

**PROPOSED
WEST HIGH LONESOME PENROSE SAND UNIT**

HIGH LONESOME QUEEN (PENROSE SAND)

EDDY COUNTY, NM

BEACH EXPLORATION, INC.

Calculation Update from T. Scott Hickman & Associates, Inc. Study dated 1/27/93

VOLUMETRIC CALCULATIONS As of 5/1/00:

Original Oil in Place (OOIP)

$$\text{OOIP} = 7,758 \phi (1-S_w) Ah / Boi$$

Where OOIP = STB

$$7,758 = \text{STB} / \text{Ac-Ft}$$

$$\phi Ah = \text{PV, Ac-Ft}$$

Sw = Connate Water Saturation, Frac of PV

$$Boi = \text{RB} / \text{STB}$$

$$\text{OOIP} = 7,758 (1-0.3) 1400.75 / 1.22$$

$$\text{OOIP} = 6,235.2 \text{ MBO}$$

Primary Recovery Factor (PRF)

$$\text{PRF} = \frac{556 \text{ MBO}}{6235.2 \text{ MBO}} \times 100 = 8.9\% \text{ of OOIP}$$

Pore Volume (PV):

$$\text{PV} = \frac{NBoi}{1 - S_w}$$

$$\text{PV} = \frac{(6235.2) (1.22)}{(1 - 0.3)}$$

$$\text{PV} = 10,867 \text{ MBBL}$$

Current Oil Saturation:

$$S_o = \frac{(N - N_p) Bo (1 - S_w)}{NBoi}$$

Where: So = Oil Saturation @ 5/1/2000, fraction of Pore Volume (PV)

N = OOIP, MSTB

Np = Cumulative Oil Production @ 5/1/2000, MSTB

Bo = Current Oil Formation Volume Factor, RB/STB

Sw = Connate Water Saturation, Fraction of PV

Boi = Initial Oil Formation Volume Factor, RB/STB

$$S_o = \frac{(6235.2 - 533.4) 1.05 (1 - 0.3)}{(6235.2) (1.22)}$$

$$S_o = 0.55$$

Free Gas Volume (FGV)

$$\text{FGV} = (1 - S_o - S_w) \text{PV}$$

$$\text{FGV} = (1 - 0.55 - 0.3) (10,867 \text{ MBBL})$$

$$\text{FGV} = 1630 \text{ MBBL}$$

Fill-up Time

$$\text{Fill-up Time} = \frac{\text{FGV}}{\text{Injection Rate}}$$

$$\text{Fill-up Time} = \frac{1,630,000 \text{ BBL}}{200 \text{ BPD/well} \times 13 \text{ wells} \times 30.4 \text{ days/mo}}$$

$$\text{Fill-up Time} = 20.6 \text{ months}$$

Theoretical Waterflood Recovery

$$\text{Waterflood Recovery} = \frac{7758 \phi Ah (S_o - S_{or}) (E_v \times E_p)}{Bo}$$

Where: Sor = Residual Oil Saturation after Waterflood, 0.315
(Roswell Geological Society Symposium)

Ev = Volumetric sweep efficiency, 0.5 (empirical)

Ep = Injection efficiency, 0.67 (geometric factor)

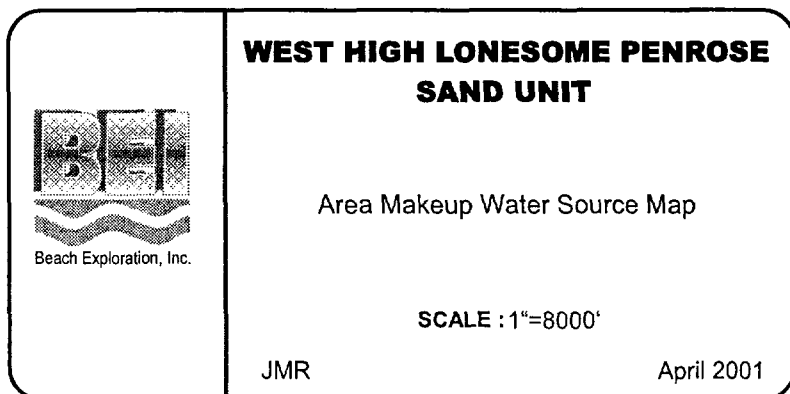
$$\text{Waterflood Recovery} = \frac{7758 (1400.75) (0.55 - 0.315) (0.5 \times 0.67)}{1.22}$$

$$\text{Waterflood Recovery} = 701 \text{ MBO}$$

OIL CONSERVATION DIVISION

CASE NUMBER _____

Beach EXHIBIT 18



R28E R29E

13

18

17

T
16
S

24

Rosewood St.

Beach
Red Lake
Unit

25

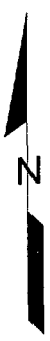
30

29

OIL CONSERVATION DIVISION

CASE NUMBER

Beach EXHIBIT 20



Drill Producer



Beach Exploration, Inc.

**PROPOSED
WEST HIGH LONESOME
PENROSE SAND UNIT**

Proposed Unit Boundary
and Well Status

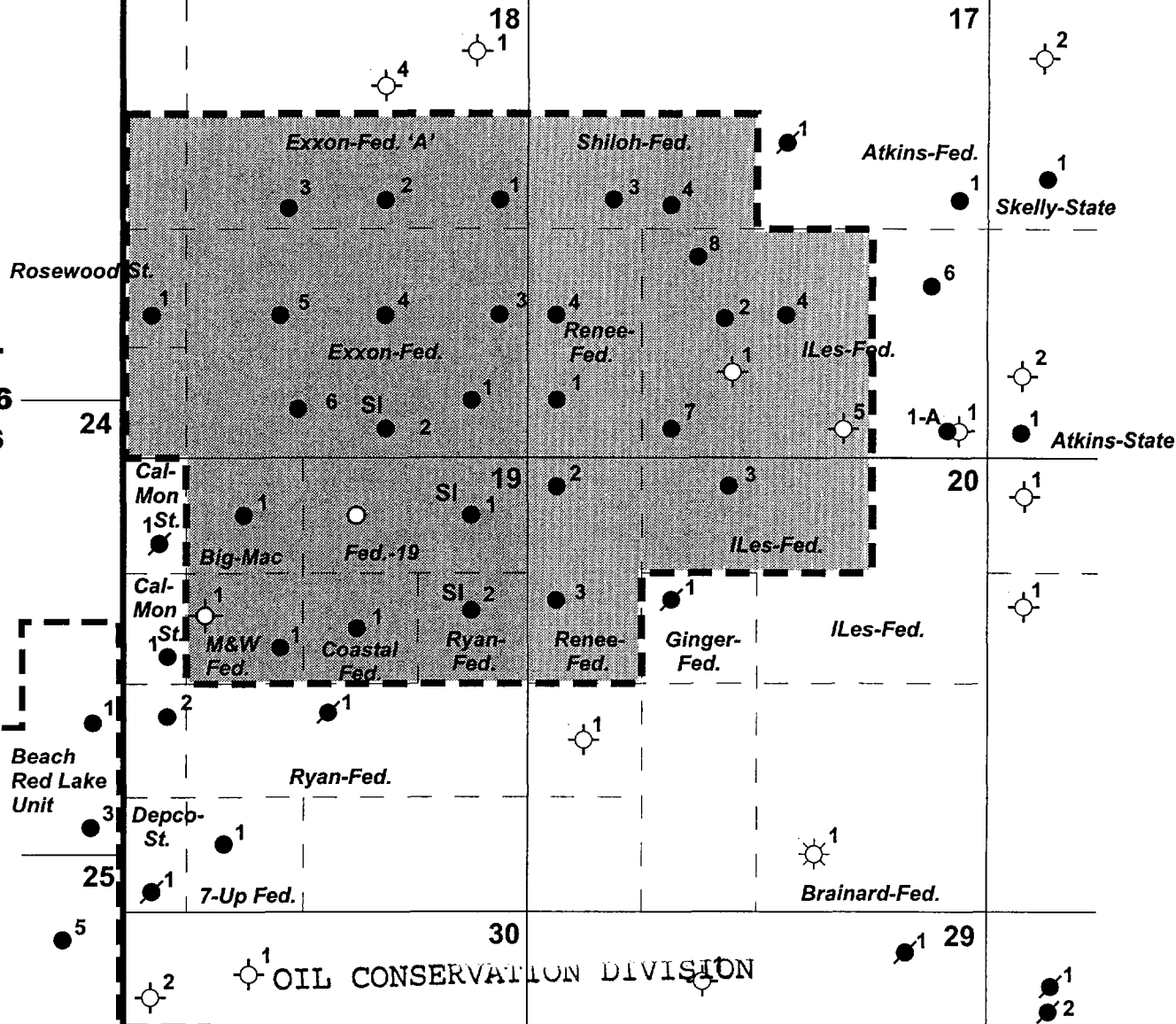
0 1000 2000

Eddy County, New Mexico

Scale : 1"=2000'

JMR

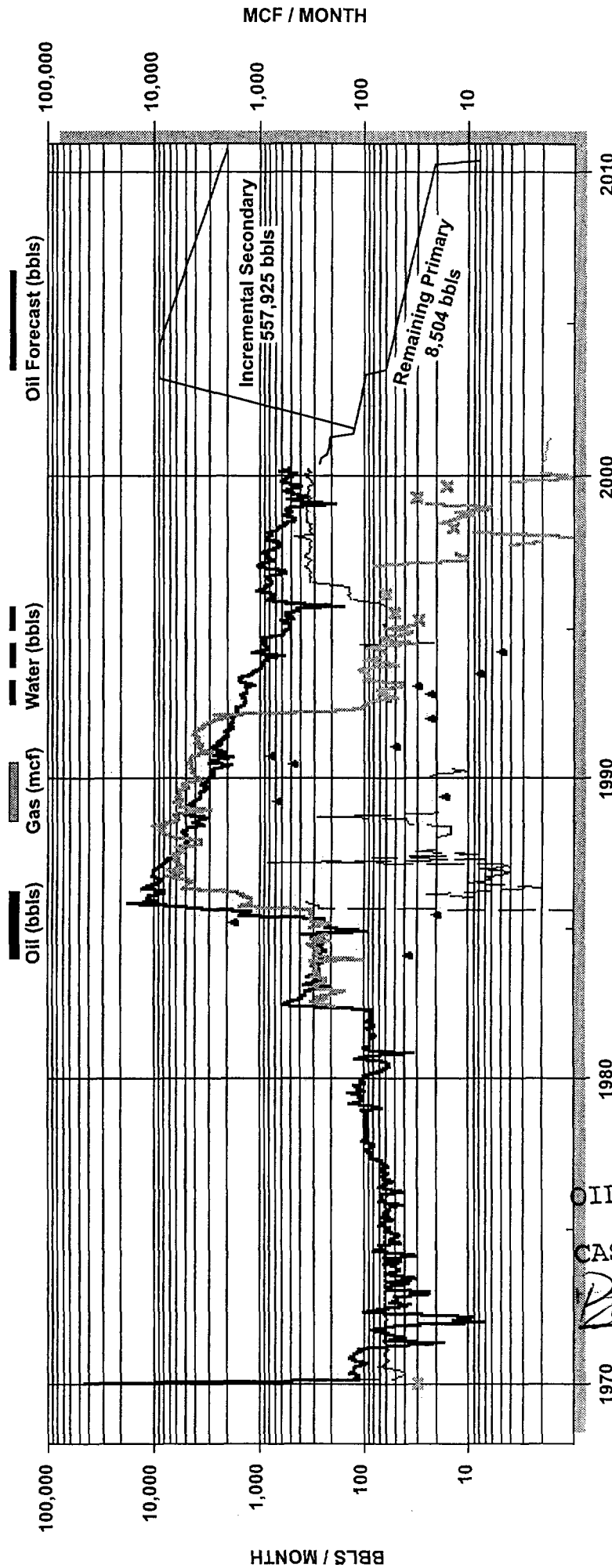
March 2001



WHLPSU - WATERFLOOD

HIGH LONESOME QUEEN, QUEEN (PENROSE SAND)
EDDY, NM

BEACH EXPLORATION, INC.



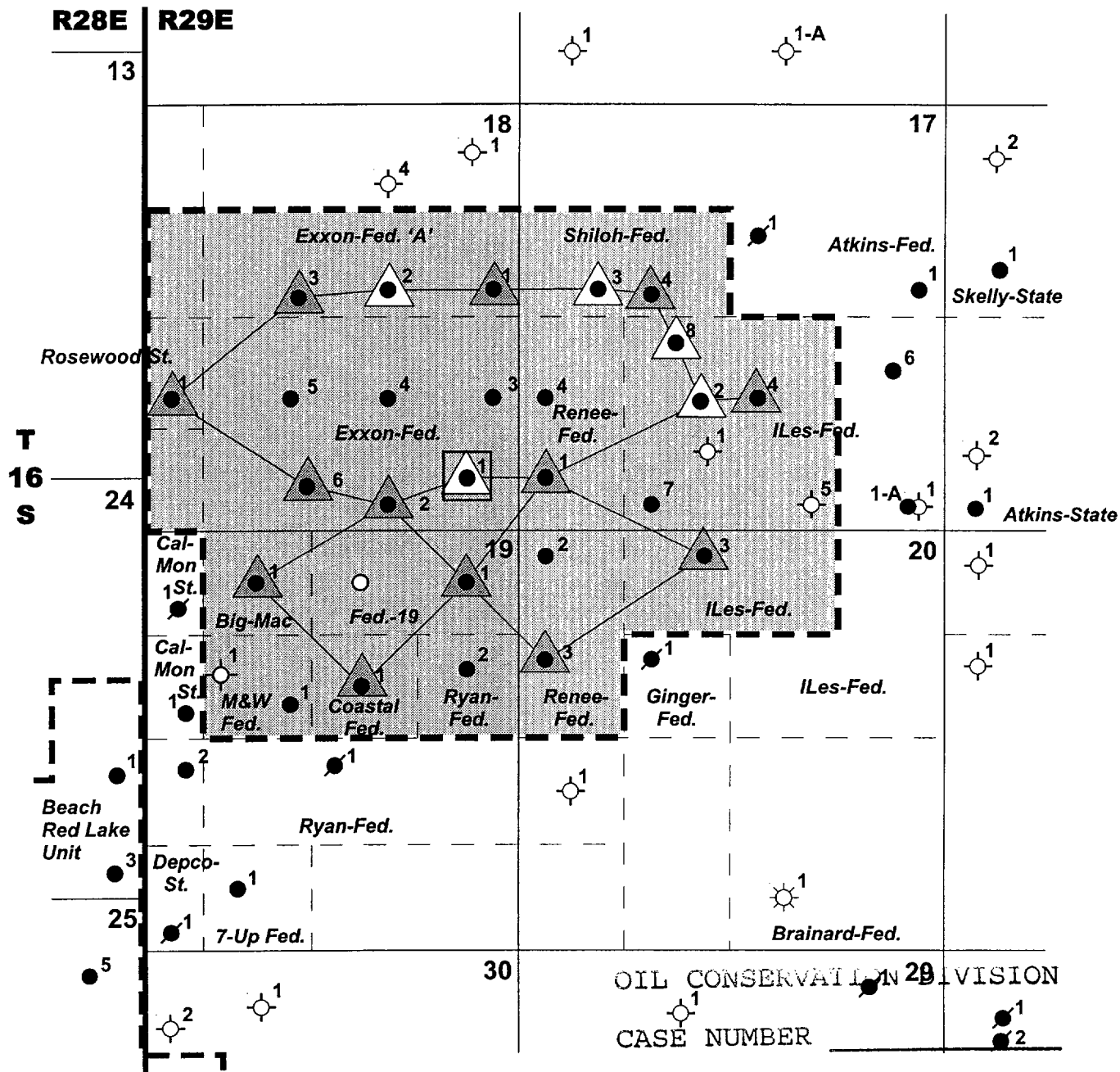
CUMULATIVES
AS OF 5/1/00

Cum Oil (bbls): 533,371
Cum Gas (mcf): 374,658
Cum Water (bbls): 30,112

OIL CONSERVATION DIVISION

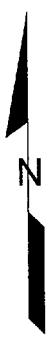
CASE NUMBER

Beach EXHIBIT 21



OIL CONSERVATION DIVISION
CASE NUMBER

Bench EXHIBIT 22



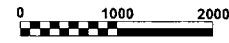
-  Injector Phase I
-  Injector Phase II
-  Drill Producer
-  Central Battery



Beach Exploration, Inc.

PROPOSED WEST HIGH LONESOME PENROSE SAND UNIT

Proposed Injection Pattern



Eddy County, New Mexico Scale : 1"=2000'
JMR March 2001

TABLE 4
Queen (Penrose) Sand Waterflood Projects
High Lonesome and Red Lake Fields
Lea County, New Mexico

Project	Field Section-Township-Range	Area (Ac.)	Primary EUR MBO/Well	Secondary EUR MBO	Injection Pattern	Maximum Wells	Floodstart Year	Average Maximum Injection Rate & Pressure
Vintage Drilling High Lonesome Penrose Ut.	High Lonesome (Queen) Sec. 15-T16S-R29E	480	529	325	Partial 40 Ac, 5-Spot	8P + 7I	1957-65	150 BWPD @ 1100 psi
Ateco Petroleum High Lonesome Queen Sand Wf	High Lonesome (Queen) Sec. 16-T16S-R29E	400	152	211	40 Ac, 5-Spot	7P + 5I	1957-59	150 BWPD @ 1100 psi
Armstrong Energy High Lonesome Brewer Bosworth	High Lonesome (Queen) Secs. 11, 12, 13 & 14- T16S-R29E	1200	1361	1315	Peripheral Line Drive	14P + 16I	1963	280 BWPD @ 750 psi
Kincaid & Watson E. RedLake Ut.	Red Lake Queen Grayburg East Secs. 35 & 36-T16S-R28E Secs. 1 & 2-T11S-R28E	520	226	222	80 Ac, 5-Spot	6P + 7I	1970	280 BWPD @ 700 psi
Proposed W. High Lonesome Penrose Sand Unit	High Lonesome (Queen) Secs. 17, 18, 19 & 20- T16S-R29E	1080	538	538 Est.	1.0 Est.			

OIL CONSERVATION DIVISION

CASE NUMBER _____

Beach EXHIBIT 23

Waterflood Development Cost
Proposed West High Lonesome Penrose Sand Unit
High Lonesome Queen Field
Eddy County, New Mexico

Beach Exploration, Inc.

	ITEM	Cost (M\$)
I.	Drill & Equip one (1) Producing Well	150
II.	Convert 13 Wells to Injection	140
III.	Recondition 13 Producing Wells	56
IV.	Install Water Supply Line	73
V.	Install Water Injection Plant and Facilities	47
VI.	Install Water Injection Lines	124
VII.	Production Facility Consolidation	170
VIII.	Re-Plug 4 Abandoned Wells in Proposed Unit Area	<u>40</u>
	Subtotal	800
	Pre Unitization Expense	<u>65</u>
	Total	865

OIL CONSERVATION DIVISION

CASE NUMBER _____

Beach EXHIBIT 24

WHLPSU - INCREMENTAL FLOOD

DATE : 07/09/01

BEACH EXPLORATION, INC.

TIME : 17:24:51

HIGH LONESOME QUEEN (QUEEN (PENROSE SAND))

EDDY, NM

INJ 7/01, PEAK RESPONSE - 300BPD 3/03, DECL 20% 3/04

26 WELLS OPX \$19,500, 7/01 \$39,000, 7/09 \$19,500

NET LSE 83.83%, INSTALL 7/01-865M\$, SUB INJ 7/02-64M\$

RESERVES AND ECONOMICS

EFFECTIVE DATE:

5/00

-END- MO-YR	GROSS OIL PRODUCTION ---MBBLS---	GROSS GAS PRODUCTION ---MMCF---	NET OIL PRODUCTION ---MBBLS---	NET GAS PRODUCTION ---MMCF---	NET OIL PRICE ---\$/BBL---	NET GAS PRICE ---\$/MCF---	NET OIL SALES ---M\$---	NET GAS SALES ---M\$---	TOTAL NET SALES ---M\$---
12-00	-0.000	-0.000	-0.000	-0.000	0.000	0.000	-0.005	-0.000	-0.005
12-01	0.645	-0.000	0.541	-0.000	22.000	0.000	11.902	-0.000	11.902
12-02	21.742	0.000	18.226	0.000	22.000	0.000	400.961	0.000	400.961
12-03	102.631	0.000	86.032	0.000	22.000	0.000	1,892.708	0.000	1,892.708
12-04	98.785	0.000	82.809	0.000	22.000	0.000	1,821.788	0.000	1,821.788
12-05	79.129	0.000	66.332	0.000	22.000	0.000	1,459.294	0.000	1,459.294
12-06	63.280	0.000	53.046	0.000	22.000	0.000	1,167.005	0.000	1,167.005
12-07	50.604	0.000	42.420	0.000	22.000	0.000	933.231	0.000	933.231
12-08	40.438	0.000	33.898	0.000	22.000	0.000	745.756	0.000	745.756
12-09	32.326	0.000	27.098	0.000	22.000	0.000	596.150	0.000	596.150
S TOT	489.580	-0.000	410.400	-0.000	22.000	0.000	9,028.790	-0.000	9,028.790
AFTER	68.345	0.000	57.291	0.000	22.000	0.000	1,260.405	0.000	1,260.405
TOTAL	557.925	-0.000	467.691	-0.000	22.000	0.000	10,289.195	-0.000	10,289.195

-END- MO-YR	NET ADVAL & PROD. TAXES ---M\$---	DIRECT OPER EXPENSE ---M\$---	EQUITY INVESTMENT ---M\$---	SALVAGE ---M\$---	FUTURE NET CASHFLOW ---M\$---	CUMULATIVE CASHFLOW ---M\$---	10% FUTURE DISC CF ---M\$---	10% CUM DISC CF ---M\$---	20% FUTURE DISC CF ---M\$---
12-00	-0.000	0.000	0.000	0.000	-0.005	-0.005	-0.005	-0.005	-0.005
12-01	0.922	220.500	865.000	0.000	-1,074.520	-1,074.525	-957.876	-957.881	-862.550
12-02	31.074	441.000	64.000	0.000	-135.113	-1,209.638	-116.056	-1,073.938	-100.807
12-03	146.685	446.250	0.000	0.000	1,299.773	90.135	962.990	-110.948	732.789
12-04	141.189	450.000	0.000	0.000	1,230.599	1,320.734	832.793	721.846	583.452
12-05	113.095	450.000	0.000	0.000	896.198	2,216.932	551.540	1,273.386	354.315
12-06	90.443	450.000	0.000	0.000	626.562	2,843.494	350.679	1,624.065	206.577
12-07	72.325	450.000	0.000	0.000	410.906	3,254.400	209.210	1,833.275	113.039
12-08	57.796	450.000	0.000	0.000	237.960	3,492.360	110.298	1,943.573	54.699
12-09	46.202	333.000	0.000	0.000	216.949	3,709.308	90.190	2,033.762	40.496
S TOT	699.731	3,690.750	929.000	0.000	3,709.308	3,709.308	2,033.762	2,033.762	1,122.005
AFTER	97.681	773.250	0.000	0.000	389.474	4,098.782	141.379	2,175.141	56.306
TOTAL	797.413	4,464.000	929.000	0.000	4,098.782	4,098.782	2,175.141	2,175.141	1,178.311

	OIL	GAS		P. W. %	P. W., M\$
GROSS WELLS	0.0		LIFE, YRS.	13.00	3,597.323
GROSS ULT., MB & MMF	574.933	0.044	DISCOUNT	10.00	3,164.318
GROSS CUM., MB & MMF	0.000	0.000	UNDISCOUNTED PAYOUT, YRS.	3.67	2,788.689
GROSS RES., MB & MMF	574.933	0.044	DISCOUNTED PAYOUT, YRS.	3.83	2,461.424
NET RES., MB & MMF	481.948	0.037	UNDISCOUNTED NET/INVEST	5.41	2,175.141
NET REVENUE, M\$	10,602.859	0.112	DISCOUNTED NET/INVEST	3.34	1,923.764
INITIAL PRICE, \$	0.000	0.000	RATE-OF-RETURN, PCT.	55.81	1,702.256
INITIAL N.I., PCT.	0	0	INITIAL W.I., PCT.	0.00	1,506.425

OIL CONSERVATION DIVISION

CASE NUMBER

Beach EXHIBIT 25

18.00	1,332.761
20.00	1,178.311
22.00	1,040.579
24.00	917.446
26.00	807.106
28.00	708.011
30.00	618.834

WHLPSU - PRIMARY
 BEACH EXPLORATION, INC.
 HIGH LONESOME QUEEN (QUEEN (PENROSE SAND))
 EDDY, NM
 CONTINUED PRIMARY
 5 WELLS (ASSUMED ECONOMIC TO 1 BOPD THEN DROPPED)
 OPX \$750/MO/WELL (WELLS DROPPED 9/00, 5/01, 6/03 & 5/10)

DATE : 07/09/01
 TIME : 17:11:04

RESERVES AND ECONOMICS

EFFECTIVE DATE: 5/00

-END- MO-YR	GROSS OIL PRODUCTION ---MBBLS---	GROSS GAS PRODUCTION ---MMCF---	NET OIL PRODUCTION ---MBBLS---	NET GAS PRODUCTION ---MMCF---	NET OIL PRICE ---\$/BBL---	NET GAS PRICE ---\$/MCF---	NET OIL SALES -----M\$-----	NET GAS SALES -----M\$-----	TOTAL NET SALES -----M\$-----
12-00	1.907	0.015	1.599	0.013	22.000	3.000	35.177	0.038	35.215
12-01	1.789	0.007	1.500	0.006	22.000	3.000	32.996	0.018	33.013
12-02	1.267	0.000	1.062	0.000	22.000	0.000	23.362	0.000	23.362
12-03	0.877	0.000	0.735	0.000	22.000	0.000	16.178	0.000	16.178
12-04	0.614	0.000	0.515	0.000	22.000	0.000	11.325	0.000	11.325
12-05	0.522	0.000	0.438	0.000	22.000	0.000	9.625	0.000	9.625
12-06	0.444	0.000	0.372	0.000	22.000	0.000	8.182	0.000	8.182
12-07	0.377	0.000	0.316	0.000	22.000	0.000	6.959	0.000	6.959
12-08	0.328	0.000	0.275	0.000	22.000	0.000	6.053	0.000	6.053
12-09	0.285	0.000	0.239	0.000	22.000	0.000	5.256	0.000	5.256
S TOT	8.411	0.022	7.051	0.019	22.000	3.000	155.112	0.056	155.168
AFTER	0.093	0.000	0.078	0.000	22.000	0.000	1.721	0.000	1.721
TOTAL	8.504	0.022	7.129	0.019	22.000	3.000	156.832	0.056	156.888

-END- MO-YR	NET ADVAL & PROD. TAXES -----M\$-----	DIRECT OPER EXPENSE -----M\$-----	EQUITY INVESTMENT -----M\$-----	SALVAGE -----M\$-----	FUTURE NET CASHFLOW -----M\$-----	CUMULATIVE CASHFLOW -----M\$-----	10% FUTURE DISC CF -----M\$-----	10% CUM DISC CF -----M\$-----	20% FUTURE DISC CF -----M\$-----
12-00	2.729	27.000	0.000	0.000	5.486	5.486	5.339	5.339	5.210
12-01	2.559	30.000	0.000	0.000	0.455	5.941	0.499	5.838	0.528
12-02	1.811	27.000	0.000	0.000	-5.448	0.492	-4.429	1.409	-3.668
12-03	1.254	21.750	0.000	0.000	-6.826	-6.333	-5.080	-3.671	-3.883
12-04	0.878	18.000	0.000	0.000	-7.553	-13.886	-5.091	-8.762	-3.553
12-05	0.746	18.000	0.000	0.000	-9.121	-23.007	-5.591	-14.353	-3.579
12-06	0.634	18.000	0.000	0.000	-10.452	-33.460	-5.827	-20.180	-3.420
12-07	0.539	18.000	0.000	0.000	-11.580	-45.040	-5.870	-26.050	-3.159
12-08	0.469	18.000	0.000	0.000	-12.416	-57.456	-5.723	-31.774	-2.824
12-09	0.407	18.000	0.000	0.000	-13.151	-70.608	-5.511	-37.285	-2.493
S TOT	12.025	213.750	0.000	0.000	-70.608	-70.608	-37.285	-37.285	-20.841
AFTER	0.133	6.750	0.000	0.000	-5.163	-75.771	-2.026	-39.310	-0.862
TOTAL	12.159	220.500	0.000	0.000	-75.771	-75.771	-39.310	-39.310	-21.703

	OIL -----	GAS -----		P. W. % -----	P. W., M\$ -----
GROSS WELLS	1.0		LIFE, YRS.	10.08	0.00
GROSS ULT., MB & MMF	541.875	374.680	DISCOUNT	10.00	5.00
GROSS CUM., MB & MMF	533.371	374.658	UNDISCOUNTED PAYOUT, YRS.	0.00	10.00
GROSS RES., MB & MMF	8.504	0.022	DISCOUNTED PAYOUT, YRS.	#N/A	15.00
NET RES., MB & MMF	7.129	0.019	UNDISCOUNTED NET/INVEST	0.00	20.00
NET REVENUE, M\$	156.832	0.056	DISCOUNTED NET/INVEST	0.00	25.00
INITIAL PRICE, \$	22.000	3.000	RATE-OF-RETURN, PCT.	400.00	30.00
INITIAL N.I., PCT.	83.8268244	83.8268244	INITIAL W.I., PCT.	100.00	50.00
				100.00	2.048
				200.00	3.695
				300.00	3.836
				400.00	3.774
				500.00	3.677
				750.00	3.447
				1000.00	3.269

WHLPSU - WATERFLOOD
 BEACH EXPLORATION, INC.
 HIGH LONESOME QUEEN (QUEEN (PENROSE SAND))
 EDDY, NM
 INJ 7/01, PEAK RESPONSE - 300BPD 3/03, DECL 20% 3/04
 26 WELLS OPX \$19,500, 7/01 \$39,000, 7/09 \$19,500
 NET LSE 83.83%, INSTALL 7/01-865M\$, SUB INJ 7/02-64M\$

DATE : 07/09/01
 TIME : 16:55:11

RESERVES AND ECONOMICS

EFFECTIVE DATE: 5/00

-END- MO-YR	GROSS OIL PRODUCTION	GROSS GAS PRODUCTION	NET OIL PRODUCTION	NET GAS PRODUCTION	NET OIL PRICE	NET GAS PRICE	NET OIL SALES	NET GAS SALES	TOTAL NET SALES
----	---MBBLS---	---MMCF---	---MBBLS---	---MMCF---	---\$/BBL---	---\$/MCF---	---M\$---	---M\$---	---M\$---
12-00	1.907	0.015	1.599	0.013	22.000	3.000	35.172	0.038	35.210
12-01	2.435	0.007	2.041	0.006	22.000	3.000	44.898	0.018	44.915
12-02	23.009	0.000	19.287	0.000	22.000	0.000	424.323	0.000	424.323
12-03	103.508	0.000	86.768	0.000	22.000	0.000	1,908.886	0.000	1,908.886
12-04	99.399	0.000	83.323	0.000	22.000	0.000	1,833.112	0.000	1,833.112
12-05	79.651	0.000	66.769	0.000	22.000	0.000	1,468.919	0.000	1,468.919
12-06	63.724	0.000	53.418	0.000	22.000	0.000	1,175.186	0.000	1,175.186
12-07	50.981	0.000	42.736	0.000	22.000	0.000	940.190	0.000	940.190
12-08	40.766	0.000	34.173	0.000	22.000	0.000	751.809	0.000	751.809
12-09	32.611	0.000	27.337	0.000	22.000	0.000	601.406	0.000	601.406
S TOT	497.991	0.022	417.450	0.019	22.000	3.000	9,183.901	0.056	9,183.957
AFTER	68.438	0.000	57.369	0.000	22.000	0.000	1,262.126	0.000	1,262.126
TOTAL	566.429	0.022	474.819	0.019	22.000	3.000	10,446.027	0.056	10,446.083

-END- MO-YR	NET ADVAL & PROD. TAXES	DIRECT OPER EXPENSE	EQUITY INVESTMENT	SALVAGE	FUTURE NET CASHFLOW	CUMULATIVE CASHFLOW	10% FUTURE DISC CF	10% CUM DISC CF	20% FUTURE DISC CF
----	---M\$---	---M\$---	---M\$---	---M\$---	---M\$---	---M\$---	---M\$---	---M\$---	---M\$---
12-00	2.729	27.000	0.000	0.000	5.481	5.481	5.334	5.334	5.205
12-01	3.481	250.500	865.000	0.000	-1,074.066	-1,068.584	-957.378	-952.043	-862.022
12-02	32.885	468.000	64.000	0.000	-140.562	-1,209.146	-120.485	-1,072.528	-104.474
12-03	147.939	468.000	0.000	0.000	1,292.947	83.801	957.910	-114.619	728.906
12-04	142.066	468.000	0.000	0.000	1,223.046	1,306.847	827.703	713.084	579.899
12-05	113.841	468.000	0.000	0.000	887.078	2,193.925	545.949	1,259.033	350.736
12-06	91.077	468.000	0.000	0.000	616.109	2,810.034	344.852	1,603.885	203.157
12-07	72.865	468.000	0.000	0.000	399.325	3,209.359	203.340	1,807.224	109.880
12-08	58.265	468.000	0.000	0.000	225.544	3,434.903	104.574	1,911.799	51.875
12-09	46.609	351.000	0.000	0.000	203.797	3,638.700	84.679	1,996.478	38.003
S TOT	711.757	3,904.500	929.000	0.000	3,638.700	3,638.700	1,996.478	1,996.478	1,101.165
AFTER	97.815	780.000	0.000	0.000	384.311	4,023.012	139.353	2,135.831	55.443
TOTAL	809.571	4,684.500	929.000	0.000	4,023.012	4,023.012	2,135.831	2,135.831	1,156.608

	OIL	GAS		P. W. %	P. W., M\$
	-----	-----		-----	-----
GROSS WELLS	1.0		LIFE, YRS.	13.00	4,023.012
GROSS ULT., MB & MMF	1,099.800	374.680	DISCOUNT	10.00	2,915.888
GROSS CUM., MB & MMF	533.371	374.658	UNDISCOUNTED PAYOUT, YRS.	0.00	2,135.831
GROSS RES., MB & MMF	566.429	0.022	DISCOUNTED PAYOUT, YRS.	#N/A	1,572.327
NET RES., MB & MMF	474.819	0.019	UNDISCOUNTED NET/INVEST	5.33	1,156.608
NET REVENUE, M\$	10,446.027	0.056	DISCOUNTED NET/INVEST	3.30	844.430
INITIAL PRICE, \$	22.000	3.000	RATE-OF-RETURN, PCT.	55.81	606.473
INITIAL N.I., PCT.	83.8268244	83.8268244	INITIAL W.I., PCT.	100.00	77.283
				100.00	-244.634
				200.00	-243.142
				300.00	-189.290
				400.00	-149.644
				500.00	-121.844
				750.00	-80.732
				1000.00	-58.929

Beach Exploration, Inc.

OCD CLARIFICATION TO - EXHIBIT "C"

6/12/01

TRACT PARTICIPATION

WEST HIGH LONESOME PENROSE SAND UNIT
Eddy County, New Mexico

UNITIZATION PARAMETER:

Ultimate Primary Recovery

TRACT	LEASE NAME	OPERATOR	CUM PROD Apr-00 (BO)	REMAINING PRIMARY (BO)	PROVED UNDEVELOPED (BO)	ULTIMATE		TRACT PARTICIPATION (%)
						PRIMARY RECOVERY (BO)	TRACT PARTICIPATION (%)	
1	Exxon Federal "A"	Beach Expl.	34,082	0	0	34,082	6.132558%	
2	Exxon Federal	Beach Expl.	179,372	6,941	0	186,313	33.524305%	
3	Renee Federal	Beach Expl.	99,220	0	0	99,220	17.853191%	
4	Big Mac Federal	Beach Expl.	13,004	0	0	13,004	2.339880%	
5	Shiloh Federal #3	Beach Expl.	32,441	0	0	32,441	5.837284%	
6	Shiloh Federal #4	Beach Expl.	11,033	0	0	11,033	1.985227%	
7	lles Federal	Beach Expl.	121,782	86	0	121,868	21.928368%	
8	Federal 19*	Beach Expl.	4,044	0	13,880	17,924	3.225162%	
9	Coastal Federal	Beach Expl.	3,821	0	0	3,821	0.687533%	
10	Ryan Federal	Beach Expl.	9,846	0	0	9,846	1.771644%	
11	M&W Federal	H&S Oil LLC	23,845	1,477	0	25,322	4.556324%	
12	Rosewood State	Beach Expl.	881	0	0	881	0.158523%	
TOTAL			533,371	8,504	13,880	555,755	100.000000%	

* Includes 13,880 barrels of reserves for undrilled interior location on west half of the Federal 19 lease.
(Ultimate primary for the eight surrounding wells = 83,809/ 8 wells = 13,880 BO)

OIL CONSERVATION DIVISION

CASE NUMBER

Beach

EXHIBIT

26

R28E R29E

13

T
16
S

Rosewood St.

Beach
Red Lake
Unit

25

Depco-
St.

7-Up Fed.

Ryan-Fed.

Cal-
Mon
1 St.

M&W
Fed.

Big-Mac

Coastal
Fed.

Fed.-19

Cal-
Mon
1 St.

Exxon-Fed.

Exxon-Fed. 'A'



17



Atkins-Fed.

Skelly-State

ILes-Fed.

1-A

Atkins-State

20

ILes-Fed.

Ginger-
Fed.

Renee-
Fed.

Ryan-
Fed.

Coastal
Fed.

M&W
Fed.

Cal-
Mon
1 St.



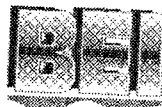
Brainard-Fed.

29

30



Drill Producer



Beach Exploration, Inc.

PROPOSED WEST HIGH LONESOME PENROSE SAND UNIT

Ultimate Primary (MBO)



Eddy County, New Mexico

Scale : 1"=2000'

JMR

March 2001



June 18, 2001

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

RE: Proposed West High Lonesome Penrose Sand Unit
Eddy County, New Mexico

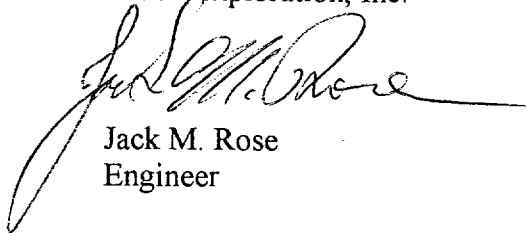
Gentlemen:

Attached for your consideration is Form C-108, "Application for Authorization to Inject", along with the required attachments, relating to the proposed waterflood to be initiated in the West High Lonesome Penrose Sand Unit in sections 17, 18, 19 and 20, Township 16S, Range 29E, Eddy County, New Mexico.

Should any further information be required, please advise.

Yours truly,

Beach Exploration, Inc.



Jack M. Rose
Engineer

OIL CONSERVATION DIVISION

CASE NUMBER _____

Beach EXHIBIT 27

APPLICATION FOR AUTHORIZATION TO INJECT

- I. PURPOSE: X Secondary Recovery _____ Pressure Maintenance _____ Disposal _____ Storage _____
Application qualifies for administrative approval? _____ Yes X No
- II. OPERATOR: Beach Exploration, Inc.
- ADDRESS: 800 N. Marienfeld Ste. 200 Midland, Texas 79701
- CONTACT PARTY: Jack Rose PHONE: 915/683-6226
- III. WELL DATA: Complete the data required on the reverse side of this form for each well proposed for injection.
Additional sheets may be attached if necessary.
- IV. Is this an expansion of an existing project? _____ Yes X No
If yes, give the Division order number authorizing the project: _____
- V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.
- VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.
- VII. Attach data on the proposed operation, including:
1. Proposed average and maximum daily rate and volume of fluids to be injected;
 2. Whether the system is open or closed;
 3. Proposed average and maximum injection pressure;
 4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and,
 5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).
- *VIII. Attach appropriate geologic data on the injection zone including appropriate lithologic detail, geologic name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval.
- IX. Describe the proposed stimulation program, if any.
- *X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted).
- *XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.
- XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.
- XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.
- XIV. Certification: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.
- NAME: Jack M. Rose TITLE: Engineer
- SIGNATURE: [Signature] DATE: June 18, 2001
- * If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be resubmitted. Please show the date and circumstances of the earlier submittal: _____

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate District Office

Beach Exploration, Inc.
C-108 Application
Proposed West High Lonesome Penrose Sand Unit
Eddy County, New Mexico

<u>Form C108 – Item I.</u>	Purpose - Secondary Recovery
<u>Form C108 – Item II.</u>	Operator - Beach Exploration, Inc. Address - 800 N. Marienfeld, Suite 200 Midland, Texas 79701-3382 Contact - Jack M. Rose (915) 683-6226
<u>Form C108 – Item III.</u>	Injection Well Data Sheets (attached 3 legal sheets)
<u>Form C108 – Item IV.</u>	Expansion of existing project? <u>NO</u>
<u>Form C108 – Item V.</u>	Large area map and Area of Review Detail map (attached)
<u>Form C108 – Item VI.</u>	Area of Review – Well data tabulation & schematics Unit Producing Wells – (attached 2 legal sheets) Offset Well – (attached 1 legal sheet) Plugged Wells – (attached 1 list, 11 schematics)
<u>Form C108 – Item VII.</u>	Feasibility Study – (attached 25 pages) Development Plat – (attached map) Water Analyses – (attached 10 pages)

A feasibility study of the proposed unit was prepared by T. Scott Hickman & Associates in 1993. This study is the basis for our proposed operation and it indicates that additional reserves of 538,000 barrels can reasonably be expected to be recovered as a result of waterflooding. The engineering study with its related geological information is included for your review.

The proposed development of the waterflood is as shown on the attached plat. It consists of conversion of thirteen existing wells to Phase I water injectors, drilling one additional producer, installation of a (closed system) waterflood plant and distribution system, consolidation of twelve tank batteries to a central battery, and installation of a supply water pipeline. A subsequent conversion of five existing unit producing wells to Phase II water injectors is planned when water breakthrough occurs in these wells.

Make-up water volume requirements have been recalculated based on current cumulative production and is estimated to be 1.6 million barrels. Total make-up water requirements will be at least 1.6 million barrels and could range up to 2.4 million barrels depending on injection efficiency (67% estimated previously). The maximum monthly requirement would be 110,000 barrels initially and should decrease uniformly to little or no usage in a 3.5 to 4 year period with re-injection of produced water. On a daily basis, the targeted injection rate will be 200 BHPD for each well. Initially with thirteen injectors this would

be 2,600 BWPD and after Phase II water injectors have been converted (5 additional) the daily requirement would be 3,600 BWPD.

The maximum injection pressure is anticipated to be 1100 psi. Experience in four other Penrose floods in this area show that injection pressures can vary from a low of 280 BWPD at 700 psi to 150 BWPD at 1100 psi. The pay quality in the area of the proposed flood is expected to be on the tighter side and higher injection pressures are anticipated.

A four-township area surrounding the proposed flood was investigated for potential sources of makeup water. There are a few water wells in the area. One is indicated to be a saltwater well and the rest are fresh. The State Engineer's office has indicated that these wells are shallow, discontinuous water sources of very limited capacity and unsuitable for our purposes.

The City of Carlsbad Water Supply System has several fresh water pipelines in the area that have serviced waterflood operations. The closest is 3.24 miles to the east. This source is capable of delivering more than twice our maximum required daily makeup volume. The delivery point is uphill from our proposed flood and strong enough to flow by gravity to our proposed flood site.

Produced water is scarce in the area of the proposed flood but abundant to the south. The proposed flood is central to two townships. No saltwater disposal wells exist in these two townships and total water production is 175 barrels of water per day. Nine disposal wells exist in the north half of the two townships to the south of the proposed flood. Three of the nine wells are handling sufficient volumes of water to be considered as possible sources for makeup water. Two of these three are considered to be cost prohibitive, requiring seven plus miles of large diameter pipeline to be installed. The remaining disposal well, Mack Energy's Big George State #3, handles 6,500 barrels of water per day from Mack operated wells in the Paddock and Yeso. This well is 5.1 miles to the south and would require pumping by mechanical means to reach the proposed flood site.

Beach Exploration is requesting the use of Carlsbad Double Eagle fresh water as make-up water for the West High Lonesome Penrose Sand Unit. The Big George State #3 disposal water is extremely poor quality. This water has severe problems with suspended solids, oil carryover, scaling tendencies and bacteria. The water borders on being cost prohibitive from a chemical treating and facilities requirement standpoint but most significantly it is Beach's opinion that it would pose a significant long-term risk to the success of the flood.

City of Carlsbad fresh water has been successfully used in Penrose floods in the immediate vicinity of our proposed flood and should not create a problem with soluble salts or swelling clays.

Enclosed are individual analyses for the two potential make-up water sources: City of Carlsbad Double Eagle Fresh Water and Mack Energy's Big George State #3 disposal well. Also enclosed are water compatibility reports for the combination of these two waters with produced water from the proposed flood interval (source: Beach, Exxon Federal lease).

Form C108 – Item VIII.

The injection zone in the proposed unit is locally called the Penrose sand, a lower member of the Queen formation. The sand is generally a gray, fine grained, well sorted, and rounded to sub-rounded quartz sandstone. The sand ranges from 26 to 32 feet in thickness in the proposed unit area, and ranges in depth from 1,650 feet to 1,800 feet depending upon regional dip and surface elevation.

The office of the State Engineer has said that no fresh aquifers exist above or below the proposed injection zone. There are scattered but very limited shallow fresh water Triassic sands in the area down to approximately 100 feet. These are produced from occasional windmills. Only one such windmill exists within one mile of any of the proposed injection wells.

Form C108 – Item IX.

There is no stimulation program planned for this unit initially other than routine acid treatments for potential calcium carbonate scaling.

Form C108 – Item X.

All wells in the proposed flood are of public record and logs have been filed with the OCD.

Form C108 – Item XI.

Fresh water well water analysis – only one within one mile
Windmill located 900' FNL 400' FEL, Section 24,
T16S, R28E, Eddy County, New Mexico
Location Plat (attached)
Chemical analysis (attached – Water Well #2)

Form C108 – Item XII.

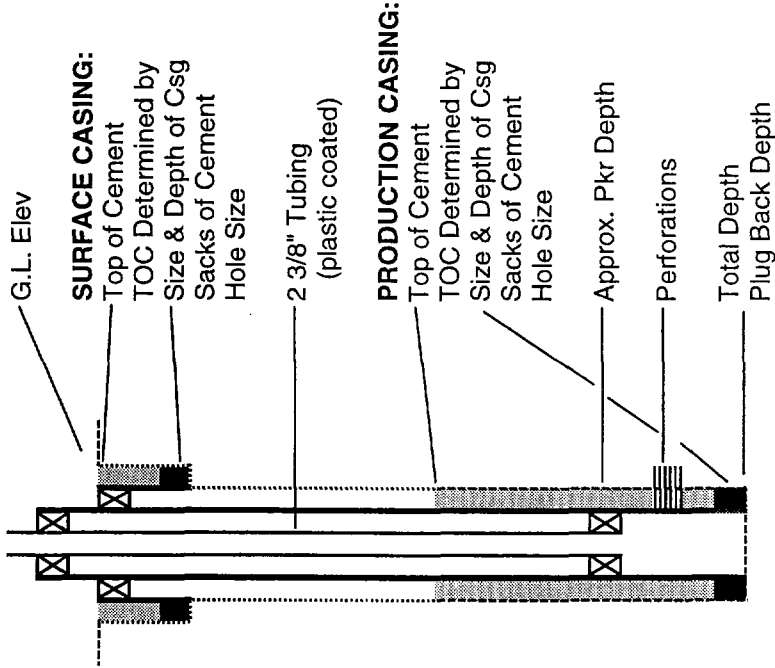
Not applicable

Form C108 – Item XIII.

“Proof of Notice” to be supplied later

Operator Lease & Well # Location Sec.-Unit, Twp., Rge.	Beach Expl Exxon Federal "A" #1 2310' FNL 330' FEL 18-H, 16S, 29E	Beach Expl Exxon Federal "A" #2 2310' FNL 1650' FEL 18-G, 16S, 29E	Beach Expl Exxon Federal "A" #3 2410' FNL 1932' FWL 18-F, 16S, 29E	Beach Expl Exxon Federal #1 660' FSL 660' FEL 18-P, 16S, 29E	Beach Expl Exxon Federal #2 330' FSL 1650' FEL 18-O, 16S, 29E	Beach Expl Exxon Federal #6 560' FSL 2035' FWL 18-N, 16S, 29E
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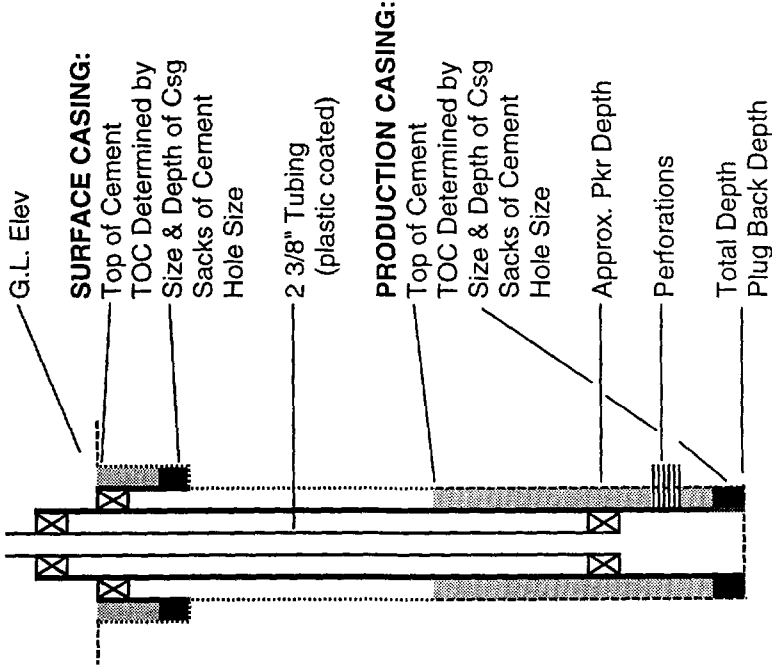
TYPICAL SCHEMATIC



ALL WELLS:
2 3/8" Tubing internally plastic coated.
Model AD-1 Tension Packer set within 100' of top perf.
Injection formation: Penrose Sand member of Queen formation
Field: High Lonesome (Queen)
All wells were originally producers and will be converted to injection
There are no known overlying or underlying oil or gas zones.

Operator Lease & Well # Location Sec.-Unit, Twp., Rge.	Beach Expl Rosewood St. "18" #1 1650' FSL 330' FWL 18-L, 16S, 29E	Beach Expl Shiloh Federal #3 2310' FNL 988' FWL 17-E, 16S, 29E	Beach Expl Shiloh Federal #4 2210' FNL 1650' FWL 17-F, 16S, 29E	Beach Expl Illes Federal #2 1650' FSL 2310' FWL 17-K, 16S, 29E	Beach Expl Illes Federal #3 330' FNL 2310' FWL 20-C, 16S, 29E	Beach Expl Illes Federal #4 1650' FSL 2310' FWL 17-J, 16S, 29E
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TYPICAL SCHEMATIC



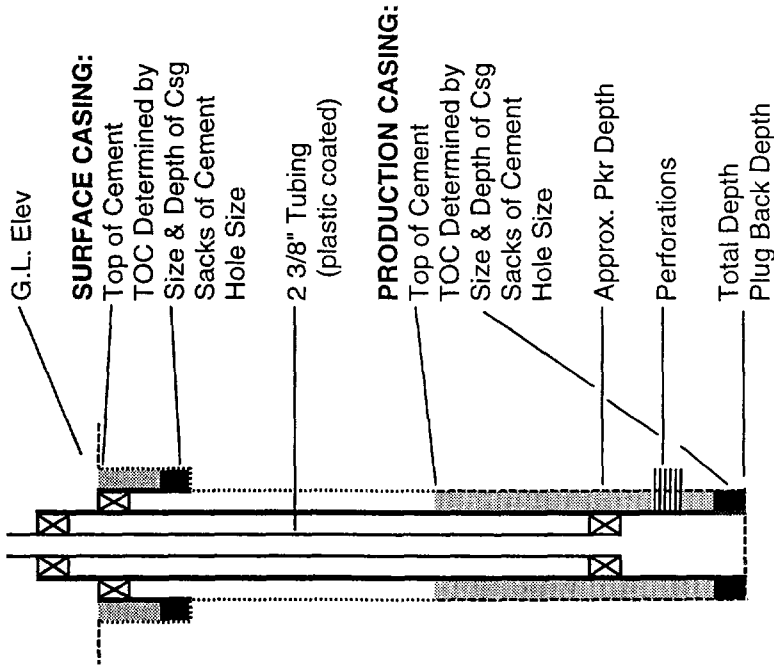
ALL WELLS:

2 3/8" Tubing internally plastic coated.
Model AD-1 Tension Packer set within 100' of top perf.
Injection formation: Penrose Sand member of Queen formation
Field: High Lonesome (Queen)
All wells were originally producers and will be converted to injection
There are no known overlying or underlying oil or gas zones.

Operator	Beach Expl	Beach Expl	Beach Expl	Beach Expl	Beach Expl
Lease & Well #	Iles Federal #8	Renee Federal #1	Renee Federal #3	Federal "19" #1	Big-Mac Federal #1
Location	2310' FSL 1950' FWL	660' FSL 330' FWL	1650' FNL 330' FWL	660' FNL 660' FEL	660' FNL 3300' FWL
Sec.-Unit, Twp., Rge.	17-K, 16S, 29E	17-M, 16S, 29E	20-E, 16S, 29E	19-A, 16S, 29E	19-C, 16S, 29E

Beach Expl	Beach Expl
Coastal Federal #1	Coastal Federal #1
1980' FNL 1980' FEL	1980' FNL 1980' FEL
19-G, 16S, 29E	19-G, 16S, 29E

TYPICAL SCHEMATIC

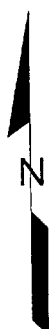
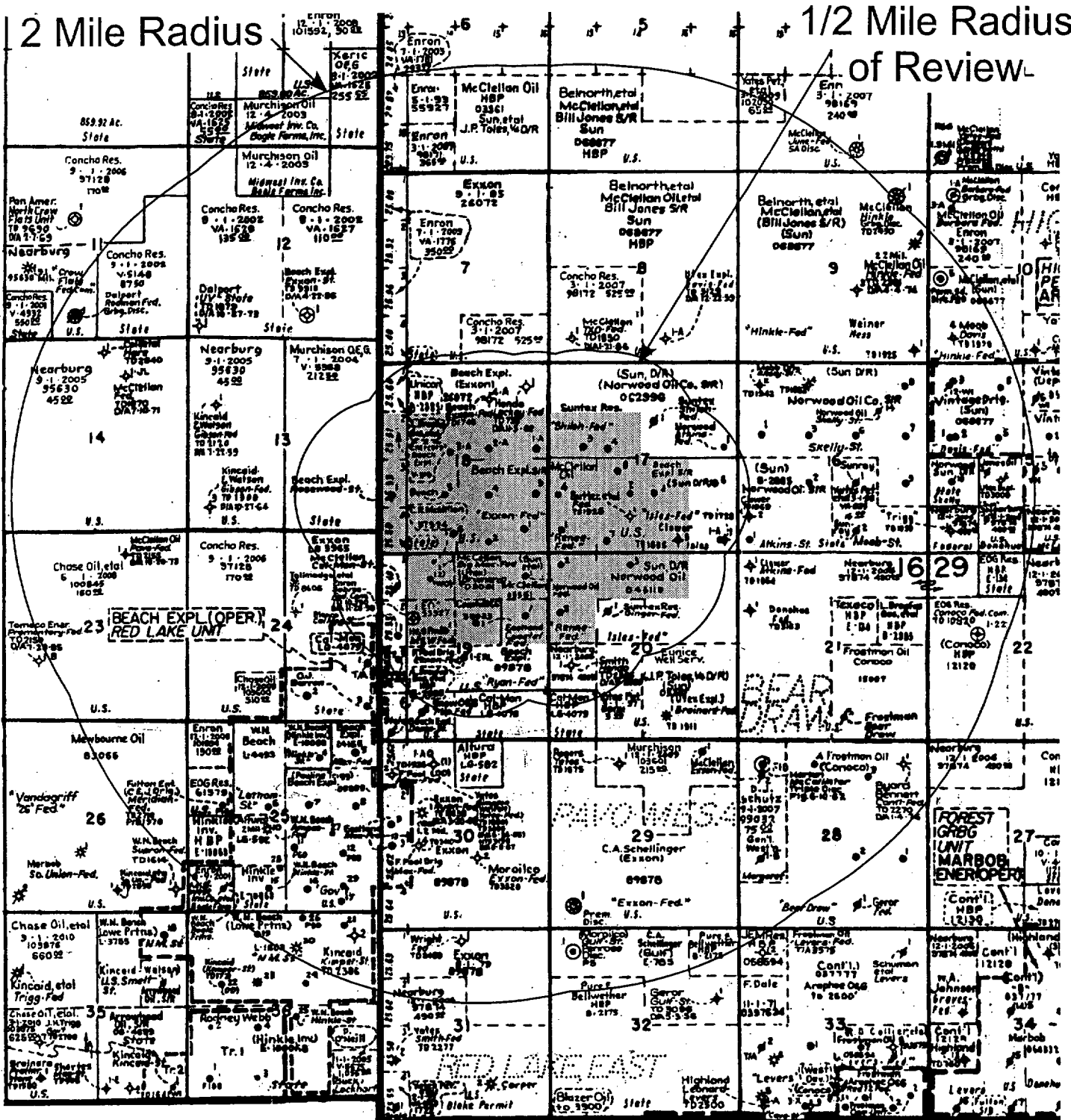


3642'	3642'	3638'	3639'	3597'	3637'
Surface Circulated	Surface Circulated	Surface Circulated	Surface Circulated	Surface Calculated	Surface Circulated
8 5/8" @ 253'	8 5/8" @ 300'	8 5/8" @ 300'	8 5/8" @ 355'	8 5/8" @ 202'	8 5/8" @ 304'
190	200	280	250	100	200
12 1/4"	12 1/4"	12 1/4"	12 1/4" assumed	12 1/4" assumed	12 1/4"

Surface Circulated	40'	16'	205'	1112'	Surface Circulated
4 1/2" @ 1809'	Calculated 5 1/2" @ 1815'	Calculated 5 1/2" @ 1920'	Calculated 4 1/2" @ 1874'	Calculated 4 1/2" @ 1871'	5 1/2" @ 1877'
480	350	375	360	200	400
7 7/8"	7 7/8"	7 7/8"	7 7/8"	7 7/8"	7 7/8"
1690'	1679'	1724'	1696'	1633'	1697'
1740' - 1764'	1729' - 1750'	1774' - 1793'	1746' - 1772'	1683' - 1699'	1747' - 1797'
1813'	1850'	1925'	1875'	3001'	1877'
1783'	1815'	1920'	1846'	1829'	1834'

Well drilled to 3001' and P&A'd in 1956
No record of where plugs were set.
Cleaned out to 2100'
8/85, 4 1/2" set at 1871'

ALL WELLS:
2 3/8" Tubing internally plastic coated.
Model AD-1 Tension Packer set within 100' of top perf.
Injection formation: Penrose Sand member of Queen formation
Field: High Lonesome (Queen)
All wells were originally producers and will be converted to injection
There are no known overlying or underlying oil or gas zones.



Beach Exploration, Inc.

WEST HIGH LONESOME PENROSE SAND UNIT

Form C108 Item V.

2 Mile Radius and
1/2 Mile Radius Area of Review

0 2000 4000

Eddy County, New Mexico

Scale : 1"=4000'

JMR

Land Map 3/2001

R28E R29E

13



17



18



Rosewood St.

Exxon-Fed. 'A'

Shiloh-Fed.

Atkins-Fed.

Skelly-State

T
16
S

24

Exxon-Fed.

Renee-Fed.

ILes-Fed.

Atkins-State

Cal-Mon
1 St.

Big-Mac

Fed.-19

ILes-Fed.

1-A

Cal-Mon
1 St.

M&W
Fed.

Coastal
Fed.

Ryan-Fed.

Renee-Fed.

Ginger-Fed.

ILes-Fed.

Beach
Red Lake
Unit

25

Depco-
St.

7-Up Fed.

Ryan-Fed.

Brainard-Fed.

30

29

N



Injector Phase I



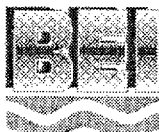
Injector Phase II



Drill Producer



Central Battery



Beach Exploration, Inc.

WEST HIGH LONESOME PENROSE SAND UNIT

Form C108 Item V.

AREA OF REVIEW

1/2 MILE RADIUS - ALL INJECTORS

0 1000 2000



Eddy County, New Mexico

Scale : 1"=2000'

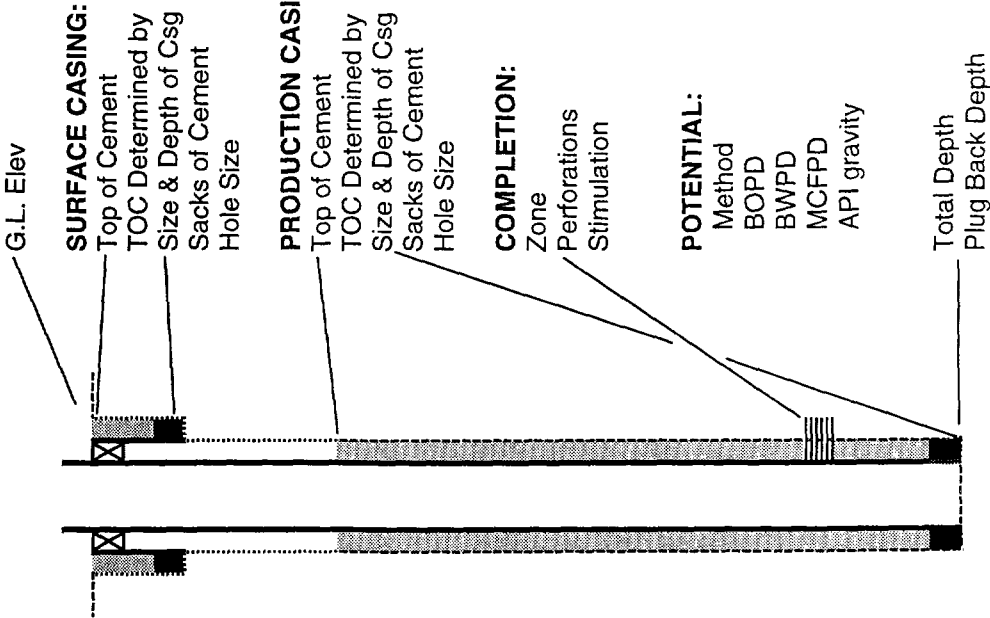
JMR

March 2001

Operator Lease & Well # Location Sec.-Unit, Twp., Rge.	Beach Expl Exxon Federal #3 1650' FSL 330' FEL 18-I, 16S, 29E	Beach Expl Exxon Federal #4 1650' FSL 1650' FEL 18-J, 16S, 29E	Beach Expl Exxon Federal #5 1650' FSL 1835' FWL 18-K, 16S, 29E	Beach Expl Renee Federal #4 1650' FSL 330' FWL 17-L, 16S, 29E	Beach Expl lles Federal #7 330' FSL 1650' FWL 17-N, 16S, 29E	Beach Expl Renee Federal #2 330' FNL 330' FWL 20-D, 16S, 29E
Date Drilled	Nov-85	Apr-86	Aug-86	Jan-85	Mar-86	Sep-85
	3642'	3653'	3608'	3626'	3648'	3636'
TYPICAL SCHEMATIC						
SURFACE CASING:	Surface Circulated 8 5/8" @ 303' 235 12 1/4"	Surface Circulated 8 5/8" @ 333' 175 12 1/4"	Surface Circulated 8 5/8" @ 303' 250 12 1/4"	Surface Circulated 8 5/8" @ 250' 250 12 1/4"	Surface Circulated 8 5/8" @ 292' 250 12 1/4"	Surface Circulated 8 5/8" @ 300' 200 12 1/4"
PRODUCTION CASING:	Surface Circulated 4 1/2" @ 1818' 700 7 7/8"	Surface Circulated 4 1/2" @ 1800' 500 7 7/8"	Surface Circulated 4 1/2" @ 1715' 450 7 7/8"	Surface Circulated 5 1/2" @ 1839' 370 7 7/8"	Surface Circulated 5 1/2" @ 1842' 350 7 7/8"	Surface Circulated 5 1/2" @ 1840' 350 7 7/8"
COMPLETION:	Penrose 1717' - 1741' Acidize w/1500gal Frac w/18,600gal gel+ 27,000# sand	Penrose 1714' - 1731' Acidize w/1200gal Frac w/20,000gal gel+ 42,000# sand	Penrose 1639' - 1652' Acidize w/1200gal Frac w/20,000gal gel+ 42,000# sand	Penrose 1721' - 1738' Acidize w/1000gal Frac w/30,000gal gel+ 50,000# sand	Penrose 1767' - 1787' Acidize w/1000gal Frac w/30,000gal gel+ 49,000# sand	Penrose 1760' - 1783' Acidize w/1000gal Frac w/30,000gal gel+ 43,000# sand
POTENTIAL:	Pumping 80 0 48 32.6	Pumping 89 29 42 36.4	Pumping 79 Trace 100 38	Pumping 100 15 38 34	Pumping 84 13 TSTM 34	Pumping 30 5 TSTM no record
	1820' 1793'	1800' 1791'	1715' 1711'	1850' 1839'	1850' 1841'	1850' 1840'

Operator Lease & Well # Location Sec.-Unit, Twp., Rge.	Beach Expl M&W Federal #1 2210' FNL 1833' FWL 19-F, 16S, 29E	Beach Expl Ryan Federal #2 1780' FNL 660' FEL 19-H, 16S, 29E
Date Drilled	Nov-85	Apr-82
	3640'	3630'
SURFACE CASING: Top of Cement TOC Determined by Size & Depth of Csg Sacks of Cement Hole Size	Surface Calculated 8 5/8" @ 290' 175 12 1/4" assumed	Surface Circulated 8 5/8" @ 348' 225 12 1/4"
PRODUCTION CASING: Top of Cement TOC Determined by Size & Depth of Csg Sacks of Cement Hole Size	Surface Calculated 5 1/2" @ 1972' 1000 7 7/8" assumed	500' Temp Survey 5 1/2" @ 2300' 650 7 7/8"
COMPLETION: Zone Perforations Stimulation	Penrose 1734' - 1746' Acidize w/1000gal Frac w/17,000gal wtr+ 38,500# sand	Penrose 1688' - 1804' Acidize w/1500gal Frac w/50,000gal gel+ 60,000# sand
POTENTIAL: Method BOPD BWPD MCFPD API gravity	Pumping 80 no record no record no record	Pumping 19 0 10 31.7
Total Depth Plug Back Depth	1974' 1972'	CIBPs @ 1645' & 1817' 2310' 2227'

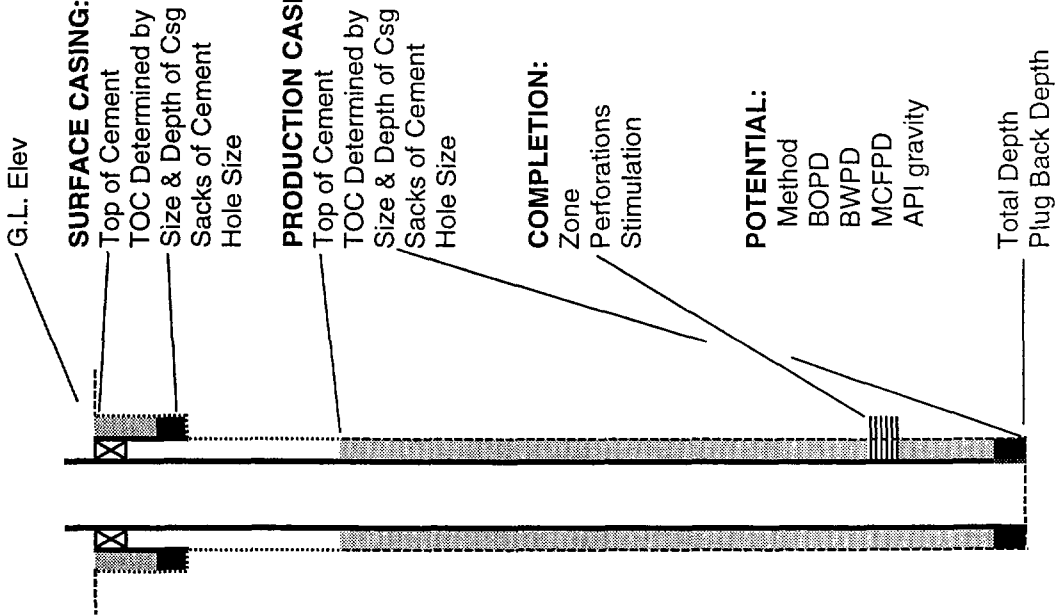
TYPICAL SCHEMATIC



Operator Lease & Well # Location Sec.-Unit, Twp., Rge.	Mack Energy Corp. Atkins Federal #1 2310' FNL 330' FEL 17-H, 16S, 29E	Beach Expl Iles Federal #1-A 330' FSL 345' FEL 17-P, 16S, 29E	Beach Expl Iles Federal #6 1980' FNL 660' FEL 17-I, 16S, 29E	Aspen Pumping Service Cal-Mon State #1 2310' FNL 512' FWL 19-E, 16S, 29E	Aspen Pumping Service Cal-Mon State #2 22260' FSL 512' FWL 19-L, 16S, 29E
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Date Drilled	Apr-56	Aug-39	Mar-57	Oct-87	Apr-88
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TYPICAL SCHEMATIC



3653'	3655'	3648'	3584'	3632'
Surface Circulated 8 5/8" @ 450' unknown 12 1/4" assumed	Surface Unknown 8 1/4" @ 291' 70 11" assumed	Surface Circulated 8 5/8" @ 315' 150 12 1/4"	Surface Calculated 10 3/4" @ 200' 100 12 1/4" assumed	Surface Calculated 10 3/4" @ 171' 60 12 1/4" assumed
1317' Calculated 5 1/2" @ 1825' 100 7 7/8" assumed	544' Calculated 7" @ 1620' 100 8" 5 1/2" liner 1470' - 1735' cmt'd 85sx TOC 1540' by temp survey	Surface Circulated 4 1/2" @ 1825' 800 7 7/8"	1271' Calculated 4 1/2" @ 1658' 100 7 7/8" assumed	1021' Calculated 7" @ 1803' 200 9 1/2" assumed
Penrose 1774' - 1799' Sand Frac w/10,000gal + assumed 10,000# sand	Penrose 1735'-1835' (open hole) 1801'-1821' pay interval Shot w/90 qts nitro	Penrose 1778' - 1802' Sand Frac w/15,000 gal +15,000# sand	Penrose 1658'-1678' (open hole) 1658'-1678' pay interval Natural completion	Penrose 1719' - 1733' Natural completion
Pumping 100 not reported not reported not reported	Pumping 2 not reported not reported not reported	Pumping 20 not reported not reported not reported	Pumping 7 0 TSTM not reported	Pumping 40 Trace TSTM not reported
1825' 1825'	1835' 1835'	1825' 1810'	1678' 1678'	1804' 1790'

Beach Exploration, Inc.
Proposed West High Lonesome Penrose Sand Unit
Area of Review - Plugged Wells (wellbore schematics attached)
Form C-108, Item VI

<u>Operator</u>	<u>Lease & Well #</u>	<u>Location</u>	<u>Sec.-Unit, Twp., Rge.</u>
1. Suntex Resources, Inc.	Shiloh Federal #1	1650' FNL 2308' FEL	17-G, 16S, 29E
2. Butler & Horne	Iles #1	990' FSL 2310' FWL	17-N, 16S, 29E
3. George Atkins	Iles #5	330' FSL 1650' FEL	17-O, 16S, 29E
4. B.H. Nolen / George Atkins	Iles #1	330' FSL 330' FEL	17-P, 16S, 29E
5. Hondo Oil & Gas	Lackey Federal	660' FNL 660 FEL	18-A, 16S, 29E
6. Beach Exploration, Inc.	Exxon Federal "A" #4	990' FNL 1650' FEL	18-B, 16S, 29E
7. McClellan Oil Corp.	Cal-Mon State #1	990' FNL 421' FWL	19-D, 16S, 29E
8. Enron Oil & Gas Co.	Sabres "19" Fed. Com. #1	1846' FNL 926' FWL	19-F, 16S, 29E
9. Upland Production Co.	Exxon ERL Federal #1	2310' FSL 2310 FEL	19-J, 16S, 29E
10. Suntex Resources, Inc.	Ginger Federal #1	1650' FNL 1650' FWL	20-F, 16S, 29E
11. Raymond Smith	Hondo #1	1980' FSL 660' FWL	20-L, 16S, 29E

Calc TOC Surf
yld 1.32 50% exc
both strings

Cmt plug 4 sx Surf
Cmt Plug 25sx
Calc 67' - 350'

8-5/8"
@305'

Yates
@780

7 Rivers
@936

Queen
@1,517

Penrose
@1,756

4-1/2"
@1,850'

Cmt Plug 25sx
tagged
1517' - 1800'

Penrose
1,756 - 1,781

Shiloh Federal #1

GL: 3,656
KB: 1,850
TD: 1,850
PBD: 1,836
Fr. Wtr: Legal: 1,650 from N
2,308 from E
Section: 17-G
Township: 16S
Range: 29E
County: Eddy

Status: P&A
Perfs: 1756' - 1781'
API: 30-015-25525
NM Lse: NMLC062996B
Field: High Lonesome (Queen)
Logs:
Archeological:

Casing	Wt	Type	Set	Cmt	Hole	TOC	Method
8-5/8"			305	250	12 1/4"es	Surf	Calc
4-1/2"			1,850	450	7 7/8"est	Surf	Calc

3-Jan-86 Spud well
Suntex Resources, Inc. Shiloh Federal #1

Penrose Completion

Perforate (1756 - 1781)

Acid w/1000gal, Sand and Water frac w/28Mgal and 50M# sd

15-Mar-87 Potential: Pump 2 BOPD 28 API, ? BWPD, NR MCFPD

15-Mar-87 Plugged

8-5/8"
@415'

7"
@1,730'

0' - 10'
5 sx cmt plug

TOC Calc 241'
yld 1.32, 50% exc

365' 405'
10 sx cmt plug

TOC Calc 490'
yld 1.32, 50% exc

1755' - 1785'
10 sx cmt plug

Butler & Horne - lles #1

GL: KB: 3,647 TD: 1,920 PBD: Fr. Wtr: Legal: 990 from S 2,310 from W
Status: D&A Perfs: API: 30-015- NM Lse: NML 046119A Field: High Lonesome (Queen)
Section: 17-N Township: 16S Range: 29E County: Eddy
Logs: Archeological: none

Casing	Wt	Type	Set	Cmt	Hole	TOC	Method
8 5/8"			415	50	11" est	241	Calc 50% exc
7"			1,730	100	7 7/8" est	490	Calc 50% exc

May-40 Spud well
Butler & Horne Drilling Co. and A.J. Frasier - lles #1

Jul-41 Plug Well

cmt plug w/marker

George Atkins - Iles #5

GL:
KB: 3,655
TD: 1,866
PBD:
Fr. Wtr:
Legal:

Status: D&A
Perfs:
API: 30-015-

NM Lse: NML 043119A
Field: High Lonesome (Queen)

Section: 17-O
Township: 16S
Range: 29E
County: Eddy

Logs:

Archeological: none

Casing	Wt	Type	Set	Cmt	Hole	TOC	Method
8 5/8"			446	0	11" est	Csg pulled from hole	
7"			1,593	0	7 7/8" est	Csg pulled from hole	

Sep-54 Spud well
George Atkins (J.C. Clower / agent) - Iles #5

Oct-54 Plug Well

270'

Salt

8 5/8" Pulled
from 446'

665'

7" Pulled
from 1593'

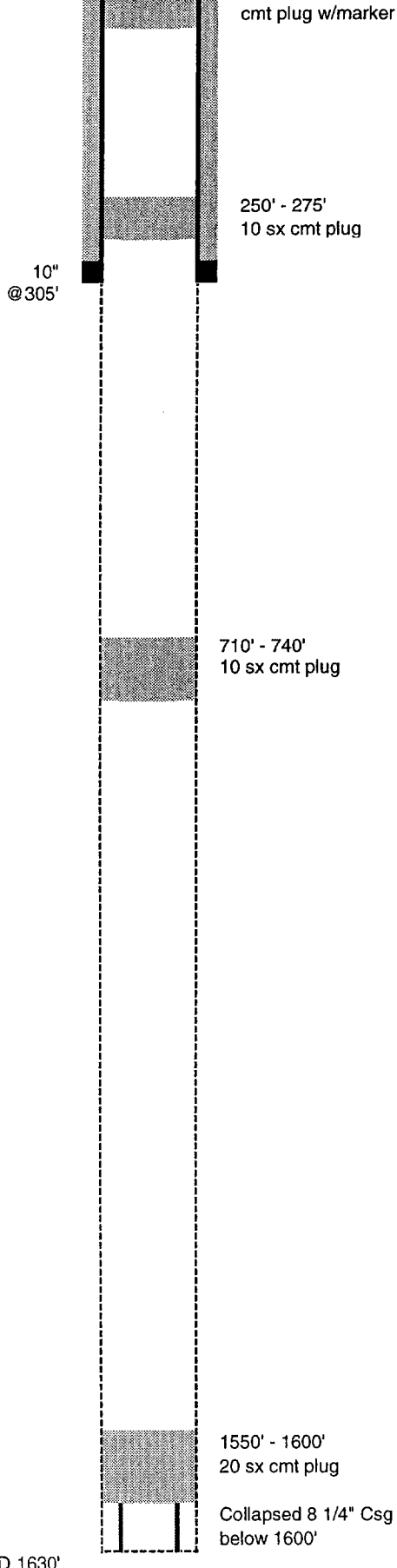
Queen
@ 1783'

TD 1866'

Calc 270' - 285'
10 sx cmt plug on
Bridge set @ 285'

Calc 1554' - 1593'
15 sx cmt plug on
Bridge set @ 1593'

1770' - 1866'
20sx cmt plug



B.H. Nolen / George Atkins - Iles #1

GL:
KB: 3,655
TD: 1,630
PBD:
Fr. Wtr:
Legal: 330 from S
 330 from E
Section: 17-P
Township: 16S
Range: 29E
County: Eddy

Status: D&A
Perfs:
API: 30-015-
NM Lse: NML 046119
Field: High Lonesome (Queen)
Logs:
Archeological: none

Casing	Wt	Type	Set	Cmt	Hole	TOC	Method
10"			305	40	11" est	Surf	Circulated
8 1/4"			1,630	0	Bottom 30' collapsed left in hole remainder of 8 1/4" pulled		

Jul-39 Spud well
 B.H. Nolen (George Atkins) - Iles #1

Oct-41 Plug Well

Cmt plug 10sx Surf
0' - 20'

Cmt plug 15sx
175' - 250'

Yates
@725'

TD 755'

Lackey Federal #1

GL: 3,653
KB:
TD: 755
PBD: 755
Fr. Wtr:
Legal: 660 from N
660 from E
Section: 18-A
Township: 16S
Range: 29E
County: Eddy
Status: D&A
Perfs: none (open hole)
API: 30-015-
NM Lse:
Field:
Logs:
Archeological:

Casing	Wt	Type	Set	Cmt	Hole	TOC	Method
no casing set					7 7/8" est		

28-Oct-62 Spud well
Hondo Oil & Gas - Lackey Federal #1

5-Nov-62 Plugged

TOC Surf
Circ

8-5/8"
@298'

Yates
@714'

7 Rivers
@873'

Queen
@1452'

Penrose
@1689'

TD 1745'

Cmt plug 15sx 0'-60'
Cmt plug 45sx
60' - 250'

Cmt plug 30sx
250' - 312'

Cmt plug 60sx
312' - 350' tagged

Cmt Plug 60sx
600' - 700'

Cmt Plug 40 sx
1575' - 1700' tagged

Exxon Federal "A" #4

GL: 3,660
KB: 3,668
TD: 1,745
PBD: 1,745

Status: D&A
Perfs: none

API: 30-015-26072

Fr. Wtr:
Legal: 990 from N
1,650 from E

NM Lse: 26072
Field: High Lonesome (Queen)

Section: 18-B
Township: 16S
Range: 29E
County: Eddy

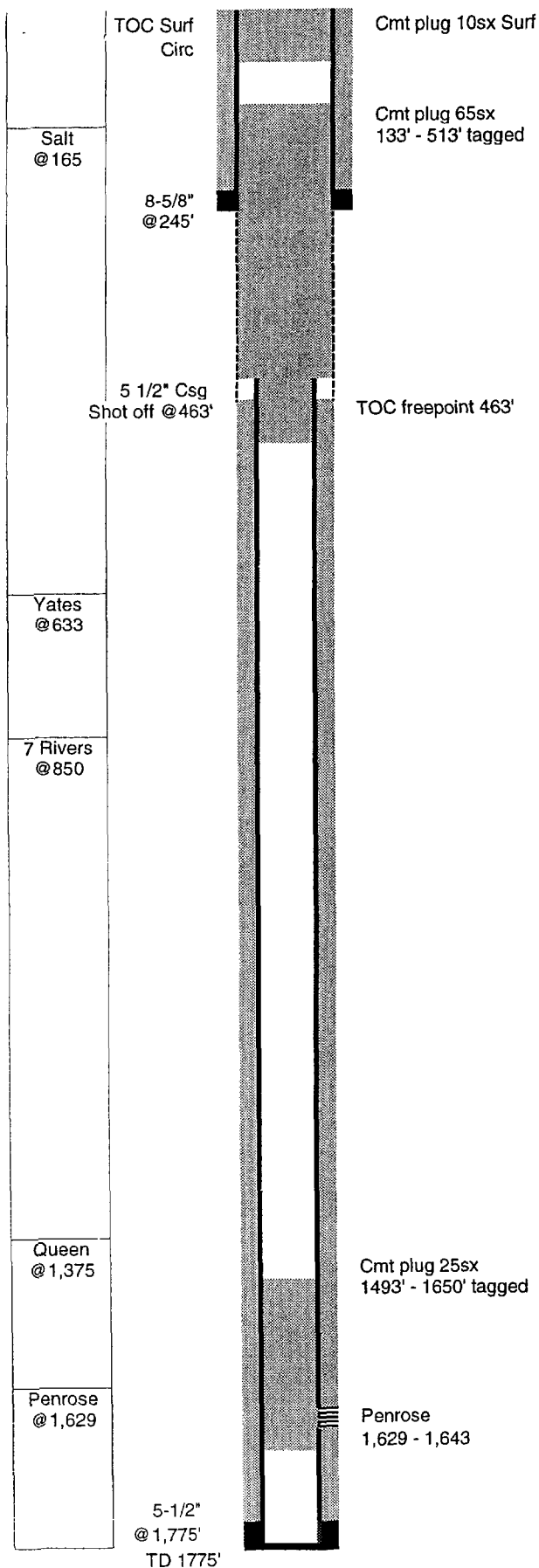
Logs: GR, DEN, NEU, DLL

Archeological:

Casing	Wt	Type	Set	Cmt	Hole	TOC	Method
8-5/8"	24 & 32	J55 ST&C	298	250	12-1/4"	Surf	Circulated

1-Oct-89 Spud well
Beach Exploration's Exxon Federal "A" #4

4-Oct-89 Plugged - no completion



Cal-Mon State #1

GL: 3,580
KB: 1,775
TD: 1,775
PBD: 1,775
Fr. Wtr: 990 from N
Legal: 421 from W
Section: 19-D
Township: 16S
Range: 29E
County: Eddy

Status: P&A
Perfs: 1629' - 1643'
API: 30-015-25487
NM Lse: LG4079
Field: High Lonesome (Queen)
Logs:
Archeological: none

Casing	Wt	Type	Set	Cmt	Hole	TOC	Method
8-5/8"			245	250	12-1/4"	Surf	Circulated
5-1/2"			1,775	350	7-7/8"	463'	Csg Pulled

19-Dec-85 Spud well
 McClellan Oil Corp. - Cal-Mon State #1
Penrose Completion
 16-Jan-86 Perforated: (1629' - 1643')
 Acid w/1000gal, SWF frac w/22Mgal 32M# sand
 Potential: Pump 7 BOPD 34 API, 1 BWPD, 10 MCFPD GOR 1400
 31-Jan-89 Plugged

TOC Surf
both strings
11-3/4"
@417'

Cmt plug 9sx
Surf - 60'
Cmt plug 34sx
330 - 448

8-5/8"
@2448'

Cmt plug 37sx
2375 - 2497 tagged

Cmt plug 34sx
4000 - 4105

Cmt plug 68sx
5707 - 5867

Cmt plug 51sx
6892 - 7042

Cmt plug 68sx
8775 - 8947

Cmt plug 51sx
9750 - 9903

TD 10,380'

Sabres "19" Fed. Com. #1

GL: 3,692
KB:
TD: 10,380
PBD: 10,380
Fr. Wtr:
Legal: 1,846 from N
926 from W
Section: 19-F
Township: 16S
Range: 29E
County: Eddy
Status: D&A
Perfs: none
API: 30-015-30461
NM Lse: NM 55927
Field: Wildcat Morrow
Logs:
Archeological: none

Casing	Wt	Type	Set	Cmt	Hole	TOC	Method
11-3/4"	42.00	H40 ST&C	417	290	14 3/4"	Surf	Circulated
8-5/8"	32.00	J55 LT&C	2,448	685	11'	Surf	Circulated
					7 7/8"		

8-Nov-98 Spud well
Enron Oil & Gas Company - Sabres "19" Fed. Com #1

29-Nov-98 plugged

TOC Surf
Circ

8-5/8"
@302'

Yates
@752

7 Rivers
@920

Queen
@1,520

Penrose
@1,750

5-1/2"
@1,916'
TD 1916'

Cmt plug 35sx
Surf - 357'

Attempted to pump
down 8 5/8x5 1/2
annulus - could not
pump @500 psi

7
yld 1.32 25% exc

Cmt plug 35sx
1539' - 1875'

Penrose
1,704 - 1,814

Exxon ERL Federal #1

GL: 3,635
KB: 1,916
TD: 1,916
PBD: 1,875
Fr. Wtr:
Legal: 2,310 from S
2,310 from E
Section: 19-J
Township: 16S
Range: 29E
County: Eddy

Status: P&A
Perfs: 1704' - 1814'
API: 30-015-25324
NM Lse: NM9987
Field: High Lonesome (Queen)
Logs:
Archeological: none

Casing	Wt	Type	Set	Cmt	Hole	TOC	Method
8-5/8"			302	200	12 1/4"es	Surf	Circulated
5-1/2"			1,916	270	7-7/8"	271'	Calc 25%exc

1-Jul-85 Spud well
Upland Production Co. - Exxon "ERL" Federal #1

20-Jul-85 Penrose Completion
Perforated: (1704 - 1814) 1704,09,66,68,70,72,74,76,86,1800,02,07,10,14
Acid w/1500gal, SWF frac w/28Mgal 59.6M# sand
Potential: Flow 6 BOPD, ? BWPD, 13 MCFPD GOR 2100 FTP 20 psi 31 API
5-Aug-87 Plugged

Calc TOC Surf
both strings
yld 1.32 50% exc

Cmt plug 4sx Surf

Cmt plug 25sx
Calc 13' - 350'

8 5/8"
@301'

Yates
@772'

Queen
@1534'

Penrose
@1792'

4 1/2"
@1870'
TD 1870'

Cmt plug 25 sx
Tag 1463' - 1800'

Penrose Perfs
1790' - 1802'

Ginger Federal #1

GL: 3,637
KB: 1,870
TD: 1,870
PBD: 1,840
Fr. Wtr:
Legal: 1,650 from N
1,650 from W
Section: 20-F
Township: 16S
Range: 29E
County: Eddy

Status: P&A
Perfs: 1790' - 1802'
API: 30-015-25515
NM Lse: NMLC046119A
Field: High Lonesome (Queen)
Logs:
Archeological:

Casing	Wt	Type	Set	Cmt	Hole	TOC	Method
8 5/8"			301	250	12 1/4"es	Surf	Calc 50% exc
4 1/2"			1,870	500	7 7/8"est	Surf	Calc 50% exc

30-Dec-85 Spud well
Suntex Resources - Ginger Federal #1

Penrose Completion

15-Mar-86 Perf (1790'-1802')
acid w/1Mgal, SWFFrac w/19Mgal fluid 36M# sand
IP pumping 2 BOPD NR BWPD NR MCSPD 29 API
12-Mar-87 Plugged

Calc TOC 170'
yld 1.32 50% exc

8 5/8"
@ 277'

Cmt plug ?sx Surf

Cmt plug 15sx
Calc 221' - 277'
yld 1.32 50% exc

Yates
@ 772'

Queen
@ 1534

7"
@ 1625'

Grbg
@ 1943'

San Anc
@ 2326'

TD 2335'

Top Csg 1555'
Approx 2 jts 7" Csg
the rest pulled

Cmt plug 10 sx
Calc 1650' - 1700'
yld 1.32 50% exc

Cmt Plug 10sx
Calc 2290' - 2335'
yld 1.32 50% exc

Hondo #1

GL: 3,631
KB:
TD: 2,335
PBD: 2,335
Fr. Wtr:
Legal: 1,980 from S
660 from W
Section: 20-L
Township: 16S
Range: 29E
County: Eddy
Status: D&A
Perfs: 1625' - 2335 (open hole)
API: 30-015-
NM Lse: NML02844
Field: High Lonesome (Queen)
Logs:
Archeological:

Casing	Wt	Type	Set	Cmt	Hole	TOC	Method
8 5/8"			277	50	12 1/4"es	170	Calc 50% exc
7"			1,625	??	7 7/8"est 6 1/4"est	??	

29-Aug-59 Spud well
Raymond Smith - Hondo #1

26-Sep-59 Plugged - no completion
show oil 1805' - 1815, 1828' - 1836'

**Waterflood Feasibility Study
High Lonesome Queen Field
Eddy County, New Mexico**

**Prepared For
Beach Exploration, Inc.**

T. SCOTT HICKMAN & ASSOCIATES, INC.

P E T R O L E U M E N G I N E E R S

January 27, 1993

Beach Exploration, Inc.
800 N. Marienfeld
Suite 200
Midland, TX 79701

Attention: Mr. Hal Gill

Gentlemen:

Re: Waterflood Feasibility Study
High Lonesome Queen Field
Eddy County, New Mexico

In accordance with Mr. Gills' request, we have conducted a waterflood feasibility study of selected leases in the High Lonesome Queen Field, Eddy County, New Mexico. The results of this study along with the waterflood economics are discussed in the attached report.

Net oil and gas reserves shown on Tables 6 through 8 are estimated quantities of crude oil attributed to the composite revenue interests being evaluated after deduction of royalty and/or overriding royalty interests. The 1987 Oil and Gas Reserve Definitions, as endorsed by the SPE and SPEE, were used to classify the reserves. Future net revenue was adjusted for capital expenditures, operating costs, ad valorem taxes and wellhead taxes, but no consideration was given to Federal income taxes or any encumbrances that might exist against the evaluated interest. Present worth future net revenue shows the time value of money at certain discount rates, but does not represent our estimate of fair market value.

Oil reserves were determined using industry-accepted methods including extrapolation of established performance trends, volumetric calculations and analogy to similar producing zones. Since there are currently no gas sales from the leases, no gas reserves were assigned for the proposed unit area.

In the preparation of this report, we have reviewed for reasonableness, but accepted without independent verification information furnished by Beach Exploration, Inc. with respect to interest factors, current prices, operating costs,

Beach Exploration, Inc.
January 27, 1993
Page 2

investments and various other data. We are qualified to perform engineering evaluations and do not claim any expertise in accounting, legal or environmental matters. As is customary in the profession, no field inspection was made of the properties nor have we verified that all operations are in compliance with any states and/or Federal conservation, pricing and environmental regulations that apply to them.

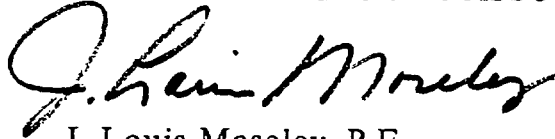
At the client's request, an oil price of \$18/BBL was held constant for the life of the project. Operating costs and capital investments were also held constant. No equipment salvage value or abandonment costs were included for the properties. The development and operating costs for the project were estimated by Beach Exploration based on the specifications furnished by us.

This study was performed using industry-accepted principles of engineering and evaluation that are predicated on established scientific concepts. However, the application of such principles involves extensive judgment and assumptions and is subject to changes in performance data, existing technical knowledge, economic conditions and/or statutory provisions. Consequently, our reserve estimates are furnished with the understanding that some revisions will probably be required in the future.

This report is solely for the information of and the assistance to Beach Exploration, their investors and others authorized by Beach in their evaluation of the waterflood potential in the High Lonesome Queen Field and is not to be used, circulated, quoted or otherwise referred to for any other purpose without the express written consent of the undersigned except as required by law. Persons other than those to whom this report is addressed or those authorized by the addressee shall not be entitled to rely upon the report unless it is accompanied by such consent. Data utilized in this report will be maintained in our files and are available for your use.

Yours very truly,

T. SCOTT HICKMAN & ASSOC., INC.

A handwritten signature in dark ink, appearing to read "J. Louis Moseley", is written over the typed name.

J. Louis Moseley, P.E.

glb
attachments

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DISCUSSION

INTRODUCTION

The High Lonesome Queen Field, located approximately 11 miles northwest of Loco Hill, Eddy County, New Mexico was discovered in November 1939 with the completion of the B.H. Nolen #1 lles. The field has produced approximately 4.5 MMBBL of oil and 1.5 BCF of gas to date from the Queen (Penrose) sand. The field currently includes 45 producing, 7 injection and 10 shut-in or temporarily abandoned wells.

Waterflood operations have been on going in the field in Sections 11 through 16 of T16S R39E, N.M.P.M. since 1957. The waterflood feasibility study area, covering the proposed West High Lonesome Penrose Sand Unit (WHLPSU), includes Sections 17 through 20.

CONCLUSIONS

1. The Queen (Penrose) sand is continuous throughout the field and the proposed Unit area.
2. Unitization is required to efficiently waterflood the reservoir.
3. Original oil-in-place (OOIP) for the proposed West High Lonesome Penrose Sand Unit area is estimated at 6119 MBBL.
4. Primary reserves are estimated at approximately 61 MBBL as of January 1, 1993.
5. Ultimate primary recovery is estimated at 538 MBBL or 8.8% of OOIP.
6. Waterflood reserves for the proposed unit are estimated at 538 MBBL based on a secondary/primary recovery ratio of 1.0.
7. Total waterflood development cost for the proposed unit is estimated at \$787,000.
8. Incremental BFIT waterflood economics for the proposed unit indicate unrisks future net revenue of \$1,511,000 discounted at 10%, payout of 3.2 years and an income to investment ratio of 4.6 undiscounted. The DCF ROR is estimated at 44%.

RECOMMENDATIONS

1. Unitize proposed unit area shown on Figure 8.
2. Drill and complete 1850' producing well in Unit B Section 19 T16S, R29E.
3. Install 80-acre, 5-spot waterflood pattern as shown on Figure 8.

4. Install supply line and purchase make-up water from the City of Carlsbad's Double Eagle fresh water system.
5. Install injection plant facilities and distribution lines and commence full-scale waterflood operations.
6. Monitor waterflood performance including balancing injection and withdrawals in each pattern to maximize waterflood economics.

GEOLOGY

The High Lonesome Queen Field produces from the Penrose sand at a depth of about 1700' (+1900' subsea). The Penrose is a relatively thin, blanket sand developed in the lower half of the Queen Formation (Guadalupian, Permian). The sand is widespread areally and is 26-32 feet thick in the study area. It dips to the southeast at 100-125 feet/mile (Figure 1).

The High Lonesome Queen Field is one of a series of fields trending northeast-southwest where hydrocarbons are stratigraphically trapped in the Penrose. Figures 2 and 3 illustrate the apparent continuity of the sand development and the long, narrow producing trend. The reservoir producing facies is a gray, very fine - medium grained, and subrounded quartz sandstone cemented with varying amounts of anhydrite and salt. This porous and permeable facies is sandwiched in between tight evaporitic sand in an updip direction and a red, shaley, and non-reservoir facies in the downdip direction. Along this producing trend, porosities average 12% and permeabilities nearly 14 md.

PRIMARY PERFORMANCE

Development drilling in the study area occurred mainly after mid 1985, the most recent being the Beach-Exxon A-Federal No. 3 well completed in June 1989 (Table 1). The wells were usually completed with 4 1/2" or 5 1/2" casing set through the Queen pay interval. The initial fracture treatments utilized 20,000-30,000 gallons gelled water with 1-2 lb/gal of sand concentration. Initial potentials ranged from 3 BOPD for the Norwood-Isles Federal No. 3 to 100 BOPD for the McClellan-Renee Federal No. 4.

The 10 leases and 26 wells within the proposed West High Lonesome Penrose Sand Unit have produced approximately 477 MBBL from the Queen (Penrose) sand as of January 1, 1993. Current production from the proposed unit averages approximately 2.1 BOPD per well. Individual lease production for 1992 year-to-date is shown on Table 2.

Primary reserves for the proposed W. High Lonesome Penrose Sand Unit are estimated at 61 MBBL as of January 1, 1993 based on individual well and composite decline curve analysis. Ultimate primary recovery is estimated at 538 MBBL. Primary performance for the proposed unit area is summarized on Table 2 and shown on Figures 4 and 5.

Declining fluid production associated with declining reservoir pressure, increasing GOR's and negligible water production over the life indicate the primary producing mechanism has been solution gas-drive. The maximum producing rate of approximately 11,000 BOPM occurred in 1986 from 21 producing wells. The composite GOR peaked at approximately 1300 SCF/BBL in 1991 before declining to the present level of less than 1000 SCF/BBL. Currently there are no gas sales from the study area based on available data. The reservoir fluid properties for the proposed unit area are summarized on Table 3.

A ϕh (porosity x net pay) isopach map of the Penrose sand was constructed for the proposed unit area and is shown as Figure 6. All available CNL-FDC wireline porosity logs as shown on Figure 7 were utilized to estimate net pay and ϕh for individual wells. Since core analysis data was not available to establish a porosity-permeability relationship, a 12% porosity cut-off was assumed. The average connate water saturation (S_w) for the Queen (Penrose) sand in the proposed Unit area was estimated to be 30% based on available wireline log data. Gross reservoir pore volume within the proposed unit area was estimated at 1374.55 ac-ft from the ϕh isopach map. The original oil-in-place (OOIP) volume calculated from the ϕh map appears reasonable based on the calculated primary recovery efficiency.

Volumetric calculations for the proposed area are as follows:

$$OOIP = 7,758 \phi (1-S_w) Ah/Boi$$

$$\text{Where } OOIP = STB$$

$$7,758 = STB/Ac-Ft$$

$$\phi Ah = PV, Ac-Ft$$

$$S_w = \text{Connate Water Saturation, Frac of PV}$$

$$Boi = RB/STB$$

$$= 7,758 (1-0.3)1374.55/1.22$$

$$= 6118.6 MBO$$

The primary recovery factor (PRF) for the proposed unit area is calculated as follows:

$$PRF = \frac{538 \text{ MBBL} \times 100}{6118.6 \text{ MBBL}} = 8.8\% \text{ of } OOIP$$

SECONDARY PERFORMANCE

A nominal 80-acre, 5-spot injection pattern utilizing 12 injection and 14 producing wells is recommended for the proposed W. High Lonesome Penrose Sand Unit based on analysis of other Queen (Penrose) waterfloods in the area (Table 4). This includes the proposed producing well to be drilled in Unit B of Section 19).

The proposed unit boundary as shown on Figure 8 should maximize the economics of secondary recovery for the study area. This optimization is achieved by excluding wells with very poor primary recovery (<8MBO) on the south and west side, minimizing the re-plugging liability to the south and east and installing the maximum number of 5-spot patterns utilizing existing wellbores.

The current average oil saturation in the proposed unit area is calculated as follows:

$$S_o = \frac{(N-N_p) B_o (1-S_w)}{NB_{oi}}$$

Where: S_o = Oil Saturation @ 1/1/93, fraction of Pore Volume (V_p)

N = OOIP, MSTB

N_p = Cumulative Oil Production @ 1/1/93, MSTB

B_o = Current Oil Formation Volume Factor, RB/STB

S_w = Conate Water Saturation, Fraction of PV

B_{oi} = Initial oil Formation Volume Factor, RB/STB

$$S_o = \frac{(6118.6-477.5)1.05(1-0.3)}{(6118.6)(1.22)}$$

$$= 0.56$$

$$\text{Pore Volume } (V_p) = \frac{NB_{oi}}{1-S_w}$$

$$= \frac{(6118.6)(1.22)}{(1-0.3)}$$

$$= 10,664 \text{ MBBL}$$

$$\begin{aligned} \text{Free Gas Volume (FGV)} &= (1-S_o-S_w)V_p \\ &= (1-0.56-0.3)(10,664 \text{ MBBL}) \\ &= 1493 \text{ MBBL} \end{aligned}$$

Fillup-time, assuming an average injection rate of 200 BPD/well, can be estimated as follows:

$$\begin{aligned}
 \text{Fillup Time} &= \frac{\text{FGV}}{\text{Injection Rate}} \\
 &= \frac{1,493,000 \text{ BBL}}{200 \text{ BPD/well} \times 12 \text{ wells} \times 30.4 \text{ days/month}} \\
 &= 20.5 \text{ months}
 \end{aligned}$$

Theoretical waterflood recovery based on volumetric calculations is as follows:

$$\begin{aligned}
 \text{Waterflood Recovery} &= \frac{7758 \phi Ah (S_o - S_{or})(E_v \times E_p)}{B_o} \\
 &= \frac{7758 (1374.55)(0.56 - 0.315)(0.5 \times 0.67)}{1.22} \\
 &= 717 \text{ MBBL}
 \end{aligned}$$

Where: S_{or} = Residual oil saturation after waterflood, 0.315
 (Roswell Geological Society Symposium)
 E_v = Volumetric sweep efficiency, 0.5 (Empirical)
 E_p = Project effective injection efficiency, 0.67
 (Geometric Factor)

The estimated waterflood recovery utilizing volumetric calculations (717 MBBL) compares favorably with waterflood reserves of 538 MBBL based on a 1.0 S/P (Secondary/Primary Recovery) ratio by analogy. These reserves include those attributed to the proposed drilling well in Unit B of Section 19. Estimated recoveries for other Queen (Penrose) Sand Units on trend are summarized on Table 4.

Flood-start for the proposed unit is assumed to be July 1, 1993. The project effective injection rate is estimated at 48,000 BWPM or 0.67 x 72,000 BWPM. The effective injection rate factor of 0.67 is based on the areal confinement for the proposed injection plan which accounts for peripheral and east end injection losses in the proposed unit.

The estimated peak oil rate of 9000 BOPM or 23 BOPD per producing well was based on the observed performance of analogous Queen (Penrose) Waterfloods in the region adjusted for well spacing. Peak production, which is estimated to occur at fillup in March 1995, was held constant for 12 months before declining at approximately 20% per year for the life of the project (Figure 4).

In our opinion, the potential waterflood oil recovery for each of the leases within the proposed unit area can best be represented by ultimate primary

recovery and it should be utilized as the major parameter in the unit participation formula.

ECONOMICS

The total estimated waterflood development cost of \$787,000 for the proposed unit is summarized on Table 5. Operating costs were estimated at \$700/well-month for remaining primary operations and \$1240/well-month for waterflood operations based on 26 total wells. The estimate for waterflood operations includes the cost of make-up water estimated to be \$0.15/BBL. Operating costs were reduced to \$14,000/month near the end of waterflood operations to account for the elimination of make-up water and abandonment of uneconomic wells.

The initial injection rate is estimated to be 200 BWPD per well at a maximum wellhead pressure of 1100 psi based on analogy (Table 4). The initial make-up water volume (72,000 BPM) can be purchased from the city of Carlsbad's Double Eagle fresh water system approximately 3 miles from the proposed unit. The cost to install the water supply line from the system to the proposed unit is estimated at \$72,000 (Table 5). The cost of the make-up water volume, initially estimated at \$10,800/month, should decrease over the life of the project due to re-cycling produced water.

Tables 6, 7 and 8 are the respective cash flow projections for the Total Proved, Proved Developed Producing (PDP) and Proved Undeveloped (PUD) reserve categories. All economics were based on constant prices and costs.

Incremental waterflood (PUD) economics for the proposed unit indicate a rate of return of 44% and payout of 3.2 years on a total waterflood development cost of \$787,000.

TABLE 1
WELL DATA
PROPOSED WEST HIGH LONESOME PENROSE SAND UNIT
HIGH LONESOME QUEEN FIELD
EDDY COUNTY, NEW MEXICO

LOCATION				CONF		PERFS	INITIAL TREATMENTS	INITIAL POTENTIAL		
OPERATOR	LEASE	WELL NO.	SEC	TWN	R&E DATE			ROFD	EMPD	GOR-SGF/80
BEACH EXPLORATION	EXXON FEDERAL	1 660 FSL 660	FEL	18-16-29	5/30/85	8 5/8-302-225 4 1/2-1840-375	1722-1756	A/950 SGF/17,000 X 10,000#	F-70	3 1132
BEACH EXPLORATION	EXXON FEDERAL	2 330 FLS 1650	FEL	18-16-29	10/14/85	8 5/8-343-475 4 1/2-1814-400	1713-1750	A/1500 SGF/18,000 X 15,000#	F-10	3 600
BEACH EXPLORATION	EXXON FEDERAL	3 1650 FSL 330	FEL	18-16-29	11/29/85	8 5/8-304-235 4 1/2-1818-700	1717-1741	SGF/10,500 X 27,000#	F-80	600
BEACH EXPLORATION	EXXON FEDERAL	4 1650 FSL 1650	FEL	18-16-29	4/28/86	8 5/8-333-175 4 1/2-1800-500	1714-1731	A/1200 SGF/20,000 X 42,000#	F-89	29 472
BEACH EXPLORATION	EXXON FEDERAL	5 1650 FSL 1835	FAL	18-16-29	9/14/86	8 5/8-303-250 4 1/2-1715-450	1639-1652	A/1200 SGF/20,000 X 42,000#	F-79	1266
BEACH EXPLORATION	EXXON FEDERAL	6 560 FSL 2035	FAL	18-16-29	12/7/86	8 5/8-307-250 4 1/2-1772-500	1708-1727	A/1200 SF/20,000 X 40,000#	F-50	600
BEACH EXPLORATION	EXXON "A" FEDERAL	1 2310 FNL 330	FEL	18-16-29	10/2/88	8 5/8-311-350 4 1/2-1800-450	1714-1728	A/1200 SGF/20,000 X 42,000 #	F-74	70 135
BEACH EXPLORATION	EXXON "A" FEDERAL	2 2310 FNL 1650	FEL	18-16-29	2/12/89	8 5/8-295-250 4 1/2-1770-550	1702-1722	A/1200 SGF/20,000 X 42,000#	F-28	2 1357
BEACH EXPLORATION	EXXON "A" FEDERAL	3 2410 FNL 1932	FAL	18-16-29	6/9/89	8 5/8-330-250 4 1/2-1705-600	1645-1655	A/1200 SGF/20,000 X 42,000#	F-10	1 2000
BUTLER-HORN	ISLES	1 990 FSL 2310	FAL	17-16-29	3/21/40	8 1/4-415 7-1735-100	F&A			
CLONER, J.C.	ISLES FEDERAL	5 330 FSL 1650	FEL	17-16-29	10/1/54	8 5/8-446 7-1593	F&A			
ERSTLEMAN	COASTAL FEDERAL	1 1980 FNL 1980	FEL	19-16-29	6/20/85	8 5/8-304-200 5 1/2-1877-400	1747-1757	A/1500 SGF/26,540 X 47,900#	F-20	1 2500
HAILE PETROLEUM	H&W FEDERAL	1 2210 FNL 1833	FAL	19-16-29	5/19/86	8 5/8-290-175 5 1/2-1972-1040	1734-1746	A/1000 SGF/33,600 X 55,500#	F-80	
JFC	RYAN FEDERAL	2 1750 FNL 660	FEL	19-16-29	6/21/82	8 5/8-348-225 5 1/2-2310-650	1688-1604	A/1500 SF 50,000 X 60,000#	F-19	0 526
MCCLELLAN OIL	BIO PAC FEDERAL	1 660 FNL 3300	FEL	19-16-29	9/3/85	4 1/2-1871-190	1683-1699	A/500 SGF/20,000 X 31,500#	F-14	
MCCLELLAN OIL	RENEE FEDERAL	1 660 FLS 330	FAL	17-16-29	9/16/85	8 5/8-300-200 5 1/2-1815-350	1729-1750	SGF/31,000 X 50,000#	F-32	4

TABLE 1
WELL DATA
PROPOSED WEST HIGH LONESOME FENCE SAND UNIT
HIGH LONESOME QUEN FIELD
EDDY COUNTY, NEW MEXICO

OPERATOR	LEASE	LOCATION			CASP	CASPING RECORDS	PERFS	INITIAL TREATMENTS	INITIAL POTENTIAL		
		WELL NO.	SEC	TWP	R	DATE			BOFD	BRSD	GOR-SGF/SD
MCCLELLAN OIL	RENEE FEDERAL	2	330	FML	20-16-29	9/25/85	8/58-300-250 5 1/2-1840-350	1740-83 A/1000 SGF/30,000 X 43,000#	P-60	5	24
		3	1650	FML	330	FML	20-16-29	12/28/85	8 5/8-300-280 5 1/2-1920-375	P-85	5 295
		4	1650	FSL	330	FML	17-16-29	1/15/86	8 5/8-250-250 5 1/2-1839-370	P-100	15 375
NORMAN	FEDERAL "19"	1	660	FML	660	FEL	19-16-29	9/30/85	8 5/8-355-250 4 1/2-1874-360	F-17	1 4000
		2	1650	FSL	2310	FML	17-16-29	5/14/80	8 1/4-43 5 1/2-1703-180	P-20	
NORMAN	ISLES FEDERAL	3	330	FML	2310	FML	20-16-29	6/11/80	8 1/4-330-50 7-1590-100	P-3	
NORMAN	ISLES FEDERAL	4	1650	FSL	2310	FEL	17-16-29	3/9/83	8 5/8-275-50 2/12/84 7-1740-50	P-25	
NORMAN OIL	ISLES FEDERAL	7	330	FSL	1650	FML	17-16-29	4/14/86	8 5/8-292-250 5 1/2-1842-350	P-84	13
		8	2310	FSL	1950	FML	17-16-29	9/16/87	8 5/8-253-190 4 1/2-1509-450	P-42	2 534
SUNTEX RESOURCES	SHILOH FEDERAL	3	2310	FML	988	FML	17-16-29	1/27/86	8 5/8-311-250 4 1/2-1850-500	P-75	43 200
		4	2310	FML	1650	FML	17-16-29	6/1/86	8 5/8-309-250 4 1/2-1850-550	P-41	24 488

TABLE 2
OPERATOR AND LEASE STATISTICS
PROPOSED W. HIGH LONESOME PENROSE SAND UNIT
HIGH LONESOME QUEEN FIELD
EDDY COUNTY, NEW MEXICO

OPERATOR LEASE	WELLS NO.	NOMINAL SURFACE ACRES	1992 OIL PROD		CUM OIL PROD		PRIMARY RESERVES		ULTIMATE PRIMARY	
			YTD (8 MO)	%	@ 9-1-92	%	@ 1-1-93	%	RECOVERY	%
		TOTAL	BBLs		BBLs		BBLs		BBLs	
Beech Exploration, Inc. Exxon Federal	6	240	3677	28.9	156528	33.2	14140	22.9	172547	32.1
Exxon Federal-A	3	120	1994	15.7	25740	5.5	1587	2.6	27971	5.2
Total	9	360	5671	44.6	182268	38.7	15727	25.5	200518	37.3
Eastland Oil Co. Coastal Federal	1	40	130	1.0	3043	0.6	0.0	0.0	3043	0.6
Hallie Petroleum, LTD. M&W Federal	1	40	1135	8.9	17435	3.7	12305	19.9	30291	5.6
JFG Enterprises Ryan Federal	1	40	0.0	0.0	9846	2.1	0.0	0.0	9846	1.8
McClellan Oil Corp. Blg Mac Federal	1	40	502	3.9	9745	2.0	2760	4.5	12780	2.4
Renee Federal	4	160	1897	14.9	90344	19.2	3163	5.1	94170	17.5
Total	5	200	2399	18.8	100089	21.2	5923	9.6	106950	19.9
Norwood Oil Corp. Federal 19	1	80	22	0.2	4044	0.9	0.0	0.0	4044	0.7
Isles Federal	5	240	2181	17.1	115754	24.6	23763	38.3	140347	26.1
Total	6	320	2203	17.3	119798	25.5	23763	38.3	144391	26.8
Suntex Energy Corp. Shiloh Federal	2	80	1195	9.4	38757	8.2	4119	6.7	43257	8.0
Grand Total	25	1080	12733	100.0	471236	100.0	61837	100.0	538296	100.0

TABLE 3
Reservoir Fluid Properties
Proposed West High Lonesome Unit
High Lonesome Field
Eddy County, New Mexico

Pi,	740 psi est.
Pb,	1800 psi est.
Oil Gravity,	35° API
Rsi,	490 SCF/BBL
T,	90° F
Boi,	1.22 RB/STB
Bo,	1.05 RB/STB @ current BHP est. @ 100 psi

TABLE 4
Queen (Penrose) Sand Waterflood Projects
High Lonesome and Red Lake Fields
Lea County, New Mexico

Project	Field Section-Township-Range	Area (Ac.)	Primary EUR MBO	MBO/Well	Secondary EUR MBO	S/P	Injection Pattern	Maximum Wells	Floodstart Year	Average Maximum Injection Rate & Pressure
Vintage Drilling High Lonesome Penrose Ut.	High Lonesome (Queen) Sec. 15-T16S-R29E	480	529	48.1	325	0.61	Partial 40 Ac, 5-Spot	8P + 71	1957-65	150 BWPD @ 1100 psi
Acasco Petroleum High Lonesome Queen Sand WF	High Lonesome (Queen) Sec. 16-T16S-R29E	400	152	21.7	211	1.39	40 Ac, 5-Spot	7P + 51	1957-59	150 BWPD @ 1100 psi
Armstrong Energy High Lonesome Brewer Bosworth	High Lonesome (Queen) Secs. 11, 12, 13 & 14- T16S-R29E	1200	1361	45.4	1315	0.97	Peripheral Line Drive	14P + 161	1963	280 BWPD @ 750 psi
Kincaid & Watson E. RedLake Ut.	Red Lake Queen Grayburg East Secs. 35 & 36-T16S-R28E Secs. 1 & 2-T11S-R28E	520	226	17.4	292	1.29	80 Ac, 5-Spot	6P + 71	1970	280 BWPD @ 700 psi
Proposed W. High Lonesome Penrose Sand Unit	High Lonesome (Queen) Secs. 17, 18, 19 & 20- T16S-R29E	1080	538	22.4	538 Est.	1.0 Est.	0.94 Wid. Ave. 1.07 Arith. Ave.			

TABLE 5
Waterflood Development Cost
Proposed W. High Lonesome Penrose Sand Unit
High Lonesome Queen Field
Eddy County, New Mexico

Item	Cost (M\$)
I. Drill & Equip one (1) Producing Well	125
II. Convert 12 Wells to Injection	140
III. Install Water Supply Line	72
IV. Install Waterflood Plant and Facilities	85
V. Install Water Injection Lines	140
VI. Production Facility Consolidation	120
VII. Re-Plug 2 Abandoned Wells in Proposed Unit Area	<u>40</u>
Subtotal	722
Pre Unitization Expense	<u>65</u>
Total	787

TABLE 6

REMAINING PRIMARY & SECONDARY (PROVED)
 PROPOSED W. HIGH LONESOME PENROSE SD UNIT
 HIGH LONESOME QUEEN FIELD
 EDDY COUNTY, NEW MEXICO

DATE: 01/20/93
 TIME: 10:11.54
 FILE: BEACH
 GET#: 96

RESERVES AND ECONOMICS

BEACH EXPLORATION INC
 CONSTANT OIL PRICE

AS OF JANUARY 1, 1993

T. SCOTT HICKMAN & ASSOC
 PETROLEUM ENGINEERS

-END- MO-YR	---GROSS PRODUCTION---			----NET PRODUCTION----			--PRICES--		-----OPERATIONS, M\$-----			CAPITAL COSTS, M\$	CASH FLOW BTAX, M\$	10.00 PCT CUM. DISC BTAX, M\$
	OIL, MBBL	GAS, MMCF		OIL, MBBL	GAS, MMCF		OIL \$/B	GAS \$/M	NET OPER REVENUES	SEV+ADV+ WF TAXES	NET OPER EXPENSES			
12-93	19.204	.000		15.363	.000		18.00	.00	276.534	20.351	372.000	787.000	-902.817	-860.844
12-94	50.253	.000		40.202	.000		18.00	.00	723.636	53.255	372.000	.000	298.381	-602.114
12-95	104.649	.000		83.719	.000		18.00	.00	1506.942	110.901	372.000	.000	1024.041	205.121
12-96	101.699	.000		81.359	.000		18.00	.00	1464.462	107.775	372.000	.000	984.687	910.769
12-97	82.309	.000		65.847	.000		18.00	.00	1185.246	87.227	372.000	.000	726.019	1383.752
12-98	66.126	.000		52.901	.000		18.00	.00	952.218	70.077	372.000	.000	510.141	1685.883
12-99	53.125	.000		42.500	.000		18.00	.00	765.000	56.300	372.000	.000	336.700	1867.165
12- 0	42.680	.000		34.144	.000		18.00	.00	614.592	45.230	276.000	.000	293.362	2010.755
12- 1	34.289	.000		27.431	.000		18.00	.00	493.758	36.338	276.000	.000	181.420	2091.481
12- 2	27.547	.000		22.038	.000		18.00	.00	396.684	29.194	276.000	.000	91.490	2128.490
12- 3	16.635	.000		13.308	.000		18.00	.00	239.544	17.629	201.616	.000	20.299	2136.050
12- 4														
12- 5														
12- 6														
12- 7														
S TOT	598.516	.000		478.812	.000		18.00	.00	8618.616	634.277	3633.616	787.000	3563.723	2136.050
REM.	.000	.000		.000	.000		.00	.00	.000	.000	.000	.000	.000	2136.050
TOTAL	598.516	.000		478.812	.000		18.00	.00	8618.616	634.277	3633.616	787.000	3563.723	2136.050
CUM.	477.484	.000												
ULT.	1076.000	.000												
										-----PRESENT WORTH PROFILE-----				
										DISC	PW OF NET	DISC	PW OF NET	
										NET OIL REVENUES (M\$)	8618.616	RATE	BTAX, M\$	
										NET GAS REVENUES (M\$)	.000			
										TOTAL REVENUES (M\$)	8618.616			
BTAX RATE OF RETURN (PCT)				68.92	PROJECT LIFE (YEARS)				10.730	.0	3563.723	30.0	812.369	
BTAX PAYOUT YEARS				2.59	DISCOUNT RATE (PCT)				10.000	2.0	3205.295	35.0	631.304	
BTAX PAYOUT YEARS (DISC)				2.75	GROSS OIL WELLS				25.000	5.0	2744.439	40.0	483.313	
BTAX NET INCOME/INVEST				5.53	GROSS GAS WELLS				.000	8.0	2358.823	45.0	361.140	
BTAX NET INCOME/INVEST (DISC)				3.85	GROSS WELLS				25.000	10.0	2136.050	50.0	259.377	
										12.0	1936.505	60.0	101.703	
INITIAL W.I. FRACTION				1.000000	INITIAL NET OIL FRACTION				.800000	15.0	1674.336	70.0	-12.369	
FINAL W.I. FRACTION				1.000000	FINAL NET OIL FRACTION				.800000	18.0	1449.570	80.0	-96.718	
PRODUCTION START DATE				8- 1-92	INITIAL NET GAS FRACTION				.000000	20.0	1317.232	90.0	-160.188	
MONTHS IN FIRST LINE				12.00	FINAL NET GAS FRACTION				.000000	25.0	1036.420	100.0	-208.623	

TABLE 7

REMAINING PRIMARY-EXISTING OPERATIONS (PDP)
 PROPOSED W. HIGH LONESOME PENROSE SD UNIT
 HIGH LONESOME QUEEN FIELD
 EDDY COUNTY, NEW MEXICO

DATE: 01/20/93
 TIME: 10:11.54
 FILE: BEACH
 GET#: 95

RESERVES AND ECONOMICS

BEACH EXPLORATION INC
 CONSTANT OIL PRICE

AS OF JANUARY 1, 1993

T. SCOTT HICKMAN & ASSOC
 PETROLEUM ENGINEERS

-END- MO-YR	---GROSS PRODUCTION---		----NET PRODUCTION----		--PRICES--		-----OPERATIONS, M\$-----			10.00 PCT		
	OIL, MBBL	GAS, MMCF	OIL, MBBL	GAS, MMCF	OIL \$/B	GAS \$/M	NET OPER REVENUES	SEV+ADV+ WF TAXES	NET OPER EXPENSES	CAPITAL COSTS, M\$	CASH FLOW BTAX, M\$	CUM. DISC BTAX, M\$
12-93	16.214	.000	12.971	.000	18.00	.00	233.478	17.182	156.600	.000	59.696	56.939
12-94	13.728	.000	10.982	.000	18.00	.00	197.676	14.548	120.000	.000	63.128	111.678
12-95	11.827	.000	9.462	.000	18.00	.00	170.316	12.534	120.000	.000	37.782	141.461
12-96	10.334	.000	8.267	.000	18.00	.00	148.806	10.951	120.000	.000	17.855	154.256
12-97	9.136	.000	7.309	.000	18.00	.00	131.562	9.683	120.000	.000	1.879	155.480
12-98												
12-99												
12- 0												
12- 1												
12- 2												
12- 3												
12- 4												
12- 5												
12- 6												
12- 7												
S TOT	61.239	.000	48.991	.000	18.00	.00	881.838	64.898	636.600	.000	180.340	155.480
REM.	.000	.000	.000	.000	.00	.00	.000	.000	.000	.000	.000	155.480
TOTAL	61.239	.000	48.991	.000	18.00	.00	881.838	64.898	636.600	.000	180.340	155.480
CUM.	477.484	.000					NET OIL REVENUES (M\$)	881.838	-----PRESENT WORTH PROFILE-----			
							NET GAS REVENUES (M\$)	.000	DISC	PW OF NET	DISC	PW OF NET
ULT.	538.723	.000					TOTAL REVENUES (M\$)	881.838	RATE	BTAX, M\$	RATE	BTAX, M\$
BTAX RATE OF RETURN (PCT)		100.00	PROJECT LIFE (YEARS)				5.000	.0	180.340	30.0	122.610	
BTAX PAYOUT YEARS		.00	DISCOUNT RATE (PCT)				10.000	2.0	174.727	35.0	116.635	
BTAX PAYOUT YEARS (DISC)		.00	GROSS OIL WELLS				24.000	5.0	166.952	40.0	111.289	
BTAX NET INCOME/INVEST		.00	GROSS GAS WELLS				.000	8.0	159.864	45.0	106.480	
BTAX NET INCOME/INVEST (DISC)		.00	GROSS WELLS				24.000	10.0	155.480	50.0	102.133	
								12.0	151.346	60.0	94.591	
INITIAL W. I. FRACTION		1.000000	INITIAL NET OIL FRACTION				.800000	15.0	145.564	70.0	88.280	
FINAL W. I. FRACTION		1.000000	FINAL NET OIL FRACTION				.800000	18.0	140.238	80.0	82.923	
PRODUCTION START DATE		8- 1-92	INITIAL NET GAS FRACTION				.000000	20.0	136.919	90.0	78.326	
MONTHS IN FIRST LINE		12.00	FINAL NET GAS FRACTION				.000000	25.0	129.326	100.0	74.339	

TABLE 8

SECONDARY (PUD)
 PROPOSED W. HIGH LONESOME PENROSE SD UNIT
 HIGH LONESOME QUEEN FIELD
 EDDY COUNTY, NEW MEXICO

DATE: 01/20/93
 TIME: 10:11.54
 FILE: BEACH
 GET#: 0

RESERVES AND ECONOMICS

BEACH EXPLORATION INC
 CONSTANT OIL PRICE

AS OF JANUARY 1, 1993

T. SCOTT HICKMAN & ASSOC
 PETROLEUM ENGINEERS

		---GROSS PRODUCTION---				---PRICES---		-----OPERATIONS, M\$-----					10.00 PCT				
-END-	MO-YR	OIL,	MBBL	GAS,	MMCF	OIL,	MBBL	GAS,	MMCF	\$/B	\$/M	NET OPER REVENUES	SEV+ADV+ WF TAXES	NET OPER EXPENSES	CAPITAL COSTS, M\$	CASH FLOW BTAX, M\$	CUM. DISC BTAX, M\$
	12-93	2.990		.000		2.392		.000		18.00	.00	43.056	3.169	215.400	787.000	-962.513	-917.783
	12-94	36.525		.000		29.220		.000		18.00	.00	525.960	38.707	252.000	.000	235.253	-713.792
	12-95	92.822		.000		74.257		.000		18.00	.00	1336.626	98.367	252.000	.000	986.259	63.660
	12-96	91.365		.000		73.092		.000		18.00	.00	1315.656	96.824	252.000	.000	966.832	756.513
	12-97	73.173		.000		58.538		.000		18.00	.00	1053.684	77.544	252.000	.000	724.140	1228.272
	12-98	66.126		.000		52.901		.000		18.00	.00	952.218	70.077	372.000	.000	510.141	1530.403
	12-99	53.125		.000		42.500		.000		18.00	.00	765.000	56.300	372.000	.000	336.700	1711.685
	12- 0	42.680		.000		34.144		.000		18.00	.00	614.592	45.230	276.000	.000	293.362	1855.275
	12- 1	34.289		.000		27.431		.000		18.00	.00	493.758	36.338	276.000	.000	181.420	1936.001
	12- 2	27.547		.000		22.038		.000		18.00	.00	396.684	29.194	276.000	.000	91.490	1973.010
	12- 3	16.635		.000		13.308		.000		18.00	.00	239.544	17.629	201.616	.000	20.299	1980.570
	12- 4																
	12- 5																
	12- 6																
	12- 7																
	S TOT	537.277		.000		429.821		.000		18.00	.00	7736.778	569.379	2997.016	787.000	3383.383	1980.570
	REM.	.000		.000		.000		.000		.00	.00	.000	.000	.000	.000	.000	1980.570
	TOTAL	537.277		.000		429.821		.000		18.00	.00	7736.778	569.379	2997.016	787.000	3383.383	1980.570
	CUM.	.000		.000													
	ULT.	537.277		.000													
			</														

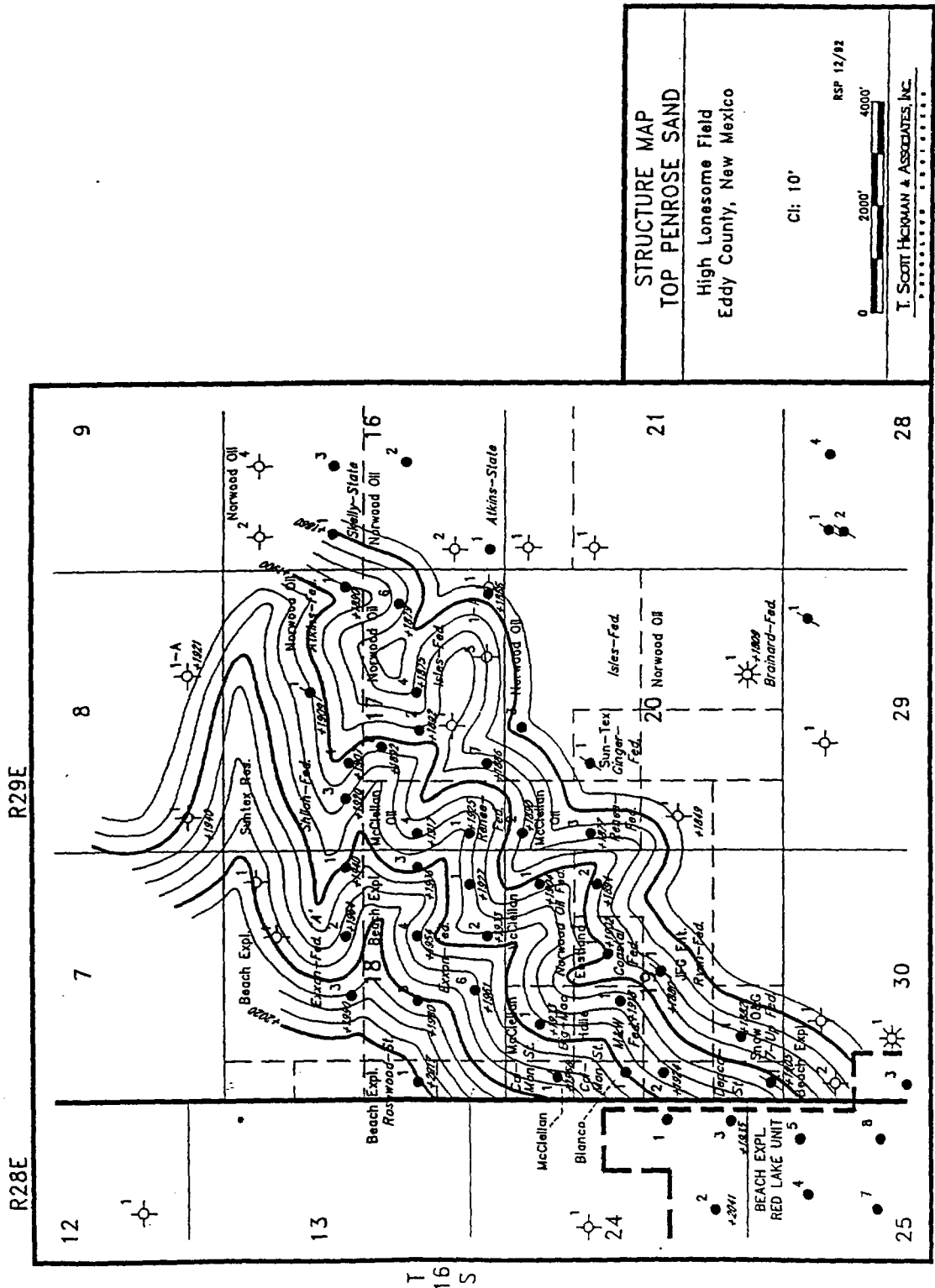


FIGURE 1

PROPOSED W. HIGH LONESOME PENROSE SD UNIT
 HIGH LONESOME QUEEN FIELD
 EDDY COUNTY, NEW MEXICO

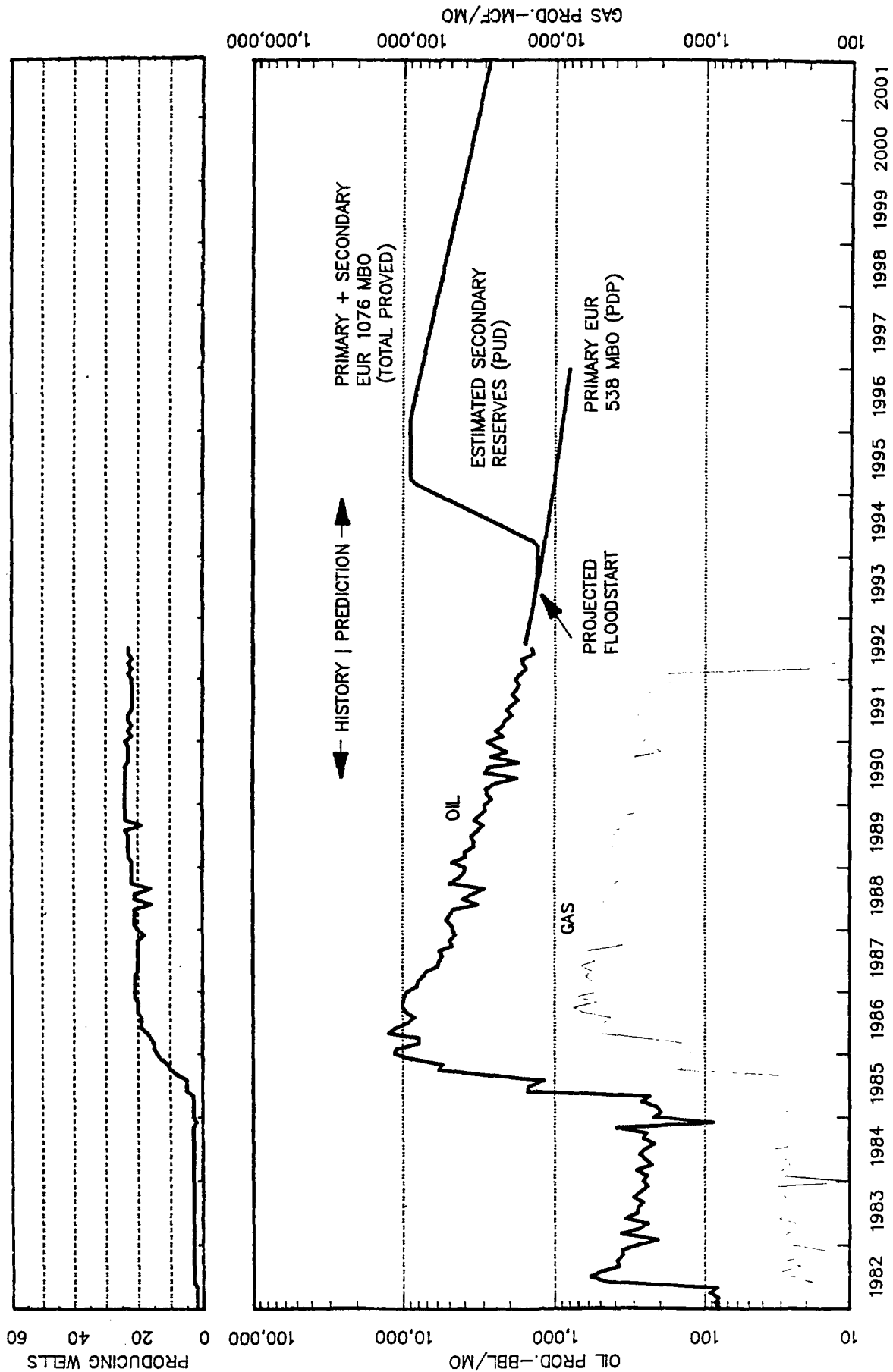


FIGURE 4

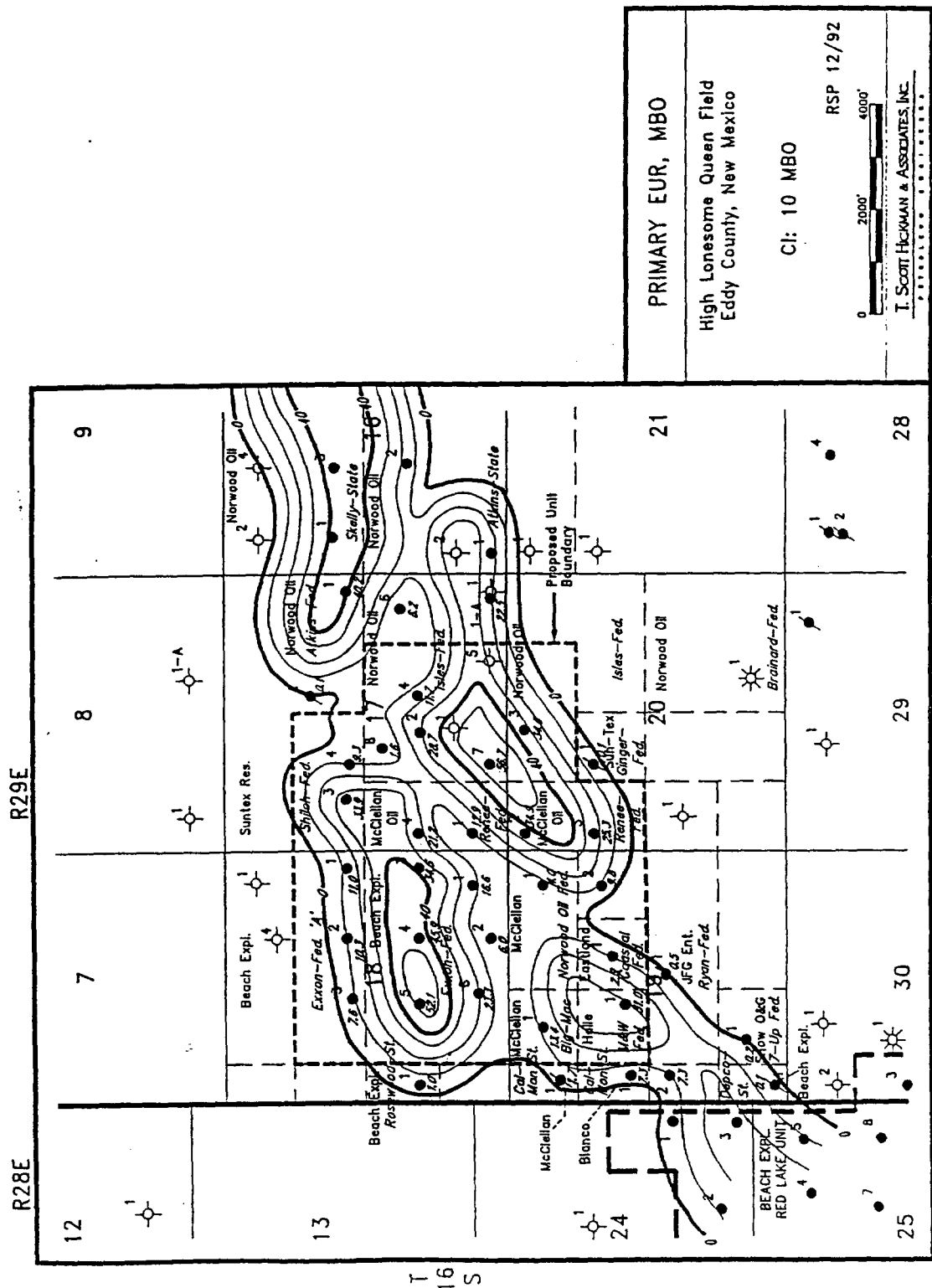


FIGURE 5

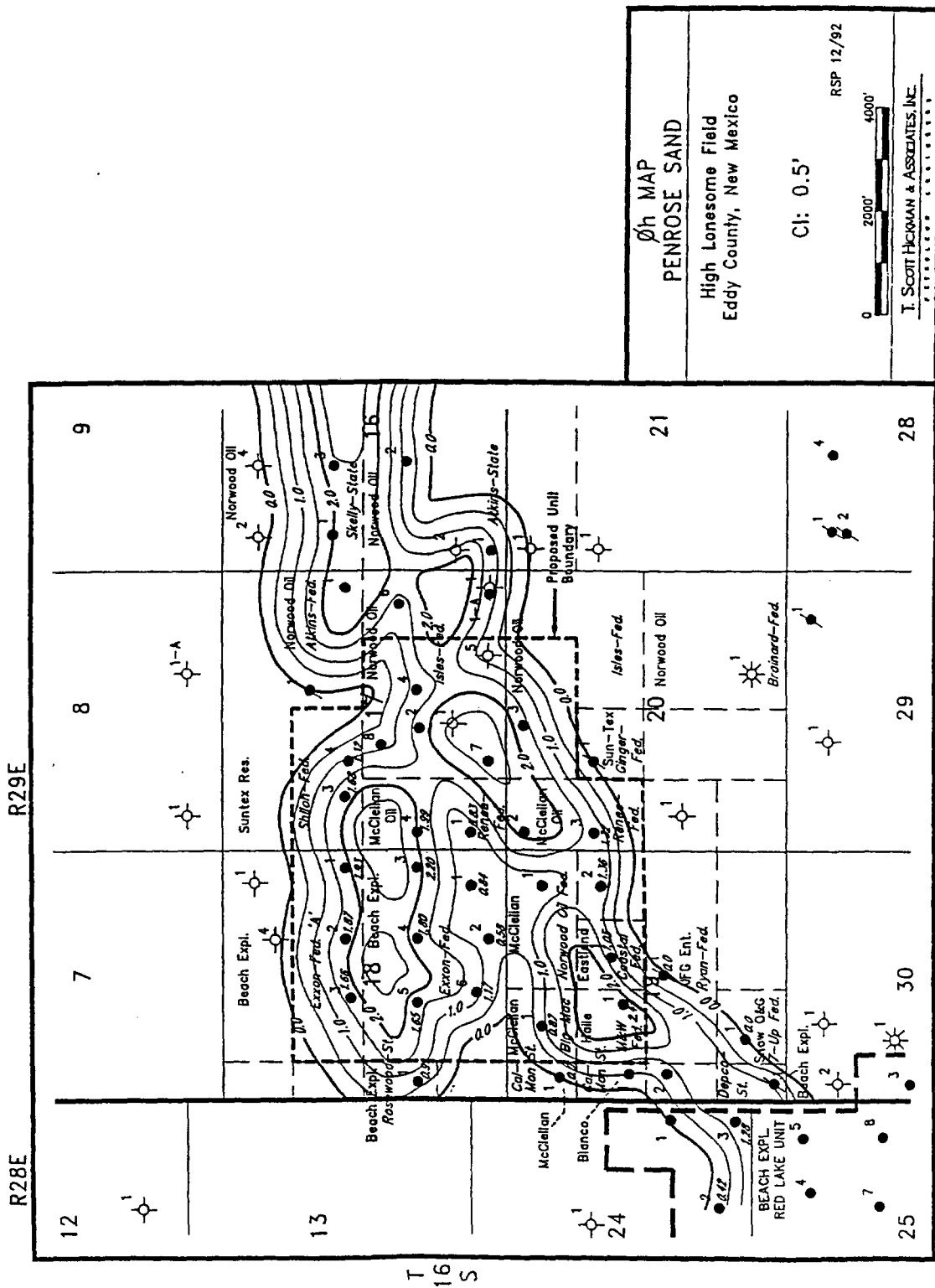


FIGURE 6

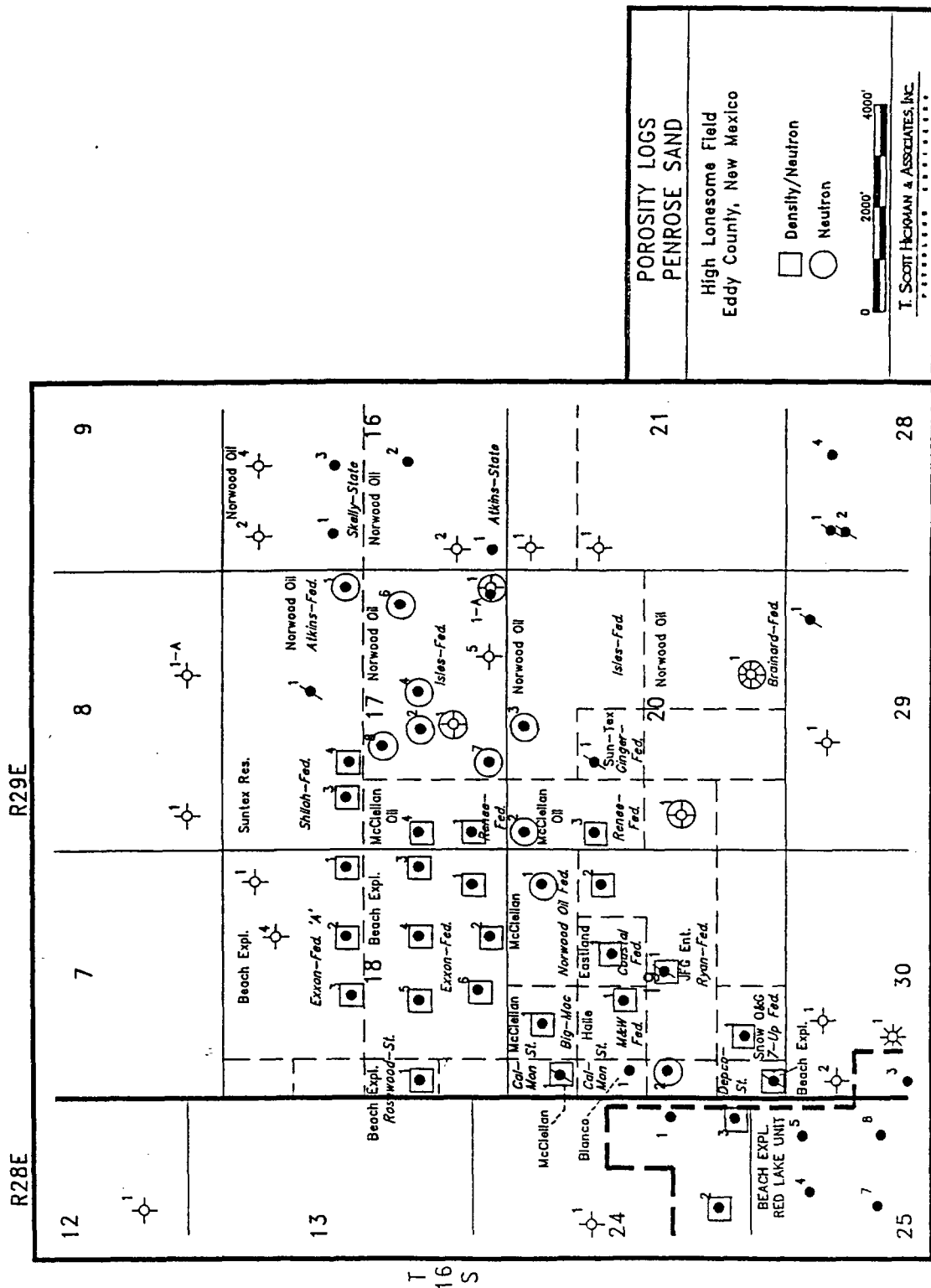
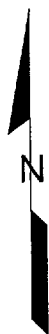
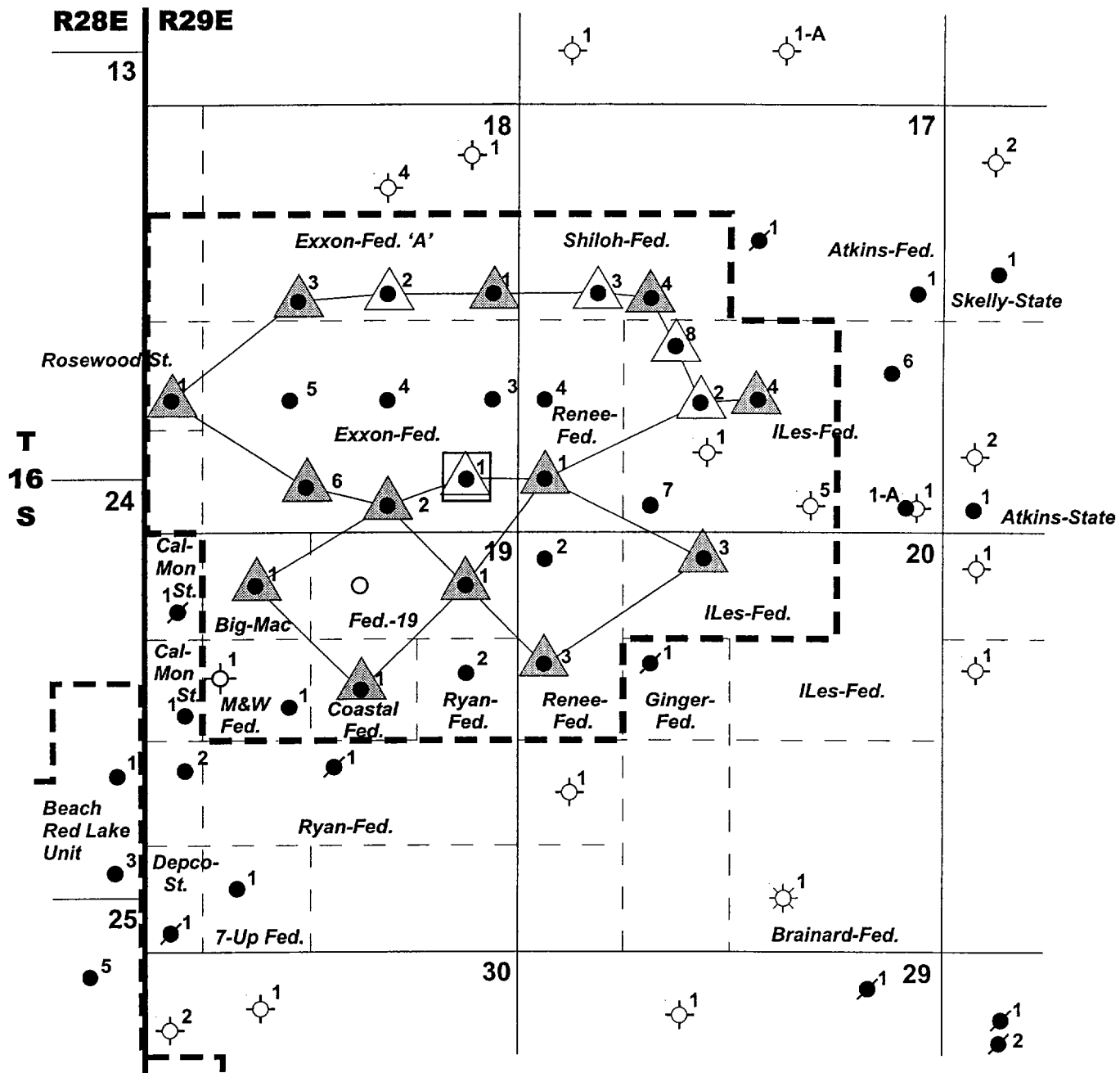


FIGURE 7



Injector Phase I



Injector Phase II



Drill Producer



Central Battery



Beach Exploration, Inc.

WEST HIGH LONESOME PENROSE SAND UNIT

Form C108 Item VII.
DEVELOPMENT PLAT



Eddy County, New Mexico

JMR

Scale : 1"=2000'

March 2001



InterChem, Inc

3803 Mankins

P. O. Box 13166

Odessa, Tx. 79768

Membrane Filter Evaluation

Monday, June 04, 2001

Pro Kem, Inc.

Oil Company **Beach Exploration**

Lease: **Double Eagle**

Sample ID: **Fresh Water**

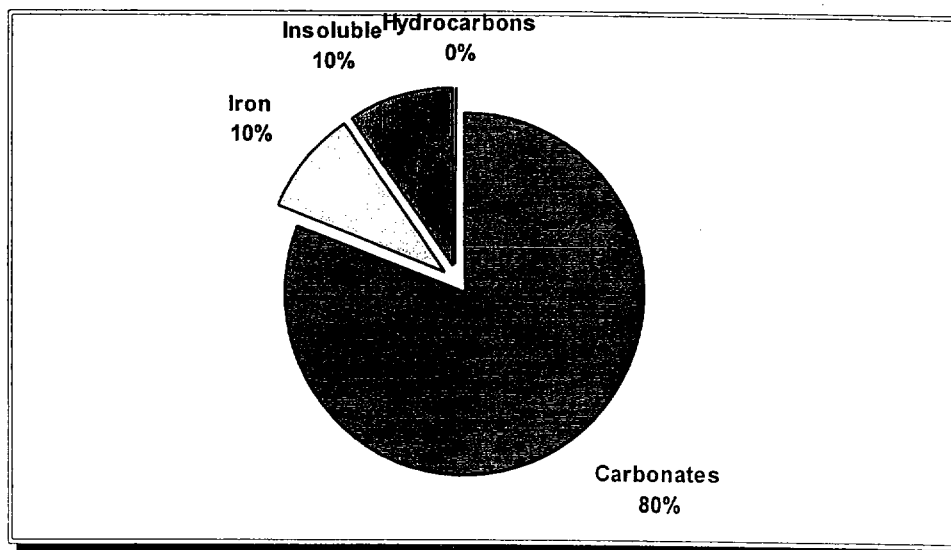
Location:

Test Date: **5/25/2001**

Filter Size: **0.45 micron membrane filter**

Volume/Time: **900 ccs in 4 minutes.**

	mg/L.	Percent of Total
Hydrocarbons	0.00	0.00%
Oil, Paraffin, Asphaltenes, etc.		
Carbonates	7.56	80.95%
Calcium Carbonate, etc.		
Iron	0.89	9.52%
Iron Oxide, Iron Sulfide, etc..		
Acid Insolubles	0.89	9.52%
Sand, Silt, Clay, Calcium Sulfate, etc.		
Total Suspended Solids	9.33	



Microscopic examination of the residues after leaching with 15% HCl revealed the presence of the following:
Small amounts of undissolved Iron Oxide, along with some sand.

Pro-Kem, Inc.

WATER ANALYSIS REPORT

SAMPLE

Oil Co. : Beach Exploration
 Lease : Double Eagle
 Well No.: Fresh Water
 Lab No. : F:\ANALYSES\jun0501.001

Sample Loc. :
 Date Analyzed: 5-June-2001
 Date Sampled : 2-June-2001

ANALYSIS

1. pH 7.850
2. Specific Gravity 60/60 F. 1.004
3. CaCO₃ Saturation Index @ 80 F. +0.631
 @ 140 F. +1.231

Dissolved Gasses

	MG/L	EQ. WT.	*MEQ/L
4. Hydrogen Sulfide	0		
5. Carbon Dioxide	5		
6. Dissolved Oxygen	6.0		

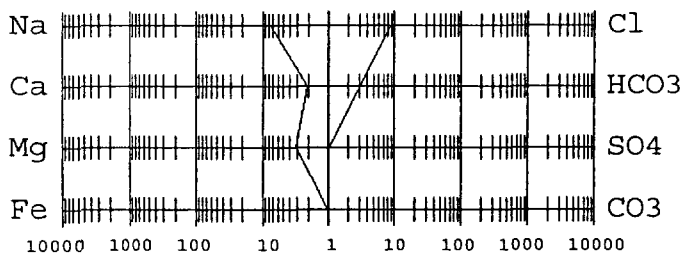
Cations

7. Calcium (Ca ⁺⁺)	39	/ 20.1 =	1.94
8. Magnesium (Mg ⁺⁺)	36	/ 12.2 =	2.95
9. Sodium (Na ⁺)	168	/ 23.0 =	7.30
10. Barium (Ba ⁺⁺)	Not Determined		

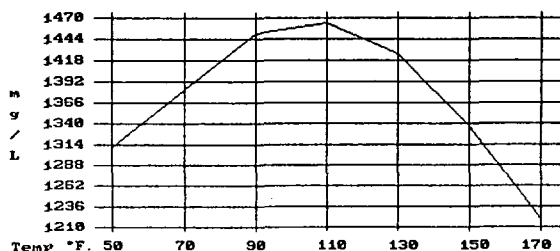
Anions

11. Hydroxyl (OH ⁻)	0	/ 17.0 =	0.00
12. Carbonate (CO ₃ ⁼)	0	/ 30.0 =	0.00
13. Bicarbonate (HCO ₃ ⁻)	176	/ 61.1 =	2.88
14. Sulfate (SO ₄ ⁼)	42	/ 48.8 =	0.86
15. Chloride (Cl ⁻)	300	/ 35.5 =	8.45
16. Total Dissolved Solids	761		
17. Total Iron (Fe)	2	/ 18.2 =	0.11
18. Total Hardness As CaCO ₃	245		
19. Resistivity @ 75 F. (Calculated)	2.810 /cm.		

LOGARITHMIC WATER PATTERN *meq/L.



Calcium Sulfate Solubility Profile

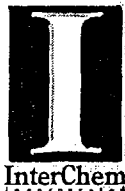


PROBABLE MINERAL COMPOSITION COMPOUND EQ. WT. X *meq/L = mg/L.

Ca (HCO ₃) ₂	81.04	1.94	157
CaSO ₄	68.07	0.00	0
CaCl ₂	55.50	0.00	0
Mg (HCO ₃) ₂	73.17	0.94	69
MgSO ₄	60.19	0.86	52
MgCL ₂	47.62	1.15	55
NaHCO ₃	84.00	0.00	0
NaSO ₄	71.03	0.00	0
NaCl	58.46	7.30	427

*Milli Equivalents per Liter

This water is mildly corrosive due to the pH observed on analysis.
 The corrosivity is increased by the content of mineral salts, and the presence of, CO₂, Oxygen in solution.



InterChem, Inc.

(915) 550-7027 P. O. Box 13166 Odessa, Tx. 79768

Water Quality Survey

20-April-2001

Pro-Kem, Inc. Beach Exploration - Big George SWD

Attached please find the printouts reflecting the results obtained from the survey conducted at the above water handling facilities on April 20, 2001. Following, for your perusal, is a detailed explanation of our findings, on a point-by-point basis.

Sample Locations

Listed below are the locations sampled for the purposes of this survey.

» Second Water Holding Tank

Water Analyses

Results indicate that the water handled by this system is moderately corrosive due to the content of dissolved mineral salts, reporting a TDS of 211,045 mg/L., in combination with the presence of H_2S and CO_2 in solution. In addition, the presence of small amounts of Oxygen will exacerbate the corrosion process on the tubular goods exposed to this water by the process of cathodic depolarization.

The Stiff and Davis Saturation Index predicts that this water should exhibit a moderate to severe Calcium Carbonate deposition tendency at 80°F., increasing in magnitude to a severe level at 140°F. A mild to moderate Calcium Sulfate scaling potential is expected from this water.

Dissolved Gasses

Listed below are the results obtained from the tests carried out on-site at the time of sampling. Results indicate minor amounts of CO_2 and H_2S in the produced water; however, we detected Oxygen in solution. Please review the following table.

Location	ppm. O_2	ppm. CO_2	ppm. H_2S
Water Holding Tank	0.5	130	40

Suspended Solids Test

Results of the 0.45 micron membrane filter tests carried out on-site at the time of sampling indicate that about 65% of the total suspended solids present in the injection water is composed of carbonates. The next highest figure is due to the hydrocarbons, which account for 19% of this water's suspended solids. The total

amount of suspended solids present is considered to be high, since it falls above the accepted lower limit of 50 mg/L. After leaching with 15% HCl, examination of the residues revealed small amounts of undissolved iron sulfide, along with what appears to be Calcium Sulfate. Please review the following table and graph outlining our results.

Location	mg/L. Organic	mg/L. Carbonates	mg/L. Iron	mg/L. Insolubles	mg/L. Total
Water Tank	37.00	129.50	29.00	2.50	198.00

Suspended Oil Content

The TriChloroEthane extraction carried out on the sample collected during this survey indicate that there were 2,518 ppm. of oil in suspension in the injection water at the time of collection.

Bacteria Counts

The results obtained from the bacteria culture bottles inoculated on-site at the time of sampling indicate moderate amounts of Sulfate-Reducing bacteria. Please review the following table.

Location	Col./ml. Aerobic	Col./ml. SRB
Water Tank	Negative	10,000<X<100,000

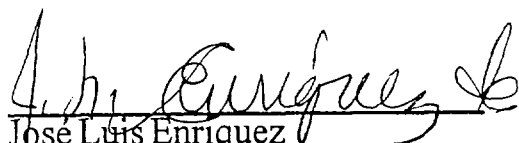
Observations and Recommendations

Based on the above observations, we feel that the system is operating above acceptable limits. The dissolved oxygen in these waters should be minimized by replacing the thief hatch seals if necessary and installing a gas blanket with at least 2oz. of pressure on all water holding tanks. As you know, the presence of this gas in solution acts to further precipitate any solids still in solution, such as iron sulfide, as well as to increase the corrosive attack by hydrogen sulfide on any metal surfaces exposed to the injection water, by the mechanism of cathodic depolarization.

At the time of sampling, the bacteria tests indicate moderate amounts of sulfate-reducing bacteria present in suspension, such that we recommend that the producing wells be tested to determine those which may be candidates for cleaning and treatment with a bactericide.

Should there be an observed production drop in some of the producing wells, it may be that there is scale deposition downhole. Based on the results of the water analyses, as well as of the membrane filters, the majority of this scale should be Calcium Carbonate, with perhaps small amounts of Calcium Sulfate. Therefore, those producing wells which may have experienced a production drop may be acidized with 5% by volume of blend No. 1 to assist the acid in penetrating any hydrocarbon deposits downhole. These wells should also be considered candidates for squeezing with a scale inhibitor to extend the producing life of the well.

If we may further assist you in the interpretation of the above observations, please call at your convenience.


José Luis Enriquez
Technical Services

Blend No. 1

Micellar Solvent for Acidizing

Product	Gals/55
INC 901	55

Pro-Kem, Inc.

WATER ANALYSIS REPORT

SAMPLE

Oil Co. : Beach Exploration
 Lease : Mack Energy
 Well No.: Big George SWD
 Location: Water Holding Tank
 Attention:

Date Sampled : 20-April-2001
 Date Analyzed: 20-April-2001
 Lab ID Number: May1401.001- 1
 Salesperson :

File Name : c:\Waters\May1401.001

ANALYSIS

- | | | |
|----|---------------------------|--------------|
| 1. | Ph | 6.750 |
| 2. | Specific Gravity 60/60 F. | 1.148 |
| 3. | CACO3 Saturation Index | @ 80F 0.876 |
| | | @ 140F 2.046 |

Dissolved Gasses

	MG/L.	EQ. WT.	*MEQ/L
4. Hydrogen Sulfide	40		
5. Carbon Dioxide	130		
6. Dissolved Oxygen	0.5		

Cations

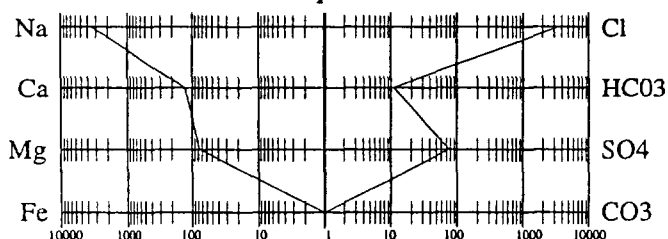
7. Calcium	(Ca++)	2,467	/ 20.1 =	122.74
8. Magnesium	(Mg++)	898	/ 12.2 =	73.61
9. Sodium	(Na+)	78,473	/ 23.0 =	3,411.87
10. Barium	(Ba++)	Not Determined		

Anions

11. Hydroxyl	(OH+)	0	/ 17.0 =	0.00
12. Carbonate	(CO3=)	0	/ 30.0 =	0.00
13. Bicarbonate	(HCO3-)	635	/ 61.1 =	10.39
14. Sulfate	(SO4=)	3,600	/ 48.8 =	73.77
15. Chloride	(Cl-)	124,972	/ 35.5 =	3,520.34
16. Total Dissolved Solids		211,045		
17. Total Iron	(Fe)	4	/ 18.2 =	0.22
18. Total Hardness as CaCO3		9,857		
19. Resistivity @ 75 F. (Calculated)		0.001 /cm.		

LOGARITHMIC WATER PATTERN

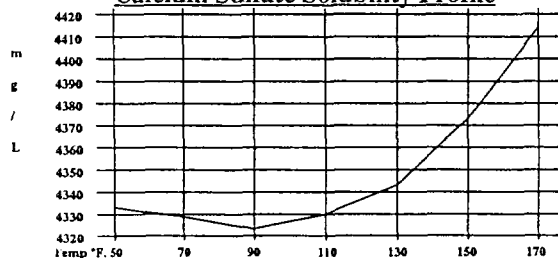
*meq / L.



PROBABLE MINERAL COMPOSITION

COMPOUND	EQ. WT.	X	*meq/L	= mg/L.
Ca(HCO3)2	81.04		10.39	842
CaSO4	68.07		73.77	5,022
CaCl2	55.50		38.57	2,141
Mg(HCO3)2	73.17		0.00	0
MgSO4	60.19		0.00	0
MgCl2	47.62		73.61	3,505
NaHCO3	84.00		0.00	0
NaSO4	71.03		0.00	0
NaCl	58.46		3,408.16	199,241

Calcium Sulfate Solubility Profile





InterChem, Inc
3803 Mankins

P. O. Box 13166

Odessa, Tx. 79768

Suspended Oil Tests

Monday, May 14, 2001

Pro-Kem, Inc.

Oil Company	Beach Exploration	Date	ppm
Sample ID	Location	Collected	Suspended Oil

Lease: Mack Energy

Big George SWD

Water Holding Tank

20-Apr-01

2518

José Luis Enriquez

Tech Services



InterChem, Inc
3803 Mankins

P. O. Box 13166

Odessa, Tx. 79768

Membrane Filter Evaluation

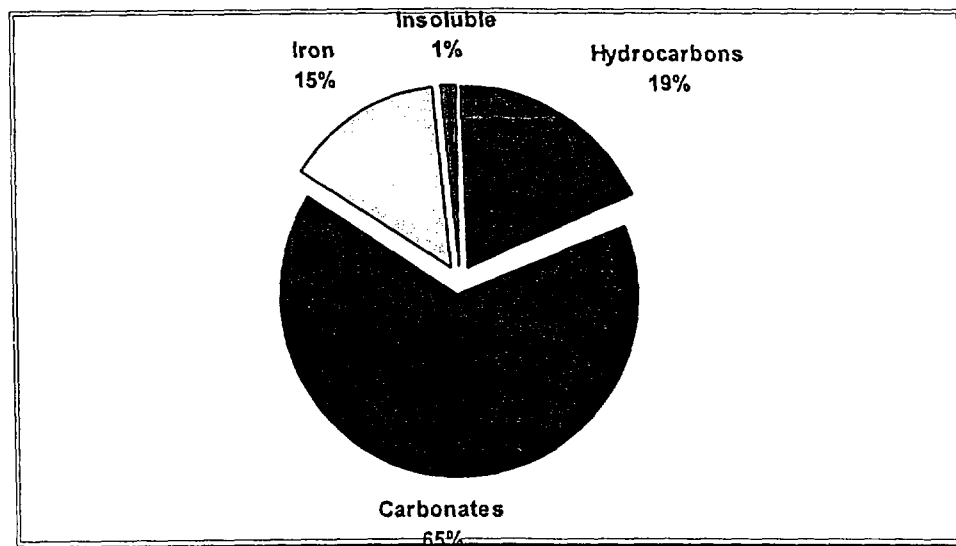
Monday, May 14, 2001

Pro Kem, Inc.

Oil Company **Beach Exploration**
Lease: **Mack Energy**
Sample ID: **Big George SWD**
Location: **Water Holding Tank**

Test Date: **4/20/2001**
Filter Size: **0.45 micron membrane filter**
Volume/Time: **200 ccs in 5 minutes.**

	mg/L.	Percent of Total
Hydrocarbons	37.00	18.69%
Oil, Paraffin, Asphaltenes, etc.		
Carbonates	129.50	65.40%
Calcium Carbonate, etc.		
Iron	29.00	14.65%
Iron Oxide, Iron Sulfide, etc.		
Acid Insolubles	2.50	1.26%
Sand, Silt, Clay, Calcium Sulfate, etc.		
Total Suspended Solids	198.00	



Microscopic examination of the residues after leaching with 15% HCl revealed the presence of the following:

Small amounts of undissolved Iron Sulfide, along with
what appears to be Calcium Sulfate.

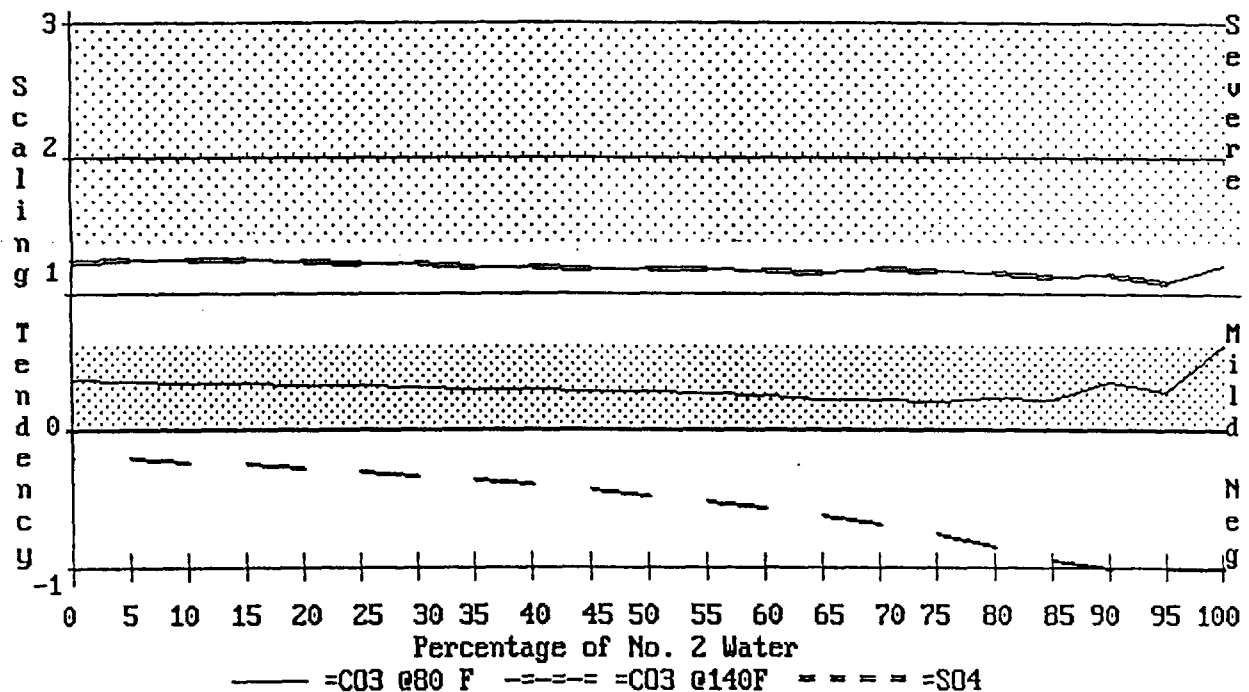
Comparison Between Two Waters

Pro-Kem, Inc.

Sample # 1
Beach Exploration
Exxon Federal
11-December-2000

Sample # 2
Beach Exploration
Double Eagle Fresh Water
11-December-2000

Percent of #1 & #2		pH	TDS mg/L	SpGr	Saturation Index @80°F. @140°F.		Calcium Sulfate Scaling Potential
100	- 0	6.530	125966	1.093	+0.357	+1.247	Nil
95	- 5	6.590	119706	1.089	+0.346	+1.251	Nil
90	- 10	6.649	113446	1.084	+0.333	+1.258	Nil
85	- 15	6.709	107186	1.080	+0.328	+1.263	Nil
80	- 20	6.768	100926	1.075	+0.320	+1.240	Nil
75	- 25	6.828	94,666	1.071	+0.310	+1.230	Nil
70	- 30	6.887	88,406	1.066	+0.296	+1.226	Nil
65	- 35	6.947	82,146	1.062	+0.282	+1.200	Nil
60	- 40	7.006	75,886	1.057	+0.279	+1.199	Nil
55	- 45	7.066	69,626	1.053	+0.274	+1.184	Nil
50	- 50	7.125	63,367	1.048	+0.273	+1.183	Nil
45	- 55	7.185	57,107	1.044	+0.261	+1.186	Nil
40	- 60	7.244	50,847	1.039	+0.241	+1.171	Nil
35	- 65	7.304	44,587	1.035	+0.217	+1.157	Nil
30	- 70	7.363	38,327	1.030	+0.212	+1.182	Nil
25	- 75	7.423	32,067	1.026	+0.201	+1.171	Nil
20	- 80	7.482	25,807	1.021	+0.230	+1.160	Nil
15	- 85	7.542	19,547	1.017	+0.218	+1.128	Nil
10	- 90	7.601	13,287	1.012	+0.348	+1.138	Nil
5	- 95	7.661	7,027	1.008	+0.273	+1.083	Nil
0	- 100	7.720	767	1.003	+0.614	+1.214	Nil



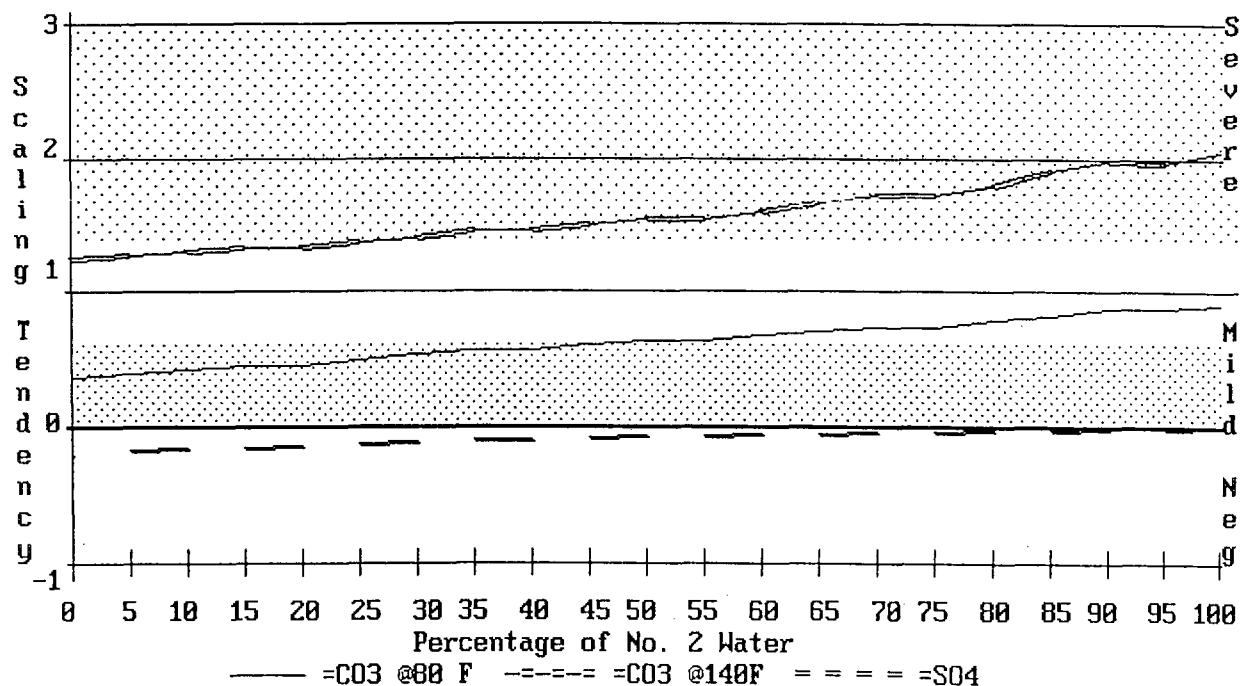
Comparison Between Two Waters

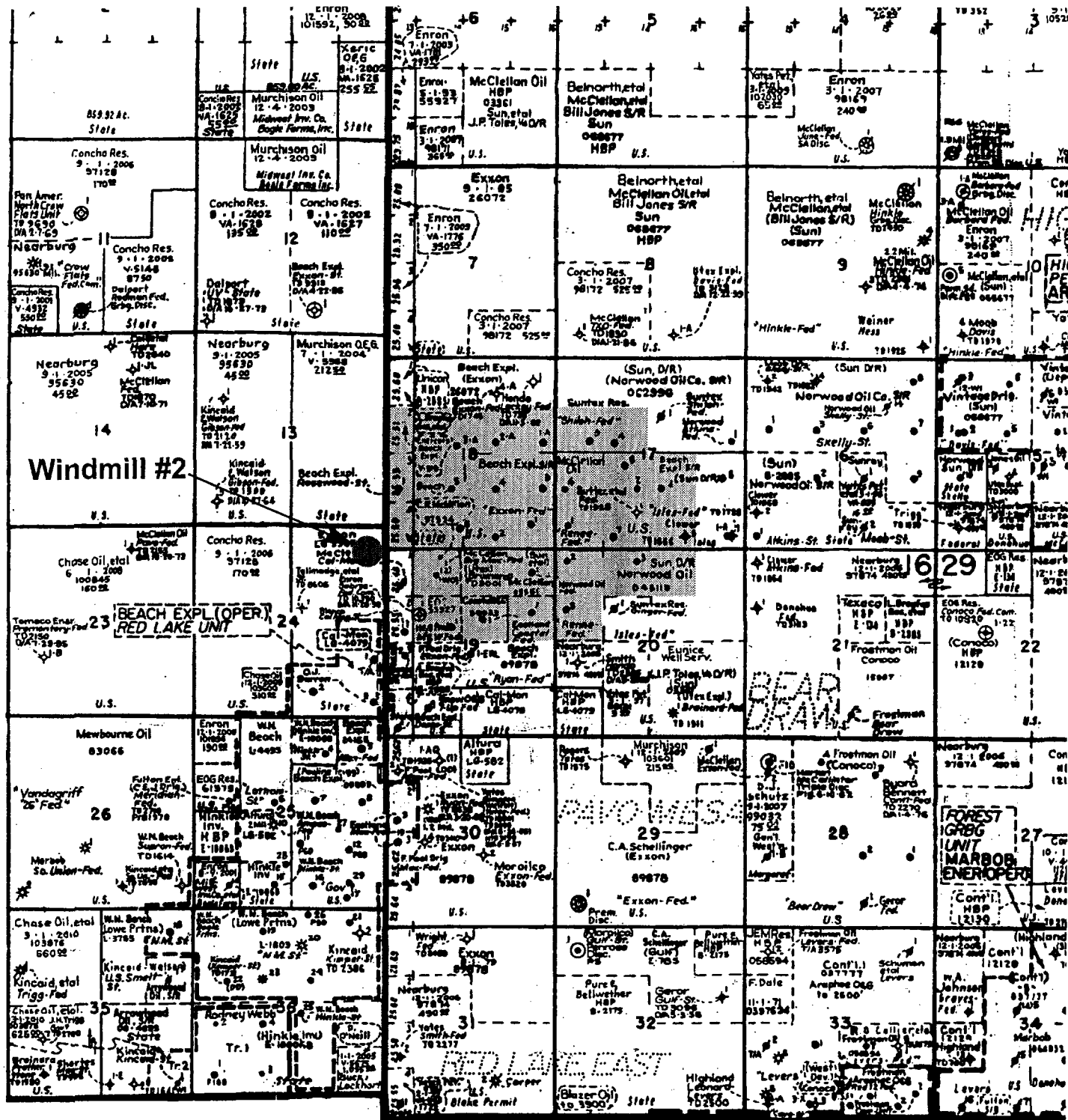
Pro-Kem, Inc.

Sample # 1
Beach Exploration
Exxon Federal Tank Battery
18-May-2001

Sample # 2
Mack Energy
Big George SWD
18-May-2001

Percent of #1 & #2	pH	TDS mg/L	SpGr	Saturation Index @80°F.	Saturation Index @140°F.	Calcium Sulfate Scaling Potential
100 - 0	6.530	125966	1.093	+0.357	+1.247	Nil
95 - 5	6.541	130225	1.096	+0.389	+1.269	Nil
90 - 10	6.552	134484	1.099	+0.411	+1.301	Nil
85 - 15	6.563	138743	1.101	+0.443	+1.333	Nil
80 - 20	6.574	143002	1.104	+0.444	+1.334	Nil
75 - 25	6.585	147261	1.107	+0.486	+1.366	Nil
70 - 30	6.596	151520	1.110	+0.527	+1.407	Nil
65 - 35	6.607	155779	1.112	+0.558	+1.458	Nil
60 - 40	6.618	160038	1.115	+0.558	+1.458	Nil
55 - 45	6.629	164297	1.118	+0.598	+1.498	Nil
50 - 50	6.640	168556	1.121	+0.628	+1.548	Nil
45 - 55	6.651	172814	1.123	+0.628	+1.548	Nil
40 - 60	6.662	177073	1.126	+0.667	+1.607	Nil
35 - 65	6.673	181332	1.129	+0.705	+1.665	Nil
30 - 70	6.684	185591	1.132	+0.734	+1.724	Nil
25 - 75	6.695	189850	1.134	+0.732	+1.722	Nil
20 - 80	6.706	194109	1.137	+0.779	+1.799	Nil
15 - 85	6.717	198368	1.140	+0.816	+1.916	Nil
10 - 90	6.728	202627	1.143	+0.872	+1.982	Nil
5 - 95	6.739	206886	1.145	+0.868	+1.978	Nil
0 - 100	6.750	211145	1.148	+0.893	+2.063	Nil



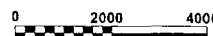


Beach Exploration, Inc.

WEST HIGH LONESOME PENROSE SAND UNIT

Form C-108 Item XI.

Fresh Water Wells
Within 1 Mile of Injectors



Eddy County, New Mexico

Scale: 1"=4000'

JMR

Land Map 3/2001

HALLIBURTON SERVICES

ARTESIA DISTRICT

LABORATORY REPORT

No. W685, W686, & W68

TO Beach Exploration

Date December 4, 1990

P. O. Box 3669

Midland, TX 79701

This report is the property of Halliburton Services and neither it nor any part thereof, nor a copy thereof, is to be published or disclosed without first securing the express written approval of laboratory management. It may however, be used in the course of regular business operations by any person or concern and employees thereof receiving such report from Halliburton Services.

Submitted by _____ Date Rec. December 4, 1990

Well No. _____ Depth _____ Formation _____

Field _____ County _____ Source _____

(CITY OF CARLSBAD)
DOUBLE EAGLE WATER

(WATER WELL # 1)
BOGLE MILL #1

(WATER WELL # 2)
MILL #2

*

Resistivity 12.55 @ 70° 3.41 @ 70° 12.55 @ 70°

Specific Gravity .. 1.0011 @ 70° 1.002 @ 70° 1.0011 @ 70°

pH 8.1 7.6 7.7

Calcium 1,571 1,675 1,152

Magnesium 508 762 889

Chlorides 300 1,000 300

Sulfates Small Heavy Heavy

Bicarbonates 214 214 214

Soluble Iron 0 0 0

Remarks:

E. Jacobson
Respectfully submitted

Analyst: Eric Jacobson - Field Engineer

HALLIBURTON SERVICES

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