



CORE LABORATORIES

January 11, 1990

GREENHILL PETROLEUM CO.
12777 Jones Road
Suite 375
Houston, Texas 77070

File No.: 57181-16259
Subject: Core Analysis
Lovington San Andres Unit No. 66
Lovington San Andres Field
Lea County, New Mexico

Gentlemen:

The subject well was cored using diamond coring equipment and brine gel to obtain 4 inch diameter cores from 4665 to 4755.5 feet and 4922 to 5003.5 feet from the San Andres formation.

Core analysis data is presented in tabular and graphical form for your convenience. A porosity vs. permeability plot and porosity and permeability histograms were prepared for statistical evaluation.

We trust these data will be useful in the evaluation of your property and thank you for the opportunity of serving you.

Very truly yours,

CORE LABORATORIES, a division of
WESTERN ATLAS INTERNATIONAL, INC.

Dean Olson
Laboratory Supervisor

DO/yn

GREENHILL PETROLEUM CO.
Lovington San Andres Unit No. 66
File No. 57181-16259
Procedural Page

The cores were preserved at the wellsite in a CO₂ atmosphere and transported to Midland by Core Laboratories personnel.

Core analysis was made from intervals requested on one inch diameter samples.

Fluid removal and saturations were achieved using a Dean Stark/gas solvent extraction method.

Gas expansion porosity and grain density were determined using Boyle's Law.

Air permeability was measured in a horizontal direction while the core was held in a Hassler rubber sleeve.

The core was slabbed and photographed under natural light.

The core was boxed after the analysis and shipped to Core Lab in Houston, Texas.

CORE ANALYSIS REPORT
FOR
GREENHILL PETROLEUM CO.
LOVINGTON SAN ANDRES UNIT NO. 66
LOVINGTON SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom; and for whose exclusive and confidential use; this report is made. The interpretations or opinions expressed present the best judgment of Core Laboratories (all errors and omissions excepted); but Core Laboratories and its officers and employees, assume no responsibility and make no warranty or representations, as to the productivity, proper operations, or profitability of any oil, gas or other mineral well or formation in connection with which such report is used or relied upon.

WILLIAMS PETROLEUM CO.
 LOVINGTON SAN ANDRES UNIT NO. 66
 1244' FNL & 2592' FEL, SEC. 36, T-16-S, R-36-E
 LEA COUNTY, NEW MEXICO

Field : LOVINGTON SAN ANDRES FIELD File No.: 57181-16259
 Formation : SAN ANDRES Date : 12-23-90
 Coring Fluid : BRINE GEL API No. : 30-025-31029
 Elevation : 3844' GL Analysts: OLSON

C O R E A N A L Y S I S R E S U L T S

SAMPLE NUMBER	DEPTH ft	PERMEABILITY (HORIZONTAL) K _{air} md	POROSITY (HELIUM) %	SATURATION		GRAIN DENSITY gm/cc	F L U I D
				(OIL VOLUME) %	(WATER VOLUME) %		
CORE NO. 1 4665-4755 CUT 90' REC 90.5'							
1	4665.0- 80.0						NA Dol f lam sty1
2	4680.0- 80.4	0.01	6.3	21.1	5.2	2.87	Dol f sli/vug
	4680.4- 81.6	0.01	5.9	16.6	8.8	2.86	Dol f sli/vug
3	4682.0- 84.0						NA Dol f sty1
4	4684.0- 85.4	0.04	9.0	47.4	28.3	2.86	Dol f sli/vug p.p.
5	4685.4- 85.8	0.47	9.1	43.2	22.0	2.86	Dol f sli/vug p.p.
	4685.8- 89.2	0.04	4.8	46.8	31.9	2.87	Dol f p.p.
6	4690.0- 93.0						NA Dol F
7	4693.0- 93.5	164.	15.8	25.4	36.3	2.85	Dol p.p. ool
8	4693.5- 94.4	11.0	17.2	43.4	17.7	2.86	Dol p.p. ool
9	4694.4- 95.4	1.60	15.6	43.3	9.9	2.86	Dol p.p.
	4695.4- 96.8	2.00	8.7	34.5	21.7	2.85	Dol p.p.
10	4697.0- 31.0						NA Dol f sh lam
11	4731.0- 31.8	0.01	7.9	24.7	22.6	2.86	Dol sli/vug foss
	4731.8- 32.6	0.01	7.0	46.8	20.3	2.87	Dol sli/vug foss
12	4733.0- 34.0						NA Dol f p.p.
	4734.0- 34.6	19.0	8.5	40.9	9.7	2.87	Dol anhy f sli/vug p.p. foss
13	4735.0- 36.0						NA Dol F
14	4736.0- 36.8	0.06	9.5	37.9	13.6	2.85	Dol sli/anhy sli/vug foss
15	4736.8- 37.6	0.09	10.6	28.7	18.6	2.86	Dol sli/anhy sli/vug foss lam
16	4737.6- 38.2	0.06	17.4	17.8	24.7	2.86	Dol sli/vug ool
17	4738.2- 39.6	0.41	18.7	30.6	7.7	2.86	Dol sli/vug ool
	4739.6- 40.7	0.18	14.9	31.8	8.2	2.86	Dol f sli/vug p.p. ool
18	4740.7- 41.3	0.16	12.1	33.7	15.0	2.86	Dol f sli/vug p.p. ool
	4742.0- 55.5						NA Dol sh lam

C O R E A N A L Y S I S R E S U L T S

SAMPLE NUMBER	DEPTH ft	PERMEABILITY (HORIZONTAL) K _{air} md	POROSITY (HELIUM) %	SATURATION		GRAIN DENSITY gm/cc	DESCRIPTION
				(PORE VOLUME) OIL %	WATER %		

4755.5-4922 DRILLED INTERVAL

CORE NO. 2 4922-5002 CUT 80' REC 81.5'

19	4922.0- 29.0	<.01	4.3	38.5	8.8	2.84	NA Dol sli/anhy F sh lam
	4929.0- 29.2						Dol p.p.
	4930.0- 47.0						NA Dol f sh lam
20	4947.0- 47.2	<.01	3.9	40.9	36.5	2.86	Dol p.p.
	4948.0- 50.0						NA Dol f sli/vug p.p.
21	4950.0- 50.2	0.02	2.7	60.9	29.2	2.84	Dol F open/vf sli/vug p.p.
22	4950.2- 51.2	0.75	7.3	43.4	24.6	2.84	Dol f p.p.
23	4951.2- 52.2	166.	13.7	30.4	51.3	2.83	Dol p.p.
24	4952.2- 53.2	126.	14.0	34.7	48.1	2.83	Dol p.p.
25	4953.2- 54.2	54.0	12.4	27.0	43.6	2.83	Dol p.p. foss
26	4954.2- 55.4	32.0	10.2	25.3	46.4	2.84	Dol p.p.
	4956.0- 60.0						NA Dol F p.p. styl
27	4960.0- 60.6	0.02	6.6	56.7	28.2	2.85	Dol sli/vug p.p. foss
	4961.0- 72.0						NA Dol p.p. sh lam
28	4972.0- 72.5	<.01	4.8	60.6	18.0	2.85	Dol p.p.
	4973.0- 87.0						NA Dol shy sh lam
29	4987.0- 87.9	0.29	7.1	26.4	11.8	2.85	Dol sli/anhy f p.p.
	4988.0- 03.5						NA Dol shy f sh lam

LITHOLOGICAL ABBREVIATIONS

Anhy, anhy	anhedrite (-ic)	Lim, lim	limestone
Ark, ark	arkose (-ic)	med gr	medium grain
bnd	band (-ed)	Mtrx	matrix
Brec, brec	breccia	NA	interval not analyzed
Calc, calctc	calcite (-ic)	Nod, nod	nodules (-ar)
carb	carbonaceous	Ool, ool	oolite (-itic)
crs gr	course grained	Pisol, pisol	pisolite, pisolitic
Chk, chky	chalk (-y)	p.p.	pin-point (porosity)
cht, cht	chert (-y)	Ptg	parting
Cgl, cgl	conglomerate (-ic)	Pyr, pyr	pyrite (-itized, -itic)
crs xln	coarsely crystalline	Sd, sdy	sand (-y)
dns	dense	Sh, shy	shale (-ly)
Dol, dol	dolomite (-ic)	SHR	solid hydrocarbon residue
F	randomly oriented fractures	sli	slightly
f	slightly fractured	Slt, slty	silt (-y)
f gr	fine grained	styl	stylolite (-itic)
foss	fossil (-iferous)	suc	sucrosic
f xln	finely crystalline	Su, su	sulphur, sulphurous
Gil	gilsonite	TEFA	TOO BROKEN FOR ANALYSIS
Glauc, glauc	glauconite (-itic)	Trip, trip	tripoli (-itic)
Grt	granite	v	very
Gyp, gyp	gypsum (-iferous)	vf	predominantly vertically fractured
hor frac	predominantly horizontally fractured	vug	vug (-gy)
incl	inclusion (-ded)	xbd	crossbedded
intbd	interbedded	xln	medium crystalline
lam	lamina (-tions, -ated)	xtl	crystal

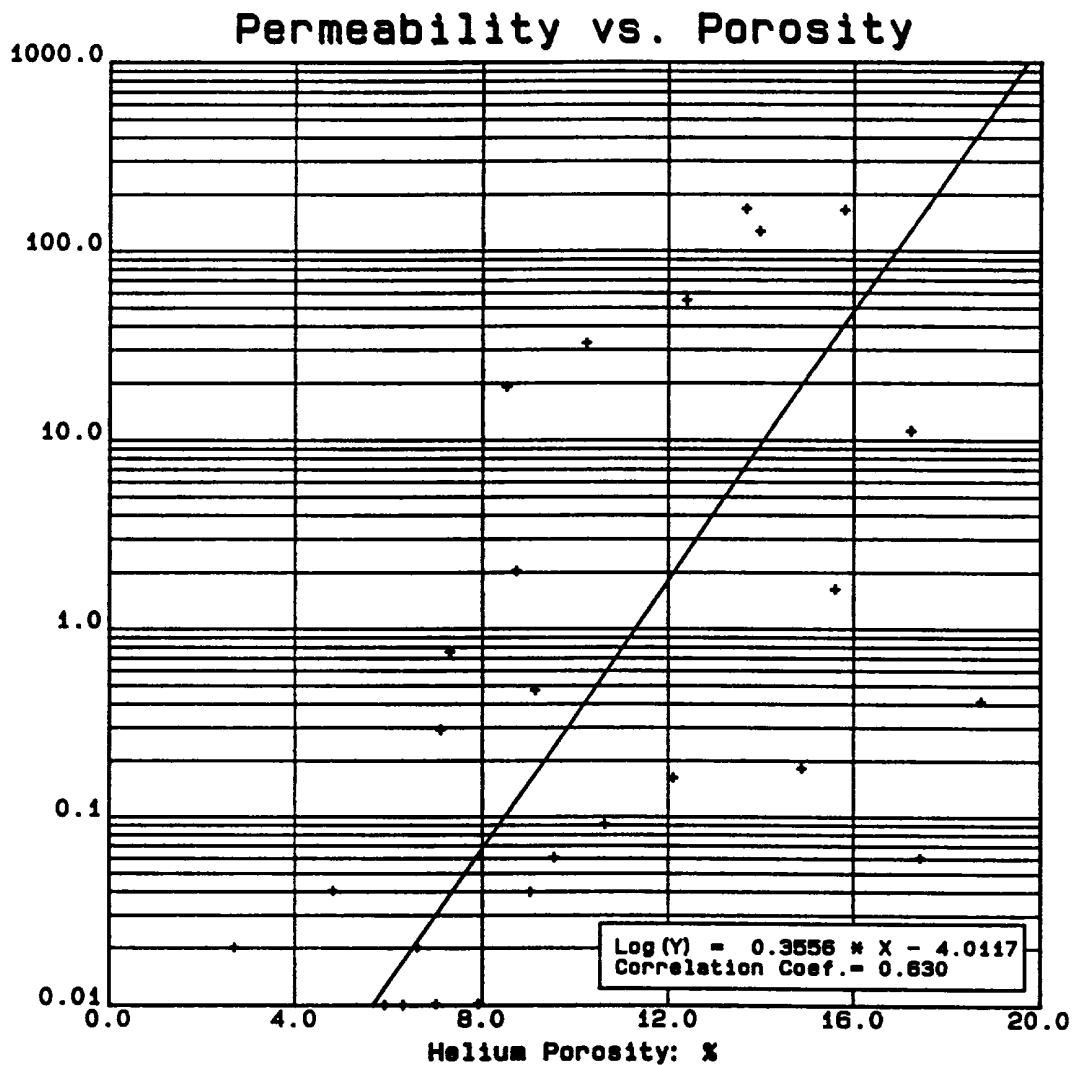
THE FIRST WORD IN THE DESCRIPTION COLUMN OF THE CORE ANALYSIS REPORT
DESCRIBES THE ROCK TYPE. FOLLOWING ARE ROCK MODIFIERS IN DECREASING
ABUNDANCE AND MISCELLANEOUS DESCRIPTIVE TERMS.

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10cc

GREENHILL PETROLEUM CO.
ATTN: KEN PFAU
12777 JONES ROAD
SUITE 375
HOUSTON, TX 77070



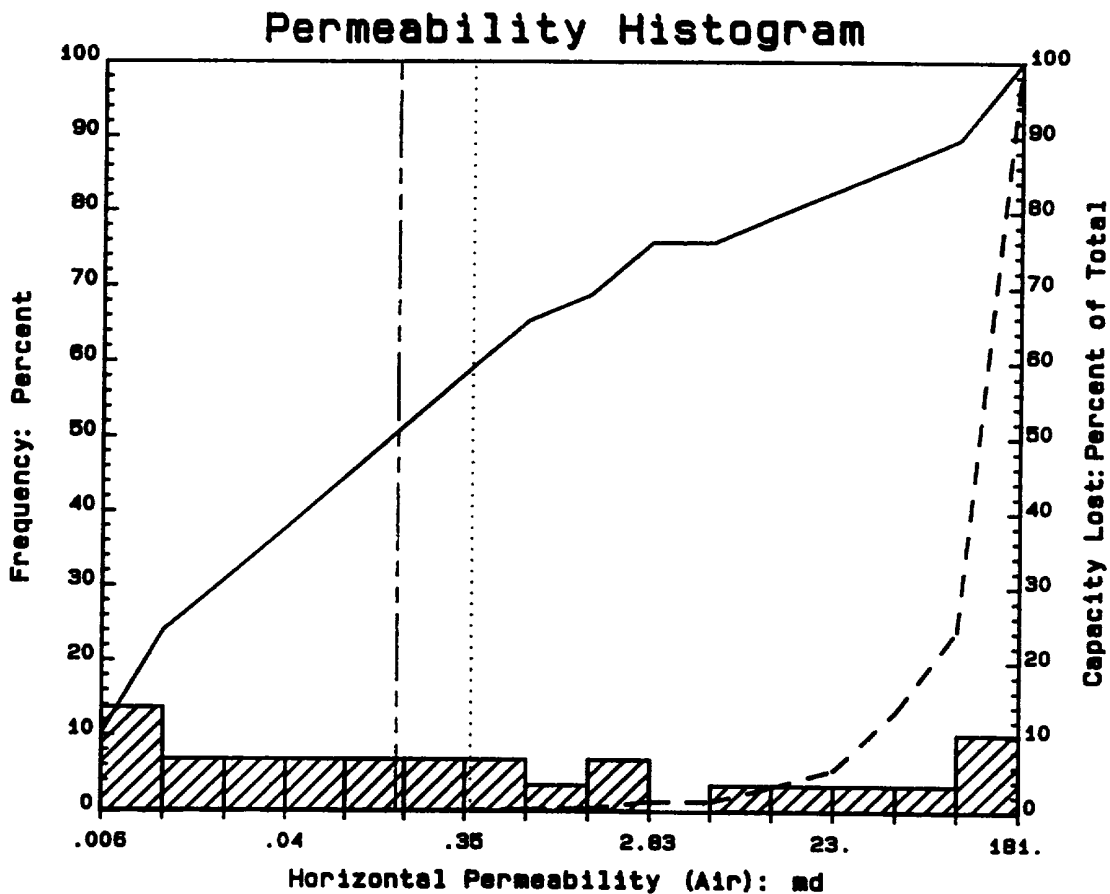
GREENHILL PETROLEUM CO.
LOVINGTON SAN ANDRES UNIT NO. 66
LOVINGTON SAN ANDRES FIELD

SAN ANDRES (4665-5003.5 feet)

Core Laboratories

12-23-90

- LEGEND -
SAN ANDRES



GREENHILL PETROLEUM CO.
LOVINGTON SAN ANDRES UNIT NO. 66
LOVINGTON SAN ANDRES FIELD

SAN ANDRES (4665-5003.5 feet)

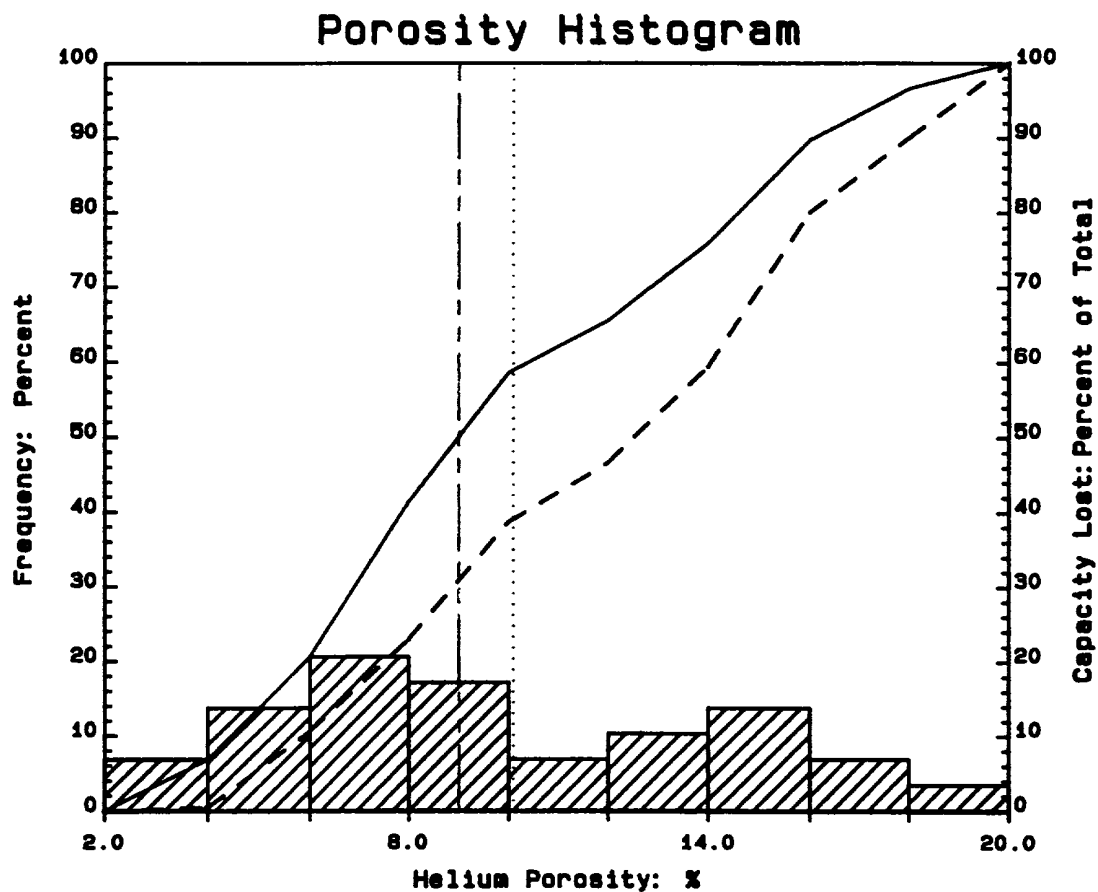
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- LEGEND -

- Median Value (0.160)
- Geom. Average (0.376)
- Cumulative Frequency
- - - Cumulative Capacity Lost

29 Samples



GREENHILL PETROLEUM CO.
LOVINGTON SAN ANDRES UNIT NO. 66
LOVINGTON SAN ANDRES FIELD

SAN ANDRES (4665-5003.5 feet)

Core Laboratories

12-23-90

- LEGEND -

- Median Value (9.0)
- Arith. Average (10.1)
- Cumulative Frequency
- - - Cumulative Capacity Lost

29 Samples

TABLE I

SUMMARY OF CORE DATA

ZONE AND CUTOFF DATA				CHARACTERISTICS REMAINING AFTER CUTOFFS			
ZONE:		SAN ANDRES		ZONE:		PERMEABILITY:	
Identification -----				Number of Samples -----	29	Flow Capacity -----	494.6 md-ft
Top Depth -----		4665.0 ft		Thickness Represented -	25.9 ft	Arithmetic Average -----	19.1 md
Bottom Depth -----		5003.5 ft				Geometric Average -----	0.38 md
Number of Samples -----		42		POROSITY:		Harmonic Average -----	0.02 md
DATA TYPE:				Storage Capacity -----	261.3 ϕ -ft	Minimum -----	0.00 md
Porosity -----			(HELIUM)	Arithmetic Average -----	10.1 %	Maximum -----	166. md
Permeability -----			(HORIZONTAL) Kair	Minimum -----	2.7 %	Median -----	0.16 md
CUTOFFS:				Maximum -----	18.7 %	Standard Dev. (Geom) --	K-10 ¹ .600 md
Porosity (Minimum) -----		0.0 %		Median -----	9.0 %		
Porosity (Maximum) -----		100.0 %		Standard Deviation -----	$\pm$ 4.5 %	HETEROGENEITY (Permeability):	
Permeability (Minimum) ---		0.0000 md				Dykstra-Parsons Var. --	0.960
Permeability (Maximum) ---		100000. md		GRAIN DENSITY:		Lorenz Coefficient ----	0.819
Water Saturation (Maximum)		100.0 %		Arithmetic Average -----	2.85 gm/cc	AVERAGE SATURATIONS (Pore Volume):	
Oil Saturation (Minimum) -		0.0 %		Minimum -----	2.83 gm/cc		
Grain Density (Minimum) --		2.00 gm/cc		Maximum -----	2.87 gm/cc	Oil -----	34.7 %
Grain Density (Maximum) --		3.00 gm/cc		Median -----	2.86 gm/cc	Water -----	23.8 %
Lithology Excluded -----		NONE		Standard Deviation ----	$\pm$ 0.01 gm/cc		

COMPLETION COREGRAPH

GREENHILL PETROLEUM CO.
LOVINGTON SAN ANDRES UNIT NO. 66
LOVINGTON SAN ANDRES FIELD

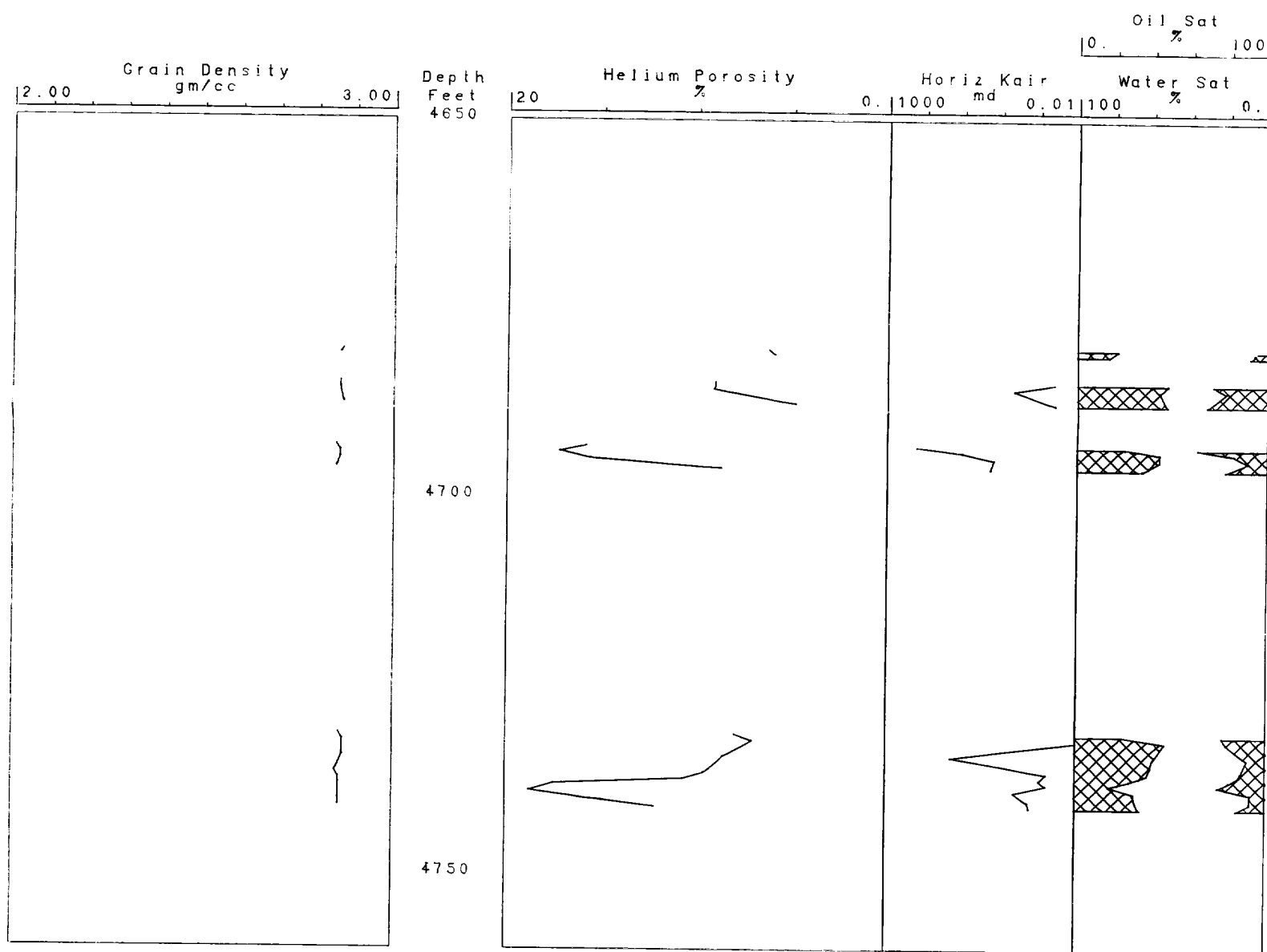
SAN ANDRES (4665-4755.5 feet)

ZONE 1

Core Laboratories

12-23-90

Vertical Scale
5.00 in = 100.0 ft



COMPLETION COREGRAPH

GREENHILL PETROLEUM CO.
LOVINGTON SAN ANDRES UNIT NO. 66
LOVINGTON SAN ANDRES FIELD

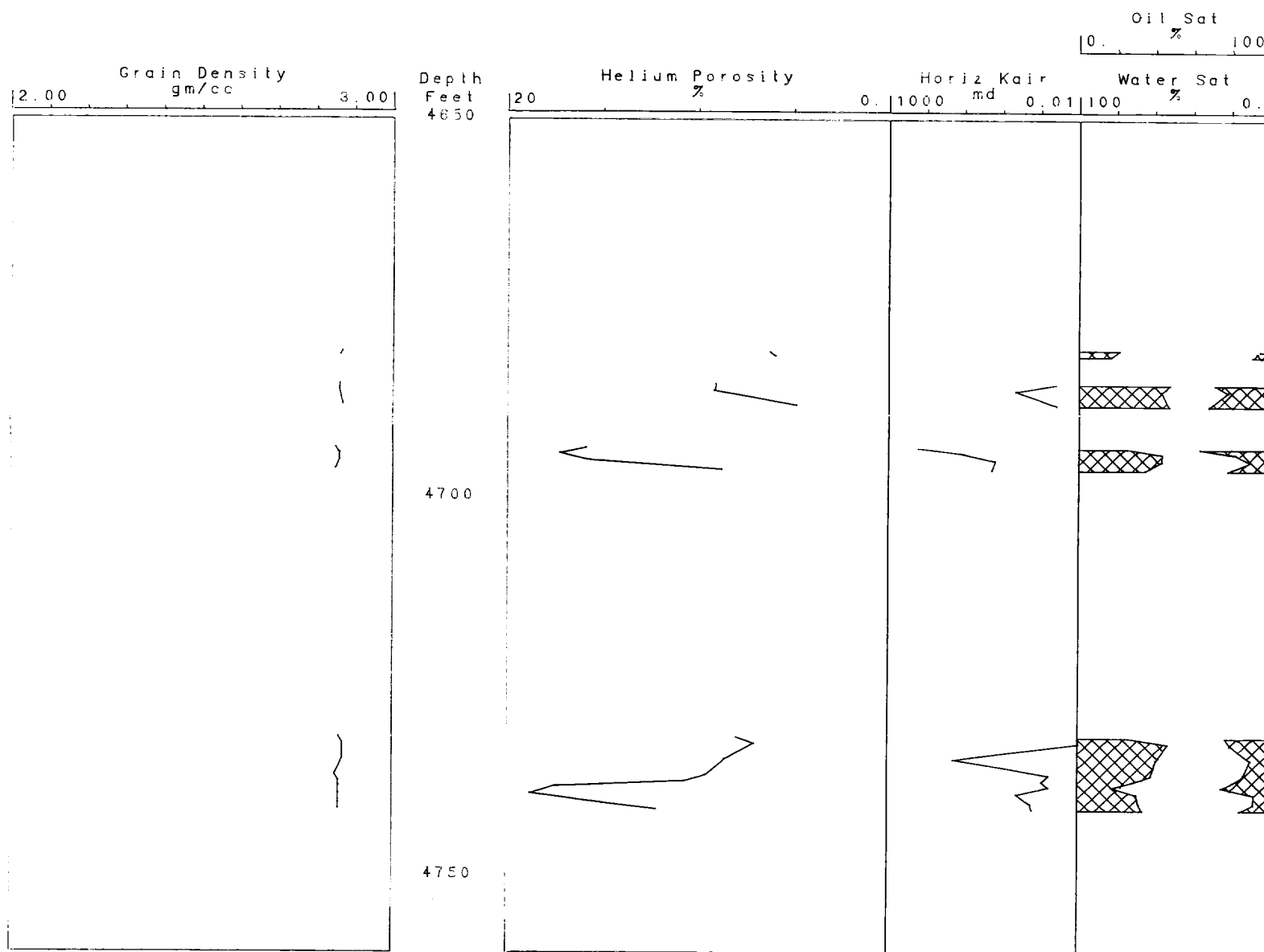
SAN ANDRES (4922-5003.5 feet)

ZONE 2

Core Laboratories

12-23-90

Vertical Scale
5.00 in = 100.0 ft



Submit 3 Copies
to Appropriate
District Office

DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-103
Revised 1-1-89

OIL CONSERVATION DIVISION
P.O. Box 2088
Santa Fe, New Mexico 87504-2088

WELL API NO. 3002531029
5. Indicate Type of Lease STATE ☒ FEE ☐
6. State Oil & Gas Lease No. B2411
7. Lease Name or Unit Agreement Name Lovington San Andres Unit
8. Well No. 66
9. Pool name or Wildcat Lovington Grayburg San Andres
10. Elevation (Show whether DF, RKB, RT, GR, etc.) 3844.1 GR

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A
DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT"
(FORM C-101) FOR SUCH PROPOSALS.)

1. Type of Well:
OIL WELL ☒ GAS WELL ☐ OTHER ☐

2. Name of Operator
Greenhill Petroleum Corporation

3. Address of Operator
11490 Westheimer, Suite 200, Houston, TX 77077

4. Well Location
Unit Letter B : 1244 Feet From The North Line and 2592 Feet From The East Line
Section 36 Township 16S Range 36E NMPM Lea County

11. Check Appropriate Box to Indicate Nature of Notice, Report, or Other Data
NOTICE OF INTENTION TO: SUBSEQUENT REPORT OF:

PERFORM REMEDIAL WORK ☐	PLUG AND ABANDON ☐	REMEDIAL WORK ☐	ALTERING CASING ☐
TEMPORARILY ABANDON ☐	CHANGE PLANS ☐	COMMENCE DRILLING OPNS. ☐	PLUG AND ABANDONMENT ☐
PULL OR ALTER CASING ☐		CASING TEST AND CEMENT JOB ☒	
OTHER: ☐		OTHER: ☐	

12. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 1103.

12-15-90 - Ran 9 jts of 8-5/8" 24# K-55 ST&C csg set @ 365' w/275 sxs
Class "C" + 2% CaCl₂. TOC - surface determined by circulation.
Test csg to 800 psi - Test OK.

1-01-91 - Ran 116 jts of 5-1/2" 15.5# K-55 LT&C csg set @ 5130' w/850 sxs
Class "C". TOC - 2780' - determined by Bond Log. Test csg
to 1500 psi - Test OK.

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Michael J. Newport TITLE Land Manager - Permian Basin DATE 3-27-91
TYPE OR PRINT NAME Michael J. Newport TELEPHONE NO. 713-955-1146

(This space for State Use) ORIGINAL SIGNED BY JERRY SEXTON

APR 29 1991

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

RECEIVED

APR 26 1991

Office
HOBBS Office