

Original 65
Texas v New Mexico

PECOS RIVER COMPACT

Report of the River Master

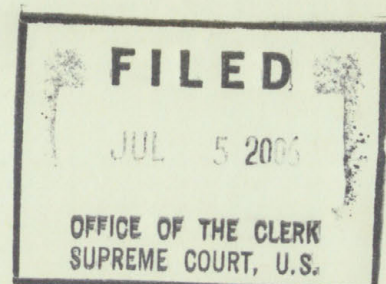
Water Year 2005

Accounting Year 2006

Final Report

June 27, 2006

**Neil S. Grigg
River Master of the Pecos River
749 S. Lemay, Ste. A3, PMB 330
Fort Collins, Colorado 80524**



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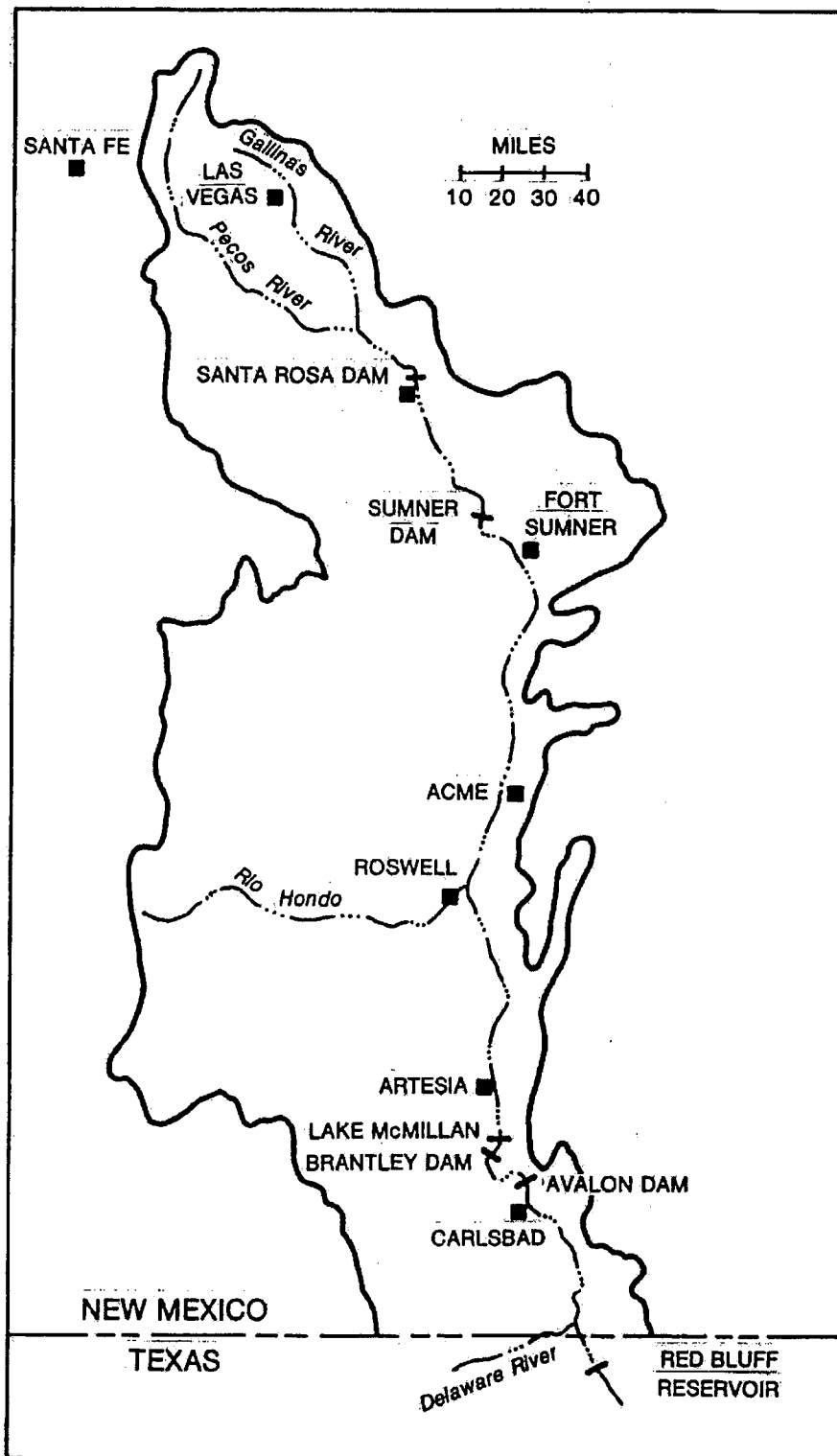
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Map of Pecos River Basin Showing Accounting Reaches

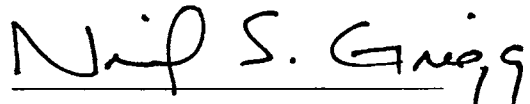
PECOS RIVER COMPACT
Supreme Court of the United States
No. 65, Original
Amended Decree

Final Report of the River Master
Water Year 2004 - Accounting Year 2005
June 27, 2006

Purpose of the Report. In its Amended Decree issued March 28, 1988 the Supreme Court of the United States appointed a River Master of the Pecos River and directed him to "... Deliver to the parties a Preliminary Report setting forth the tentative results of the calculations required by Section III.B.1 of this Decree by May 15 of the accounting year..." and to consider "... any written objections to the Preliminary Report submitted by the parties prior to June 15 of the accounting year..." and to deliver "... to the parties a Final Report setting forth the final results of the calculations required by Section III.B.1 of this Decree by July 1 of the accounting year." This is the required Final Report with the determination of:

- a. The Article III(a) obligation;
- b. Any shortfall or overage, which calculation shall disregard deliveries of water pursuant to an Approved Plan;
- c. The net shortfall, if any, after subtracting any overages accumulated in previous years, beginning with water year 1987.

Result of Calculations and Statement of Shortfall or Overage. The results of the calculations in this Final Report show that New Mexico's delivery in Water Year 2005 was an overage of 24,000 acre-feet. The accumulated overage since the beginning of Water Year 1987 is 41,200 acre-feet.



Neil S. Grigg
River Master of the Pecos River

Pecos River Compact		
Accumulated Shortfall or Overage		
	June 26, 2006	
Water Year	Annual Overage or Shortfall, AF	Accumulated Overage or Shortfall, AF
1987	15,400	15,400
1988	23,600	39,000
1989	2,700	41,700
1990	-14,100	27,600
1991	-16,500	11,100
1992	10,900	22,000
1993	6,600	28,600
1994	5,900	34,500
1995	-14,100	20,400
1996	-6,700	13,700
1997	6,100	19,800
1998	1,700	21,500
1999	1,400	22,900
2000	-12,300	10,600
2001	-700	9,900
2002	-3,000	6,900
2003	2,000	8,900
2004	8,300	17,200
2005	24,000	41,200

Table 1. General Calculation of Annual Departures, TAF, WY 2005			
6/26/2006			
	WY 2003	WY 2004	WY 2005
B.1.a. Index Inflows			
(1) Annual flood inflow			
(a) Gaged flow Pecos R bel Alamogordo Dam	69.0	95.2	110.5
(b) Flood Inflow Alamogordo - Artesia (Table 2)	-1.3	41.5	12.4
(c) Flood Inflow Artesia - Carlsbad (Table 3)	6.3	66.3	14.3
(d) Flood Inflow Carlsbad - State Line (Table 4)	2.2	62.6	5.6
Total (annual flood inflow)	76.2	265.6	142.8
(2) Index Inflow (3-year avg)			161.5
B.1.b. 1947 Condition Delivery Obligation (Index Outflow)			68.1
B.1.c. Average Historical (Gaged) Outflow			
(1) Annual historical outflow			
(a) Gaged Flow Pecos River at Red Bluff NM	22.4	125.2	106.5
(b) Gaged Flow Delaware River nr Red Bluff NM	1.3	19.5	2.8
(c) Metered diversions Permit 3254 into C-2713	0.5	0.6	0.2
Total Annual Historical Outflow	24.2	145.3	109.5
(2) Average Historical Outflow (3-yr average)			93.0
B.1.d. Annual Departure			24.9
C. Adjustments to Computed Departure			
1. Adjustments for Depletions above Alam Dam			
a. Depletions Due to Irrigation (Table 5)	3.3	-1.7	-0.2
b. Depl fr Operation of Santa Rosa Reservoir (Table 6)	1.6	1.5	6.1
c. Transfer of Water Use to Upstream of AD	0	0	0
Recomputed Index Inflows			
(1) Annual flood inflow			
(a) Gaged flow Pecos R bel Alamogordo Dam	73.9	95.0	116.4
(b) Flood Inflow Alamogordo - Artesia	-1.3	41.5	12.4
(c) Flood Inflow Artesia - Carlsbad	6.3	66.3	14.3
(d) Flood Inflow Carlsbad - State Line	2.2	62.6	5.6
Total (annual flood inflow)	81.1	265.4	148.7
Recomputed Index Inflow (3-year avg)			165.1
Recomputed 1947 Condition Del Outflow (Index Outflow)			70.2
Recomputed Annual Departures			22.8
Credits to New Mexico			
C.2 Depletions Due to McMillan Dike			1.1
C.3 Salvage Water Analysis			0
C.4 Unappropriated Flood Waters			0
C.5 Texas Water Stored in NM Reservoirs			0
C.6 Beneficial C.U. Delaware River Water			0
Final Calculated Departure, TAF			24.0

Table 3. Determination of Flood Inflows, Artesia to Carsbad, WY 2005 (B.4)

Table 4. Summary Table for Computations, Carlsbad to State Line - WY 2005 (B.5)

5/2/2006							
	BCB - RB	BCB - RB*	Del R	DC			
	RM	USGS	USGS				
Jan	0	0.0	0.0	0.0			
Feb	0.1	0.0	0.0	0.0			
Mar	0.0	0.0	0.0	0.0			
Apr	0.4	0.4	0.0	0.0			
May	0.8	0.7	0.5	0.0			
Jun	0.1	0.0	0.0	0.0			
Jul	0.7	0.4	0.0	0.0			
Aug	2.2	1.8	0.3	0.0			
Sep	0.2	0.1	0.1	0.0			
Oct	0.1	0.1	0.0	0.0			
Nov	0.0	0	0.0	0.0			
Dec	0	0	0.0	0.0			
Total	4.6	3.5	1.0	0.0			
* - Average of two USGS estimates is shown							
Summary of flood inflows, Carlsbad to State Line, TAF							
Red Bluff - Carlsbad + Dark C RM calcs)					4.6		
Delaware River (USGS Computation					1.0		
Total Flood Inflow, Carlsbad to State Line					5.6		

Table 5. Depletions Due to Irrigation Above Sumner Dam - WY 2005 (C.1.a)											
	4/30/2006										
	APR	MAY	JUN	JUL	AUG	SEPT	OCT	TOTAL			
Precip Las Vegas FAA AP	0.55	1.93	1.02	1.03	2.73	3.54	0.82	11.62			
Eff prec Las Veg FAA AP	0.54	1.77	0.99	1.00	2.39	2.98	0.80	10.47			
Precip Pecos Natl Monument	0.50	0.98	1.05	0.78	2.59	3.03	1.45	10.38			
Eff Precip Pecos RS	0.49	0.95	1.02	0.76	2.28	2.61	1.37	9.48			
Precip Santa Rosa	1.23	1.95	2.13	2.19	2.61	2.08	0.52	12.71			
Eff Precip Santa Ro	1.17	1.79	1.93	1.98	2.45	1.89	0.51	11.72			
Average eff precip, ft	0.06	0.13	0.11	0.10	0.20	0.21	0.07	0.88			
Consumptive use, ft	0.19	0.36	0.36	0.30	0.27	0.18	0.11	1.77			
Unit depletion rate (CU less eff precip), ft	0.13	0.23	0.25	0.20	0.07	0.00	0.04	0.92			
Acres (most recent inventory)	11529										
Streamflow depletion (actual use), AF	10584										
1947 depletion, AF	10804										
Difference (actual use - 1947 depletion), TAF	-0.2										
Adjustment to Gaged Flow, Pecos River below Sumner Dam, TAF =						-0.2					

Table 6. Depletions Due to Santa Rosa Reservoir Operations - WY 2005 - (C.1.b)												
6/26/2006												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
LS 2001 table (USBR); SRL 1997 tables used (COE)												
Lk Sumner ga ht, avg	55.57	57.35	58.71	58.52	59.73	62.90	61.90	61.13	61.85	61.35	57.48	51.19
LS content, AF, avg	25678	29336	32352	31920	34741	42982	40237	38215	40102	38784	29616	18035
LS area, acres, avg	1964	2147	2289	2269	2395	2813	2678	2575	2671	2604	2161	1537
LS evap, inches	3.47	2.73	5.30	9.02	8.83	15.43	15.24	10.22	7.61	5.57	7.30	4.93
.77 LS Evap	2.67	2.10	4.08	6.95	6.80	11.88	11.73	7.87	5.86	4.29	5.62	3.80
LS Precip, inches	0.68	1.38	0.60	1.64	2.87	0.28	0.68	2.38	1.57	0.54	0.00	0.00
Net LS Evap, inches	1.99	0.72	3.48	5.31	3.93	11.60	11.05	5.49	4.29	3.75	5.62	3.80
LSum Evaploss, TAF	0.33	0.13	0.66	1.00	0.78	2.72	2.47	1.18	0.95	0.81	1.01	0.49
L S Rosa ga ht, avg												
LSR content, AF, avg	19.72	21.53	25.89	33.84	43.01	44.56	44.38	44.56	44.50	44.37	44.12	41.22
LSR area, acres, avg	31161	34309	42743	61646	89978	95472	94822	95472	95255	94787	93890	83892
LSR evap, inches	3.72	4.98	8.68	8.75	8.88	12.92	13.01	9.29	8.49	5.15	5.47	3.76
.77 LSR Evap	2.86	3.83	6.68	6.74	6.84	9.95	10.02	7.15	6.54	3.97	4.21	2.90
LSR precip, inches	1.66	0.87	1.88	1.80	1.22	1.11	0.68	2.57	2.66	0.59	0.03	0.00
Net LSR Evap, inches	1.20	2.96	4.80	4.94	5.62	8.84	9.34	4.58	3.88	3.38	4.18	2.90
LSR Evaploss, TAF	0.17	0.44	0.83	1.10	1.62	2.66	2.80	1.38	1.17	1.01	1.25	0.80
Total evaploss, TAF	0.49	0.57	1.50	2.10	2.41	5.38	5.27	2.56	2.12	1.83	2.26	1.29
Sum contents, AF												
1947 area, acres	56839	63645	75095	93566	124719	138454	135059	133687	135357	133571	123506	101927
1947 evaploss, TAF	2625	2840	3136	3626	4436	4600	4600	4600	4600	4600	4395	3847
current-1947evaploss	0.44	0.17	0.91	1.60	1.45	4.45	4.24	2.10	1.64	1.44	2.06	1.22
	0.06	0.40	0.59	0.50	0.96	0.93	1.03	0.45	0.48	0.39	0.20	0.07
Annual adjustment for excess evaporation =												
												6.1
ADJUSTMENT FOR EXCESSIVE STORAGE IN SANTA ROSA RESERVOIR												
			2004	2004	2005	2005						
			Gage	Storage	Gage	Storage						
EndYear Summer Sto			4253.30	21479	4253.07	21083						
EndYear S R Sto			4719.08	30101	4741.13	83592						
Sum				51580		104675						
Sto Adjustment, AF						0						
Adjustm Ex Evap, TAF						6.1						
Total Adjustment, TAF						6.1						

Table 7. Carlsbad Springs New Water WY 2005 - (B.4.c)					
4/30/2006					
		TAF	AF/day	cfs	Totals
Pecos R bel DC		75.1	205.8	103.7	103.7
Dark Canyon		0.0	0.0	0.0	0.0
Pecos R bel Lake Av, cfs		55.8	152.9	77.1	77.1
Depletion, cfs					2.0
CID lag seep, cfs (from Table 8)					7.1
Return flow, cfs					1.0
Lake Av lagged seep, cfs (from Table 9)					19.8
PR seepage, cfs					3.0
Carls new water, cfs					-2.2
Carls new wat, TAF					-1.6
Carls new wat monthly, TAF					-0.1

Table 8. Carlsbad Main Canal Seepage Lagged - WY 2005 - [B.4.c.(1)(e)]													
4/30/2006	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
WY 2005													
CID, TAF	0.0	0.0	5.4	9.6	9.8	15.6	13.9	3.9	12.4	7.0	0.0	0.0	77.5
days/mo	31	28	31	30	31	30	31	31	30	31	30	31	365
cfs	0.0	0.0	87.8	161.8	158.7	262.8	225.2	62.8	207.7	113.4	0.0	0.0	106.7
cfs, qtr avg			30.2			194.1			164.8			38.2	
WY 2004		1Q	2Q	3Q	4Q								
FLows, cfs				131.5	4.9								
SEVEN %				9.2	0.3								
WY 2005 lagged		1Q	2Q	3Q	4Q								
FLows, cfs		30.2	194.1	164.8	38.2								
SEVEN %		2.1	13.6	11.5	2.7								
LAG		2.7	7.6	10.6	7.4	Avg =	7.1	cfs					

Table 9. Lake Avalon Leakage Lagged - WY 2005 - B.4.c.(1)(g)

Table 10. Evaporation Loss at Lake Avalon - WY 2005 - (B.4.f)

Table 12. Data Required for River Master Manual Calculations, Water Year 2005

4/30/2006	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL			
STREAMFLOW GAGING RECORDS, TAF																
Pecos R b Sumner Dam	0.6	1.0	2.1	5.8	25.0	13.8	6.2	5.4	5.7	14.5	26.7	3.7	110.5			
Fort Sumner Main C	0.0	0.0	1.3	5.2	4.5	4.3	5.3	4.5	4.7	5.0	0.8	0.0	35.6			
Pecos R nr Artesia	7.7	8.0	6.1	4.8	11.5	23.8	4.8	6.6	6.0	8.5	18.4	20.0	126.2			
Rio Penasco at Dayton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.9			
Fourmile Draw nr Lakewood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
South Seven Rivers nr Lkwd	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.5			
Rocky Arroyo at Hwy Br nr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Pecos R at Dam Site 3	1.6	7.2	13.3	10.7	11.6	15.8	14.5	5.1	12.5	7.6	17.2	24.4	141.5			
Pecos bel Avalon Dam	0.0	3.1	8.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.6	27.0	55.8			
Carlsbad Main Canal	0.0	0.0	5.4	9.6	9.8	15.6	13.9	3.9	12.4	7.0	0.0	0.0	77.5			
Dark Canyon at Carlsbad	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Pecos below Dark Canyon	1.7	4.4	9.9	2.4	2.4	1.7	1.5	2.0	1.7	1.9	18.1	27.4	75.1			
Pecos R at Red Bluff	4.5	6.5	13.0	4.9	5.4	3.9	3.8	6.5	4.0	5.1	18.2	30.9	106.5			
Delaware R nr Red Bluff	0.2	0.2	0.2	0.2	0.7	0.2	0.1	0.4	0.3	0.1	0.1	0.1	2.8			
GAGE HEIGHTS																
Avalon gage ht, end mo	74.70	77.35	73.50	73.00	73.50	73.30	73.20	74.20	73.20	73.60	74.00	73.90				
Avalon gage ht, avg	73.98	76.26	76.53	73.26	73.14	73.24	73.28	73.66	73.38	73.57	73.86	73.91				
Sumner Lake ga ht, end mo	56.52	58.00	58.95	58.16	62.35	62.44	60.71	61.75	61.54	58.81	46.71	53.07				
Sumner Lake gage ht, avg	55.57	57.35	58.71	58.52	59.73	62.90	61.90	61.13	61.85	61.35	57.48	51.19				
Lake S Rosa ga ht, end mo	20.12	24.01	29.12	40.07	45.27	44.57	44.23	44.52	44.56	44.24	43.79	41.13				
Lake S Rosa ga ht, avg	19.72	21.53	25.89	33.84	43.01	44.56	44.38	44.56	44.50	44.37	44.12	41.22				
PRECIPITATION, INCHES																
Brantley Lake	0.56	1.88	0.74	0.02	2.25	0.00	0.51	4.23	0.21	0.78	0.00	0.00	11.18			
Las Vegas FAA AP	1.00	0.43	0.94	0.55	1.93	1.02	1.03	2.73	3.54	0.82	0.00	0.00	13.99			
Pecos National Monument	2.02	1.65	2.56	0.50	0.98	1.05	0.78	2.59	3.03	1.45	0.07	0.02	16.70			
Santa Rosa	1.68	0.66	1.72	1.23	1.95	2.13	2.19	2.61	2.08	0.52	0.00	0.00	16.77			
Lake Santa Rosa	1.66	0.87	1.88	1.80	1.22	1.11	0.68	2.57	2.66	0.59	0.03	0.00	15.07			
Sumner Lake*	0.68	1.38	0.60	1.64	2.87	0.28	0.68	2.38	1.57	0.54	0.00	0.00	12.62			
PAN EVAPORATION, INCHES																
Lake Santa Rosa	3.72	4.98	8.68	8.75	8.88	12.92	13.01	9.29	8.49	5.15	5.47	3.76	93.10			
Lake Sumner	3.47	2.73	5.30	9.02	8.83	15.43	15.24	10.22	7.61	5.57	7.30	4.93	95.65			
Brantley Lake	4.65	5.60	7.49	11.26	11.44	16.97	15.29	10.35	10.08	6.15	4.80	4.34	108.42			
OTHER REPORTS																
Base Acme-Art, TAF (USGS)	5.9	5.1	4.6	2.9	2.6	2.0	1.3	1.5	1.8	2.3	3.9	5.4	39.3			
Pump depl Ac-Artesia, TAF	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.0	0.0	0.6			
Pumping, C-2713, Brine Part.	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2			
NM irrig inv, acres (3/9/2000)													11529			
NM Transfer water use, TAF													0			
NM salvaged water, TAF													0			
Texas, water stored NM, TAF	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Texas, use Del water, TAF																

* = New Mexico's table for Monthly Precipitation shows 11.94 inches total for Lake Sumner but the monthly values sum to 12.62 inches

APPENDIX

RIVER MASTER'S RESPONSE TO STATES' OBJECTIONS

RESPONSE TO STATES' OBJECTIONS

Final Report, Accounting Year 2006

NEW MEXICO'S OBJECTIONS

1. Table 4. Flood Inflows, Carlsbad - State Line (B.5.c)

January

New Mexico objected to not computing flood inflow in January. There were two small events in that month, and the River Master computed them to total 6 cfs-days, or about 12 acre-feet.

July—August, and October

New Mexico presented alternative scalping schemes, but did not present calculations to be compared with the River Master's. If accepted, New Mexico's scalping lines for "Event 10" and "Event 11" would have altered the computed flood inflow, but New Mexico did not present any computations or results to compare with the River Master's.

In summary, the River Master noted New Mexico's objections about flood inflows, Carlsbad to State Line, but because New Mexico's computation of flood inflows is the same as the River Master's, no changes are required for the Final Report.

2. Table 6. Depletion Due to Santa Rosa Reservoir Operations (C.1.b)

New Mexico objected to the value for January for 1947 area. This objection is accepted. However, the River Master could not follow New Mexico's statement "Subsequent changes would occur to the entries for evaploss ..." However, the River Master's new computation is the same as New Mexico's for evaporation loss. The error was in the line for "Net LS Evap, inches," where a spreadsheet formula was lost. After correcting this, the total evaporation loss is as New Mexico computed, 6.06 TAF. Therefore, this part of New Mexico's objection is accepted.

New Mexico also made an objection of the value for End of Year Sumner Storage and Lake Santa Rosa storage. This objection is rejected. New Mexico apparently inserted the average December gage heights in place of end of year gage heights (see New Mexico's data table that was provided to the River Master, "End of Month and Average Reservoir Elevations for WY 2005.")

3. Table 1. General Calculation of Annual Departures, TAF, WY 2005

Table 1 has been revised to reflect New Mexico's objection on Table 6, and the new value for WY 2005 departure is 24.0 TAF. The insignificant difference between this and New Mexico's calculation of 23.9 TAF is apparently due to rounding on Table 1 by either New Mexico or the River Master.

TEXAS'S OBJECTIONS

Texas did not have any objections to the Preliminary Report.

FINAL CALCULATED DEPARTURE

The Preliminary Report's Final Calculated Departure was an overage of 24.8 TAF. After considering the states' objections, the Final Determination is an overage of 24.0 TAF.

