum No 2 Sht 2 of 2







No	Date	Revisions	App
4			
3			
2			
1			

PUBLIC UTILITIES BOARD BROWNSVILLE, TX.
RIVER INTAKE PUMPING STATION

SITE PLAN

Turner Collie & Braden Inc.
CONSULTING ENGINEERS
HOUSTON, AUSTIN, SAN ANTONIO, CORPUS CHRISTI, DALLAS, FORT WORTH

Drawn: WILLIAMS	Traced: Vogt	Date: AUGUST, 1986	
Designed: F.A.M.	Checked: R.B.D.	Job No. T207262006	Contract 4
Drawn: D.C.	Approved: S.T.W.	Sheet 3 of 15	

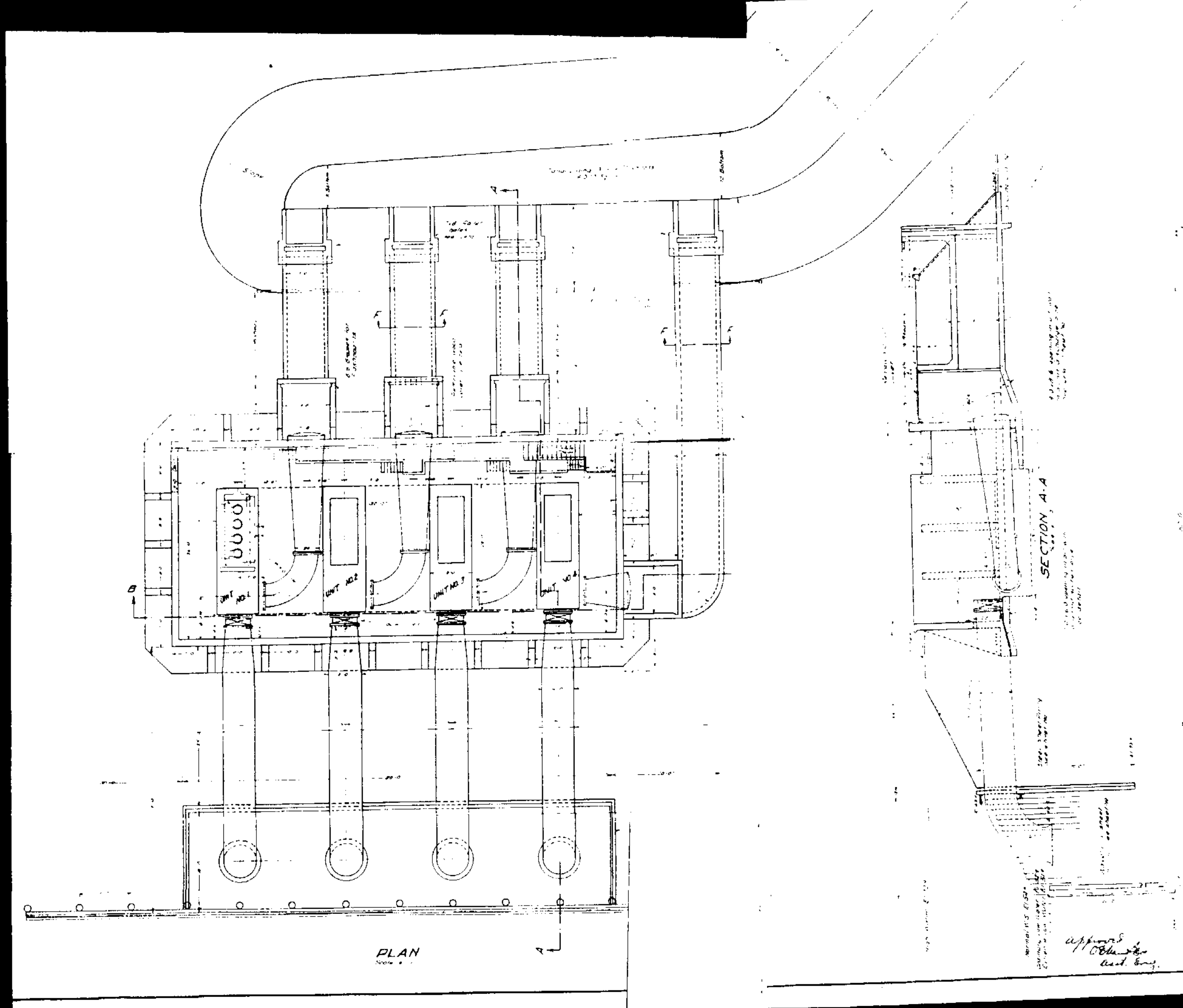
Public Utilities Board
Water and Wastewater Engineering Department

SITE PLAN

RIVER INTAKE PUMPING STATION

Scale: As Shown Date: JULY 86
Designed by: F.A. Martinez
Drawn by: J. Villarreal
Checked by: [illegible]
Approved by:
Project No.

Sheet 3 OF 15



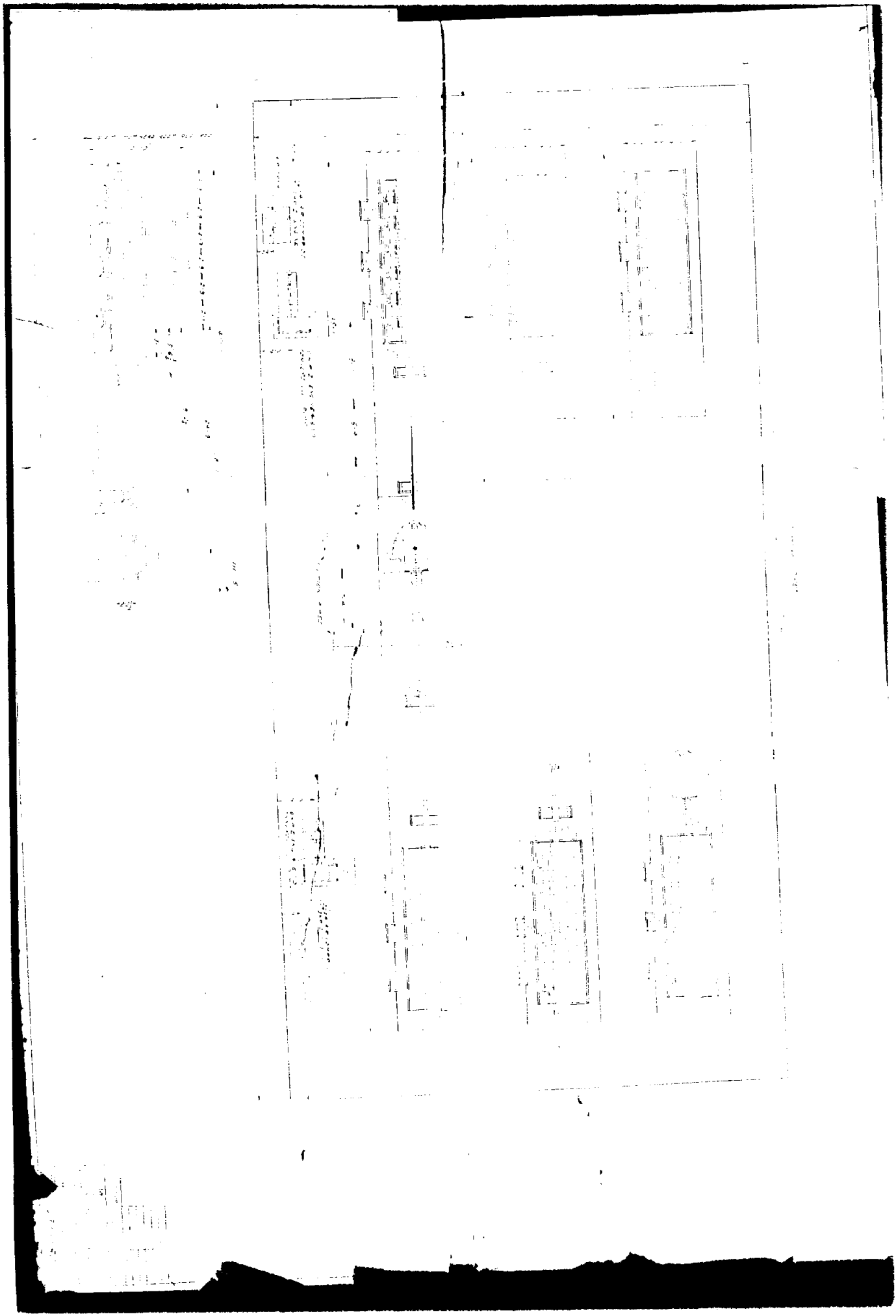
STATE OF TEXAS
WILLACY COUNTY WATER
CONTROL & IMPROVEMENT DISTRICT
NUMBER ONE
RAYMONDVILLE, TEXAS

FOUNDATIONS AND PIT
RIVER PUMPING PLANT
GENERAL LAYOUT

Drawn | Traced | Date |

Contract No.

Sheet No. 82



NOTES

THE MOTOR STARTER ELECTRIC ENTRANCES ARE TO BE DESIGNED FOR FUTURE COPPER BUSS TO 2 WIRE COMBINATION STARTERS OF THE SAME SIZE. ALL STARTERS ARE TO BE INSTALLED FACING FRONT OF THE UNITS, SIDE BY SIDE WITH CB1 TO BE ON THE RIGHT SIDE FUTURE CB2 IN THE CENTER AND FUTURE CB3 TO BE ON THE LEFT.

THIS CONTRACTOR TO FURNISH, INSTALL AND CONNECT
1. MOTOR.
2. MOTOR COUPLING BETWEEN THE MOTOR AND THE EXISTING GEAR DRIVE TO THE PUMP.
3. ELECTRIC POWER CIRCUIT FROM THE MOTOR TO THE MOTOR STARTER.
4. BEARING SENSOR AND MOTOR HEATER CIRCUITS FROM THE MOTOR STARTER TO THE MOTOR.
5. COMBINATION MOTOR STARTER CB1.
6. FEEDER FROM THE MOTOR STARTER TO THE SERVICE ENTRANCE DISCONNECT AND PROTECTION.
7. SERVICE ENTRANCE FROM THE SERVICE ENTRANCE DISCONNECT AND PROTECTION TO THE POWER CO TRANSFORMER. (THE POWER COMPANY TO MAKE THE CONNECTIONS AT THE TRANSFORMER.)
8. SERVICE ENTRANCE DISCONNECT AND PROTECTION, INCLUDING FOUNDATION FOR SAME.
9. METER PEDESTAL AS SHOWN ON PLANS

THIS CONTRACTOR TO FURNISH AND INSTALL ONLY:
1. CONCRETE FOUNDATION FOR THE POWER COMPANY TRANSFORMER TO THEIR SPECIFICATIONS FOR A 150 KVA TRANSFORMER
2. CONDUIT FROM THE TRANSFORMER FOUNDATION TO THE POWER CO. POLE TO THEIR SPECIFICATIONS.

M--METER AND COUPLING. (SEE WRITTEN SPECIFICATIONS.

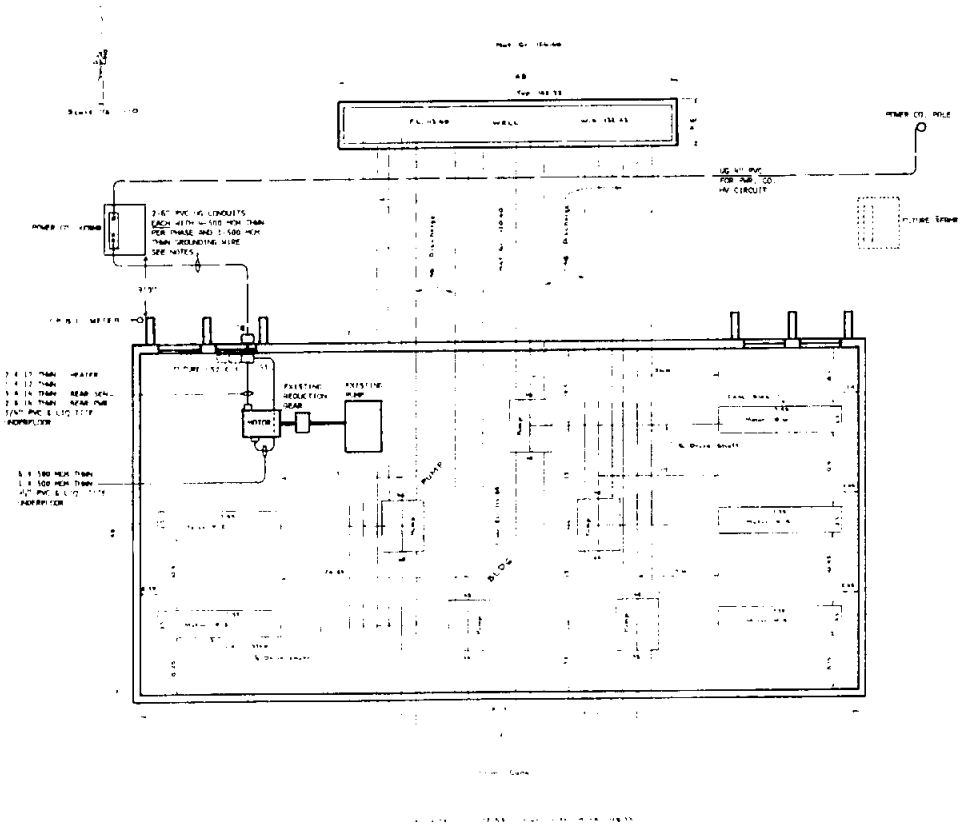
MS1--MOTOR STARTER. (SEE WRITTEN SPECIFICATIONS ALSO)

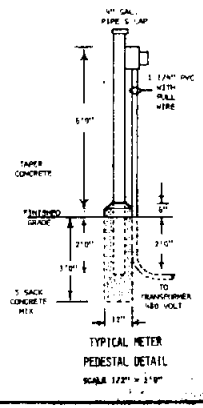
SE--SERVICE ENTRANCE DISCONNECT AND PROTECTION. (SEE WRITTEN SPECIFICATIONS ALSO)

T1 COMBINATION STARTER, AUTO TRANSFORMER TYPE, FOR 100 HP MOTOR, 480 VOLTS, 60 HERTZ, 3 OL RELAYS, SIZE 7, NEMA 1 ENCLOSURE, 800 AMP, 50,000 AIC CIRCUIT BREAKER, 120 VOLT CONTROL TRANSFORMER OF SUFFICIENT SIZE FOR THE MOTOR HEATER, BEARING SENSOR AND THE HOLDING COIL, HOA SWITCH, AMMETER AND PHASE SWITCH. A THROUGH THE DOOR CB OPERATING MECHANISM WILL NOT BE ACCEPTABLE

B CIRCUIT BREAKER, 480 VOLTS, 3 POLE, 50,000 AIC, 2500 AMP, SHUNT OPERATED, GF PROTECTED NEMA 3R ENCLOSURE, PUSH BUTTON OR FINGER OPERATED LEVER FOR TRIPPING THE CB TO THE OFF POSITION.

THE SERVICE ENTRANCE TO BE PARALLELED 500 MCM OF EIGHT (8) EACH PER PHASE. 4 PARALLELED IN EACH CONDUIT AND THESE PARALLELED TO PRODUCE A TOTAL OF 8 PER PHASE





TYPICAL METER PEDESTAL DETAIL

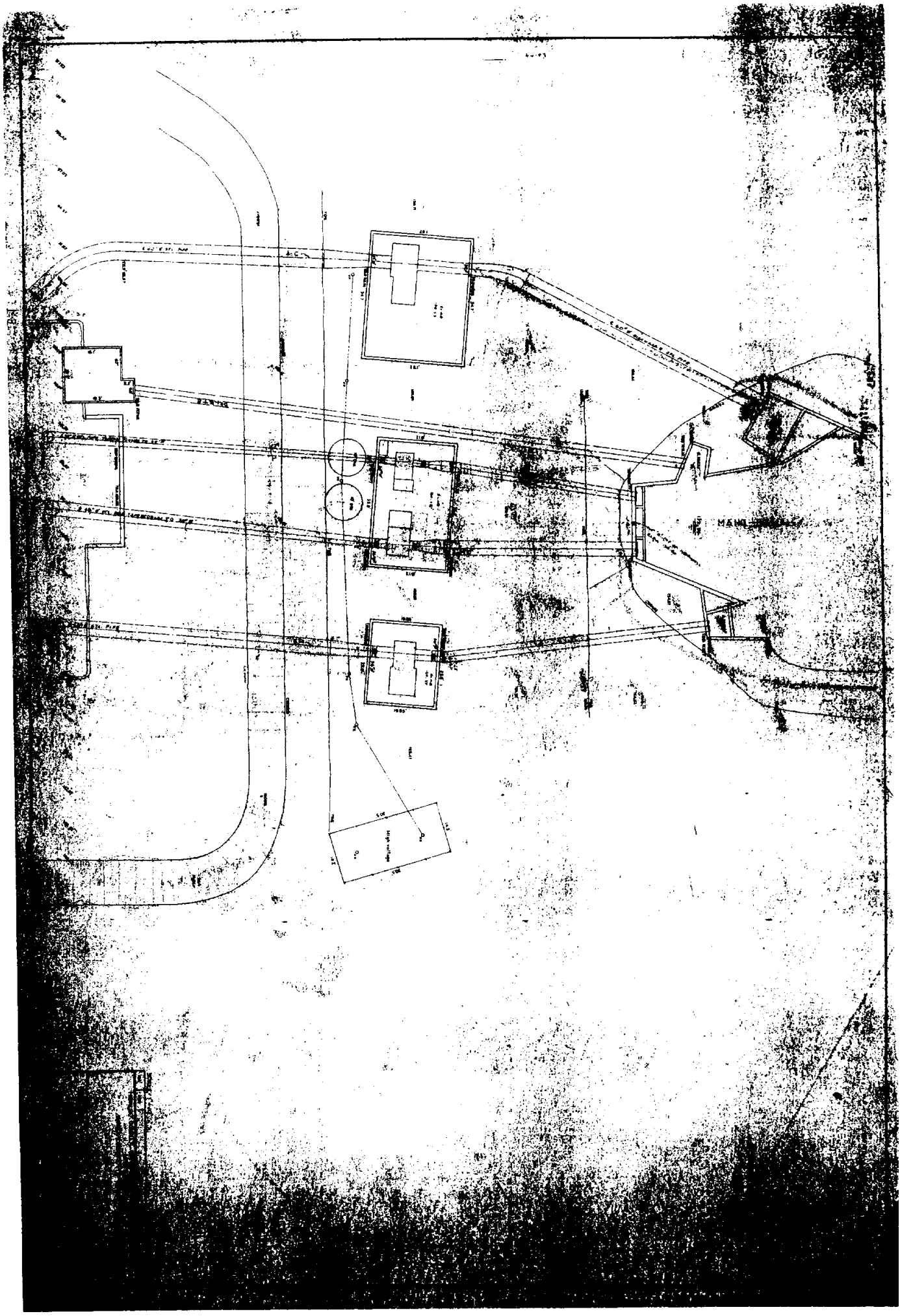
SCALE 1/2" = 1'-0"

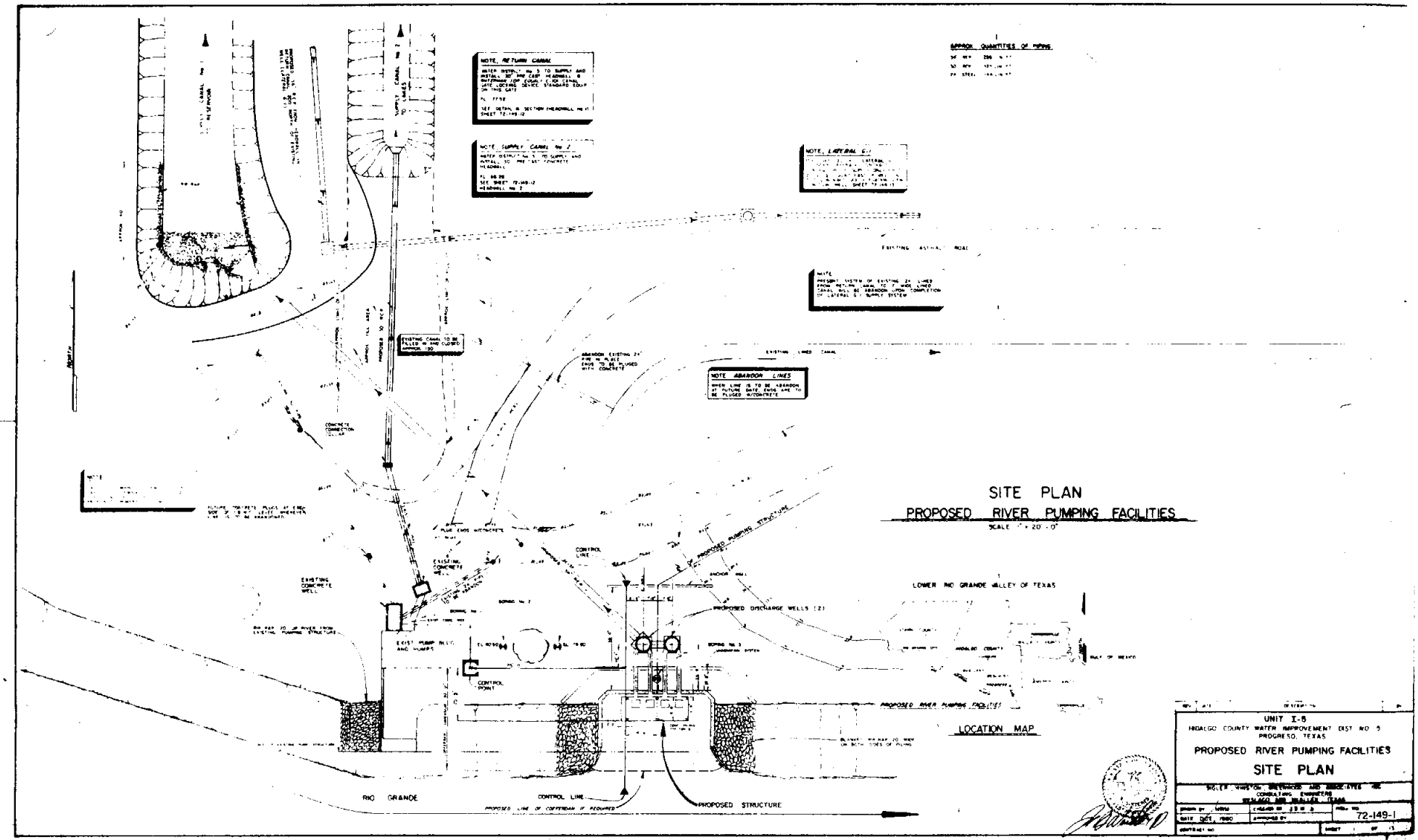
HIDALGO COUNTY WATER CONTROL & IMPROVEMENT DISTRICT NO.1
EDINBURG, TEXAS

RIVER PUMPING PLANT IMPROVEMENTS

SIGLER, WINSTON, GREENWOOD AND ASSOCIATES, INC.
CONSULTING ENGINEERS
WESLACO AND MC ALLEN, TEXAS

80-188-1





SITE PLAN

PROPOSED RIVER PUMPING FACILITIES

SCALE 1" = 20'-0"

UNIT I-B

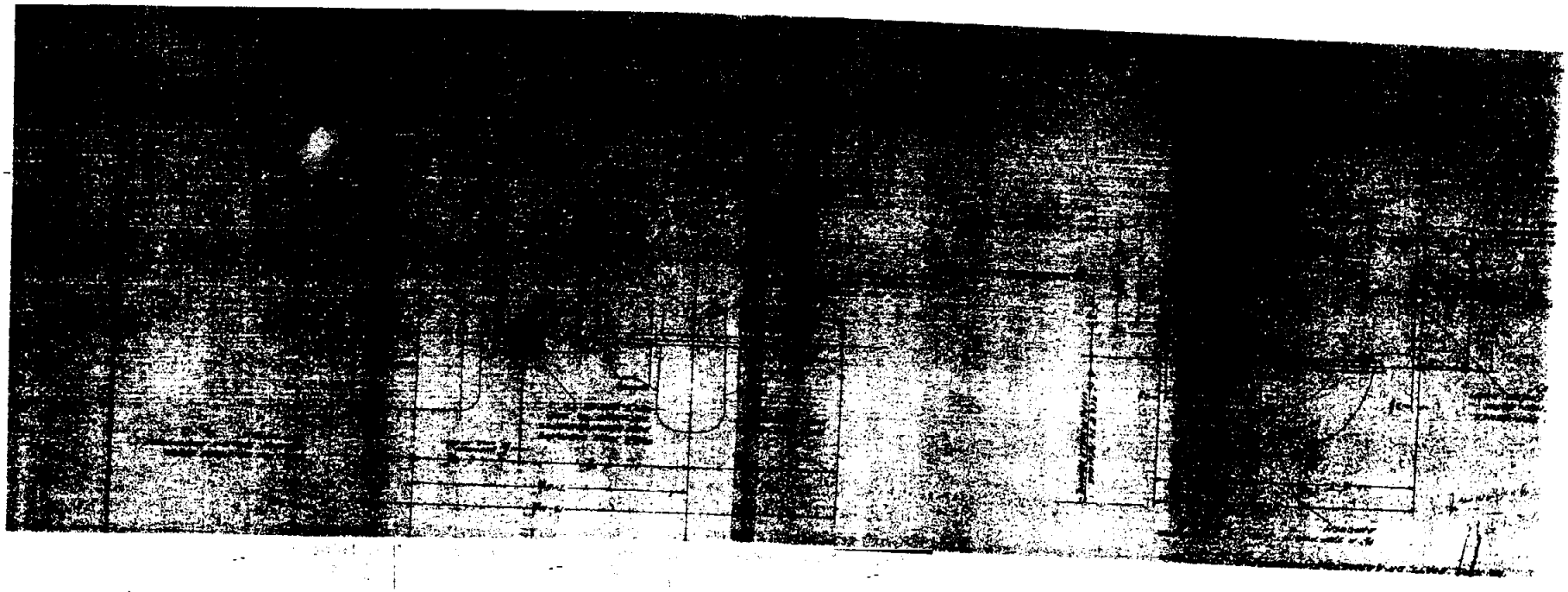
HIDALGO COUNTY WATER IMPROVEMENT DIST NO 5

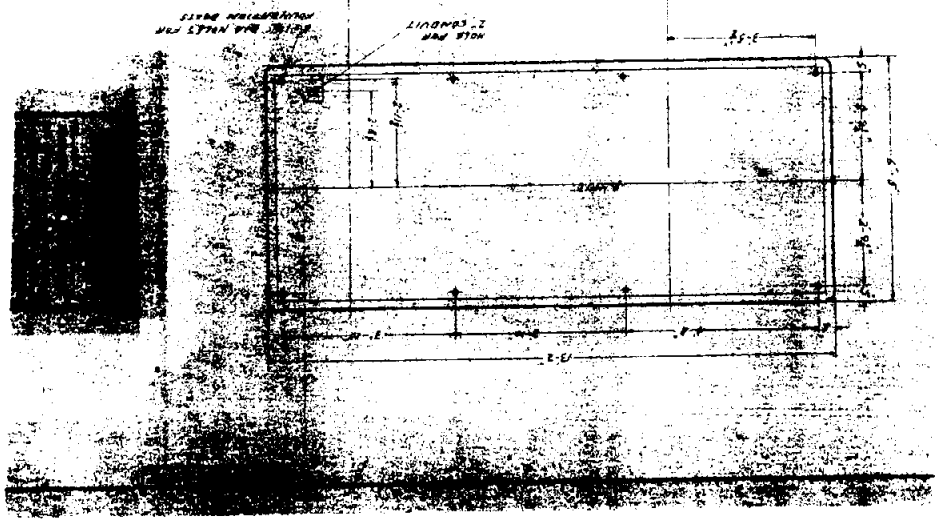
PROGRESO, TEXAS

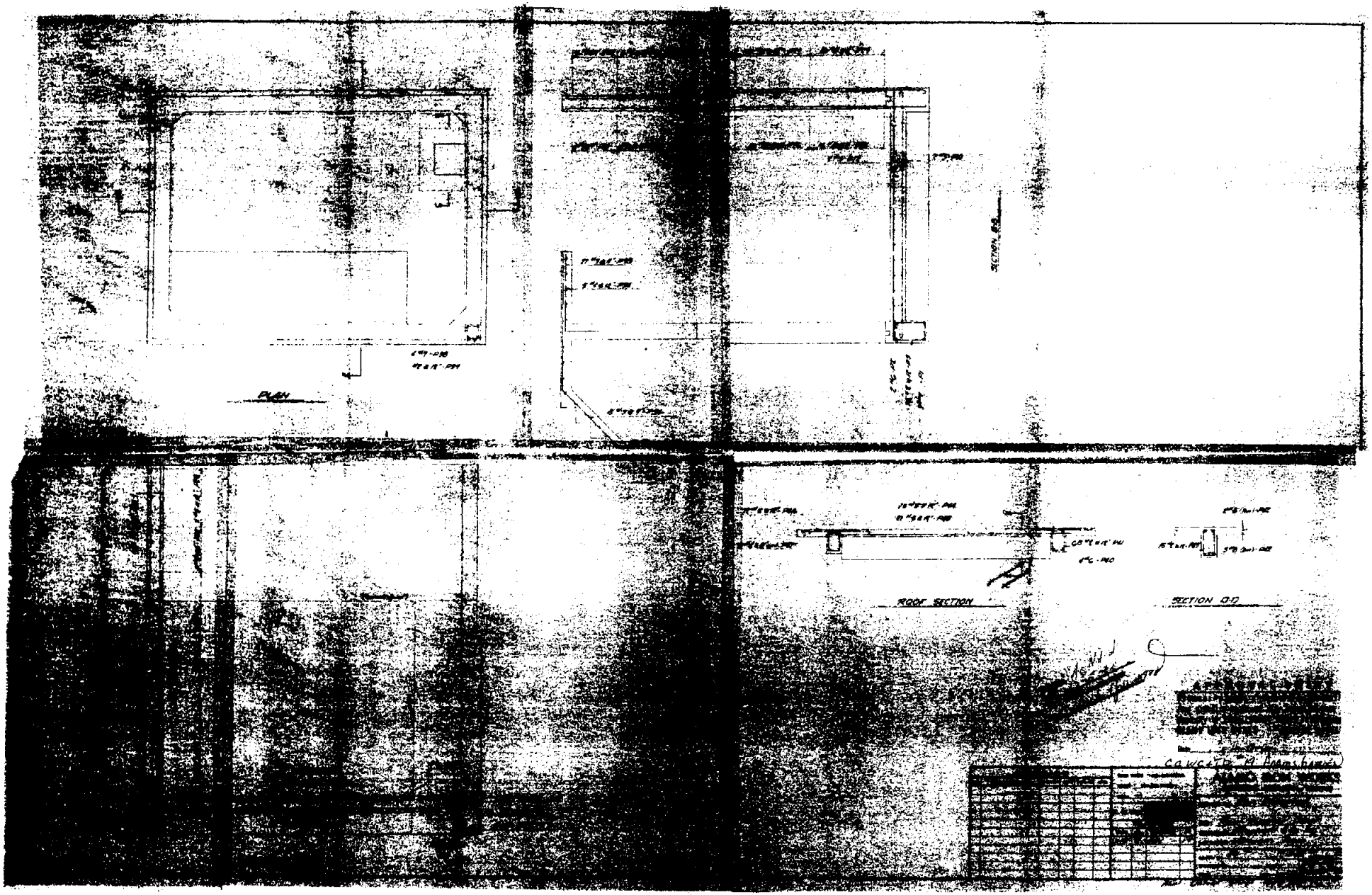
PROPOSED RIVER PUMPING FACILITIES

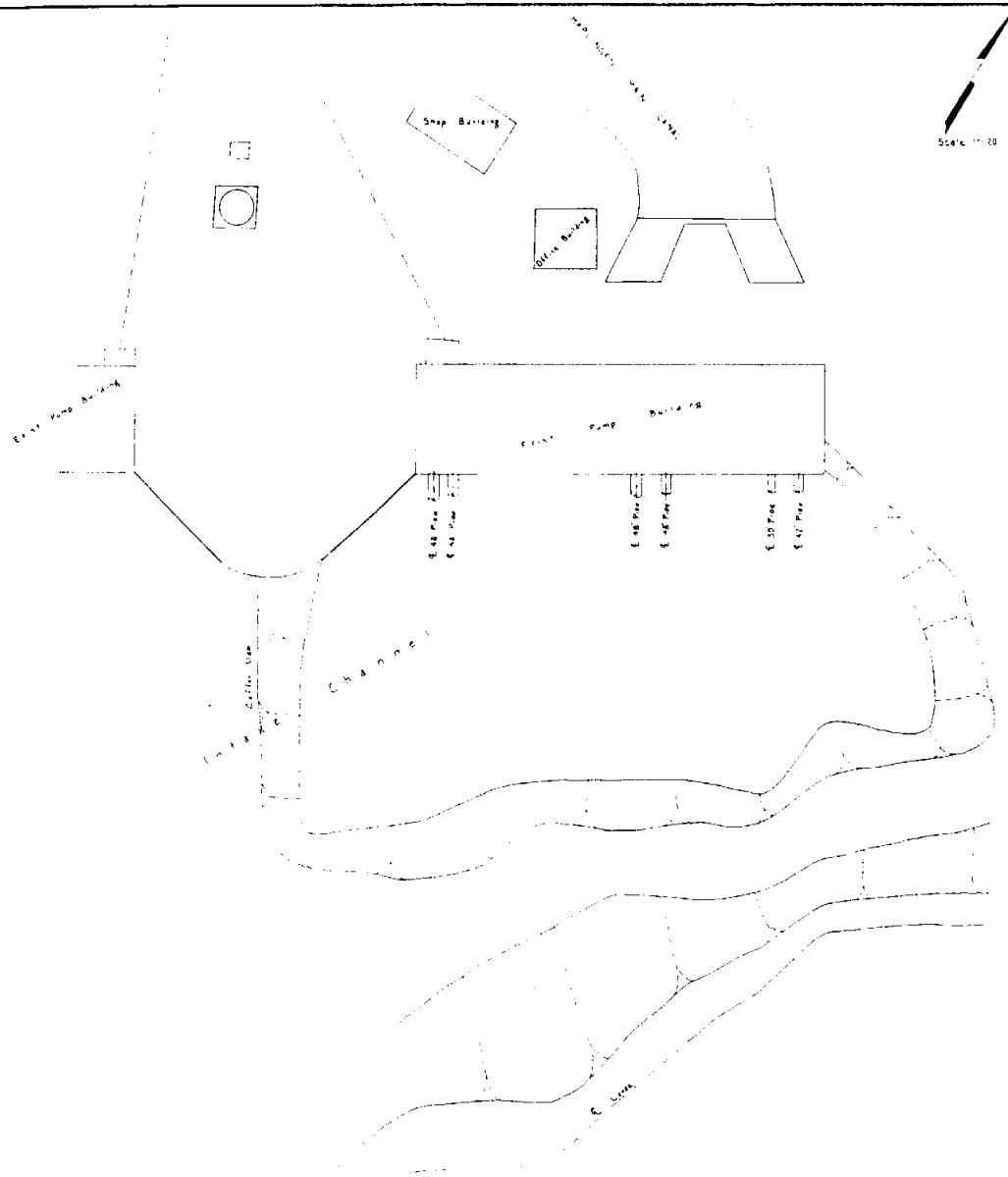
SITE PLAN

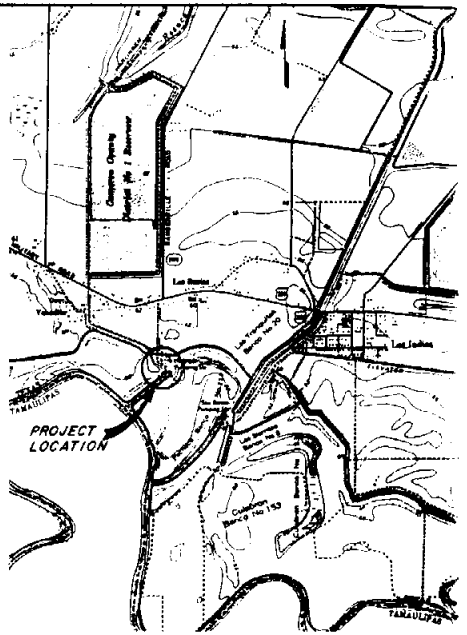
72-149-1






PLAN
ROOF SECTION
SECTION O-O



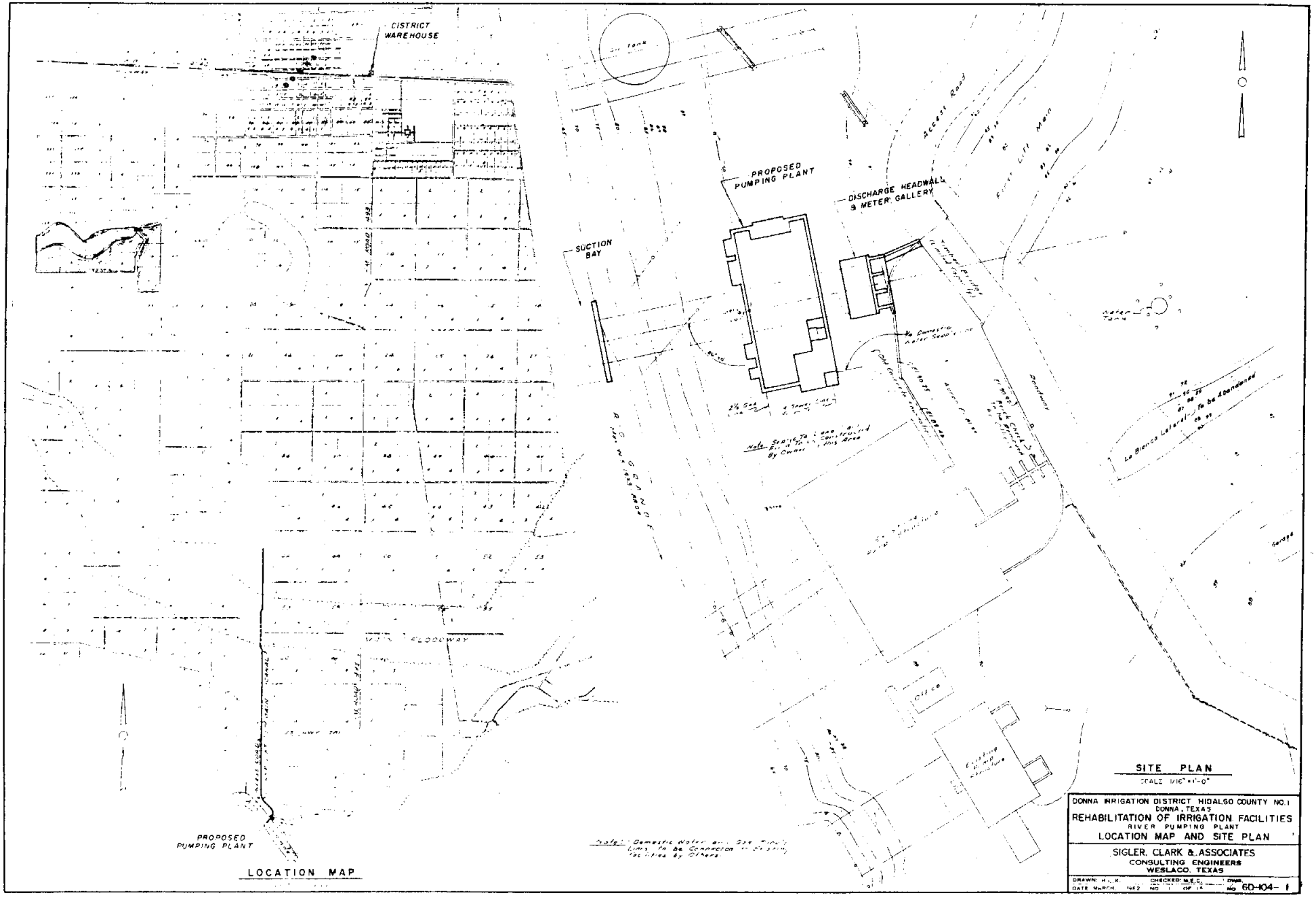


LOCATION MAP

C C Plant #1
Harlingen Tx

SIGLER, WINSTON, GREENWOOD AND ASSOCIATES, INC.
CONSULTING ENGINEERS
WESLACO AND MC ALLEN, TEXAS

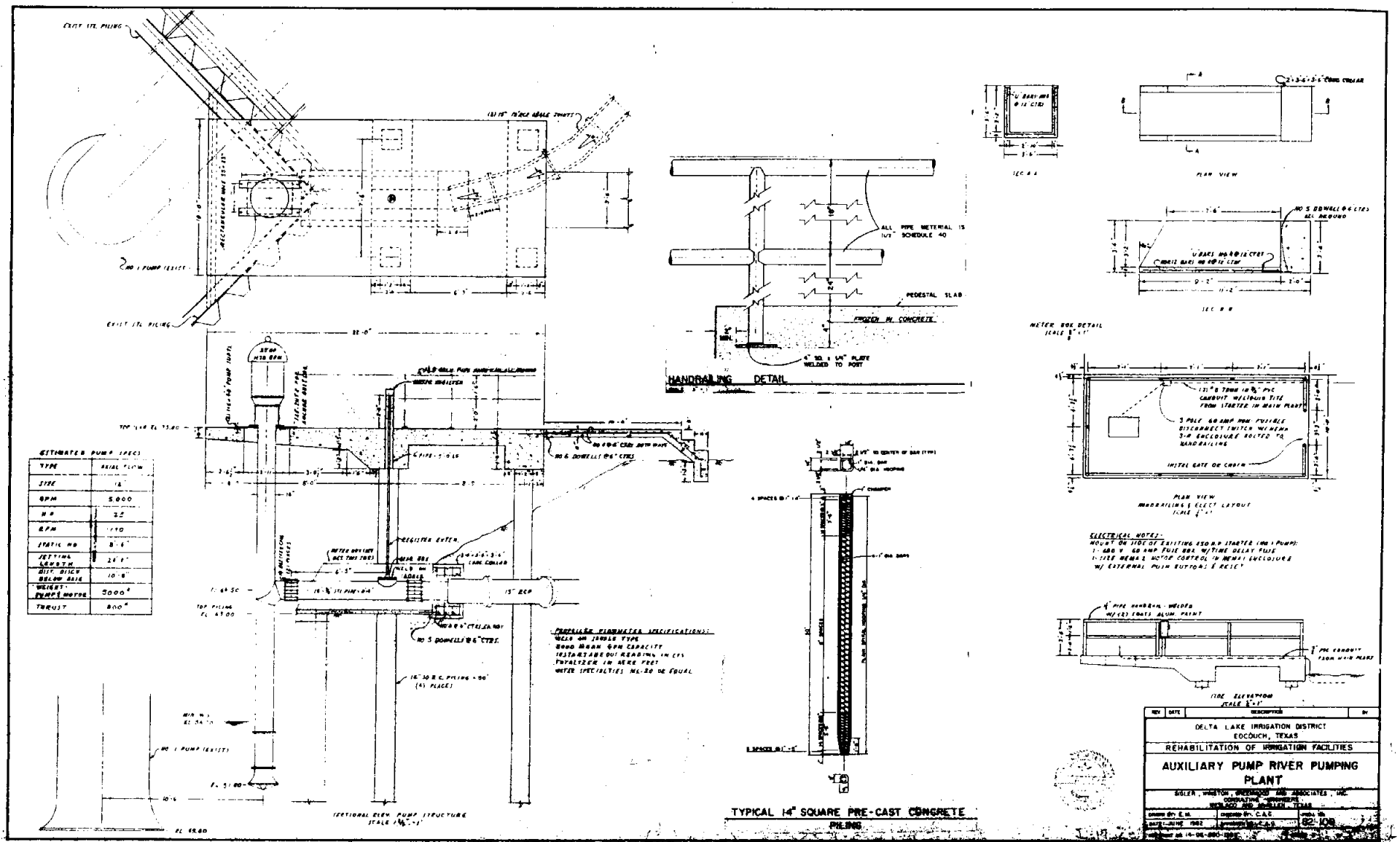
CCW10 #1



DONNA IRRIGATION DISTRICT HIDALGO COUNTY NO.1
DONNA, TEXAS
REHABILITATION OF IRRIGATION FACILITIES
RIVER PUMPING PLANT
LOCATION MAP AND SITE PLAN

SIGLER, CLARK & ASSOCIATES
CONSULTING ENGINEERS
WESLACO, TEXAS

DRAWN: H.L.K. CHECKED: M.E.C. DWG. NO. 60-104-1
DATE MARCH, 1962 SHT. NO. OF


EXIST. STL. PILING
NO. 1 PUMP (EXIST.)
EXIST. STL. PILING
RECTANGULAR WET WELL
SECTIONAL ELEV. PUMP STRUCTURE
SCALE 1/4"=1'
HANDRAILING DETAIL
ALL PIPE METERIAL IS 1 1/2" SCHEDULE 40
PEDESTAL SLAB
FROZEN IN CONCRETE
4" SQ. x 1/4" PLATE WELDED TO POST
SEC A-A
PLAN VIEW
SEC B-B
METER BOX DETAIL
SCALE 1"=1'
PLAN VIEW
HANDRAILING & ELECT. LAYOUT
SCALE 1/4"=1'
ELECTRICAL NOTES:
SIDE ELEVATION
SCALE 1/4"=1'
ESTIMATED PUMP SPEC.
TYPE | AXIAL FLOW
SIZE | 18
GPM | 5,000
H.P. | 25
R.P.M. | 1170
STATIC HD. | 8'-6"
JETTING HEAD | 28'-1"
BOTT. PUMP BELOW BASE | 10'-8"
WEIGHT PUMP & MOTOR | 5000#
THRUST | 800#
PROPELLER FLOWMETER SPECIFICATIONS:
TYPICAL 14" SQUARE PRE-CAST CONCRETE PILING
DELTA LAKE IRRIGATION DISTRICT
EDCOUCH, TEXAS
REHABILITATION OF IRRIGATION FACILITIES
AUXILIARY PUMP RIVER PUMPING PLANT
SISLER, WINSTON, SHERWOOD AND ASSOCIATES, INC.
CONSULTING ENGINEERS
WESLACO, SAN ANTONIO, TEXAS
DATE - JUNE 1982
82-109

Appendix B

Wm. Bart Hines, P.E., Utility Manager
P.O. Box 220
McAllen, Texas 78505-0220
(956) 972-7150 Office
(956) 972-7155 Fax
E-Mail: utility@utility.ci.mcallen.tx.us

MCALLEN PUBLIC UTILITIES

Fax

To:	Mr. Tony Reid Perez/Freese & Nichols	**From:**	Wm. Bart Hines, P.E. Utility Manager
Fax:	682-1545	**Pages:**	2
Phone:	631-4482	**Date:**	01/14/99
Re:	TWDB Contract Diversion Facilities on the Rio Grande River	**CC:**	Mr. Ken Jones, Lower Rio Grande Valley Development Council

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

Attached please find comments on the above mentioned contract.

Should you need additional information, please advise.

CITY OF McALLEN
DEPARTMENT OF PUBLIC UTILITIES
MEMORANDUM

TO: Tony Reid, P.E., Perez/Freese & Nichols LLC

FROM: Wm. Bart Hines, Utility Manager

SUBJECT: **Comments regarding TWDB Contract**
Diversion Facilities on the Rio Grande River

DATE: **January 14, 1999**

Please accept the following comments as requested in our meeting Monday January 11, 1999 at Sigler, Winston, Greenwood and Associates, Inc. offices where we discussed the recommendations which should be made to accomplish the above referenced contract.

It is my understanding that Mr. Greenwood has accomplished Subtask 2.1 and provided drawings to you for further evaluation and for reporting. I see no useful purpose for Subtask 2.3 (to visit each diversion point) if the assembled drawings are truly accurate. I believe the TNRCC Rio Grande Watermaster should be contacted and shown the drawings to verify their accuracy, if this could be at all possible.

The main purpose of Task 2.0, is in support of the investigation to determine the answer to two questions:

- If there is no agriculture water being discharged from Lake Falcon (only M & I water is being discharged from Lake Falcon), will the Rio Grande River be capable of delivering water to each diversion structure?

- Is each irrigation district capable of diverting water from their diversion point to the cities?

- Raising of the diversion weirs should be evaluated further, but may not be advisable. The increase of weir height will affect the flood hydrology of the Rio Grande River and may cause greater impoundment of waters, thus greater seepage and evapotranspiration. Greater weir height will also cause a great amount of backwater on land that may flood both United States and Mexican shorelines. The solution for assuring a diversion structure is able to pump water to the canals for M & I's purposes would be dredging the Rio Grande River diversion points.

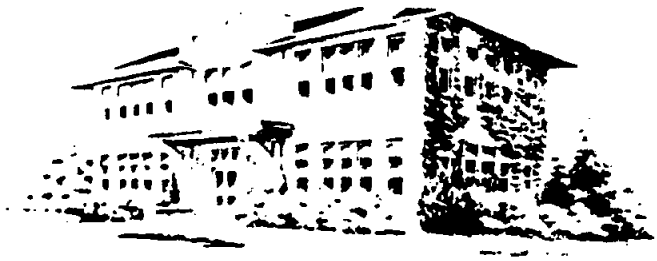
- All cities and/or water purveyors must be required to have control of, or contract to, an irrigation district for raw water storage for at least 20 days. Raw water storage requirements should meet the maximum daily demand from the water treatment facility. The 20 day storage requirement should be a firm storage requirement and not be based on total volume of storage. Also, cities should not take into account canals as storage facilities unless there are no taps to the canal prior to the city's diversion point. In other words, they can use that portion of the canal that serves solely their water treatment facility, if and only if, the irrigation district agrees to that concept and it could be contained through weirs or gates to meet that storage requirement.

If you have any questions or comments feel free to contact me.

HIDALGO AND CAMERON COUNTIES
IRRIGATION DISTRICT
No. 9

SERVING THE LANDS
TRIBUTARY TO
MERCEDES-WESLACO
ELSA-EDCOUCH-LA VILLA
82,000 ACRES

TELEPHONE 956 / 565-2411
FAX 956 / 565-0521



P.O. BOX 237
MERCEDES, TEXAS
78570-0237

January 14, 1999

Tony Reid, P.E.
Perez, Freese, and Nichols, L.L.C.
3233 N. McColl Road
McAllen, Texas 78501

Re: Low River Flow Pumping Conditions

Dear Tony,

From past history, it has been shown that Irrigation Districts River Pumping Plants (those that deliver municipal water) still have the ability to operate during low River flow conditions. Obviously, the pumping efficiencies are negatively affected and the overall volumes to be pumped are limited. The main reason that diversions can still take place is due to the existing River weirs that provide the necessary elevated pools of retained water. There is documented data (Rio Grande Watermaster and I.B.W.C.) that indicate the different past time frames when little or no irrigation water was being released from Falcon Lake. The water being diverted from the River during these times was only municipal water. One can assume from this documented history that Irrigation Districts will still be able to physically pump water from the River even if the only remaining water supply is municipal water.

To insure the continued pumping ability under low flow conditions, the following recommendations are made:

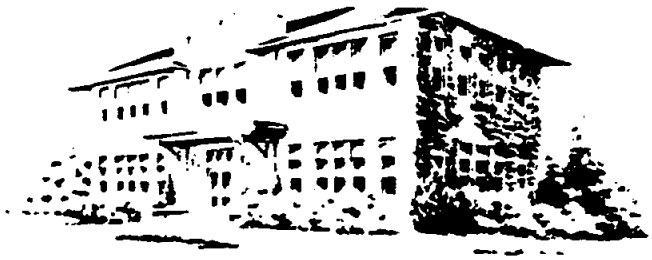
1. A study should be made on all existing River weirs (and future installations) that could determine their positive impact on pumping conditions during low flows. Also, what could be done to increase the positive results of the weirs now in place.

2. Further study should be done on the aquatic weed infestation and its impact on low River flows.

HIDALGO AND CAMERON COUNTIES
IRRIGATION DISTRICT
No. 9

SERVING THE LANDS
TRIBUTARY TO
MERCEDES-WESLACO
ELSA-EDCOUCH-LA VILLA
82,000 ACRES

TELEPHONE 956 / 565-2411
FAX 956 / 565-0521



P.O. BOX 237
MERCEDES, TEXAS
78570-0237

3. The water ordering mechansim now being used between the Districts and the Watermaster needs to be investigated to determine what would best enhance the efficient delivery of water from the Reservoirs if the situation ever arose where only municipal water was remaining in the reserves.

4. It is strongly recommended that each individual municipality have its own raw water storage reservoir. This would greatly benefit the overall efficiency of delivering water during extreme shortages.

5. Negative environmental affects resulting from low flows, such as potential fish or other wildlife damage, need to be addressed by those water right holders (Texas Parks & Wildlife, U.S. Fish & Wildlife, etc.) who have the water reserves that could possibly alleviate these conditions. No other water right allocation holders should use their reserves for this purpose.

Sincerely,

Jo Jo White
Hidalgo & Cameron Counties
Irrigation District #9

Hidalgo County Irrigation District Number Two

P.O. Box 6, San Juan, Texas 78589 (956) 787-1422 FAX (956) 781-7622

January 15, 1999

Tony Reid, P.E.
Executive Vice President
Perez/Freese and Nichols, L.L.C.
3233 N. McColl Road
McAllen, Texas 78501

RE: Task 2, Diversion Facilities on the Rio Grande below Falcon Dam.

Dear Tony,

As discussed at the January 11, 1999 meeting at the offices of Sigler, Winston, Greenwood, and Assoc., there should be no difficulty in diverting municipal, domestic, and industrial (MDI) water from the Rio Grande, if little or no irrigation water is in the River.

The major water diverters (DISTRICTS) along the Rio Grande, below Anzalduas Dam, have wiers downstream of their diversion points that maintain a minimum river elevation and create a pool of water that facilitates the diversion of water during low flow conditions.

The Districts upstream of Anzalduas Dam utilize the pool created by the Dam; therefore, their ability to divert water for MDI purposes only should not change.
There have been numerous occurrences where only MDI water is in the River. Usually, after periods of widespread rainfall, when there is no irrigation water demand, the MDI demands are still met. This is due to the ability of Districts to divert MDI water only.

Although the depletion of irrigation water in the reservoirs is unlikely, there will be individual Districts that may exhaust their water right account. The problems encountered by these Districts in 1998 was maintaining a charged canal system for a city that has no reservoir.
Several cities rely on the Districts' canal system as their reservoir. This practice places an unnecessary burden on Districts. All cities should be required to have a several day water supply storage facility.

In summary, I would like to emphasize that Districts can and do divert water from the River when there is no irrigation water being released. If cities would have a requirement to have "X" number of days of water supply in storage, it would greatly increase the efficiency in how Districts divert water.

I hope that this information is beneficial to you. If you have any questions or comments, please contact me.

Sincerely,

Sonny Hinojosa
General Manager

SH:aa

HARLINGEN
WWS
WATER WORKS SYSTEM

CITY OF HARLINGEN WATERWORKS SYSTEM

January 25, 1999

TO: Tony Reid

FROM: Cloice Whitley

RE: River Diversion Water Supply for Municipalities
Integrated Water Resource Plan

Diversion of water for city water supplies by the respective irrigation district is going to be pretty well fixed because of the long term operation and the development that has grown up around most systems. These restrictions are going to make any changes impossible that would help in diverting more water or to provide any type of storage during drought periods. Also to install weirs in the river to increase the water level at the diversion points will not provide any additional beneficial results. If the districts have a storage structure at the present time, they might see if there is some way they can rework the structure to provide more storage or to see is there is a way that the city can put their own storage facility into operation. I think that each city should have at least a 30 day storage capacity reservoir that will feed their treatment facilities. This would be the responsibility of the city and not the district since it would only benefit the city. If the district has a storage structure presently, they might get the city to fund the needed repairs or enlargement of the facility.

The only way that I see the cities helping themselves is for them to either study their system themselves or to hire someone to assess theirs needs and to provide an answer for them. One problem that I see is that a lot of the smaller towns have let their treatment and distribution systems and their water supply source to their system deteriorate for so many years, that they are in an almost impossible situation money wise to be able to provide any type of fix to these. Storage reservoirs is the only thing that most can do that would give some relief.

If weirs were to be put in the river at the pump stations, several things that I think would happen would be a minus in my mind. 1. Increased height in the river would impede the flow of the river and although the changes in height would not be much. 2. A raised water level in the river could cause some critical differences in the land that would be required in the new elevations. On the Texas side of the river, this might not be a problem but on Mexico's side, it might create some difficult problems.

134 E. Van Buren • P.O. Box 1950 • Harlingen, TX 78551 • Ph. (956) 430-6100 • FAX (956) 430-6111

If there could be additional measuring or gauging stations along the river and these could be monitored as to river flow, I think that the river could be operated without too much trouble. I think that has been talked about and maybe with HBWC, we could get enough money between all of the agencies to fund such a program. Course, the answer to the cities' problem is to put the pipeline in from the lake to the lower Valley and the supply problem is solved for them. Solving the problem for one will create some problems for the other.

I really don't see any thing that can be done that does not require a tremendous amount of funding that will solve the problem during times of drought.