



WATER
WASTEWATER
STREETS & ROADS
STORM DRAINAGE
LAND DEVELOPMENT
IRRIGATION DISTRICTS
AGRICULTURE
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MEMORANDUM

To: Chad Wegley, David McGlasson
From: Richard M. Moss
Subject: Lower Tule River Irrigation District Performance under Letter of Intent with Friant Ranch
Date: December 14, 2007

I have been asked to clarify how during a time of critical water shortage the current agreement between Lower Tule River Irrigation District (LTRID) and Friant Ranch (FR) would likely function.

LTRID apparently has other obligations to provide water similar to those provided to FR. The attached Figure 1 was taken from correspondence with Dan Vink, General Manager of LTRID listing those other obligations. There apparently is no stated priority as to which of these obligations would be fully or partially met during any year and what source of water would be used to meet them. LTRID has always indicated they would endeavor to meet all of these obligations in all years. Thus, we are left to analyze their ability to meet all of these obligations given what we know of water supplies available to LTRID¹.

In 1977, the driest year of record in the 60 year history of the Friant Division diversions from the San Joaquin River, LTRID would fall short of having enough Central Valley Project (CVP) Friant Division water supplies to meet all of their existing obligations if all of these obligations were to be met from LTRID's Friant Supplies². This was a year in which 25% Class 1 entitlement was available. In accordance with attached Figure 1, LTRID would be short of making all of the CVP related out-of-district obligations with only their CVP Friant entitlement by some 4,720 acre-feet. LTRID has a history of not making any surface water available to their in-district growers in the driest of years and asks their growers to rely solely on groundwater under such circumstances.

LTRID has at a minimum two other sources of supply under its immediate control: (1) entitlement to the Tule River, and (2) its CVP Cross Valley Canal entitlement. I have

¹ Assuming the LTRID obligations in such a year would be prorated in receiving their share of LTRID's CVP allotment, the shortage to FR would be a 460 acre-feet shortfall out of their 2,000 acre-feet LTRID commitment or providing slightly more than what I understand is 1,500 acre-feet that FR currently projects as their dry year demand.

² It is possible for some of LTRID's other obligations to be met directly from the Tule River.

focused primarily on the Tule River supply in my analysis believing that it would be the most likely and secure source of alternative supply that could be used to meet LTRID's obligations.

The Tule River entitlement owned or controlled by LTRID exists in the form of pre-1914 appropriative rights which could be pumped from the Tule River into the Friant-Kern Canal to be exchanged so as to make water available to meet its out-of-district obligations which otherwise would have been met with CVP Friant Division supplies. LTRID's Tule River entitlement in 1977 (the only year in which LTRID's CVP Friant Division supply would not have been sufficient to meet all of its out-of-district obligations) was in excess of 38,000 acre-feet. However, much of this 38,000 acre-feet of entitlement arrived late in the season and thus in 1977 there still may have been a short period of time during the year when demands theoretically may have exceeded available supplies. The instantaneous timing of water availability and demand in a dry year will always be the subject of circumstance and is beyond the resolution required for this analysis.

Other years have been dryer on the Tule River, but not simultaneous with LTRID's inability to access enough CVP Friant Division supplies. Between the two sources of water, LTRID could have met all of their out-of-district obligations in all of the years reviewed. Figure 1. provides an estimate of the yield of the Tule River entitlement under the control of LTRID which potentially could be used to meet its out-of-district obligations under the worst hydrologic conditions experienced in the Friant Division³. Figure 2. is a record of CVP Friant Division Class 1 water availability and highlights the driest years of record. Figure 3. provides a summary of LTRID's headgate entitlement for Tule River water by month and by recorded water right over the reviewed period.

LTRID could also endeavor to cover the shortfall with their CVP Cross Valley Canal entitlement of some 31,000 acre-feet (contract maximum). Figure 3 provides an historical summary of Cross Valley Canal entitlement availability to LTRID since 1996.

Conditions in a series of two critically dry years only get marginally worse in that there is little reliance on reservoir surface storage to carry water over from year to year given the limited amount of capacity in these reservoirs and the reservoir space reserved for the flood control function that controls their operations in the winter and spring of each year. This is the case for both the CVP Friant Division's Millerton Lake as well as for Success Reservoir on the Tule River. There could be some diminution of the amount of CVP Friant Division supplies in back to back critically dry years given the allowance of late season releases from upstream power reservoirs in the first year of a critically dry year that likely would not be there in a second consecutive dry year. The LTRID Tule River supplies depend upon the runoff available in each year and thus do not diminish significantly in consecutive dry years. The limitation for the Cross Valley Canal availability is associated with the ability of the federal CVP to pump water out of the Sacramento/San Joaquin River Delta as CVP storage on the Sacramento, Trinity and

³ I have included the worst single year and the worst consecutive two and three year periods. A delivery loss factor of 20 percent was assumed in getting the water transported down the Tule River to the Friant Kern Canal and in the exchange with downstream Friant-Kern Canal water users.

American Rivers is very large and easily capable of withstanding a back-to-back dry year scenario. Delta pumping conditions are very hard to predict given so much of the operation depends upon factors other than tributary hydrology, such as endangered species and water quality issues.

Nonetheless, it would appear that LTRID has enough alternative water supplies available to meet its out-of-district obligations for Friant Division supplies in virtually all conditions, certainly in the conditions which have been experienced to date.

Figure 1. Analysis of Lower Tule River Irrigation District's Ability to meet Dry Year Commitments

LTRID Commitments Under Agreement										
City of Orange Cove				2000						
Friant Ranch				1500						
Fresno Co Lower Tule				1500						
Fresno Co DCTRA				770						
DCTRA Internal Use				14250						
				Friant Class 1 Total						
				Entitlement						
				800000						
Total				20020						
				LTRID Contract Supply						
				61200						
CVP Dry Year Scenarios		Friant Class 1 Declaration	Friant Class 1 Supply	LTRID Friant Supply		Required Alternate Supply		Tule River Entitlement	Delivery Losses 20%	Net for Exchange
Driest Single Year of Record										
1977		25%	200000	15300		4720		38074	7615	30459
Two Consecutive Driest Years of Record										
1976		75%	600000	45900		0		6072	1214	4858
1977		25%	200000	15300		4720		38074	7615	30459
Three Driest Consecutive Years of Record										
1988		78%	624000	47736		0		11239	2248	8991
1989		98%	784000	59976		0		18722	3744	14978
1990		68%	544000	41616		0		5358	1072	4286

Figure 2. CVP Friant Division Water Availability and Dry Year Analysis

Class 1 Availability			Driest Series	
Year	Class 1 Availability	SJR % of Normal	Driest 2 Consecutive Years	Driest 3 Consecutive Years
1966	100	70.7		
1967	100	176.1	123	
1968	92	47	112	98
1969	100	220.1	134	148
1970	100	78.8	149	115
1971	100	77.2	78	125
1972	100	56.6	67	71
1973	100	111.5	84	82
1974	100	119.3	115	96
1975	100	97.8	109	110
1976	75	34.3	66	84
1977	25	19.7	27	51
1978	100	185.3	103	80
1979	100	99.7	143	102
1980	100	162	131	149
1981	100	58.2	110	107
1982	100	180.7	119	134
1983	100	252.9	217	164
1984	100	111.3	182	182
1985	100	70	91	145
1986	100	151	111	111
1987	91	42	97	88
1988	78	47.1	45	80
1989	98	52.2	50	47
1990	68	40	46	46
1991	100	66	53	53
1992	83	46	56	51
1993	100	150	98	87
1994	80	50	100	82
1995	100	218	134	139
1996	100	124	171	131
1997	100	158	141	167
1998	100	178	168	153
1999	100	150	164	162
2000	100	103	127	144
2001	100	60	82	104
2002				
94 percent over period of 36 years				

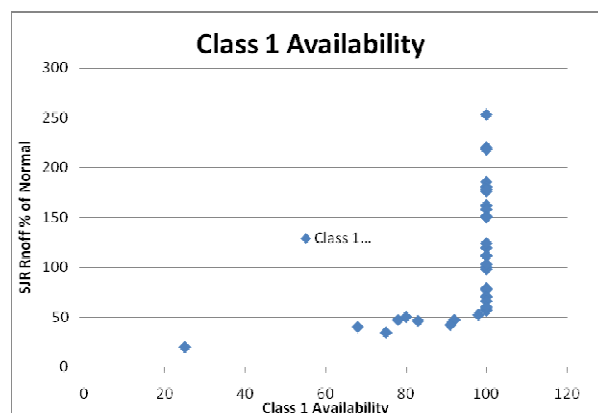


Figure 3. TULE RIVER HEADGATE ENTITLEMENT

Percentage of Runoff to Entitlement

March-Feb CVP Contract Year	Below Oettle Bridge	Woods Central Ditch	Porter Slough	Poplar Ditch	Yearly Total	Total Runoff	Percentage of Entitlement to Runoff
	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	
1975-1976	31,774	8,419	1,883	16,739	58,815	114,004	51.6%
1976-1977	1,156	1,191	0	4,836	7,183	30,745	23.4%
1977-1978	27,923	2,280	3,543	4,328	38,074	80,520	47.3%
1978-1979	71,674	17,654	10,208	25,728	125,264	230,386	54.4%
1979-1980	77,320	10,000	10,995	17,000	115,315	239,543	48.1%
1980-1981	75,756	10,000	7,107	16,903	109,766	199,057	55.1%
1981-1982	28,225	3,515	1,631	13,479	46,850	99,913	46.9%
1982-1983	138,462	9,492	26,288	15,297	189,539	403,013	47.0%
1983-1984	139,868	13,434	42,636	15,671	211,609	511,727	41.4%
1984-1985	36,671	2,321	843	18,527	58,362	113,860	51.3%
1985-1986	45,498	7,139	7,616	16,948	77,201	165,672	46.6%
1986-1987	48,718	8,825	10,442	18,646	86,631	175,054	49.5%
1987-1988	16,953	1,255	502	7,060	25,770	56,667	45.5%
1988-1989	6,917	121	623	3,578	11,239	38,199	29.4%
1989-1990	11,219	296	447	6,760	18,722	49,127	38.1%
1990-1991	2,011	160	0	3,187	5,358	23,664	22.6%
1991-1992	15,769	1,283	1,098	10,786	28,936	69,371	41.7%
1992-1993	24,655	44	2,593	942	28,234	64,980	43.5%
1993-1994	28,956	9,232	1,257	17,297	56,742	108,519	52.3%
1994-1995	26,774	1,248	2,216	6,314	36,552	76,170	48.0%
1995-1996	86,450	10,362	13,739	17,097	127,648	265,281	48.1%
1996-1997	124,107	8,903	21,807	16,545	171,362	381,568	44.9%
1997-1998	60,964	9,343	8,796	19,212	98,315	204,657	48.0%
1998-1999	119,295	11,258	32,957	14,741	178,251	393,582	45.3%
1999-2000	24,621	1,546	2,167	6,553	34,887	81,555	42.8%
2000-2001	30,078	1,950	1,543	12,277	45,848	90,331	50.8%
2001-2002	26,406	766	1,991	4,461	33,624	76,250	44.1%
2002-2003	12,257	23,584	1,224	5,277	42,342	91,288	46.4%
2003-2004	16,215	29,637	1,638	3,370	50,860	104,447	48.7%
2004-2005	22,155	2,546	2,244	5,570	32,515	74,904	43.4%
2005-2006	29,680	15,094	2,862	25,940	73,576	169,034	43.5%
2006-2007	60,636	3,450	12,113	7,889	84,088	183,148	45.9%

**Figure 4. Cross Valley Canal
Deliveries
1996-2007**

<u>Year</u>	<u>Declaration</u>	<u>Available Supply</u>
1996	95%	59,094
1997	90%	55,984
1998	90%	55,984
1999	70%	43,543
2000	65%	40,433
2001	49%	30,480
2002	75%	46,653
2003	60%	37,322
2004	70%	43,543
2005	90%	55,984
2006	100%	62,204
2007	50%	31,102