PLAN OF WATERFLOOD OPERATIONS

FOR

POWER GRAYBURG UNIT

EDDY COUNTY, NEW MEXICO

DECEMBER 18, 1985

I. Development and Production History

The Eastland Oil Company, as operator, completed the Arco Federal #1 on August 18, 1970 as the discovery well in the Power Grayburg San Andres Pool. After drilling to 3684 feet, 4 1/2 inch casing was set at total depth and a zone in the San Andres from 3623 to 3632 feet was perforated and tested, but it was not commercial. Three Grayburg sands from 3410 to 3418 feet, 3473 to 3477 feet, and 3512 to 3514 feet were perforated and treated with 30,000 gallons of water - frac and 30,000 pounds of sand.

Development continued through the drilling of Sibyl Federal #2 in September, 1971. During this period, 9 producing wells and 3 dry holes were drilled. In 1975, Arco Federal #4 was completed as a replacement well for Arco Federal #1 and in 1983, Sibyl Federal #3 was completed as a west extension to the pool. All wells were perforated through 4 1/2 inch casing and stimulated with water - frac using limited entry for better distribution of the treatment.

The 9 wells presently producing and located on 4 leases have accumulated 446,998 barrels of oil, or an average of 50,000 barrels per well. An additional 5,030 barrels were produced from a well that is now abandoned making a cumulative oil production to January 1, 1985, of 452,028 barrels. An estimated additional

37,000 barrels of primary oil will be produced from the reservoir for a total recovery of 489,028 barrels. Production for the month of December, 1984, was 900 barrels from 9 producing wells, or an average of 100 barrels per well.

II. Location and Geology

The Power Grayburg Field is located in Section 1, T18S, R30E and in Sections 5 and 6, T18S, R31E approximately 45 miles NE of Carlsbad, Eddy County, New Mexico.

The producing zone is a series of laterally continuous sands in the Grayburg formation of Permian age. For identification and correlation the sands have been designated A thru E. The three lowest sands, C, D and E, have produced most of the primary oil and should be most susceptible to waterflood.

Porosity in producing sands range from 13 to 20 per cent and wells typically complete pumping with some water. During the primary producing life of the reservoir, water production has averaged near 50 percent. Water saturation calculations from logs have proved very reliable with RW =.055. A well calculating greater than 50 percent SW is not commercial.

All the sands in the producing area show similar structure with a closed East-West trending feature having 90 feet of relief in all directions. The steepest dip occurs on the South side.

The attached structure map has been contoured on the base of the "C" sand. A 50 percent SW line has been added delineating the commercially productive sands and the water productive areas. The Eastland Kenwood Federal #4 in the SE NW of Section 6 is

presently a disposal well. The Eastland Arco Federal #2 in the SW NW of Section was perforated and fraced in the Grayburg and swabbed only water.

The Eastland Allied State #1 in the SW SW of Section 32 initially produced 36 BOPD and 76 BWPD. This well subsequently went to 100 percent water at an increased bottom-hole pressure believed to be from waterfloods to the North. If this well was influenced by sweep from other floods, it was insufficient to establish commerciality. It is therfore believed that any wells drilled lower structurally on the North side of the reservoir would be uneconomic before and after waterflood. This is confirmed by the Eastland Allied "A" Fed #1 in the SW SW of Section 31 which calculates wet even though it is structurally higher.

On the east side of the feature, the Eastland Arco Federal #3 should be included in the unit because all sands calculate less than 50 percent SW. It could possibly have made a producing well when drilled based on information since acquired. Arco Federal #3 is necessary for operational purposes as an injection well. It will be used to sweep and/or maintain pressure on the east and serve as an offset injection well to Arco Federal #4.

The 50 percent SW curve is thought to best enclose all the productive acreage in the Power Grayburg Unit and best exclude the non-productive acreage.

III. Reservoir Data and Performance

The original reservoir pressure measured in Arco Federal #1 was 1136 psi. No scheduled pressure surveys were made and pres-

sure data is limited. From the gas - oil ratio performance, it appears that the reservoir was initially saturated with some sand zones producing free gas. Gravity of the stock tank oil is 38.6 degrees. No subsurface oil samples were taken and no PVT data are available.

There is no evidence that a natural water drive exists in the reservoir. However, some indication of water encroachment through porous sands extending to the Grayburg Jackson water flood to the north has been observed. There has been no significant increase in the water production from the current producing wells, but Allied State #1 located in the SW/4 SW/4 of Section 32 was plugged due to low oil production and a rapid increase in water cut. Water production was noted while drilling Sibyl Federal #3 from the "Loco Hills" sand approximately 130 feet below the top of the Grayburg.

Gas - oil ratios were initially as high as 4,000 cubic feet per barrel, but they gradually declined to near the solution ratio of 600. With depletion of the reservoir, gas - oil ratios are again rising indicating that the producing energy has been primarily from expansion of dissolved gas.

IV. Waterflood Reserves

To effectively waterflood the reservoir, unitization of the producing leases is necessary to protect interest owner's equity and obtain maximum utilization of the wells. To arrive at a basis for unitization, it was first necessary to determine oil in place and recoverable oil by waterflooding.

The oil in place was calculated by determining the feet of net pay in each well from logs. A cut-off point of 8 percent porosity was used and the oil in place was calculated to be 3,896,500 stock tank barrels.

An alternating pattern of injection and producing wells along an east-west line offered the most effective means of contacting the maximum amount of remaining oil in place. The narrow width of the reservoir prevented closing the 5-spots to the north but some back-up has been indicated from the water-flooding in the Grayburg Jackson Pool.

Primary recovery will be 12.6 percent of the orginal oil in place or 489,000 barrels. Remaining oil in the reservoir after primary and deduction of residual oil will be 1,349,500 barrels. Using a contacted area of 50 percent and a 50 percent sweep efficiency, the waterflood recovery will be 321,400 barrels. With 37,000 barrels of primary oil left to recover, unitized reserves are calculated to be 358,400 barrels. The secondary recovery projection is 42 barrels per acre-foot compared to a primary recovery of 65 barrels per acre-foot.

V. Economics of Waterflood

The water injection plant is designed for a maximum pressure of 1000 psi at 1,500 barrels per day. During initial injection, however, the rate can be increased to as much as 2,000 barrels per day to decrease "fill-up" time. Response to injection should occur within 12 months. The majority of the present producing equipment can be utilized with the existing flow lines directed

to a central tank battery. The injection wells will be equipped with plastic-coated tubing and packers. Larger pumping equipment is anticipated for some wells as water production increases.

Water is available from the City of Carlsbad's water system with the nearest delivery point about 4 miles from the proposed plant site. It will be necessary to lay a 4 inch line to pick up the fresh water. About 2,700,000 barrels of make-up water and an equal amount of produced water will be injected over the life of the flood.

The calculated recovery to the unit of 358,400 barrels should gross $7,385,000 to the 0.763 working interest. Operating expenses and water costs are estimated to be $1,197,000 and investment is $304,400, giving a net profit from the project of $5,883,370. This money has a present worth of $3,443,000 discounted at 12 percent over the ten-year life of the flood. The discounted profit to investment ratio is 11.3 to 1.

VI. Unitization

The unitized area that is proposed comprises approximately 40 acres around each of the 9 producing wells. In addition, an abandoned well drilled on the Arco Federal lease and an undrilled proration unit on the Sibyl Federal Lease will contribute another 80 acres for a total of 427.44 acres in the unitized area.

The vertical limits of unitization are described as the top of the Grayburg lime to a depth of 450 feet below this marker. This top occurs in the Eastland's Arco Federal No. 1 at 3252 feet (+442 feet subsea) and would extend to 3692 feet.

Cumulative Production by leases offers the most equitable parameter for unitization as it is representative of recoverable oil by waterflooding. However, since some of the acreage included in the unitized area has not produced, a second parameter of Surface Area is used. A value of 90 percent is assigned to the production factor and 10 percent assigned to the acreage factor. The distribution by working interest owners of the production on each lease to January 1, 1985 and the participation of owners in the unitized acreage has been combined to arrive at total unit participation.

TABLE II
PRODUCTION DATA
POWER (GRAYBURG) POOL
EDDY COUNTY, NEW MEXICO
THE EASTLAND OIL COMPANY-OPERATOR

	ARCO FEDERAL LEASE			ALLIED FEDERAL LEASE			KENWOOD FEDERAL LEASE			SIBYL FEDERAL LEASE		
YEAR	OIL BBLS	GAS MCF	WATER BBLS	OIL BBLS	GAS MCF	WATER BBLS	OIL BBLS	GAS MCF	WATER BBLS	OIL BBLS	GAS MCF	WATER BBLS
1970	9520	23310	1454	2684	11240	429	770	1500	45			
1971	23559	81675	1962	14730	76491	1967	28949	173843	6438	3274	5727	3080
1972	13866	31667	990	8410	29292	2520	27601	126188	6005	4263	21577	6300
1973	10323	10840	2305	5959	22595	1379	24569	63030	4140	1984	8656	2150
1974	5866	1413	23280	7150	13782	1725	21972	22230	4617	1808	6132	7617
1975	2099	570	27634	9966	8572	5106	22038	13750	5338	2476	4915	3506
1976	503	613	17694	11323	6356	2500	21214	9401	13534	1165	3818	3252
1977	321	400	6954	10374	5511	1815	20377	11042	13989	1058	3122	4322
1978	(a)1869	858	23998	8651	3915	1867	16663	7750	12039	788	3831	4214
1979	1429	455	2030	6604	2030	2067	10622	4815	10030	490	3477	1616
1980	6069	6642	4347	5975	4363	2147	10301	6697	9516	668	3650	1382
1981	5344	5962	6527	5187	4281	2165	7111	5143	9344	662	3633	1930
1982	3103	1987	3776	4457	3275	2470	7084	4913	6405	550	3085	2214
1983	2282	1790	2140	3773	2669	1608	4966	3602	5797	1111	1814	2839
1984	1881	828	1564	3562	1749	1585	4338	2710	6285	1287	2322	2861
CUM TO 1/1/85	88034	169010	126655	108805	196121	31350	228575	456614	113522	21584	75759	47283

(a) DRILLED WELL NO. 4 AND PLUGGED WELL NO. 1: CUM PROD. WELL NO. 1 - 66108 BBLS

TABLE II
PRODUCTION DATA
POWER (GRAYBURG) POOL
EDDY COUNTY, NEW MEXICO

YEAR AND MONTH	ARCO FEDERAL LEASE			ALLIED FEDERAL LEASE			KENWOOD FEDERAL LEASE			SIBYL FEDERAL LEASE		
	OIL BBLS	GAS MCF	WATER BBLS	OIL BBLS	GAS MCF	WATER BBLS	OIL BBLS	GAS MCF	WATER BBLS	OIL BBLS	GAS MCF	WATER BBLS
1985												
JANUARY	154	25	131	293	83	126	342	181	528	85	96	243
FEBUARY	114	25	90	269	50	87	318	188	365	78	100	168
MARCH	148	25	105	265	82	102	332	226	426	81	109	196
APRIL	131	25	100	267	90	97	305	218	404	75	113	185
MAY	146	25	100	278	148	97	358	196	407	78	110	187
JUNE	140	25	96	250	162	93	283	260	387	70	93	178
JULY	108	25	88	273	166	85	343	311	355	75	90	163

WATERFLOOD RESERVOIR CALCULATIONS
POWER GRAYBURG SAN ANDRES POOL
EDDY COUNTY, NEW MEXICO

AVERAGE POROSITY (LOGS) PERCENT	14
AVERAGE CONNATE WATER (LOGS) PERCENT	38
FORMATION VOLUME FACTOR (ESTIMATED)	1.31
AVERAGE GROSS FEET OF PAY (LOGS)	100
AVERAGE NET FEET OF PAY (LOGS)	21
PRODUCTIVE AREA ACRES	360
GRAVITY OF OIL @ 60 DEG F	38.6
GRAVITY OF GAS @ SEPARATOR	0.83
TYPE OF PRODUCING MECHANISM	DEPLETION
RESERVOIR VOLUME ACRE-FEET	7560
PORE VOLUME BARRELS	8233000
OIL DRIGINALLY IN PLACE STB	3896500
OIL PRODUCED TO JANUARY 1, 1985 (INCLUDES 5030 BBLS FROM ALLIED STATE #1)	452028
ADDITIONAL PRIMARY OIL TO ABANDONMENT	37000
TOTAL PRIMARY RECOVERY STB	489028
PRIMARY RECOVERY PERCENT OF OIP	12.6
REMAINING OIL IN RESERVOIR AFTER PRIMARY STB	3407500
RESIDUAL OIL SATURATION ESTIMATED AFTER WATERFLOODING PERCENT OF PORE SPACE	30
RESIDUAL OIL STB	2058000
MOBILE OIL STB (REMAINING OIL LESS RESIDUAL OIL)	1349500
WATERFLOOD RECOVERY FACTOR 50%	
CONTACTED AREA AND 50% SWEEP EFFICIENCY PERCENT	25
WATERFLOOD RECOVERY STB	321400
WATERFLOOD RECOVER PERCENT OF OIP	8.2

INVESTMENT AND OPERATING COST ESTIMATES
UNITIZED POWER GRAYBURG POOL WATERFLOOD

1.)	INITIAL INVESTMENT		
	INJECTION PLANT DESIGNED FOR 1500 BBLS PER DAY @ 1000 PSI	$	18000
	TANK BATTERY CONSOLIDATION W/TREATING EQUIPMENT		10000
	METER SETTINGS AND CONNECTIONS		12000
	21.000'-4" POLY LINE DITCHED AND COVERED FOR WATER SUPPLY		63000
	INJECTION LINES INTERNALLY COATED DITCHED AND LAYED 11500		33400
	FLOW LINES RELAYED		2800
	PREPARE WELLS FOR INJECTION W/PACKERS AND WELL SERVICING		25200
	PLASTIC COAT 21.000' 2" TUBING		21000
	LABOR, TRUCKING, AND TAXES		14000
	CONTIGENCIES		10000
		$	209400
2.)	RECOMPLETE ARCO FEDERAL #3 AS AN INJECTION WELL		55000
3.)	ADDITIONAL PUMPING EQUIPMENT		40000
	TOTAL INVESTMENT	$	304400
4.)	OPERATING EXPENSE		
	PRODUCING WELLS 6 @ 750/MO (10 YEARS)		
	INJECTION WELLS 6 @ 500/MO (10 YEARS)		
	TOTAL OF $7500/MO (10 YEARS)		900000
5.)	INJECTION WATER EXPENSE		
	PURCHASE 2,700,000 BBLS @ $0.08		216000
	HANDLING AND TREATING		
	5,400,00 BBLS @ $0.015		81000
	TOTAL OPERATING EXPENSE	$	1197000

TABLE V
WATERFLOOD ECONOMICS FOR UNITIZED
POWER (GRAYBURG) POOL
EDDY COUNTY, NEW MEXICO

YEAR	FUTURE OIL PROD BBLS	NET BBLS TO W.I. 0.763	INCOME TO W.I.@ $27.00(A)	WATERFLOOD INVESTMENT	WATERFLOOD EXPENSE OPERATING	INJ.WTR (B)	TOTAL EXPENSE	NET INCOME	CUMULATIVE INCOME	INCOME DISC @ 0.12
1985	9000	6870	185490	264400	90000	38000	128000	(206910)	(206910)	(195510)
1986	19200	14650	395550		90000	38000	128000	267550	60640	225710
1987	41400	31600	853200	20000(D)	90000	38000	128000	705200	765840	531160
1988	66000	50360	1359720	20000(D)	90000	38000	128000	1211720	1977560	815490
1989	74400	56770	1532790		90000	38000	128000	1404790	3382350	844280
1990	61200	46700	1260900		90000	21400	111400	1149500	4531850	616130
1991	41400	31600	853200		90000	21400	111400	741800	5273650	354580
1992	25800	19700	531900		90000	21400	111400	420500	5694150	179550
1993	13800	10530	284310		90000	21400	111400	172910	5867060	66050
1994	6200	4730	127710		90000	21400	111400	16310	5883370	5560
TOTALS	358400(C)	273510	7384770	304400	900000	297000	1197000	5883370		3443000

(A) BASED ON DECEMBER, 1984 SALES LESS GPI
(B) INCLUDES $0.08 PER BBL FOR PURCHASED WATER AND $0.015 PER BBL FOR TREATING
(C) INCLUDES 37.000 BBLS REMAINING PRIMARY OIL
(D) ADDITIONAL PUMPING EQUIPMENT