

Case 11042

APPLICATION FOR AUTHORIZATION TO INJECT

JUN - 8 1994

- I. Purpose: Secondary Recovery Pressure Maintenance Disposal Storage
Application qualifies for administrative approval? yes no

II. Operator: MERIDIAN OIL INC.

Address: P.O. BOX 4289, FARMINGTON, NM 87499

Contact party: TRAVIS D. STICE

Phone: (505) 326-9812

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.

ATTACHED

- IV. Is this an expansion of an existing project? yes 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. ATTACHED
- 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. ATTACHED
- VII. Attach data on the proposed operation, including: ATTACHED
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 geological data on the injection zone including appropriate lithologic detail, geological 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 source known to be immediately underlying the injection interval. ATTACHED
- IX. Describe the proposed stimulation program, if any. ATTACHED
- X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division they need not be resubmitted.) CURRENTLY NOT AVAILABLE
- 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. ATTACHED
- 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 source of drinking water. ATTACHED
- 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: TRAVIS D. STICE

Title: REGIONAL ENGINEER

Signature: Travis D Stice

Date: 6/2/94

- * If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be duplicated and resubmitted. Please show the date and circumstance of the earlier submittal.

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate Division district office.

III. WELL DATA

A. The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:

- (1) Lease name; Well No.; location by Section, Township, and Range; and footage location within the section.
- (2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.
- (3) A description of the tubing to be used including its size, lining material, and setting depth.
- (4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Division District offices have supplies of Well Data Sheets which may be used or which may be used as models for this purpose. Applicants for several identical wells may submit a "typical data sheet" rather than submitting the data for each well.

B. The following must be submitted for each injection well covered by this application. All items must be addressed for the initial well. Responses for additional wells need be shown only when different. Information shown on schematics need not be repeated.

- (1) The name of the injection formation and, if applicable, the field or pool name.
- (2) The injection interval and whether it is perforated or open-hole.
- (3) State if the well was drilled for injection or, if not, the original purpose of the well.
- (4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.
- (5) Give the depth to and name of the next higher and next lower oil or gas zone in the area of the well, if any.

XIV. PROOF OF NOTICE ATTACHED

All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location.

Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located. The contents of such advertisement must include:

- (1) The name, address, phone number, and contact party for the applicant;
- (2) the intended purpose of the injection well; with the exact location of single wells or the section, township, and range location of multiple wells;
- (3) the formation name and depth with expected maximum injection rates and pressures; and
- (4) a notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, P. O. Box 2088, Santa Fe, New Mexico 87501 within 15 days.

NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.

III. Well Data

Jillson Federal SWD #1 Form C108 - Attachment Documentation

A. Proposed Disposal Well Data:

1.) Well Location:

Lease Name: Jillson Federal SWD
Well Number: 1
Location : T24N-R03W-Section 08
2305' FNL, 2415' FWL
Rio Arriba County, New Mexico

2.) Well Bore Casing Configuration:

<u>Casing</u>	<u>Hole Size</u>	<u>Casing Size</u>	<u>Depth Set</u>	<u>Cement Vol.</u>	<u>Proposed Top/Cmt</u>
Surface	12-1/4"	9-5/8" 36 lb.	300'	188 ft ³	Surface
Longstring	8-3/4"	7" 23 lb.	8,800'	2,381 ft ³	Surface

3.) Injection Tubing:

<u>Tubing Size</u>	<u>Tubing Wght/Grd</u>	<u>Lining Material</u>	<u>Depth Set</u>
4-1/2"	10.5 lb., L-80 ST&C	Scotch 650 PlastiCoat	8,400'

4.) Isolation Packer:

<u>Name</u>	<u>Model</u>	<u>Depth Set</u>
Baker	FAB-1, Ret. Prod. Pkr, 4.00" ID	8,400'

B. Proposed Well Data:

1.) Formation:

Formation Name: Entrada

2.) Injection Intervals:

Injection Intervals: Approx. 8,441' - 8,683'

3.) The original purpose for drilling this well is to dispose of produced water.

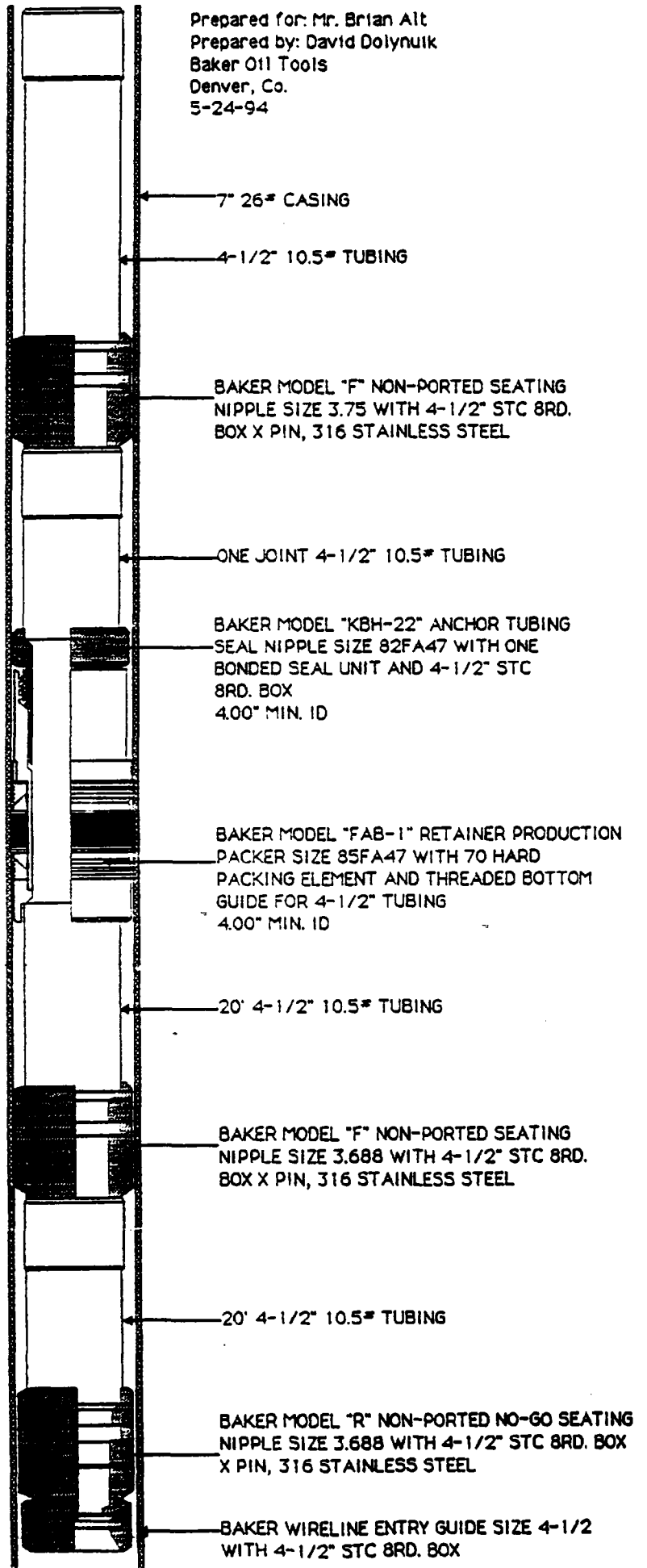
4.) There will be no additional perforated intervals in the proposed well.

5.) There are no lower producing intervals, and the next higher producing interval is the Dakota at 7285'-7680'.

Meridian Oil Inc.

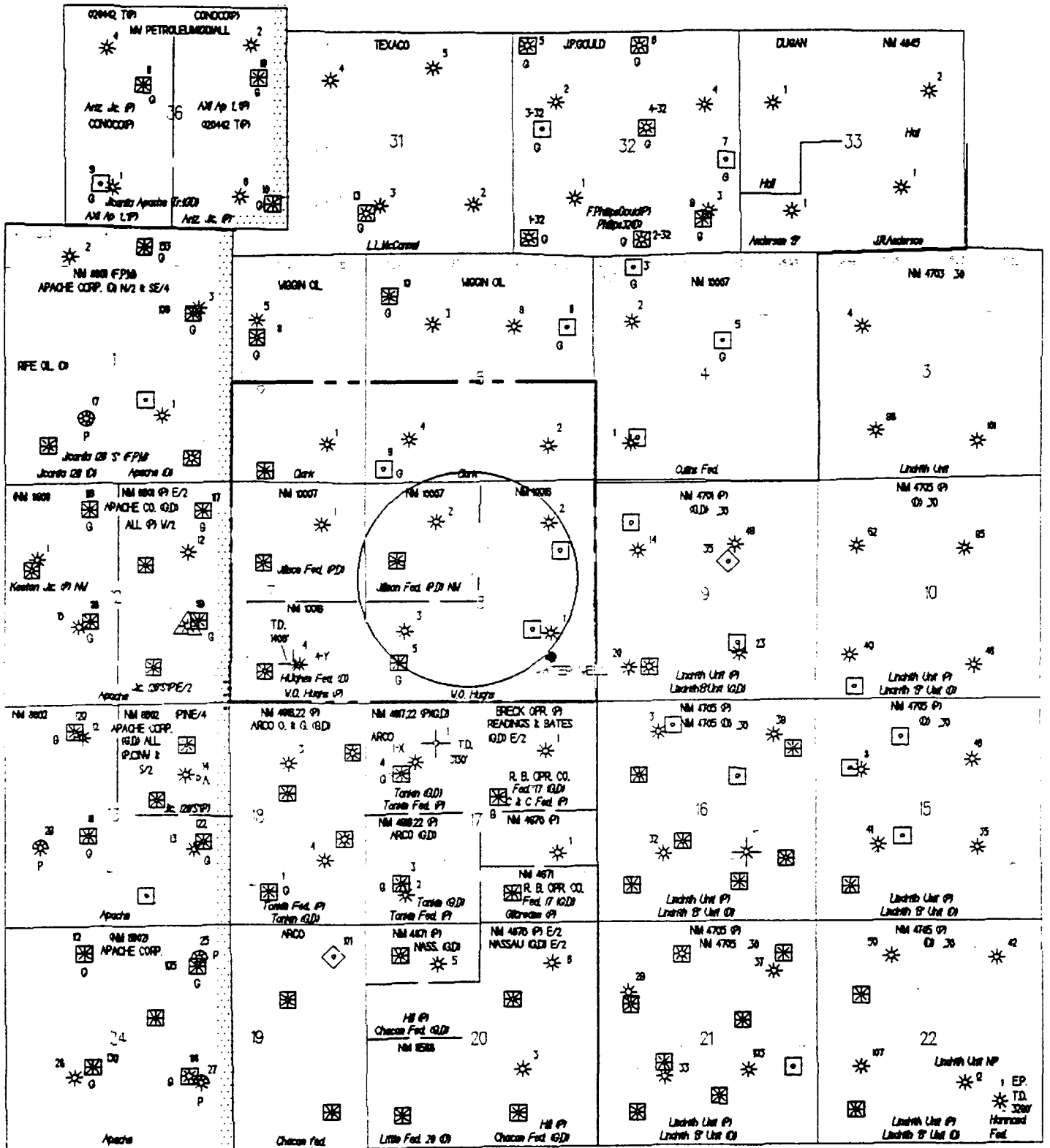
Jillson Fed. SWD #1




Prepared for: Mr. Brian Alt
Prepared by: David Dolynuk
Baker Oil Tools
Denver, Co.
5-24-94










V. Identifier Map

JILLISON FEDERAL SWD #1
NW/4 SECTION 8, T24N, R3W



-  OFFSET OPERATOR NOTIFICATION (SEE OFFSET OPERATOR PLAT)
-  ONE HALF MILE DISPOSAL WATER WELL RADIUS
-  WATER WELL

-  FRUITLAND SAND WELL
-  FRUITLAND COAL WELL
-  PICTURED CLIFFS WELL
-  CHACRA WELL
-  MESAVERDE WELL
-  DAKOTA WELL (EAS)
-  DAKOTA WELL (OIL)
-  GALLUP WELL

VI

State : New Mexico **NM Merid 24N - 3W - 8 se nw se 7**

County: RIO ARRIBA Oper: MOBIL PRODUCING TX & NM

Field : LINDRITH WEST GAL/DK **Compl: 11/18/1983 D OG O&G**

Well: W O HUGHES #6 Last Info: 01/11/1994

Pty: 1743 fsl 1341 fel

Lat-Long by GITI: 36.322296 - 107.174911

Oper Address: PO Drawer G, Cortez CO 81321 - 303/565-9558

Obt: 7700 Gallup/Dakota Permit #: 06/30/1983 API: 30-039-2324000

Elev: 6871GR

Spud: 09/06/1983 Contr: Arapahoe #7

TD: \$700 on 09/25/1983 Chinle PB: 7557

Elev: 6871GR FORMATION TOPS (Type: L=Log S=Sample V=True Vertical)
(Source: H=Scout, I=IOG, T=Govt, S=Shell, G=USGS, N=NRIS)

Formation	Depth	Elev	T/S	Formation	Depth	Elev	T/S
Cliff House	4702	2169	L H	Dakota	7286	-415	L H
Manefee	4731	2140	L H	Morrow	7680	-809	L H
Point Lookout	5152	1719	L H	Morrison	7684	-813	L H
Manco	5362	1509	L H	Todilto	8338	-1467	L H
Gallup	6330	541	L H	Entrada	8400	-1529	L H
Greenhorn	7195	-324	L H	Chinle	8645	-1774	L H
Graneros	7258	-387	L H				

Casing: 13 3/8 @ 412

8 5/8 @ 3300

4 1/2 @ 7601 w/1680

- Dakota

Core : None

OST : None rptd

Logs : FDC CNL DIL

Turnup: 2 3/8 @ 7499 w/pkr @ 7464

Perfs : 7484-7504 (Dakota D)

w/1 SPF - spot 150 gal 7 1/2% HCl - bk dn w/1800 gal 2% KCl wtr 30
ball sealers - frac w/28,000 gal 40# xlink gel 2% KCl wtr 56,000#
20/40 sd - flush w/119 bbl 2% KCl wtr

7280-7404 (Dakota)

w/44 holes @ 7280-7307, 7323-7329, 7336-7342, 7400-7404
- bk dn w/200 gal 7 1/2% HCl 3700 gal 2% KCl 70 ball sealers
- frac w/55,000 gal 40# xlink gel 2% KCl wtr 110,000# 20/40 sd -flush
w/1 w/118 bbl 2

PZone : 7280-7504 (Dakota)

IP : (Dakota 7280-7504) -- P 116 BOPD grav 43; 257 MCFGPD; 40 BWPD

Journal: 9/14/83 drlg @ 4300.

9/22/83 drlg @ 7978.

10/5/83 drlg out cement.

10/19/83 cleaning out sand.

10/27/83 tstg Dakota.

11/22/83 SI; WOPL.

12/6/83 SI; WOPL to potential test.

12/16/83 SI; WOPL to potential test.

State : New Mexico NM Merid 24N - 3W - 8 se nw se

County: RIO ARRIBA Oper: MOBIL PRODUCING TX & NM

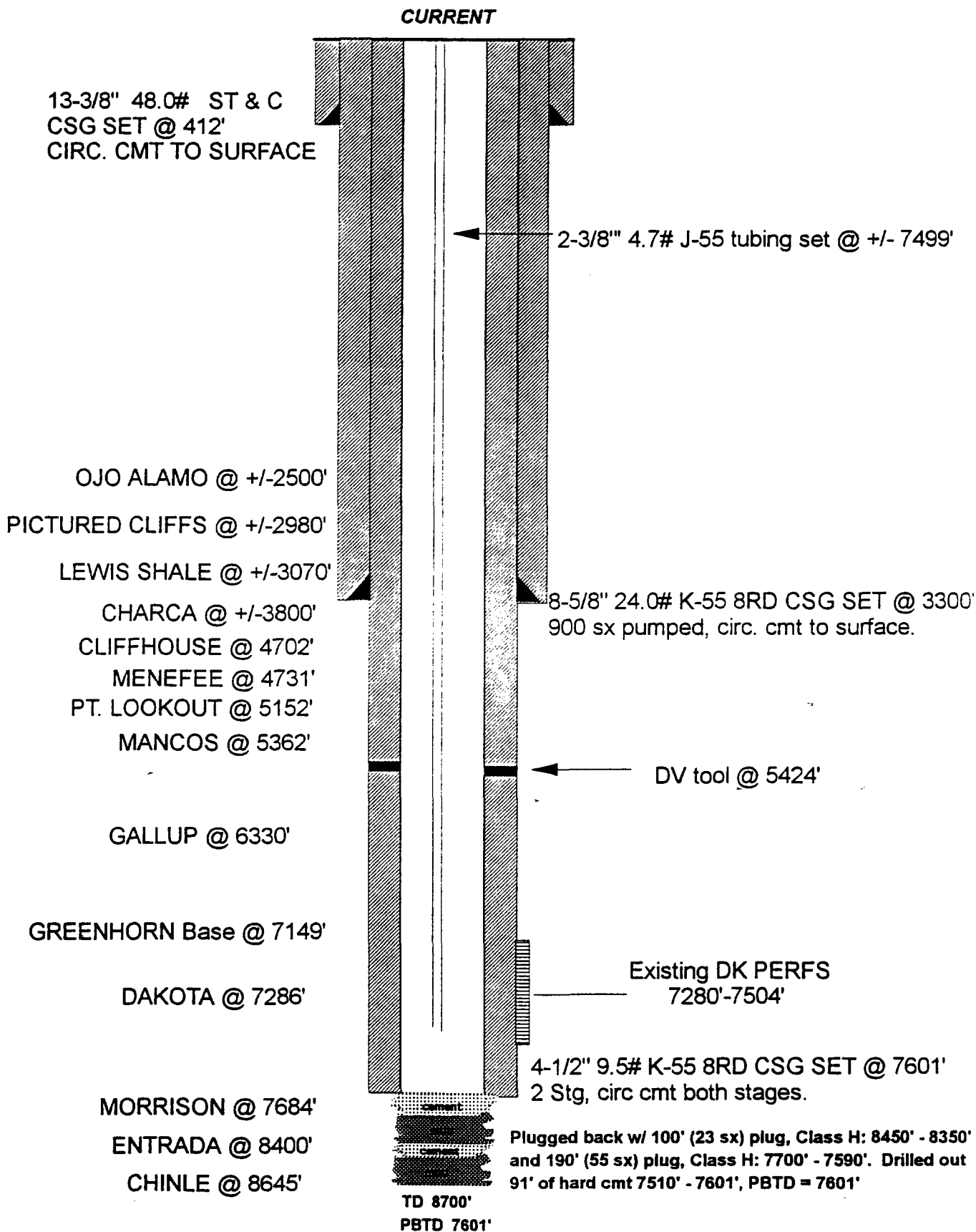
Field : LINDRITH WEST GAL/DK Compl: 11/18/1983 D OG O&G

----- Continued -----

Journal: 2/1/84 SI; WOPL to potential test.
2/29/84 SI; WOPL to potential test.
3/21/84 WOPL to IP.
5/9/84 SI; WOPL to potential test.
6/6/84 WOPL.
7/3/84 WOPL.
8/8/84 completed oil well.

W. O. Hughes #6

Unit J, Sec. 08, T24N, R03W



VII. Proposed Disposal Well Operations

**Jillson Federal SWD #1
Form C108 - Attachment Documentation**

1.) Proposed Injection Rates:

Average Injection Rate: 600 BPD
Maximum Injection Rate: 8000 BPD

2.) The system will be closed.

3.) Proposed Injection Pressures:

Average Injection Pressure: 450 - 600 psi. (anticipated)
Maximum Injection Pressure: 1690 psi

4.) Injection Fluids:

<u>Source:</u>	<u>Fluid Analysis</u>	<u>Compatibility</u>
Fruitland Coal	Sample Included	*Unavailable at this time
Pictured Cliffs	Sample Included	*Unavailable at this time
Chacra	Sample Included	*Unavailable at this time
Mesaverde	Sample Included	*Unavailable at this time
Gallup	Sample Included	*Unavailable at this time
Dakota	Sample Included	*Unavailable at this time

*Upon retrieving a fluid sample from the Entrada formation compatibility tests will be conducted.

5.) Analysis of disposal zone formation water:

Published salinities for the Entrada Formation are relatively scarce except for data from produced waters in known Entrada Formation fields. The following is published data from Four Corners Geological Society publications on San Juan Basin Entrada Formation Oil Fields:

<u>Entrada Field</u>	<u>Location</u>	<u>Depth</u> (ft.)	<u>Cl Salinity (ppm)</u>
Media & SW Media	T19N-R3W	5,300	2,500
Papers Wash	T19N-R5W	5,200	3,010
Eagle Mesa	T19N-R4W	5,500	6,205
Ojo Encino	T20N-R5W	5,900	10,726
Snake Eyes	T21N-R8W	5,600	11,114

* Note the general salinity increase with increasing depth.

Superior Oil reported an Entrada salinity of 80,000 ppm in the Sealy Government #1-7 in Section 7-T25N-R6W from a depth of 8,400 feet. Six miles east of the Jillson Federal SWD location and at the same depth of 8,400 feet, Magnolia Petroleum swabbed oil and a lot of water from the Entrada Formation in the Magnolia Ingwerson Federal #4 (Section 20-T24N-R2W). Based on a general increase in salinity with depth, oil and gas recoveries on production tests and the reported salinity in the Superior Sealy Gov't. #1-7, the Entrada water salinity in the Jillson Federal SWD is expected to be at least 20,000 to 30,000 ppm chlorides.

VII. Proposed Disposal Well Operations

4.) Injection Fluids: (Addendum to 4.) Injection Fluids (previous page)

Injection fluids will include only those materials suitable for a Class II well under the Underground Injection Control Program.

Sample analyses of example Class II fluids are attached for review. These include analyses from:

<u>Well</u>	<u>Location</u>	<u>Formation</u>
Jicarilla 117-E #1	T26N-R03W-SEC 33	Fruitland Coal
Canyon Largo Unit #144	T25N-R06W-SEC 17	Pictured Cliffs
Jicarilla 67 #3	T25N-R05W-SEC 19	Pictured Cliffs
Klein #15	T26N-R06W-SEC 33	Chacra
Klein #16	T26N-R06W-SEC 33	Chacra
Vaughn #30E	T26N-R06W-SEC 28	Mesa Verde
Vaughn #12	T26N-R06W-SEC 26	Mesa Verde
Klein #28E	T26N-R06W-SEC 33	Gallup
Jicarilla 67 #5E	T25N-R05W-SEC 29	Dakota
Canyon Largo Unit Com #295	T25N-R06W-SEC 04	Dakota

In addition to the attached sample analyses, a table documenting additional example analyses is attached.

Foreman: STEVE MC CAMENT

STRICKCO
Water Analysis Laboratories
FARMINGTON, NEW MEXICO 87401

File WA/0514/91

Company MERIDIAN OIL INC. Well Name Jicarrilla 117-E #1 Sample No. One

Formation Fruitland Coal Depth N/A Sampled From Produced

Location N/A Field Basin Fruitland County Rio Arriba State N.M.

Date Sampled 7/9/91 Date Analyzed 7/10/91 Engineer WDS

Total Dissolved Solids 19,626 mg/L Calculated

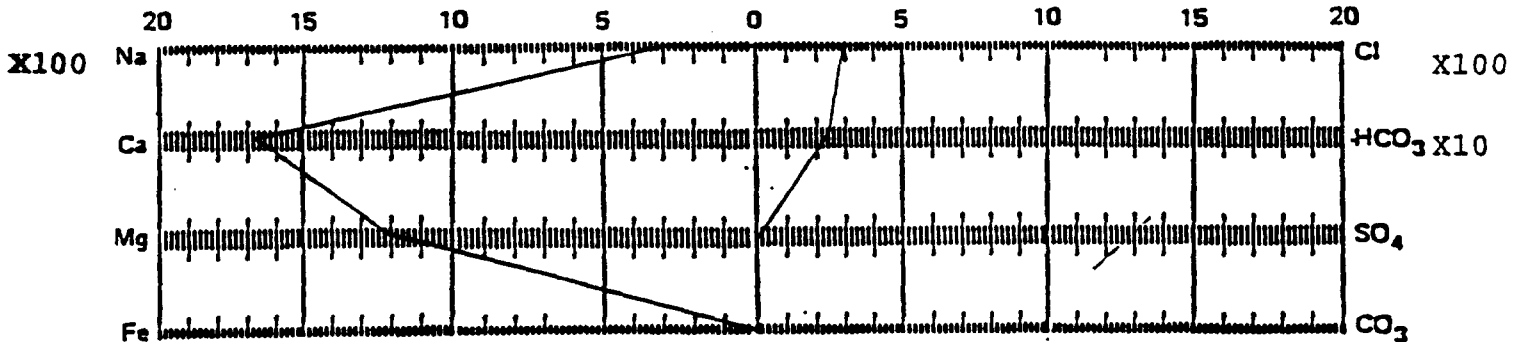
Sp. Gr. 1.013 @ 78 -F.

Resistivity 0.39 ohm-meters @ 78 -F. Measured

pH 6.41 @ 78 -F. Measured

Constituents	meq/L	mg/L	Constituents	meq/L	mg/L
Sodium	<u>299.6</u>	<u>6,888</u>	Chloride	<u>304.4</u>	<u>10,792</u>
Calcium	<u>16.8</u>	<u>336</u>	Bicarbonate	<u>24.0</u>	<u>1,464</u>
Magnesium	<u>12.0</u>	<u>146</u>	Sulfate	<u>-0-</u>	<u>-0-</u> (Grav.)
Iron	<u>-0-</u>	<u>-0-</u>	Carbonate	<u>-0-</u>	<u>-0-</u>
Hydrogen Sulfide	<u>Absent</u>		Hydroxide	<u>-0-</u>	<u>-0-</u>

Scale: meq/L



All analyses except iron determination performed on a filtered sample.



Lab Number: W94-050

Standard A.P.I. Water Analysis Report

Company:	MERIDIAN OIL INC.	Date Collected:	2/25/94
Sample ID:	CANYON LARGO 144	Date Received:	2/28/94
Formation:	Pictured Cliffs	Date Analyzed:	2/28;3/01/94
Location:	D-17-25-6	County:	Rio Arriba State: New Mexico
Collected By:	Joe Golding	Analyst:	Linda Spencer <i>Linda</i>

Remarks:

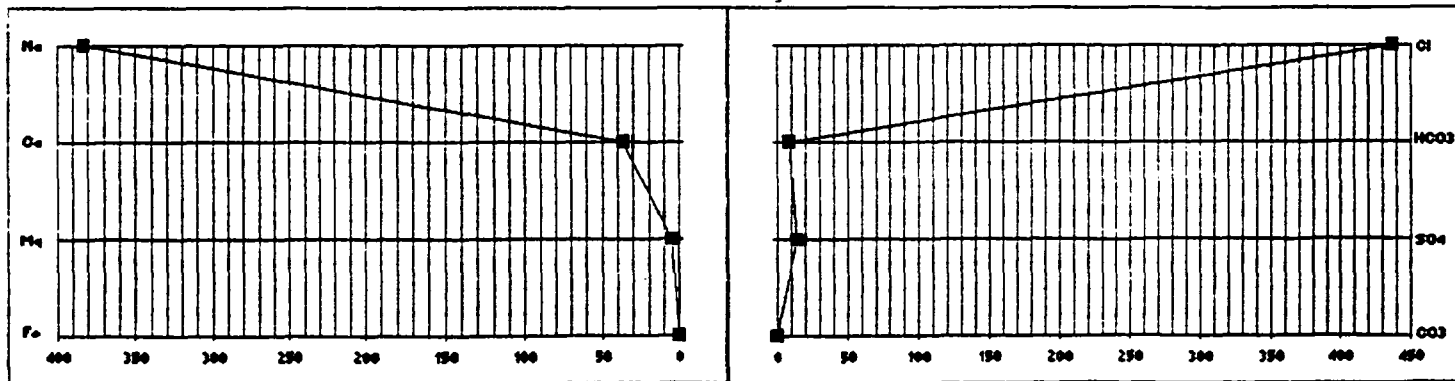
Attention: Lary Byars

PARAMETER	as ION	Comment	PARAMETER	as ION	Comment
Sodium, Na	8,800 mg/l		Chloride, Cl	15,500 mg/l	
Potassium, K	1,700 mg/l		Sulfate, SO ₄	660 mg/l	
Calcium, Ca	740 mg/l		Hydroxide, OH	0 mg/l	
Magnesium, Mg	60 mg/l		Carbonate, CO ₃	0 mg/l	
Iron, Fe (Total)	 mg/l	NOT RUN	Bicarbonate, HCO ₃	500 mg/l	
Sulfide	 mg/l	NOT RUN	Resistivity	0.24 ohm-m	
pH	6.9 units		Conductivity	41,300 uS/cm	
Total Dissolved Solids	28,400 mg/l		Specific Gravity	1.022	
				(@25 Degrees C)	
				(@60 Degrees F)	

Remarks:

Anion/Cation: 988

Stiff Diagram



Scale: Meq/L

Foreman: LARY BYARS

PROPERTY MANAGEMENT & CONSULTING, INC.

P. O. BOX 2596

FARMINGTON, NEW MEXICO 87400-2596

(505) 325-5220

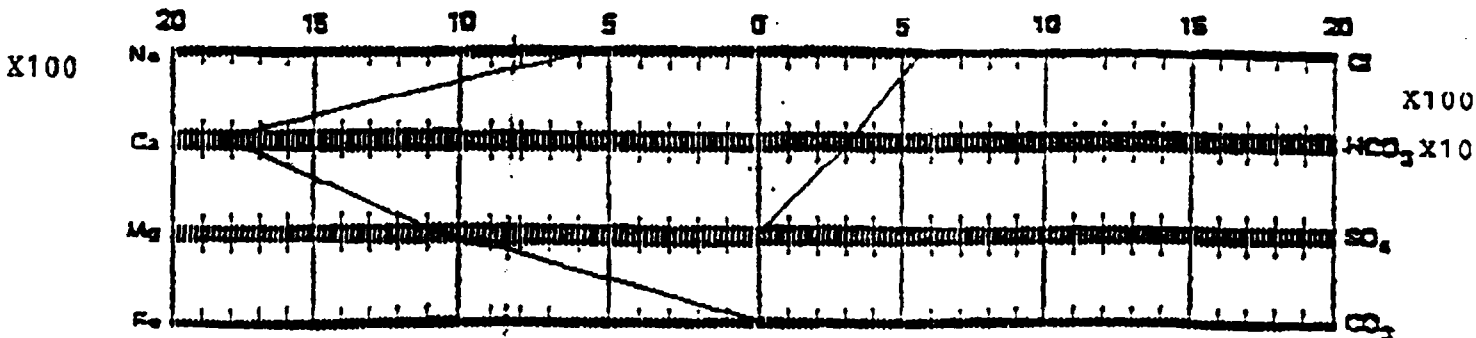
File WA/0871/93

Company MERIDIAN OIL, INC. Well Name Jicarilla #67-3 Sample No. One
 Formation Pictured Cliffs Depth N/A Sampled From Tbg.
 Location N/A Field N/A County San Juan State N.M.
 Date Sampled 9/02/93 Date Analyzed 09/07/93 Engineer W. D. Stricklin

Total Dissolved Solids 35,121 mg/L Calculated Sa. Gr. 1.026 @ 70 °F.
 Resistivity 0.20 ohm-meters @ 70 °F. Measured pH 6.52 @ 70 °F. Measured

Constituents	meq/L	mg/L	Constituents	meq/L	mg/L
Sodium	<u>561.6</u>	<u>12,912</u>	Chloride	<u>560.8</u>	<u>19,880</u>
Calcium	<u>18.4</u>	<u>368</u>	Bicarbonate	<u>30.0</u>	<u>1,830</u>
Magnesium	<u>10.8</u>	<u>131</u>	Sulfate	<u>TR</u>	<u>TR</u> (Gr)
Iron	<u>TR</u>	<u>TR</u>	Carbonate	<u>-0-</u>	<u>-0-</u>
Hydrogen Sulfide	<u>Absent</u>		Hydroxide	<u>-0-</u>	<u>-0-</u>

Scale: meq/L





The Western Company of North America

3250 South Side River Road
Farmington, New Mexico 87401
Phone (505)327-6222
Fax (505)327-5766

API WATER ANALYSIS

Company	<i>Meridian Oil</i>	W.C.N.A. Sample No.		Date Sampled	
Field		Legal Description		County or Parish	State
Lease or Unit	<i>Klein</i>	Well #	<i>#15</i>	Depth	Formation
					<i>Chalco</i>
Type of Water (Produced, Supply, ect.)		Sampling Point	<i>Producer H₂O</i>	Water, E/D	Sampled By

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na + Potassium, K (calc)	<i>4062</i>	<i>176</i>
Calcium, Ca	<i>64</i>	<i>3</i>
Magnesium, Mg (calc)	<i>40</i>	<i>3</i>
Barium, Ba		

OTHER PROPERTIES

pH	<i>6.65</i>
Specific Gravity, 60/60 F	<i>1.010</i>
Total Hardness	<i>160</i>
Resistivity (ohm-meter)	<i>°F 1.10</i>

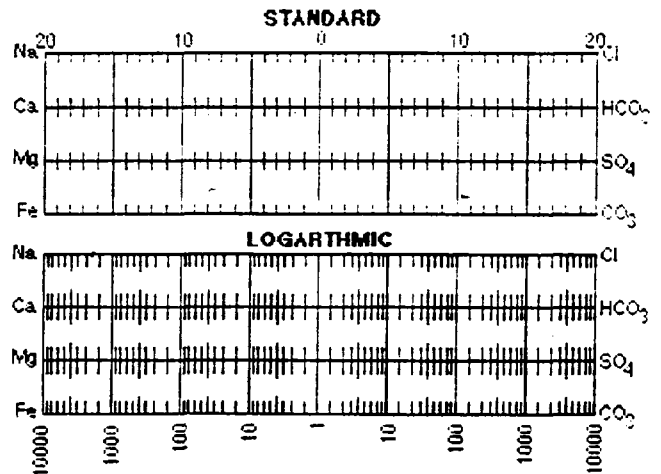
ANIONS

Chloride, Cl	<i>5865</i>	<i>166</i>
Sulfate, SO ₄	<i>0</i>	
Carbonate, CO ₃		
Bicarbonate, HCO ₃	<i>10126</i>	<i>166</i>
Hydroxide, OH		

Total Dissolved Solids (calc.) *20176*
 Iron, Fe²⁺ + Fe³⁺ (total) *0*
 Sulfide, as H₂S *0*

Remarks & Recommendations:

WATER PATTERNS-me/l



Analyst:
Date Analyzed:

Dr. H H
1-7-94

Please refer any questions to:
Loren Diede, District Engineer
Thank you.



The Western Company of North America

3250 South Side River Road
 Farmington, New Mexico 87401
 Phone (505)327-6222
 Fax (505)327-5766

API WATER ANALYSIS

Company *Meridian Oil* W.C.N.A. Sample No. Date Sampled
 Field Legal Description County or Parish State
 Lease or Unit *Klein* Well *#16* Depth Formation *Chalra* Water. E.D.
 Type of Water (Produced. Supply, ect.) Sampling Point Sampled By

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na + Potassium, K (calc)	7208	314
Calcium, Ca	160	8
Magnesium, Mg (calc)	99	8
Barium, Ba		

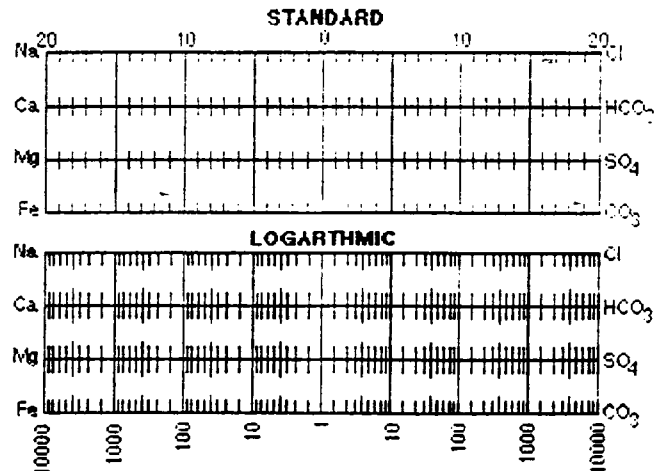
OTHER PROPERTIES

pH	6.9
Specific Gravity, 60/60 F	1.016
Total Hardness	400
Resistivity (ohm-meter)	°F .29

ANIONS

Chloride, Cl	10812	305
Sulfate, SO ₄	0	
Carbonate, CO ₃		
Bicarbonate, HCO ₃	18605	305
Hydroxide, OH		

WATER PATTERNS-me/l



Total Dissolved Solids (calc.)	36885
Iron, Fe ² + Fe ³ (total)	0
Sulfide, as H ₂ S	

Remarks & Recommendations:

Analyst:
 Date Analyzed:

D. HH
4-7-94

Please refer any questions to:
 Loren Diede, District Engineer
 Thank you.

PROPERTY MANAGEMENT & CONSULTING, INC.

P. O. BOX 2596
FARMINGTON, NEW MEXICO 87499-2596
(505) 325-5220

File NA/0857/93

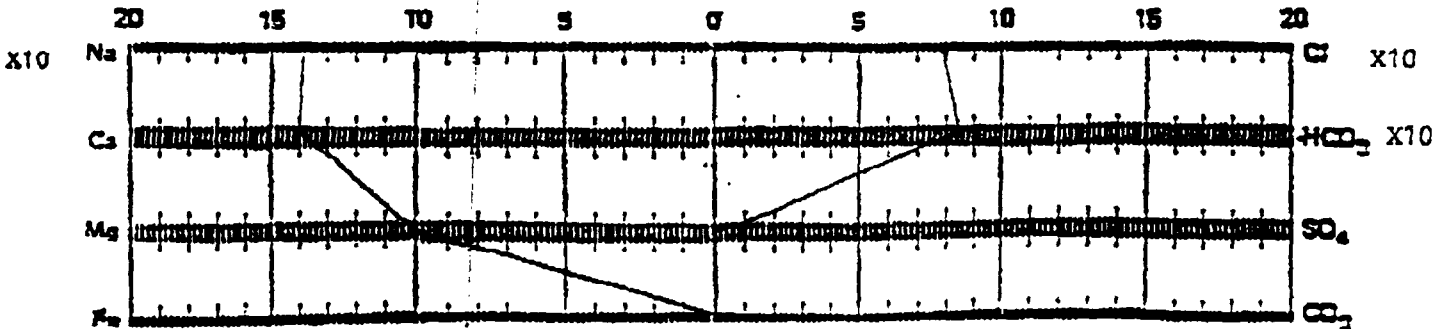
Company MERIDIAN OIL, INC. Well Name Vaughn #30-E Sample No. 078
 Formation Mesa Verde Depth N/A Sampled From Produced
 Location N/A Field N/A County Rio Arriba State NM
 Date Sampled 07/20/93 Date Analyzed 07/21/93 Engineer W. D. Stricklin

Total Dissolved Solids 11.459 mg/L Calculated Sp. Gr. 1.004 ● 77 °F

Resistivity 0.70 ohm-meters ● 77 °F Measured pH 6.48 ● 77 °F Measured

Constituents	meq/L	mg/L	Constituents	meq/L	mg/L
Sodium	<u>138.1</u>	<u>3,174</u>	Chloride	<u>78.1</u>	<u>2,769</u>
Calcium	<u>14.0</u>	<u>280</u>	Bicarbonate	<u>84.0</u>	<u>5,124</u>
Magnesium	<u>10.0</u>	<u>122</u>	Sulfate	<u>-0-</u>	<u>-0-</u> (Gram)
Iron	<u>-0-</u>	<u>-0-</u>	Carbonate	<u>-0-</u>	<u>-0-</u>
Hydrogen Sulfide	<u>Absent</u>		Hydroxide	<u>-0-</u>	<u>-0-</u>

Scale: meq/L



Foreman: LARY BYARS

PROPERTY MANAGEMENT & CONSULTING, INC.

P. O. BOX 2596
 FARMINGTON, NEW MEXICO 87499-2596
 (505) 325-6220

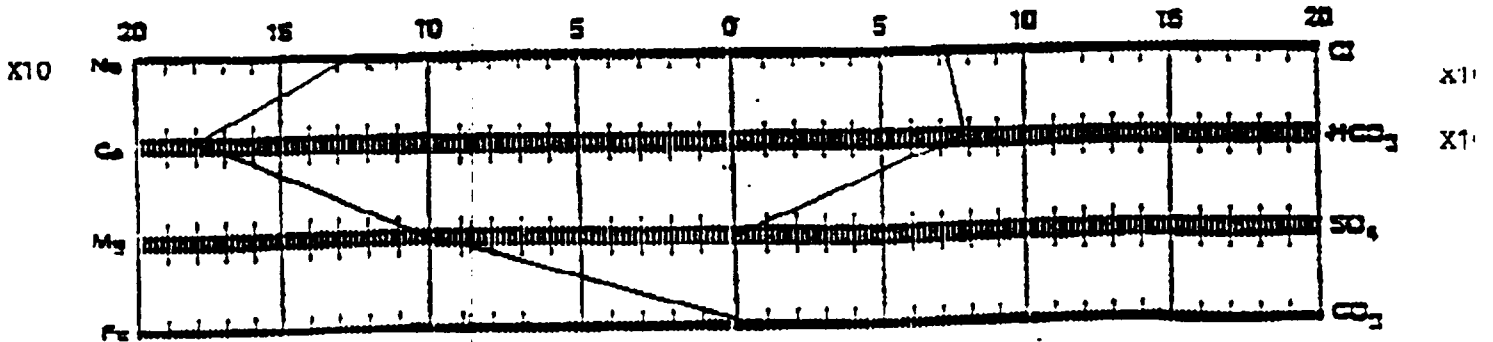
File NA/0655/93

Company MERIDIAN OIL, INC. Well Name Vaughn #12 Sample No. One
 Formation Mesa Verde Depth N/A Sampled From Produced
 Location N/A Field N/A County Rio Arriba State NM
 Date Sampled 07/19/93 Date Analyzed 07/20/93 Engineer W. D. Stricklin

Total Dissolved Solids 10,720 mg/L Calculated Sp. Gr. 1.005 @ 77 °F
 Resistivity 0.78 ohm-meters @ 77 °F Measured pH 7.04 @ 77 °F Measured

Constituents	meq/L	mg/L	Constituents	meq/L	mg/L
Sodium	124.1	2,953	Chloride	74.1	2,627
Calcium	18.0	360	Bicarbonate	78.0	4,758
Magnesium	10.0	122	Sulfate	-0-	-0-
Iron	-0-	-0-	Carbonate	-0-	-0-
Hydrogen Sulfide	Absent		Hydroxide	-0-	-0-

Scale: meq/L





The Western Company of North America

3250 South Side River Road
 Farmington, New Mexico 87401
 Phone (505)327-6222
 Fax (505)327-5766

API WATER ANALYSIS

Company *Meridian Oil* W.C.N.A. Sample No. Date Sampled
 Field Legal Description County or Parish State
 Lease or Unit *Klein* Well *#28F* Depth Formation *Gallup* Water, B/D
 Type of Water (Produced, Supply, ect.) *Produced H₂O* Sampling Point Sampled By

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na + Potassium, K (calc)	3417	149
Calcium, Ca	285	14
Magnesium, Mg (calc)	176	15
Barium, Ba		

OTHER PROPERTIES

pH	6.04
Specific Gravity, 60/60 F	1.016
Total Hardness	710
Resistivity (ohm-meter) °F	.88

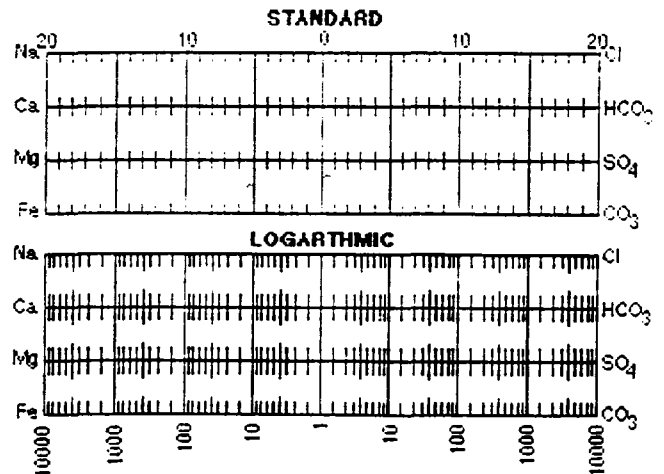
ANIONS

Chloride, Cl	5495	155
Sulfate, SO ₄	175	4
Carbonate, CO ₃		
Bicarbonate, HCO ₃	9455	155
Hydroxide, OH		

Total Dissolved Solids (calc.) *19002*
 Iron, Fe²⁺ + Fe³⁺ (total)
 Sulfide, as H₂S

Remarks & Recommendations:

WATER PATTERNS-me/l



Analyst:
 Date Analyzed:

D. HH
4-7-94

Please refer any questions to:
 Loren Diede, District Engineer
 Thank you.



1115 Farmington Avenue - Farmington, NM 87401
 (505) 325-1085

Lab Number:

W94-084

Standard A.P.I. Water Analysis Report

Company: MERIDIAN OIL INC.

Date Collected: 4/13/94

Sample ID: JICARILLA 67-5E

Date Received: 4/13/94

Formation: Dakota

Date Analyzed: 4/13-15/1994

Location:

County:

State:

Collected By:

Analyst:

Linda Spencer *Linda*

Remarks: Caught sample off separator when well started unloading.

Attention: Lary Byars

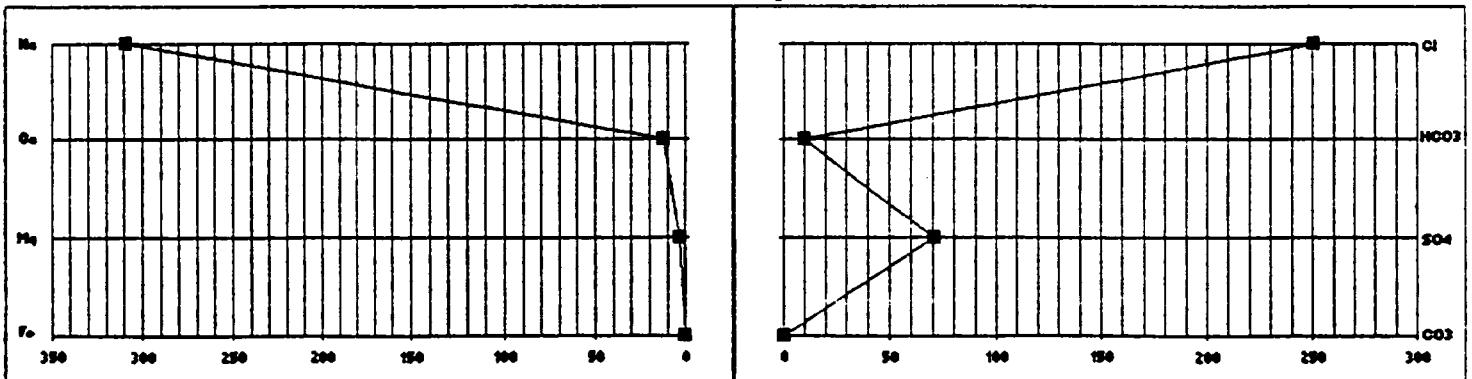
PARAMETER	as ION	Comment	PARAMETER	as ION	Comment
Sodium, Na	7,100 mg/l		Chloride, Cl	8,875 mg/l	
Potassium, K	86 mg/l		Sulfate, SO4	3,400 mg/l	
Calcium, Ca	245 mg/l		Hydroxide, OH	0 mg/l	
Magnesium, Mg	40 mg/l		Carbonate, CO3	0 mg/l	
Iron, Fe (Total)	7 mg/l		Bicarbonate, HCO3	610 mg/l	
Sulfide		NOT RUN	Resistivity	0.36 ohm-m	
pH	7.5 units		Conductivity	27,900 uS/cm	(@25 Degrees C)
Total Dissolved Solids	20,500 mg/l		Specific Gravity	1.019	(@60-Degrees F)

Remarks: Compared to other Dakota, this water has elevated sodium and chloride.

Anion/Cation:

101%

Stiff Diagram



Scale: Meq/L



1115 Farmington Avenue - Farmington, NM 87401
 (505) 325-1085

Lab Number:

W94-107

Standard A.P.I. Water Analysis Report

Company: MERIDIAN OIL INC.

Date Collected: 4/27/94

Sample ID: CLU 295

Date Received: 4/27/94

Formation: Dakota

Date Analyzed: 4/28-29/94

Location:

County:

State:

Collected By:

Analyst:

Sheila F./Linda S. *Galie*

Remarks:

Attention: Lary Byars

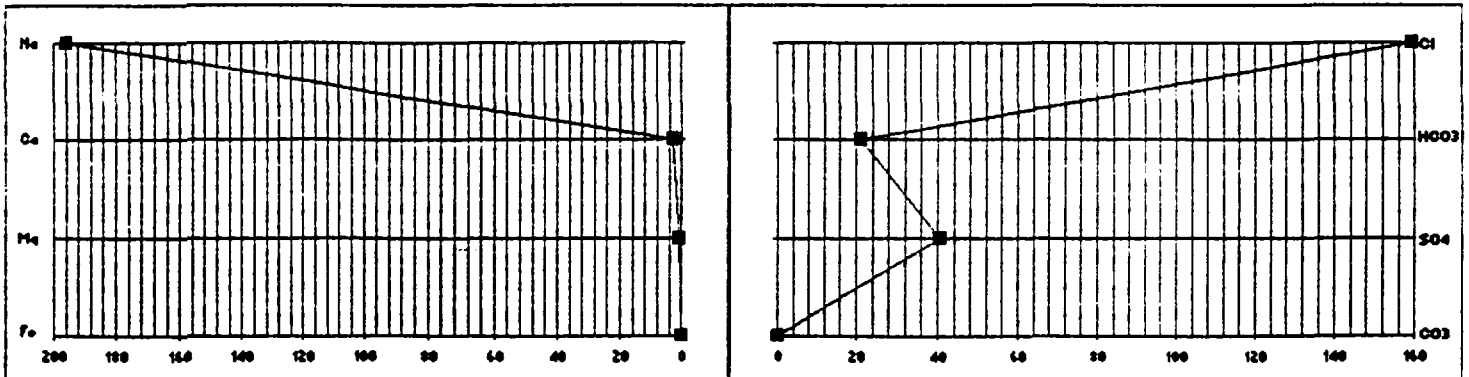
PARAMETER	as ION	Comment	PARAMETER	as ION	Comment
Sodium, Na	4,500	mg/l	Chloride, Cl	5,650	mg/l
Potassium, K	60	mg/l	Sulfate, SO4	1,950	mg/l
Calcium, Ca	60	mg/l	Hydroxide, OH	0	mg/l
Magnesium, Mg	10	mg/l	Carbonate, CO3	0	mg/l
Iron, Fe (Total)		mg/l NOT RUN	Bicarbonate, HCO3	1,280	mg/l
Sulfide		mg/l NOT RUN	Resistivity	0.51	ohm-m
pH	7.9	units	Conductivity	19,750	uS/cm
Total Dissolved Solids	12,800	mg/l	Specific Gravity	1.012	(@60 Degrees F)

Remarks: Sample had organic odor.

Anion/Cation:

110%

Stiff Diagram



Scale: Meq/L

UNIT	WELL NAME	FIN	DATE SAMPLED	Na mg/l	Ca mg/l	Mg mg/l	Cl mg/l	SO4 mg/l	CO3 mg/l	HCO3 mg/l	TDS mg/l	Fe mg/l	pH	S.G.	Resist. ohm-m
P	SJ 27-4-20A S29 T27N R4W	MV	4/28/94	6601	0	41	6745	50-	0	3050	16437	0.4	8.5	1.015	0.05 70 deg F
I	JIC 117E2A S33 T26N R3W	MV	4/28/94	2875	0	34	2130	50-	0	1086	6125	12.2	7	1.01	0.15 70 deg F
K	JIC J 21 S36 T26N R5W	GL/DK	4/26/94	7590	0	37	9585	60	0	3782	21054	0.2	8	1.015	- 70 deg F
M	LIT FED 20-1 S20 T24N R3W	GL/DK	4/29/94	2047	0	37	1420	50-	0	109	3613	2	7	1.01	0.25 70 deg F
E	SJ 27-4 69 S34 T27N R4W	DK	4/28/94	1219	0	34	1775	60	0	293	3381	20+	7	1.01	0.25 70 deg F
G	CULLINS FED 5 S4 T24N R3W	GL/DK	4/27/94	5681	0	39	1775	200+	0	24	7519	0	7	1.01	0.06 70 deg F
H	MEDIO CAN. 3 S36 T27N R4W	GL/DK	4/27/94	3197	0	609	6390	200+	0	572	10769	2.6	7.5	1.01	0.08 70 deg F
A	JIC. 98-3-A S10 T26N R3W	MV	4/29/94	6371	0	41.3	7100	50-	0	1806	15318	0	8	1.015	0.05 70 deg F
P	JIC. 101-7 S20 T26N R3W	MV	4/29/94	5566	0	41	7100	50	0	2684	15441	0.8	8	1.015	0.05 70 deg F
J	MCCRODEN A8A S9 T25N R3W	MV	4/26/94	5727	0	37	7100	50-	0	1952	14816	2.8	8	1.015	0.06 70 deg F
L	JIC. 101-7 S33 T26N R3W	MV	4/26/94	2944	0	24	2485	50-	0	622	6075	2	7	1.01	0.16 70 deg F
P	JIC. 101-7 S12 T26N R4W	MV	4/27/94	539	0	97	1065	20	0	24	1735	0	7	1.01	0.38 70 deg F
E	FLORENCE 7 S4 T25N R3W	GL	4/26/94	2691	0	29	3905	75	0	439	7139	24	6.5	1.015	0.11 70 deg F
E	MEDIO CAN 7 S35 T24N R4W	GL/DK	4/26/94	7682	0	39	11360	50	0	988	20119	4.9	7	1.02	- 70 deg F
M	JIC 117 E-5 S28 T26N R3W	MV	4/26/94	5681	0	34	7100	54	0	3013	15882	0.8	7.5	1.02	0.055 70 deg F
D	CULLINS 3 S4 T24N R3W	GL/DK	4/27/94	1403	0	34	355	50-	0	24	1816	0	6.5	1.01	0.19 70 deg F
H	W.O. HUGHES 7 S8 T24N R3W	GL/DK	4/27/94	2806	0	29	1065	50-	0	2684	6584	0	6.5	1.01	- 70 deg F
J	JIC 123 G NO 9E S6 T25N R4W	GL/DK	4/27/94	7912	72	37	12070	200+	0	756	20847	2.6	7	1.03	- 70 deg F
D	JIC J NO 9E S26 T26N R5W	MV/GL/DK	4/26/94	6233	0	32	7100	50-	0	5414	18779	0.9	7.5	1.02	- 70 deg F

UNIT	WELL NAME	PM	DATE SAMPLED	Na mg/l	Ca mg/l	Mg mg/l	Cl mg/l	SO4 mg/l	CO3 mg/l	HCO3 mg/l	TDS mg/l	Fe mg/l	pH	S.G.	Resist. ohm-m
F	JIC G-5M S12 T26N R5W	MV	4/27/94	138	0	170	2485	200+	0	256	3049	5.8	6.5	1.01	0.18
I	CHAC JIC D-10 S27 T23N R3W	GL/DK	4/29/94	7291	0	51	11005	150	0	464	18961	1.8	7	1.02	70 deg F
K	ARIZ JIC A5 S13 T25N R4W	MV	4/26/94	1265	0	24	1775	50	0	342	3456	4.2	7	1.01	70 deg F
M	JIC 95-5 S25 T27N R3W	MV	5/4/94	6555	0	39	2840	50-	0	1720	11154	2.6	8	1.015	70 deg F
D	JIC 89-6 S T27N R3W	MV	5/4/94	3082	0	37	4260	95	0	2928	10402	6.7	7	1.025	70 deg F
A	JIC 95-1 S35 T27N R3W	MV	5/4/94	1748	0	39	1775	125	0	1562	7036	4.9	7	1.01	0.144
A	JIC 94-6 S27 T27N R3W	MV	5/4/94	414	0	39	710	200+	0	37	1653	20+	6.5	1.01	70 deg F
M	JIC 94-5 S23 T27N R3W	MV	5/4/94	2254	0	44	3550	90	0	781	6719	12	7	1.01	70 deg F
	CANDELARIA W.W. STR	ATER WEL	5/4/94	460	0	41	355	0	0	769	1625	6	7.5	1.005	0.6
M	JIC 96-7 S1 T26N R3W	MV	4/29/94	2461	0	39	1775	50-	0	610	4885	2.2	7	1.005	70 deg F
P	JIC 103 NO 14 S18 T26N R4W	GL/DK	4/27/94	7981	0	37	8920	50-	0	3648	20186	1.8	8	1.015	70 deg F
F	JIC 119N-5A S6 T26N R4W	MV	4/27/94	6463	0	32	7100	50-	0	2049	15644	1.7	8.5	1.015	70 deg F
M	CHENEY FED 1 S8 T26N R2W	MAN	4/29/94	6854	0	32	2840	50-	0	4331	14057	0.6	8	1.01	0.09
J	SCHMTZ FED 34-1 S34 T24N R1W	MAN	4/29/94	13615	0	56	19170	50-	0	415	33256	13.6	7	1.03	70 deg F
M	CULLINS 4 S4 T24N R3W	GL/DK	4/27/94	1541	0	44	710	50-	0	24	2319	2.2	7	1.01	70 deg F
D	JIC 96-1A S1 T26N R5W	MV	4/26/94	2530	0	29	1775	50-	0	769	5103	2.2	7	1.01	0.02
A	JIC JVKD 7 S4 T23N R3W	GL/DK	4/29/94	1794	0	41	1065	50-	0	73	2973	4.4	6	1.01	0.04
M	JIC 99-16 S23 T26N R3W	GL/DK	4/29/94	8119	0	32	10650	50-	0	354	19155	20+	7	1.025	70 deg F
F	JIC G-5M S12 T26N R5W	DK	4/26/94	2254	0	34	3195	200+	0	351	6034	8.8	7.5	1.015	70 deg F

UNIT	WELL NAME	Fm	DATE SAMPLED	Na mg/l	Ca mg/l	Mg mg/l	Cl mg/l	SO4 mg/l	CO3 mg/l	HCO3 mg/l	TDS mg/l	Fe mg/l	pH	S.G.	Resist. ohm-m
A	JIC 126S-15 S11 T24N R4W	GL/DK	4/26/94	5382	0	27	6390	50-	0	427	12226	1	7	1.02	0.5 70 deg F
M	JIC J NO 12E S35 T26N R5W	MV/GL/DK	4/26/94	4508	0	39	3195	50-	0	3611	11353	0.6	8	1.01	0.01 70 deg F
I	CHAC JIC D-2 S16 T23N R3W	GL/DK	4/29/94	6026	0	51	9250	70	0	293	15670	1.5	7	1.02	0.5 70 deg F
M	SJ 27-4 149 S22 T27N R4W	MV	4/27/94	1564	0	37	710	50-	0	51	2335	1.6	6.5	1.01	0.02 70 deg F
A	MEDIO CAN 1 S25 T24N R4W	GL/DK	4/27/94	7360	0	49	9330	50-	0	878	17517	0.2	7	1.015	0.5 70 deg F
K	HAWK FED 3 S35 T25N R2W	MAN	4/27/94	1334	0	24	355	50-	0	24	1737	0	6.5	1.01	0.09 70 deg F

VIII. Geological Data

Jillson Federal SWD #1 Form C108 - Attachment Documentation

The proposed water injection zone in the Jillson Federal SWD is the Entrada Formation, which is Middle Jurassic in age. The clastic sandstones were deposited in an arid climate by a combination of water and wind (eolian). The sandstones are predominantly white to light gray, very fine- to medium-grained, moderately- to well-sorted quartz grains that are often "frosted" as a result of being transported and deposited by the wind in sand dunes. The Entrada sandstones are massively bedded with only negligible to no shale breaks. Outcrops of the Entrada sandstones are highly cross-bedded, which are highlighted by subtle mineralogical changes and weathering. Porosity in the upper 80 feet ranges from 15% to 25% and averages 22%. Porosity ranges from 10% to 19% and averages 15% in the lower 160 feet of Entrada. Permeabilities range from approximately 100 to 300 millidarcies in the upper sandstone and 25 to 100 millidarcies in the lower sandstones. Interstitial cement varies from siliceous to calcareous and varies in amount from none to about 10% by bulk volume. Cementation most commonly occurs in the lower sandstone units. The Entrada sandstones in a 24 township area around the proposed injection well varies in thickness from 200 feet to 240 feet.

At the Jillson Federal SWD proposed location the top of the Entrada Formation will be encountered at an approximate drill depth of 8,441 feet and the base will be at 8,683 feet. The Entrada Formation is overlain by the Middle Jurassic Todilto Formation, consisting of 50 feet of anhydrites and shales. These shales and especially the anhydrites are very effective "seals" that naturally prevent the vertical migration of fluids. The Triassic Chinle Formation shales underlie the Entrada Formation.

Potable water sources exist in the near surface Tertiary sandstones of the Nacimiento-San Jose Formations, basically from less than 500 feet deep. No known sources of potable water exist in the stratigraphic section from the Cretaceous Kirtland Shale down to Precambrian basement (meta-igneous rocks). The shallow aquifers will be protected by setting surface casing.

JILLSON FEDERAL SWD
Se/4 Nw/4 Section 8, Township 24 North, Range 3 West
Rio Arriba County, New Mexico

STRATIGRAPHIC COLUMN

<u>RECENT</u>	Surface
	Nacimiento
<u>TERTIARY</u>	Ojo Alamo Ss.
<u>CRETACEOUS</u>	Kirtland Shale
	Fruitland Formation
	Pictured Cliffs Ss.
	Lewis Shale
	Chacra
	Mesaverde Group
	Cliffhouse Ss.
	Menefee
	Point Lookout Ss.
	Mancos Shale
	"Gallup"
	Niobrara
	Tocito Ss. (not present this location)
	Juana Lopez
	Lower Mancos Shale
	Greenhorn Ls
	Graneros Shale
	Dakota
<u>CRETACEOUS</u>	Burro Canyon Ss.
<u>JURASSIC</u>	Morrison
	Bluff Ss.
	Summerville Shale
	Todilto
<u>JURASSIC</u>	Entrada Ss.
<u>TRIASSIC</u>	Chinle

IX. Stimulation Program

Jillson Federal SWD #1
Form C108 - Attachment Documentation

**JILLSON FEDERAL SWD #1
UNIT F SECTION 08, T24N, R03W
RIO ARRIBA COUNTY, NEW MEXICO
SWD Completion Procedure**

ENTRADA COMPLETION

1. Comply with all NMOCD, BLM, and MOI rules & regulations. MOL and RU completion rig. NU 7-1/16" 1500 series BOP and stripping head. Test operation of rams. NU two 2-7/8" relief lines.
2. Place 9 clean 400 bbl tanks on location and fill with 2% KCL water. Filter all water to 1 micron nominal. Total water needed for each frac is 3100 bbls.
3. TIH w/ 6-1/4" bit on 2-7/8" L-80 tbg work string & C.O. to PBD 8800'. Roll hole w/ 2% KCL water. TOH. Run CBL-CCL log from PBD 8800' to surface. Relog w/ 1000# pressure, if necessary. Evaluate CBL for sqz operations across perforated intervals. Set 7" RBP at 8730'. Place sand on top of RBP. Pressure test csg to 2500 psi for 30 min & record pressure data.
4. TIH w/ 2-7/8" tbg open ended to 4425' & unload hole w/ N2. TOH.
5. Perf Entrada w/ 2 SPF @ 8441' - 8683'. Total 210 holes. Perforate w/ 4" csg guns and Owens CML X1X # 316 19 gr which give a 0.5" hole w/ 20.05" penetration in Berea.
6. TIH w/ 7" pkr on 2-7/8" tbg & set @ 8400'. Swab at least 85 bbl water & take 4 one quart water samples.
7. Pull into test position; & test tbg to 5000 psi. Reset pkr @ 8400', load & pressure up backside to 1000 psi. Monitor & record backside pressure during breakdown. Breakdown and attempt to balloff Entrada w/ 3500 gal. 15% HCL acid, 400 7/8" 1.3 sp. gr. RCN ballsealers. Max. pressure = 5000 psi. Acid to contain 1 gal/1000 aqua flow, 5 gal/1000 XA-2L (Fe control), and 2 gal/1000 I17 (corrosion inhibitor) based on prejob testing. Lower pkr to 8455' to knock off perf balls. TOH.
8. Prepare to run pre-frac Entrada step rate test. Max pressure is 3000 psi. Ensure that at least 2880 useable bbls of filtered 2% KCL water are available for test. Shut down & use ISIP & surface injection pressures to adjust computer van friction calculations at 8550'. Begin step rate test at 1 BPM for 15 minutes. Increase rate in 1 BPM increments until four points above parting pressure are recorded. Save computer data so datum depth adjustments can be made.

Decision Point (Entrada): Team 9 will decide whether to:

- (A.) Proceed with the Entrada frac job. (Injection rate prior to parting pressure is <8 BPM) Go to step #9.
- (B.) Injection rate before parting pressure is >15 BPM. Go to Step 12

IX. Stimulation Program

JILLSON FEDERAL SWD #1 - COMPLETION PROCEDURE

Page 2

9. Heat frac fluid to 75 degrees F. Install 7" tree saver & frac Entrada with 220,000# 20/40 Ottawa sand in 108,000 gal 30# X-linked gel water @ 60 BPM. Bottom hole pressure to be monitored by computer van. All sand to be tagged w/ 0.40 mCi/1000# Ir-192 tracer. Anticipated surface pressure = 2350 psi. Max pressure = 5000 psi. Frac using the following schedule:

<u>STAGE</u>	<u>FLUID (GALS.)</u>	<u>SAND VOL. (lbs.)</u>
Pad	30,000	-----
1.0 ppg	10,000	10,000
2.0 ppg	12,000	24,000
3.0 ppg	20,000	60,000
3.5 ppg	36,000	126,000
Flush	<u>(13,335)</u>	-----
Totals	108,000	220,000#

Treat frac fluid with the following additives per 1000 gallons:

- * 6.81 gal J-4L (Gel)
- * 3 gal Buffer5-L (Buffer)
- * 1 gal CL30 (Borate X-linker)
- * 0.3 lb B-5 (Oxydizing Breaker) Test break times at 185°F
- * 1 lb Ultra Perm (Encap. Breaker)
- * 2% KCL

10. Remove tree saver. Shut well in for 6 hours to allow gel to break. Flow Entrada back slowly. TIH w/ 6-1/4" bit on 2-7/8" tbg & circ out sand to 8730'. TOH.
11. Prepare to run after-frac Entrada step rate test. Max pressure is 3000 psi. Ensure that at least 3100 bbls of filtered 2% KCL water are available for test. Preceed test w/ 3000 gal 15% HCL acid with same additives as step #7 (this is to insure all gel is broken). Shut down & use ISIP & surface injection pressures to adjust computer van friction calculations at 8550'. Begin step rate test at 1 BPM for 15 minutes. Increase rate in 1 BPM increments until four points above parting pressure are recorded. Save computer data so datum depth adjustments can be made.
12. TIH w/ retrieving head on 2-7/8" tbg. Circ sand off retrievable bridge plug @ 8730', retrieve BP, & TOH.
13. TIH w/ 6-1/4" bit on 2-7/8" tbg & clean out to 8800'. TOH. Run after frac gamma ray log from 8750' to 7400'.

TUBING & PACKER INSTALLATION

14. See the attached pkr assemble diagram. MI wireline truck. PU 7" 23# Baker "FAB-1" pkr w/ 4" bore, 20' pup jt. of 4-1/2" 10.5# tbg, "F" nipple (3.688), 20' pup jt. of 4-1/2" 10.5# tbg, seating nipple (3.688), & wireline L-80 re-entry guide. Set pkr @ 8400'.

IX. Stimulation Program

JILLSON FEDERAL SWD #1 - COMPLETION PROCEDURE

Page 3

15. PU Baker Model "KBH-22" Anchor tubing seal nipple, one joint 4-1/2" 10.5# tubing, "F" nipple (3.75), & 4-1/2" L-80 ST&C tbg. Land seal assembly in pkr @ 8400'.
16. Nipple down BOPs & nipple up wellhead. Release rig.

Mechanical Integrity Test and Final Step Rate Test

17. Shut-in well at least 12 hours prior to conducting the MIT. Note pressures on tubing and annulus. Bleed off pressure on annulus.
18. Twenty hours prior to MIT, fill annulus with inhibitor fluid (record volume)
19. At time of test, note and record pressure on injection tubing and casing/tubing annulus.
20. Pressure up casing/tubing annulus to 2000 psi. Note time and pressure when pressure source is turned off.
21. Monitor pressure for 45 min., noting pressures every five (5) min. Fill out appropriate documentation.
22. A loss of 10% pressure in 45 minutes is considered a failure. If loss is slightly more than 12 psi, bleed off pressure and retest.
23. Prepare to run total well step rate test. Notify BLM, & NMOCD to witness step rate test. Maximum pressure is 3000 psi. Ensure that at least 4000 bbls of filtered produced water are **available** for test. Run electronic gauge to 8440'. Begin step rate test at 3 BPM for 15 min. Increase rate in 1 BPM increments until four points above parting pressure are recorded. Shut well in for 36 hours. Save computer data so datum depth adjustments can be made. Provide 6 hard copies and one disk of pressure data.

Approve: _____
Drilling Superintendent

X. Logs and Test Data

Jillson Federal SWD #1 Form C108 - Attachment Documentation

Logs and test data will be supplied when available. The following log and test program is proposed for this disposal well :

Logging:

Dual Induction Log
Gamma ray
Caliper Log
Spontaneous Potential
Formation Density
Compensated Neutron Log
Photo Electric Curve
MicroLog
NUMAR Log (Magnetic Resonance Imaging)
Dipole Sonic Log
Side-Wall Cores
Drill Stem Tests

Testing:

Producible hydrocarbons testing following the swabbing.
Pre, post and Final step rate tests
Mechanical Integrity Test

Schlumberger Dowell

API Water Analysis

Operator : **Meridian Oil, Inc.**
 Well : **C andeleria W.W.**
 Field :
 Formation :

Prepared for : **Brian Ault**

DS Service Point : **Farmington, NM**
 Business Phone No. : **505 326-5096**

Proposal No. :
 Prepared by : **Kevin D. Mauth**

Date : **May 16, 1994**

Disclaimer Notice

This information is presented in good faith, but no warranty is given and Dowell Schlumberger assumes no liability for advice or recommendations made concerning results to be obtained from the use of any product or service. The results given are estimates based on calculations produced by a computer model including various assumptions on the well, reservoir and treatment. The results depend on input data provided by the operator and estimates as to unknown data and can be no more accurate than the model, the assumptions and such input data. The information presented is Dowell Schlumberger's best estimate of the actual results that may be achieved and should be used for comparison purposes rather than absolute values. The quality of input data, and hence results, may be improved through the use of certain tests and procedures which Dowell Schlumberger can assist in selecting.

The operator has superior knowledge of the well, the reservoir, the field and conditions affecting them. If the operator is aware of any conditions whereby a neighboring well or wells might be affected by the treatment proposed herein it is the operator's responsibility to notify the owner or owners of the well or wells accordingly.

Prices quoted are estimates only and are good for 30 days from the date of issue. Actual charges may vary depending upon time, equipment, and material ultimately required to perform these services. Freedom from infringement of patents of Dowell Schlumberger or others is not to be inferred.



XI

Client : Meridian Oil, Inc.
 Well : C andeleria W.W.
 Formation :
 District : Farmington, NM
 Country :

WELL DATA

..... Data
Water Source	C andeleria W.W.
Date of Sample	5/4/94
Test Date	5/4/94
Test Performed By	Dustin Jensen

API WATER ANALYSIS

..... Dissolved Solids mg/L me/L ...
Cations		
Sodium, Na (Calc)	460	20
Calcium, Ca	0	0
Magnesium, Mg	41	3.4
Barium, Ba	—	—
Anions		
Chloride, Cl	355	10
Sulfate, SO4	0	0
Carbonate, CO3	0	0
Bicarbonate, HCO3	769	12.6
Hydroxide ⁻	0	0

OTHER PROPERTIES

..... Other Properties
Total Dissolved Solids, mg/l	1625
Iron, mg/l	6
pH	7.5
Specific Gravity	1.005
Resistivity, ohm-meter	0.60
Temperature	70 deg F

XII. Zone Isolation

**Jillson Federal SWD #1
Form C108 - Attachment Documentation**

An examination of geologic and engineering data indicates no evidence of open faults or any hydraulic connection between the disposal zone and any source of drinking water and/or any currently producing formations. This conclusion is based on log data and proof of isolation between gas- and oil-bearing sands above the Entrada within the area of review.

XIII. Proof of Notice

**Jillson Federal SWD #1
Form C108 - Attachment Documentation**

A copy of the application and support material has been sent by certified mail to the following:

District I
 PO Box 1980, Lubbock, NM 88241-1980
 District II
 PO Drawer DD, Arama, NM 88211-0719
 District III
 1000 Mile Hramm Rd., Aztec, NM 87410
 District IV
 PO Box 2088, Santa Fe, NM 87504-2088

State of New Mexico
 Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
 PO Box 2088
 Santa Fe, NM 87504-2088

Form C
 Revised February 21,
 Instructions on
 Submit to Appropriate District Office
 State Lease - 4 C
 Free Lease - 3 C

AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

* API Number		* Pool Code		* Pool Name		
* Property Code		* Property Name			* Well Number	
		Jillson Federal SWD			1	
* OGRID No.		* Operator Name			* Elevation	
		Meridian Oil Inc.			6907'	

10 Surface Location

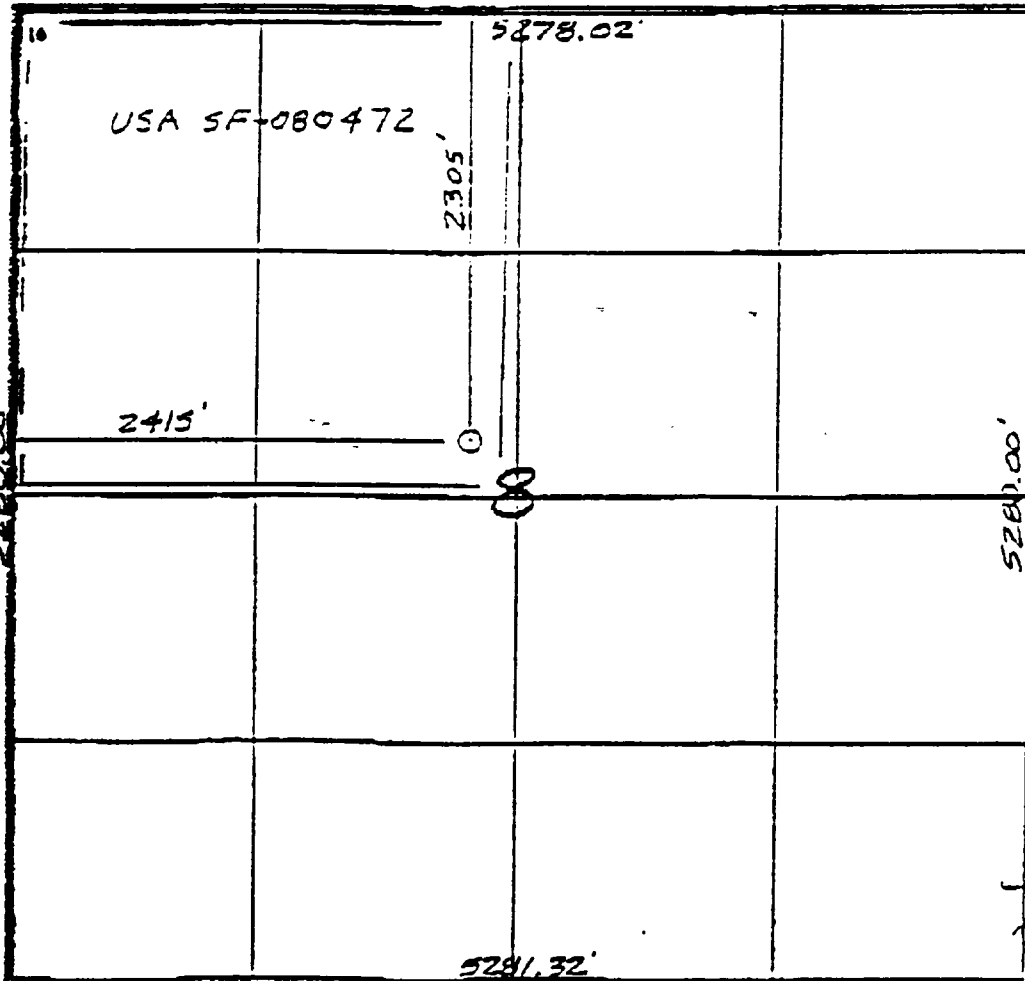
UL or lot no.	Section	Township	Range	Lot Idn	Feet from line	North/South line	Feet from line	East/West line	County
F	8	24 N	3 W		2305	North	2415	West	R.A.

11 Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from line	North/South line	Feet from line	East/West line	County

12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 Order No.

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION



17 OPERATOR CERTIFICATION

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

Signature

Printed Name

Title

Date

18 SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by or under my supervision, and that the same is true and correct to the best of my belief.

5-0-04
 Date of Survey

Signature



6857

Certificate Number

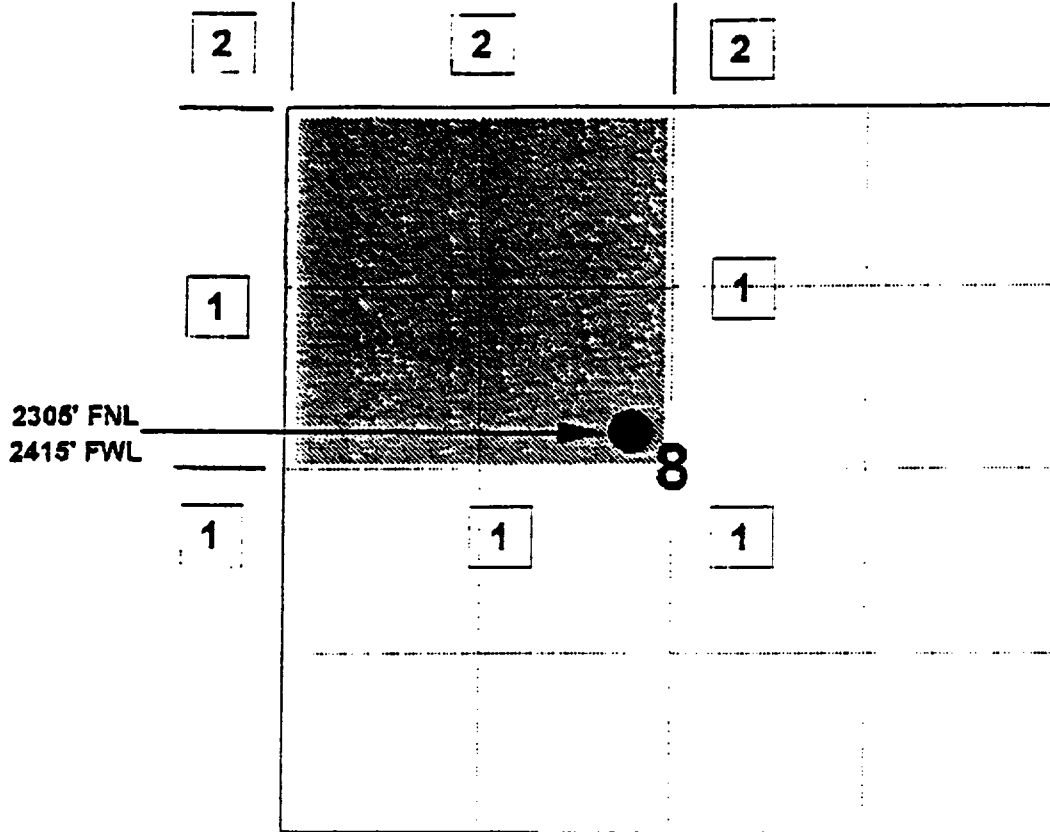
MERIDIAN OIL INC

JILLISON FEDERAL SWD #1

OFFSET OPERATOR PLAT

Saltwater Disposal Well

Township 24 North, Range 3 West



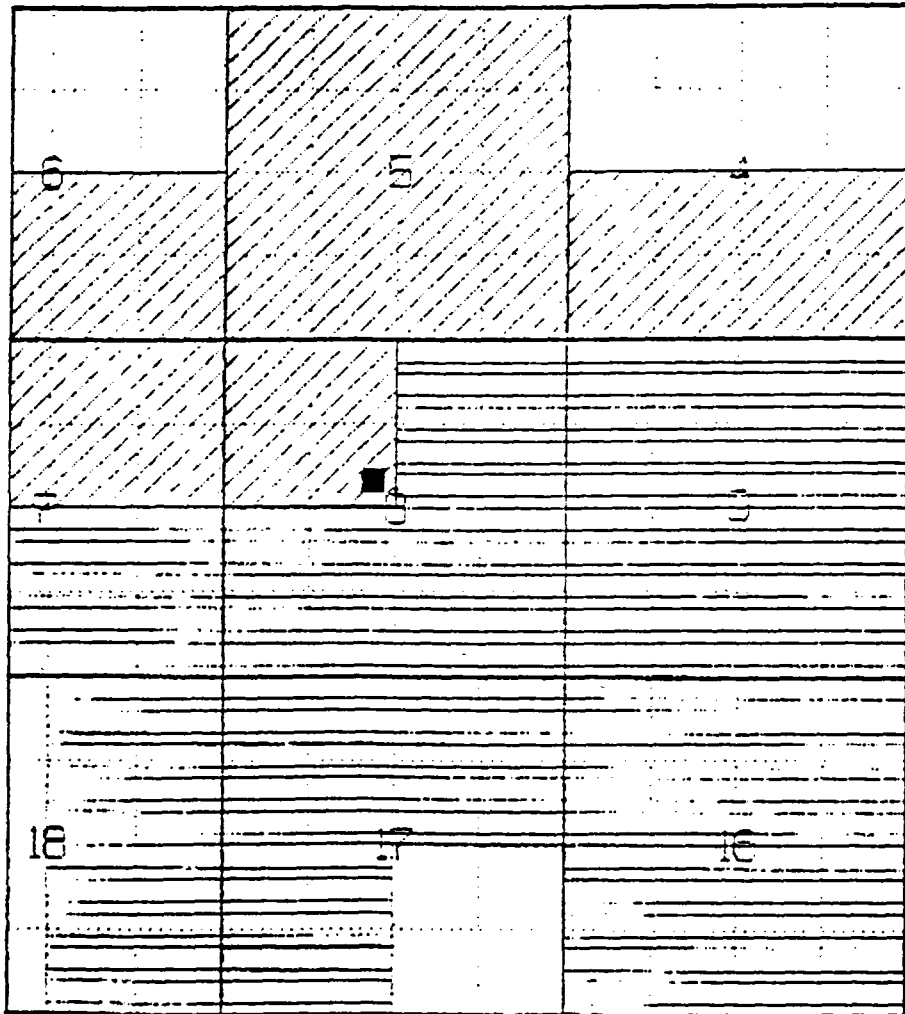
1) Meridian Oil Inc

2) Carolyn Clark Wiggin Oil Properties

PO Box 420, Farmington, NM 87499

MERIDIAN OIL INC
JILLISON SWD #1
DISPOSAL WELL

TOWNSHIP 24 NORTH, RANGE 3 WEST
2325' from North Line. 2415' from West Line



- Proposed Well Location
- ▬ Denial & Fault Considerations
- ▨ Bureau of Land Management