

MERIDIAN OIL

December 22, 1988

State of New Mexico
Oil Conservation Division
ATTN: Mr. Ernie Bush
1000 Rio Brazos Road
Aztec, New Mexico 87410

DEC 23 1988
OIL CON. DIV.
DIST. 3

Dear Mr. Bush:

In order to comply with Order No. SWD-344, the following has been enclosed:

1. Revised Completion Procedure and wellbore diagram. This represents completion only in the Entrada formation.
2. Bottom hole pressure curves from the step rate test performed on December 18, 1988.
3. Water analysis from swab runs made prior to the step rate test. The samples appear to be a mixture of Entrada formation water and load water.
4. Cement bond log, showing 7" casing with cement top at $\pm 4460'$, 100% bond across 9 5/8" shoe, and good bond to the liner top.

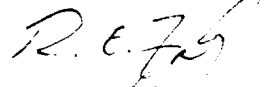
As more data becomes available, the results will be sent directly to your office.

Further verbal approval is sought to initiate water injection operations by December 27, 1988 after the following conditions have been met:

- NMOCD witness annulus pressure test of 4 1/2" internally coated tie-back string. This will ensure that no communication exists between seals and Entrada formation.
- 4 1/2" - 7" annulus is filled with packer fluid preventing corrosion.
- Pressure recording devices that will be installed to continuously monitor tubing and annulus pressure.
- Pressure limiting device that will not allow more than 1000 psig applied tubing head pressure.
- A volume totalizer that will measure cumulative bbls. injected.

Please contact me at 326-9712 at your earliest convenience.

Very truly yours,



R. E. Fraley
Regional Production Engineer

REF:WSS:car
Enclosures (as stated)
cc: David Catanach

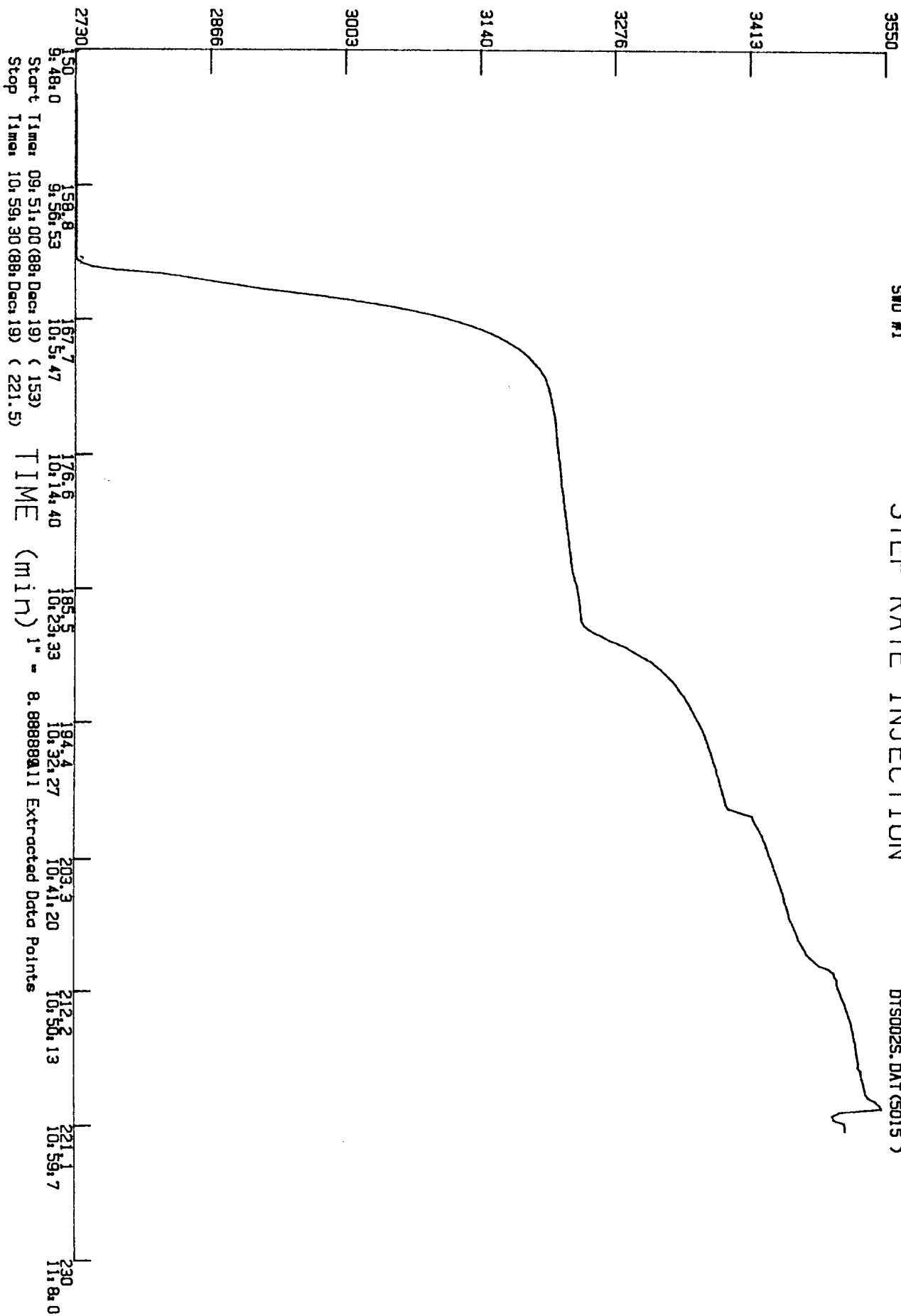
Min/Max : 2730.483 / 3547.317
Scale is 1" = 136.66

PRESSURE (PSI-G)

MERIDIAN OIL COMPANY
PUMP CANYON
SAN JUAN COUNTY
SWD #1

NL SPERRY-SUN - EVANSTON DIST. PRESSURE PLOT STEP RATE INJECTION

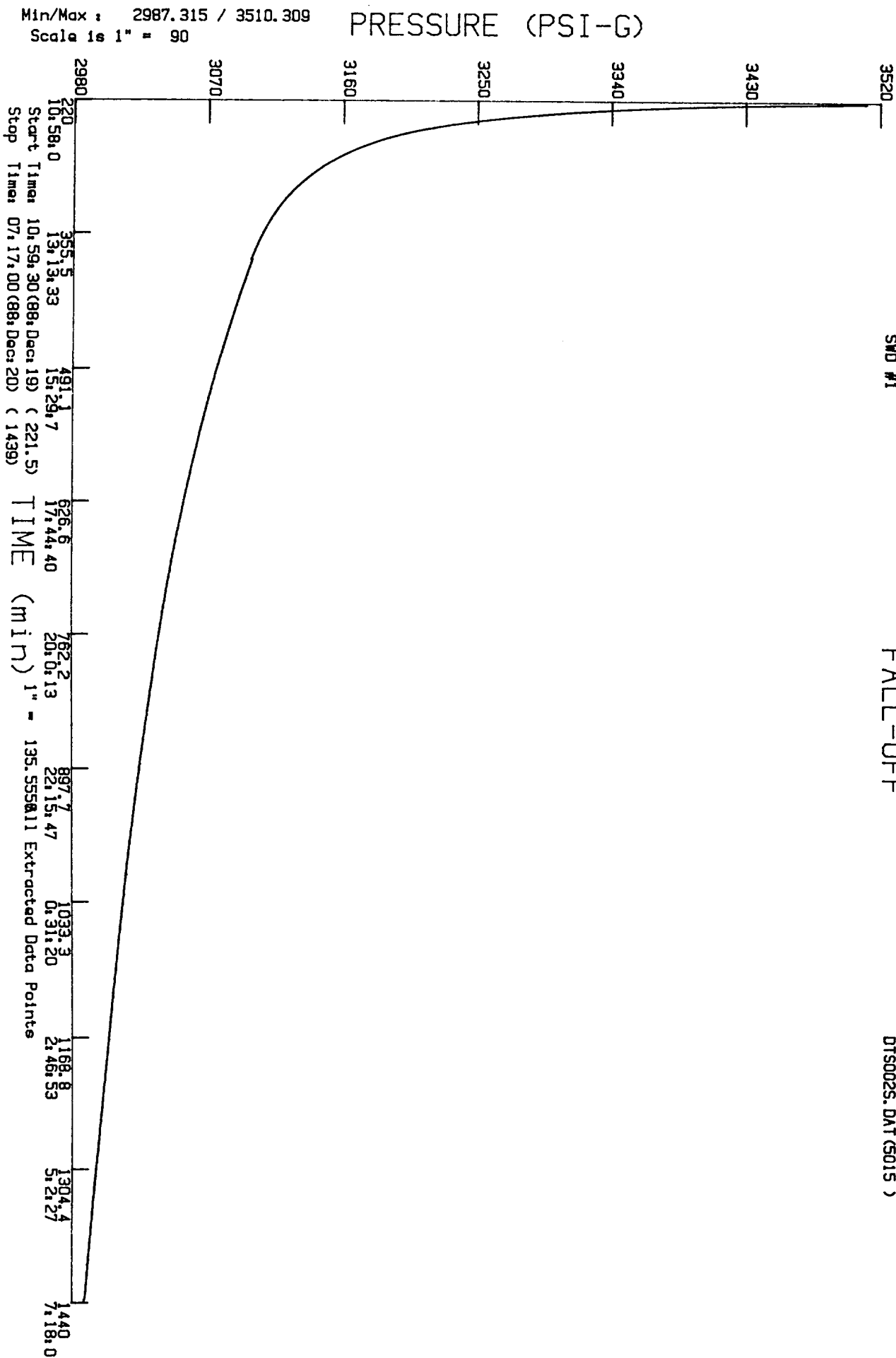
NEW MEXICO
12/18/88
EV-Y5-83088 (00024)
DTS0025.DAT (5015)



MERIDIAN OIL COMPANY
 PUMP CANYON
 SAN JUAN COUNTY
 SVD #1

NL SPERRY-SUN - EVANSTON DIST. PRESSURE PLOT FALL-OFF

NEW MEXICO
 12/18/88
 EV-Y5-83088 (00024)
 DTS0025.DAT (5015)



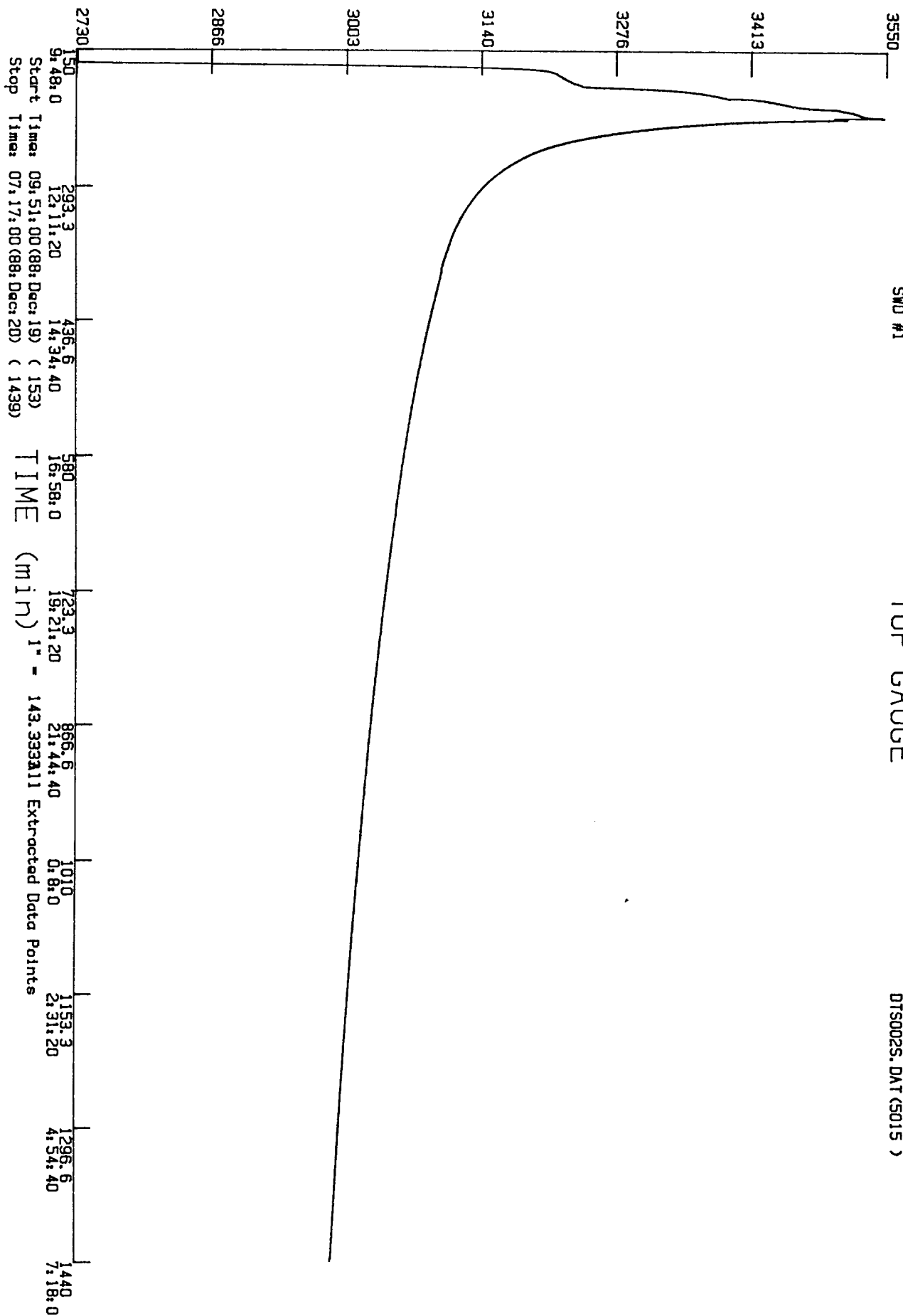
MERIDIAN OIL COMPANY
PUMP CANYON
SAN JUAN COUNTY
SWD #1

NL SPERRY-SUN - EVANSTON DIST.
PRESSURE PLOT
TOP GAUGE

NEW MEXICO
12/18/88
EV-Y5-83088 (00024)
DTS002S.DAT (5015)

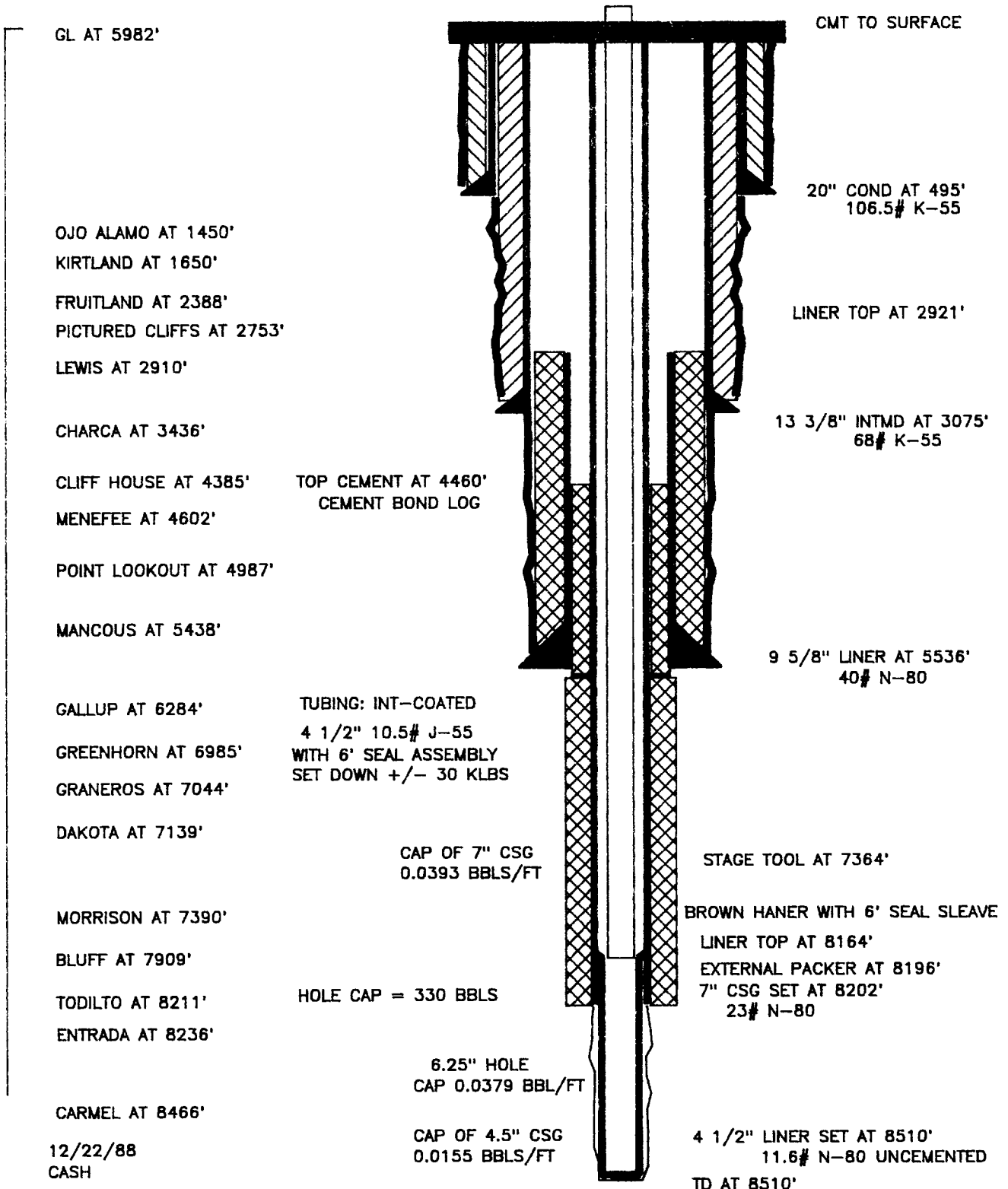
PRESSURE (PSI-G)

Min/Max : 2730.483 / 3547.317
Scale is 1" = 136.66



PUMP CANYON SWD #1

WELLBORE DIAGRAM ENTRADA COMPLETION



Completion Procedure

Pump Canyon SWD #1

1. Notify BLM and NMOCD that completion procedures are commencing.
2. MOL with completion rig, hold safety meeting, install safety signs and proper fire equipment at strategic points. Comply with all BLM, NMOCD and MOI safety regulations. RU.
3. NU 5000# BOP, test operation.
4. Make sure that fluid level is above 4400'. RU wireline unit, run CCL-GR from 8510' (PBD) to liner top at 8164', then run CCL-GR-CBL from 8164' to 7130'. Run CBL across estimated cement top at $\pm 4530'$. Locate top of fluid. Set CIBP at $\pm 8509'$.
 - Evaluate CBL for possible squeeze job.
 - If micro annulus is present, relog with 1000 psi applied pressure.
5. Perforate the Entrada Sandstone using a 3 1/8" steel carrier gun with 0.42" diameter, 10 grams from the bottom up. Use caution, well may go on a vacuum.

8236' - 8264' = 28'	
8270' - 8286' = 16'	
8294' - 8308' = 14'	
8344' - 8358' = 14'	Mid-point = 8351'
8426' - 8434' = 8'	
8440' - 8448' = 8'	
8460' - 8466' = 6'	

 - Use 1 spf 120° phase for a total of 94 shots.
6. RD wireline unit, release.
7. Shoot fluid level, record depth and time.
8. PU Hy-Tech tool and packer assembly on 2 7/8" workstring. Set packer at $\pm 8120'$. Stroke tool to establish returns. Record estimated volume of fluid recovered. *Pump Failed*
 - If fluid is muddy, continue operations until fluid cleans up.
 - If continuous muddy fluid and high rate, consider landing tubing. RU swabbing unit and swab until well cleans up.
 - If no returns, release packer, TOOH, check tool.
 - Obtain three samples marked with date, time, depth, formation and well name.
9. Load backside with filtered water. Pressure test casing to 5000 psi. Have BLM and NMOCD witness test. Hold for 10 minutes. Release packer. TOOH.
10. Prepare to run step rate test. Preset recorder to every 30 seconds for 5 hours, then every minute for the rest of the test. Set pressure bomb at $\pm 8380'$. Have BLM and NMOCD witness step rate test.

Completion Procedure
Page Two

11. Rig up pump trucks and frac van. Pressure test lines to 3500 psi. Inject as follows:
 - Load hole with water.
 - Start pumping at 1/2 BPM for 15 minutes. Then every 15 minutes increase by 1/2 BPM, until 5 BPM is obtained.
 - Note: Plot pressure vs. rate. When parting pressure observed, shut pumps down for falloff test.
 - Adjust rates depending on pressure response.
 - Recover bomb after 24 hours in the hole.
12. If step rate test indicates that fracture treatment is unnecessary, continue completion procedures, otherwise implement fracture design.
13. PU Brown type CPH liner packer, seal assembly and 6' tieback sleeve on 2 7/8" workstring. Sting into liner top at 8164'. Set packer. TOOH laying down 2 7/8" tubing.
14. PU 4 1/2" seal assembly on 4 1/2" 10.5# J-55 internally coated injection string. Sting into tieback sleeve. Set 30,000 lbs. on packer. Test backside to 3000 psi for 10 minutes. Add corrosion inhibitor to backside. RD BOP, RU wellhead. Release rig.

Approved:

D.C. Walker by T.A.H.
D. C. Walker

WSS:car

Pertinent Data Sheet - Pump Canyon SWD #1

Location: 1725' FSL, 1850' FEL, Sec. 7, T30N-R8W, San Juan County, NM

Field: Entrada Morrison

Elevation: 5972'GL TD: 8510'

5986'KB

Casing Record:

<u>Hole Dia.</u>	<u>Csg. Size</u>	<u>Jts. Run</u>	<u>Wt. & Grade</u>	<u>Depth Set</u>	<u>Cement Vol.</u>	<u>Top Cement</u>
26"	20"	12	106&133# K-55	117'	875 sx	Surface
17.5"	13 3/8"	74	68 & 61# K-55	3072'	1700 sx	Surface
12.25"	9 5/8"	60	40# N-80	5536'	900 sx	L.T.
				2921' (Liner, top)		
8.75"	7"	187	23# N-80	8202'	140 sx	
			S.T. @	7364'	600 sx	4530'
6.25"	4 1/2"	12	11.6# N-80	8510'		
				8164' (Liner, top)		Uncemented

<u>Formation Tops:</u>				
San Jose	Surface	Mancos	5438'	
Ojo Alamo	1450'	Gallup	6284'	
Kirtland	1650'	Greenhorn	6985'	
Fruitland	2388'	Graneros	7044'	
Pic. Cliffs	2753'	Dakota	7139'	
Lewis	2910'	Morrison	7388'	
Chacra	3436'	Bluff	7909'	
Cliffhouse	4385'	Todilto	8221'	
Menefee	4602'	Entrada	8236'	
Pt. Lookout	4987'	Carmel	8466'	

Logging Record: DIL, LDT, CNL, NGT, SDT, Frac Height

Coring Record: Side wall cores @ 8241', 8251', 8261', 8274', 8280' and 8461'.
K_{air} = 0.03 to <0.01 MD; K_w = 0.0 MD; Ø avg. = 4.35%.

RESOLVED

3/3/38

ON. DIV.
EST. 3

API WATER ANALYSIS REPORT FORM

CLIENT: Meridian Oil Co.

Date Sampled: 12/16/88 @ 1030 Well Location: Pump Canyon SWD #1
Date Received: 12/21/88
Date Analyzed: 12/21/88
Date Reported: 12/21/88 IML Lab Number: F2337

Dissolved Solids

Cations	mg/l	me/l
Sodium, Na	5370	233.57
Sodium, Na (calc.).....	4930	214.57
Calcium, Ca.....	16	1.30
Magnesium, Mg.....	71	3.53
Barium, Ba.....	---	---

Other Properties

pH, s.u..... 8.18
Specific Gravity 60/60 F 1.013
Resistivity (ohm-meter). 0.498
@ 77 F.

Anions

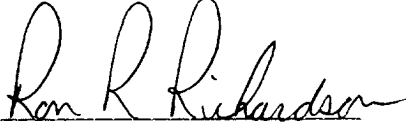
Chloride, Cl.....	6565	185.18
Sulfate, SO4.....	1200	25.00
Carbonate, CO3.....	-0-	-0-
Bicarbonate, HCO3.....	567	9.15

Total Dissolved Solids (180C), mg/l... 15500

Total Dissolved Solids (calc.), mg/l.. 13790

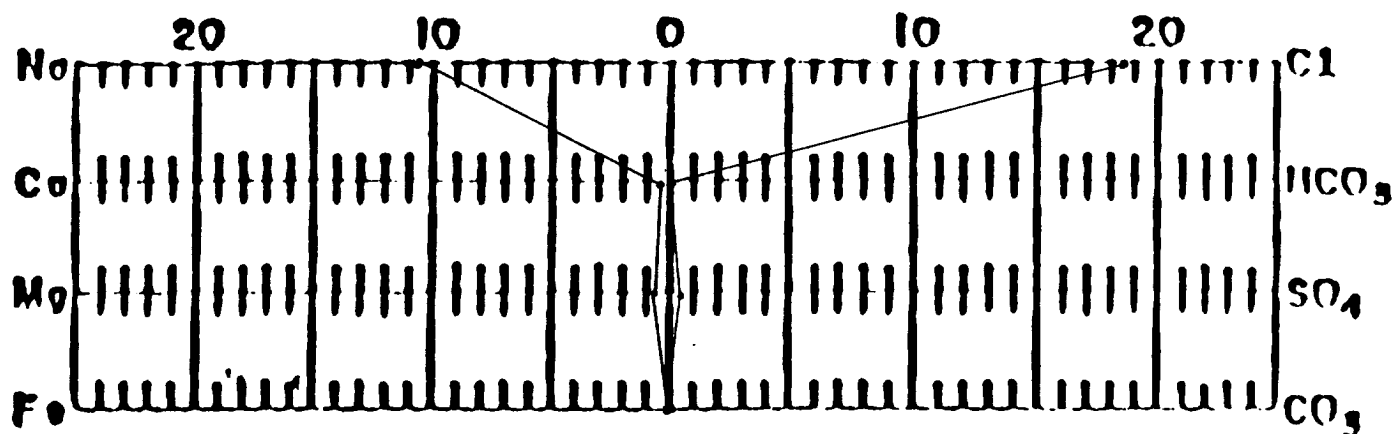
Sulfide, as H2S..... ---

Approved by:

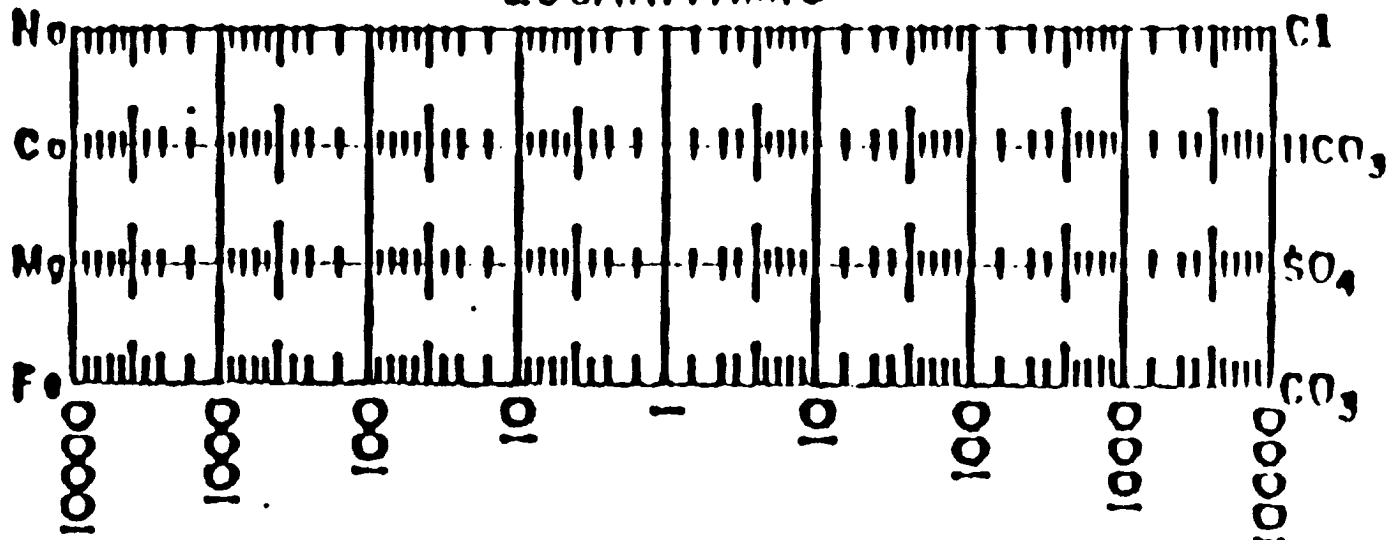

Ron R. Richardson
Laboratory Director

WATER PATTERNS — *mc/l*

STANDARD



LOGARITHMIC



API WATER ANALYSIS REPORT FORM

CLIENT: Meridian Oil Co.

Date Sampled: 12/16/88 @ 1730 Well Location: Pump Canyon SWD #1
Date Received: 12/21/88
Date Analyzed: 12/21/88
Date Reported: 12/21/88 IML Lab Number: F2338

Dissolved Solids

Cations	mg/l	me/l
Sodium, Na	5370	233.57
Sodium, Na (calc.).....	4880	212.33
Calcium, Ca.....	30	2.46
Magnesium, Mg.....	141	7.06
Barium, Ba.....	---	---

Other Properties

pH, s.u..... 7.18
Specific Gravity 60/60 F 1.012
Resistivity (ohm-meter). 0.499
@ 77 F.

Anions

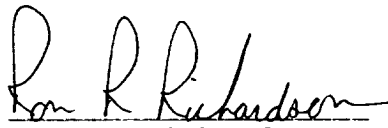
Chloride, Cl.....	6840	192.96
Sulfate, SO4.....	825	17.19
Carbonate, CO3.....	-0-	-0-
Bicarbonate, HCO3.....	713	11.70

Total Dissolved Solids (180C), mg/l... 15510

Total Dissolved Solids (calc.), mg/l.. 13990

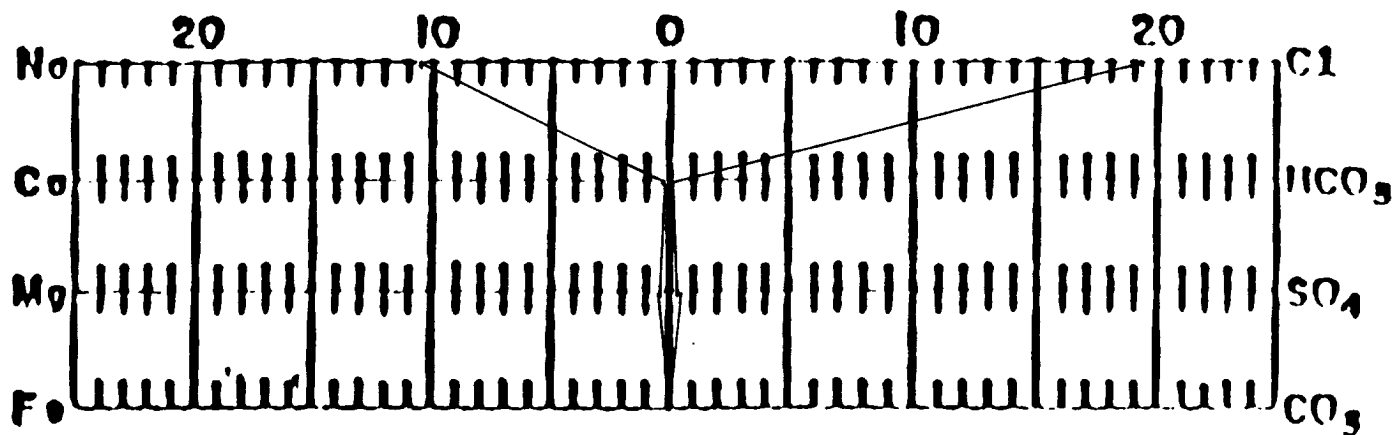
Sulfide, as H2S..... ---

Approved by:

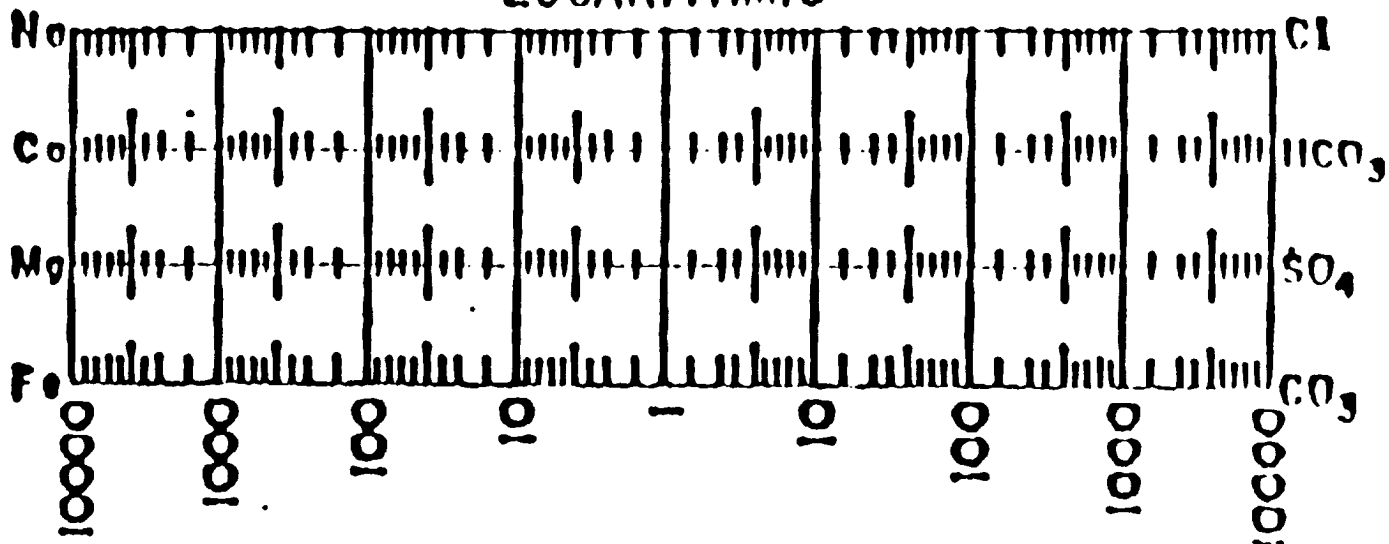

Ron R. Richardson
Laboratory Director

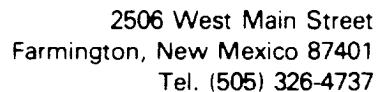
WATER PATTERNS — *mc/l*


STANDARD



LOGARITHMIC

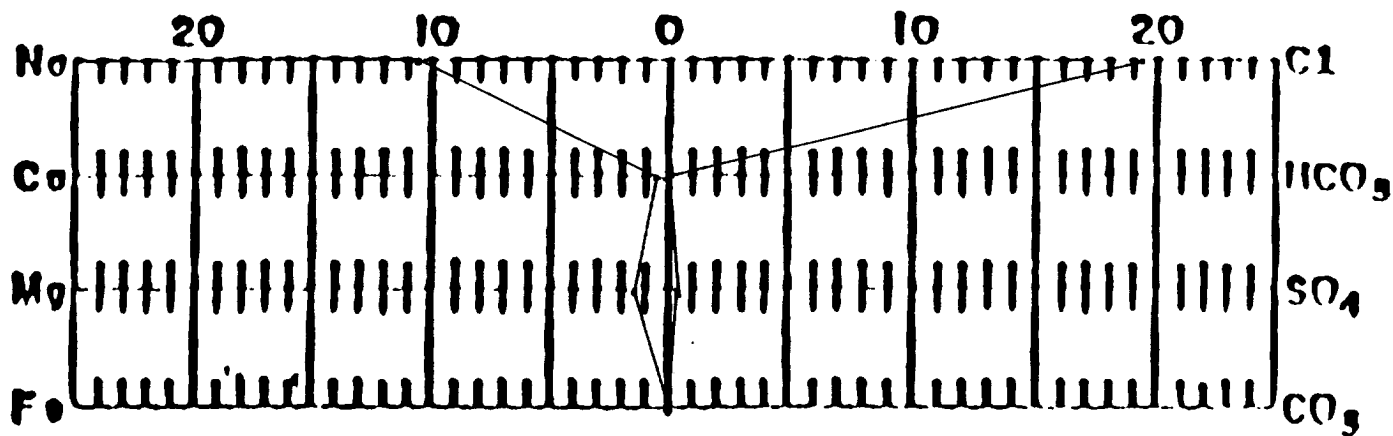




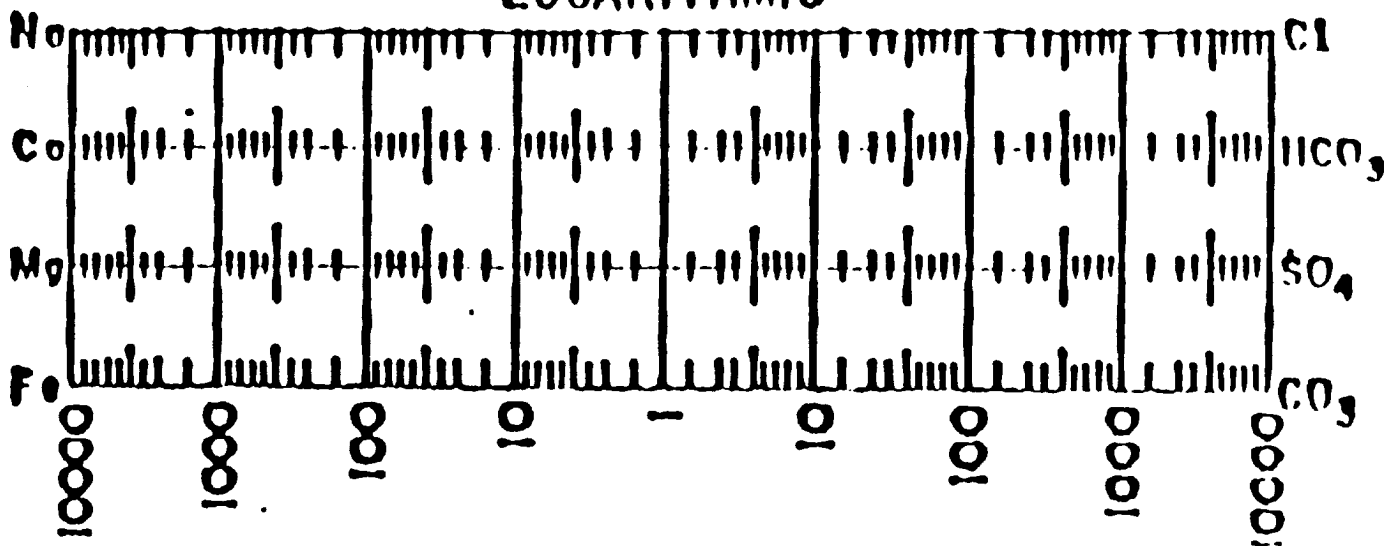

Ron R. Richardson
Laboratory Director

WATER PATTERNS — me/l

STANDARD



LOGARITHMIC



12/16/88

17:30 hrs

Pertinent Information: Lost 1400 bbls of LCM mud at 8273' - 8276' during drilling operations. Set 7" at 8202' with external packer at 8196'. Drill to TD with air-foam. During sidewall coring operations recovered large amount iron fines. Probable cause corrosion problems associated with air drilling, extent unknown.

Vendors:

Perforators:	Petro Wireline (505) 326-6669
Treatment Co:	Halliburton Company (505) 325-3575
Packer:	Baker Services-Brown Packer (505) 325-0216
Pressure Bomb:	Tefteller, Inc. (505) 325-1731
Hy-Tech Tools:	Ponder Fishing Tools (505) 325-8961

Tanks Required: 1735 bbls - 370 bbl/tank = 5 tanks

****Use Fruitland Coal water, filtered to 1 micron nominal.

Special Considerations: This will be an injection well, very tight matrix formation, use caution when applying pipe dope (doping pin ends would be better).