

SWD

7/27/99



RICHARDSON OPERATING COMPANY

1700 Lincoln, Suite 1700
Denver, Colorado 80203 (303) 830-8000
FAX (303) 830-8009

July 8, 1999

JUL 12

New Mexico Oil Conservation Division
2040 South Pacheco
Santa Fe, New Mexico 87505

Re: Application for Authorization to Inject
San Juan County, New Mexico

Dear Mr. Ben Stone,

Richardson Operating Company (ROPCO) is requesting administrative approval for salt-water disposal into the Salty Dog No. 1 well. This well is not yet drilled but is scheduled to spud near the end of July. The well will be completed in the Blanco Mesaverde field, and will be located in the NE quarter of Sec. 1-T29N- R15W, San Juan County, New Mexico. ROPCO owns both the surface and 100 percent of the oil, gas, and mineral leasehold rights at this location.

There is only one existing well, the ROPCO Pittam Pond No. 1, located within one half mile of the proposed location for the Salty Dog No. 1. The Pittam Pond No. 1 is completed in the Pictured Cliffs formation at a depth of 570 feet and has a total wellbore depth of 660 feet. The wellbore does not penetrate the Mesaverde formations. Information from the State Engineer's Office in Aztec indicates there are nine shallow fresh water wells within one mile of the Salty Dog No. 1 location. Fresh water well data is attached.

Salt water disposal will be into the Mesaverde series Cliff House and Point Lookout formations at depths of approximately 2023' and 3121', respectively. Water analysis from both the Cliff House and Point Lookout will be provided upon completion of the well.

The disposal water will be Pictured Cliffs and Fruitland Coal produced water from wells located in various sections of Townships 29 and 30 North, and Ranges 14 and 15 West, San Juan County, New Mexico. The average daily injection rate is expected to be approximately 1400 BWPD at an average surface injection pressure of approximately 540 psig.

All available geologic and engineering data has been examined and there is no evidence of open faults or any other hydrologic connections between the disposal zone and any underground sources of drinking water. A statement of ROPCO's salt-water disposal intentions was posted in the Farmington Daily Times newspaper on Wednesday, July 7, 1999.

The Application for Authorization to Inject (Form C-108) and attachments are enclosed. If there are any questions or concerns regarding this application please contact Steve Smethie at 303-830-8000.

Sincerely,

Steve Smethie

Steve Smethie, Petroleum Consultant

APPLICATION FOR AUTHORIZATION TO INJECT

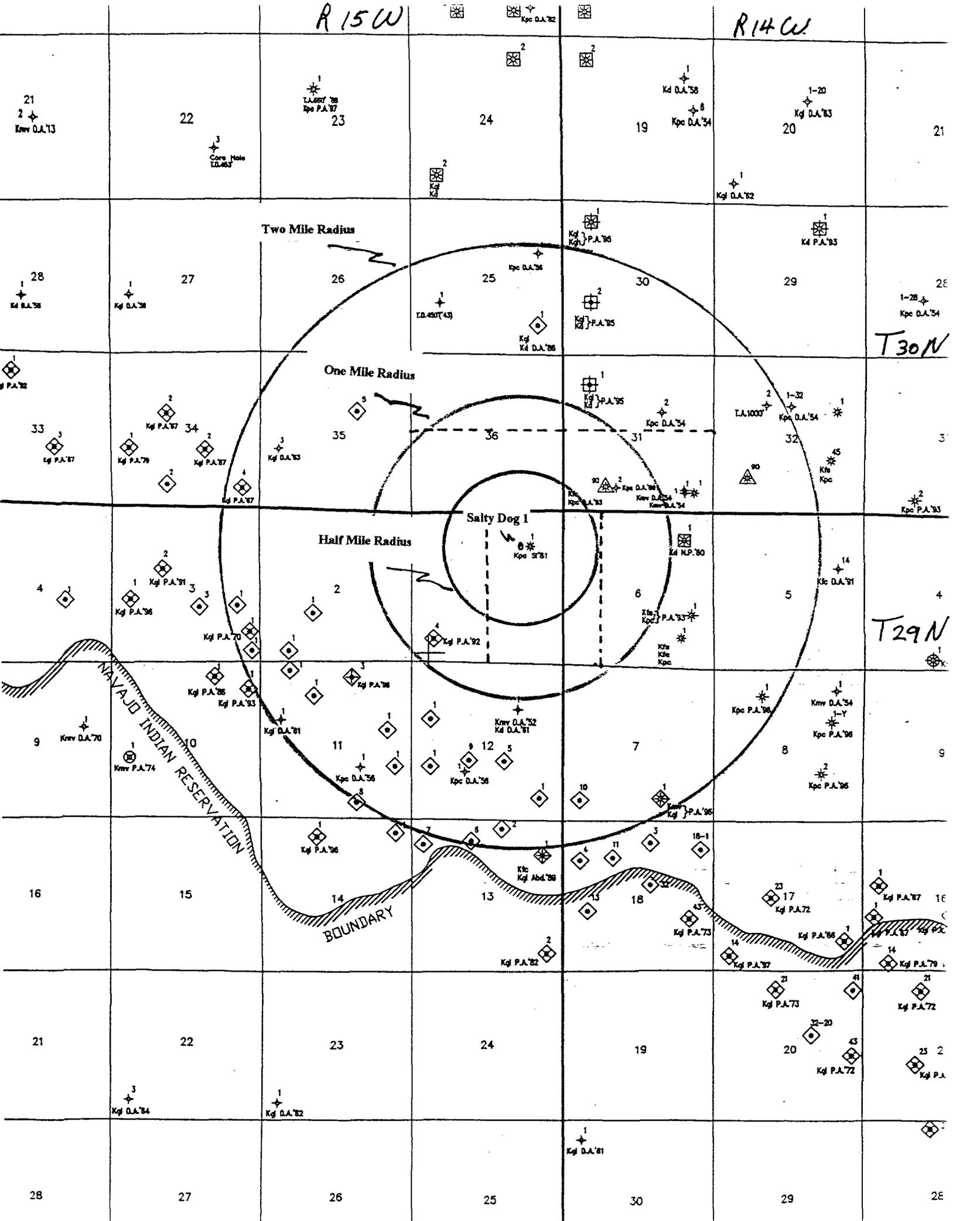
- I. PURPOSE: Disposal
- II. OPERATOR: Richardson Operating Company
ADDRESS: 1700 Lincoln Street, Suite 1700, Denver, Colorado 80203
CONTACT PARTY: Steve Smethie PHONE: 303-830-8000
- III. WELL DATA: See Attachment for the Salty Dog No. 1
- IV. Is this an expansion of an existing project? No.
- V. Map showing the "Area of Review" is attached.
- VI. No wells within the area of review penetrate the proposed injection zone.
- VII. Operation Data:
To be determined by water analysis and step-rate tests. *2050 5 250*
- VIII. The target zone is the Cliff House and Point Lookout formations of the Mesaverde series, each being thick sandstones of approximately 150 feet in thickness. The Mesaverde series begins at a depth of 1844 feet in the SW offset Pittam Pond No. 4 wellbore. There are no known sources of underground drinking water below the Cliff House formation in the area. There are potable water sands between 40 feet and 110 feet overlying the area. The log for the Pittam Pond No. 4 is attached.
- IX. Stimulation will consist of acidizing the formations and possibly a small fracture treatment if necessary.
- X. Logs will be provided when the well is completed.
- XI. See attached data pertaining to fresh water wells.
- XII. The geologic and engineering data have been examined and no evidence has been found of open faults or other hydrologic connection between the disposal zone and any underground source of drinking water.
- XIII. Proof of Notice:
See enclosed certificate of publication.
The injection rates and pressures are to be determined by step-rate tests.
- XIV. CERTIFICATION: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

ILLEGIBLE

NAME: Steve Smethie TITLE: Agent
SIGNATURE: Steve Smethie DATE: 7/8/99

R 15 W

R 14 W



Two Mile Radius

One Mile Radius

Half Mile Radius

Salty Dog 1

NAVAJO INDIAN RESERVATION BOUNDARY

T 30 N

T 29 N

21
2
Kev D.A. 13

22

1
LARRY 78
Kpc P.A. 37
23

24

1
Kl D.A. 58
Kpc D.A. 34
19

1-20
Kgl D.A. 83
20

21

3
Core Hole
E.L. 65

2

1
Kgl D.A. 82

1
Kl D.A. 58
28

27

26

25

30

29

2E

1
Kgl D.A. 38

1
L.A. 4507 (43)

1
Kgl P.A. 95
2
Kgl P.A. 95

1
Kl P.A. 93

1-28
Kpc D.A. 34

1
Kgl P.A. 82

3
Kgl P.A. 87
33

2
Kgl P.A. 78
1
Kgl P.A. 78

2
Kgl P.A. 87
34

3
Kgl D.A. 83

5

1
Kgl D.A. 86

1
Kgl P.A. 95
2
Kgl P.A. 95

2
Kpc D.A. 34

1
L.A. 1000

1-32
Kpc D.A. 34

3

2
Kgl P.A. 91
1
Kgl P.A. 91

3
Kgl P.A. 70
1
Kgl P.A. 70

1
Kgl P.A. 78
1
Kgl P.A. 78

2

1
Kpc S.D. 81

1
Kgl P.A. 92
1
Kgl P.A. 92

1
Kgl P.A. 93
1
Kgl P.A. 93

1
Kgl P.A. 96

14
Kpc D.A. 81

4

4

1
Kgl P.A. 86
2
Kgl P.A. 86

1
Kgl P.A. 83
1
Kgl P.A. 83

1
Kgl P.A. 81
1
Kgl P.A. 81

1
Kgl P.A. 78
1
Kgl P.A. 78

1
Kgl P.A. 92
1
Kgl P.A. 92

1
Kgl P.A. 96
1
Kgl P.A. 96

1
Kgl P.A. 93
1
Kgl P.A. 93

1
Kgl P.A. 96

1
Kgl P.A. 96

1
Kgl P.A. 96

1
Kgl P.A. 96

9

1
Kev D.A. 70
9

1
Kev P.A. 74

1
Kgl D.A. 81
1
Kgl D.A. 81

1
Kgl P.A. 86
1
Kgl P.A. 86

1
Kgl P.A. 81
1
Kgl P.A. 81

1
Kgl P.A. 92
1
Kgl P.A. 92

1
Kgl P.A. 96
1
Kgl P.A. 96

1
Kgl P.A. 93
1
Kgl P.A. 93

1
Kgl P.A. 96

1
Kgl P.A. 96

1
Kgl P.A. 96

1
Kgl P.A. 96

9

16

15

14

13

7

8

9

BOUNDARY

1
Kgl P.A. 96

1
Kgl P.A. 92
1
Kgl P.A. 92

1
Kgl P.A. 96
1
Kgl P.A. 96

1
Kgl P.A. 93
1
Kgl P.A. 93

1
Kgl P.A. 96

1
Kgl P.A. 96

1
Kgl P.A. 96

1
Kgl P.A. 96

1E

23
17
Kgl P.A. 72

1
Kgl P.A. 87
1
Kgl P.A. 87

1
Kgl P.A. 87
1
Kgl P.A. 87

1
Kgl P.A. 82

1
Kgl P.A. 82
2
Kgl P.A. 82

1
Kgl P.A. 82
1
Kgl P.A. 82

1E

21

22

23

24

19

20

2E

3
Kgl D.A. 84

1
Kgl D.A. 82

1
Kgl D.A. 81

21
Kgl P.A. 73

41
Kgl P.A. 72

21
Kgl P.A. 72

21-20
Kgl P.A. 72

43
Kgl P.A. 72

23 2
Kgl P.A.

28

27

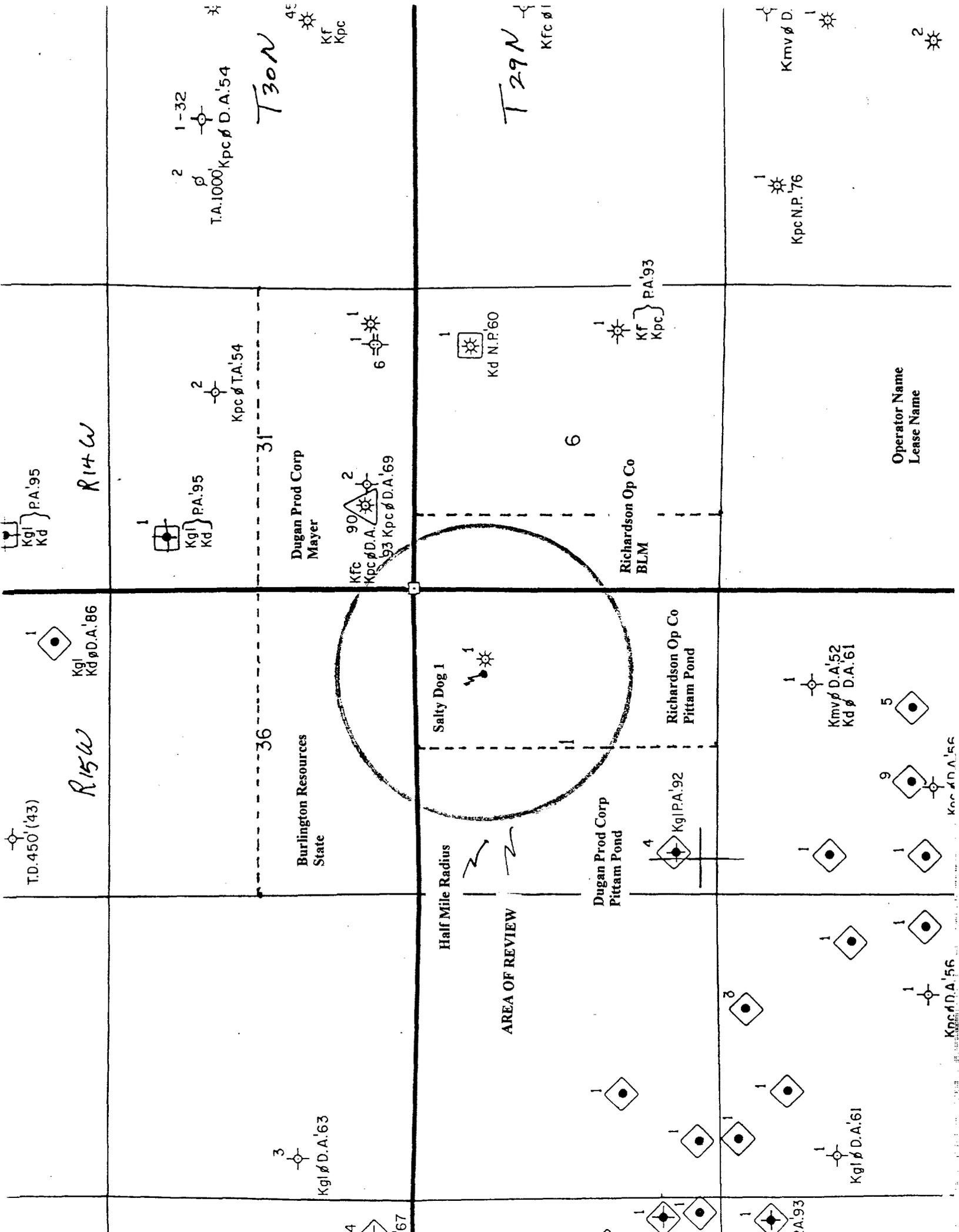
26

25

30

29

2E



Kgl
Kd } PA:95

R14W

1
Kgl
Kd } D.A.'86

R15W

T.D.450'(43)

1-32
2
Kpc } D.A.'54

T30N

4E
KF
Kpc

2
Kpc } T.A.'54

Dugan Prod Corp
Mayer

1
1
6

2
Kfc
Kpc } D.A.'69

1
Kd N.P.'60

T29N
Kfc } 1

6

1
KF
Kpc } PA:93

Richardson Op Co
BLM

1
Kmv } D.
Kpc N.P.'76

1
Kmv } D.A.'52
Kd } D.A.'61

Burlington Resources
State

Half Mile Radius

Salty Dog 1

AREA OF REVIEW

Dugan Prod Corp
Pittam Pond

4
Kgl } PA:92

Richardson Op Co
Pittam Pond

1

5

3
Kgl } D.A.'63

4
D.A.'67

1

1

1

1

1
Kgl } D.A.'61

1

Kpc } D.A.'56

1

9

Kpc } D.A.'56

5

Operator Name
Lease Name

2

NAMES AND ADDRESSES OF OFFSET OPERATORS

Copies of this application are being sent by Certified Mail (Return Receipt) to each of the parties listed below, concurrent with the mailing of this application.

Leasehold Owners

Dugan Production Corp.
P. O. Box 420
Farmington, NM 87499-0420

Burlington Resources Oil & Gas Company
P. O. Box 4289
Farmington, NM 87499-4289

Richardson Production Company
1700 Lincoln Street, Suite 1700
Denver, CO 80203

Surface Owner

Richardson Production Company
1700 Lincoln Street, Suite 1700
Denver, CO 80203

INJECTION WELL DATA SHEET

OPERATOR: RICHARDSON OPERATING COMPANY

WELL NAME & NUMBER: SALTY DOG SMD #1

WELL LOCATION: 1200 FNL & 1380' FEL

UNIT LETTER: 1 SECTION 29 TOWNSHIP 15 RANGE

FOOTAGE LOCATION

WELLBORE SCHEMATIC

WELL CONSTRUCTION DATA

Surface Casing

Hole Size: 9-7/8 Casing Size: 8-5/8, 24#

Cemented with: 42 sx. or 50 ft³

Top of Cement: Surface Method Determined:

Intermediate Casing

Hole Size: Casing Size:

Cemented with: sx. or ft³

Top of Cement: Method Determined:

Production Casing

Hole Size: 6-3/4 Casing Size: 5-1/2, 15.5#

Cemented with: 185±100 sx. or 500 ft³

Top of Cement: surface Method Determined:

Total Depth: 3400'

Injection Interval

MV perfs: 2023-3300' feet to Perforated

(Perforated or Open Hole; indicate which)

INJECTION WELL DATA SHEET

Tubing Size: 2-7/8", 6.4#, J-55 Lining Material: NONE

Type of Packer: ⁴5-1/2" X 2-7/8" Tension Set

Packer Setting Depth: _____

Other Type of Tubing/Casing Seal (if applicable): _____

Additional Data

1. Is this a new well drilled for injection? Yes No
If no, for what purpose was the well originally drilled? _____

2. Name of the Injection Formation: Mesa Verde

3. Name of Field or Pool (if applicable): _____

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail, i.e. sacks of cement or plug(s) used. _____

NO

5. Give the name and depths of any oil or gas zones underlying or overlying the proposed injection zone in this area: _____

Pictured Cliffs - 570'

Gallup - 4700'

Salty Dog SWD #1
 1200' FNL & 1380' FEL
 Sec 1, T29N, R15W
 Blanco Mesa Verde

Elev: 5291' GR

8-5/8", 24#, J-55 @ 200'.
 Cement w/ 50 cuft, to surface

- Formation Tops:**
- Pictured Cliffs @ 571'
 - Lewis @ 712'
 - Cliff house @ 2023'
 - Menefee @ 2207'
 - Point Lookout @ 3121'
 - Total Depth @ 3420'

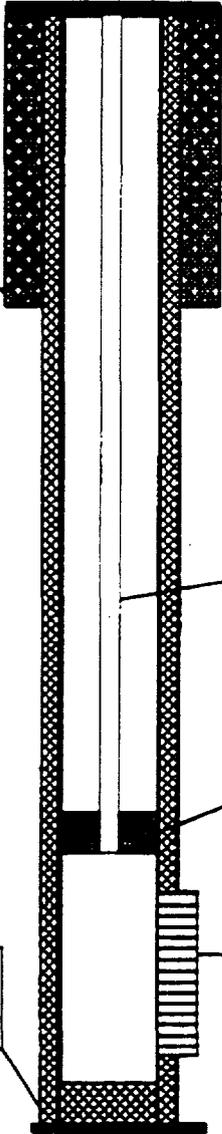
2-7/8", 6.4#, J-55 tbg

Packer @ 1975'

MV Perfs: 2023-3300'

5-1/2", 15.5#, K-55 @ 3400. Cmt w/
 500 cuft to surface.

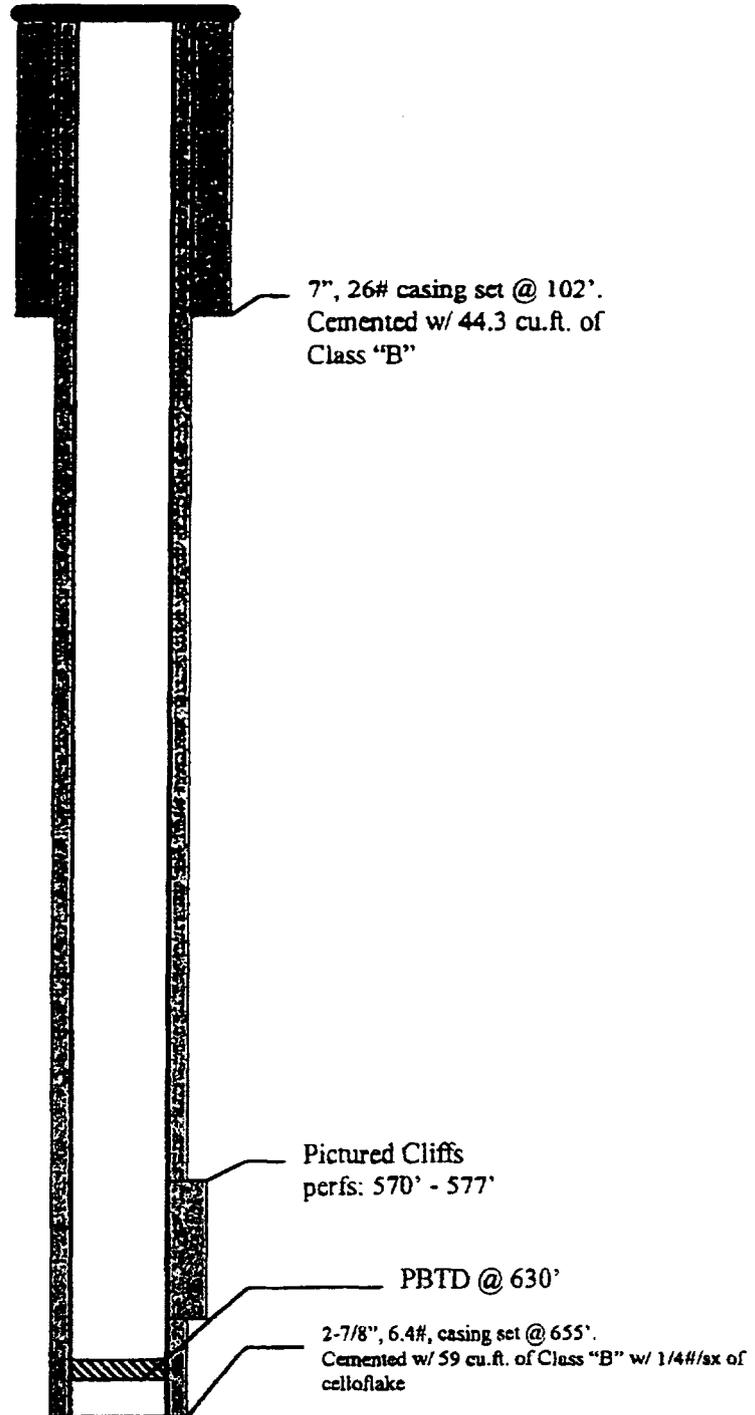
ANS July '99



Richardson Operating Company
Pittam Pond #1
Sec 1 Twp 29N Rge 15W
1235' fml & 1215' fel
San Juan County, New Mexico

6/18/99 jet

Geology	
Field: Twin Mounds PC	
Fruitland:	422'
Pictured Cliffs:	554'



FW01W266

BJ SERVICES COMPANY

WATER ANALYSIS #FW01W266

FARMINGTON LAB

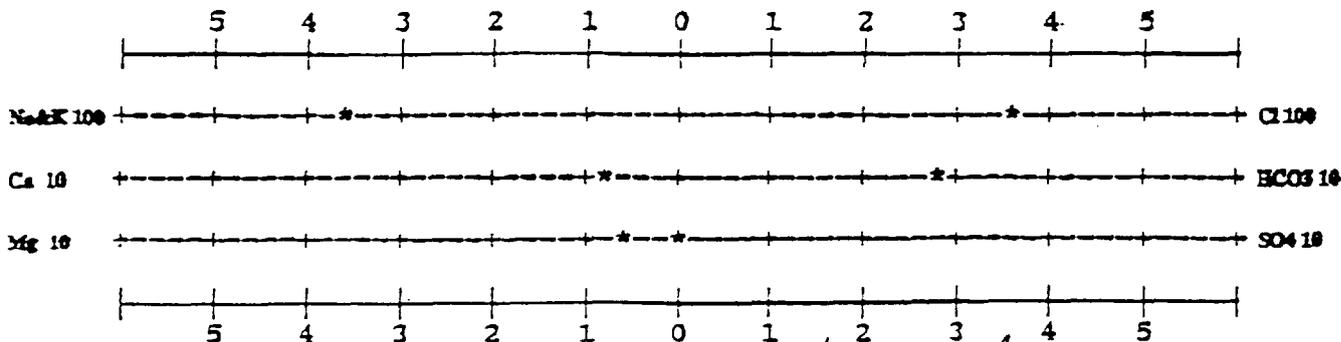
GENERAL INFORMATION			
OPERATOR:	RICHARDSON OPERATING	DEPTH:	
WELL:	BUSHMAN FEDERAL 6-1	DATE SAMPLED:	10/19/98
FIELD:	SEC06/T29N/R14W	DATE RECEIVED:	10/20/98
SUBMITTED BY:	BRAD SALZMAN	COUNTY:	SAN JUAN STATE: NM
WORKED BY:	D. SHEPHERD	FORMATION:	FC/PC
PHONE NUMBER:			

SAMPLE DESCRIPTION	
SAMPLE FOR ANALYSIS	

PHYSICAL AND CHEMICAL DETERMINATIONS			
SPECIFIC GRAVITY:	1.015	@ 74°F	PH: 7.49
RESISTIVITY (MEASURED):	0.280	ohms @ 76°F	
IRON (FE++) :	0 ppm	SULFATE:	39 ppm
CALCIUM:	158 ppm	TOTAL HARDNESS	710 ppm
MAGNESIUM:	77 ppm	BICARBONATE:	1,719 ppm
CHLORIDE:	12,574 ppm	SODIUM CHLORIDE (Calc)	20,685 ppm
SODIUM+POTASS:	8,493 ppm	TOT. DISSOLVED SOLIDS:	23,536 ppm
H2S: NO TRACE		POTASSIUM (PPM):	110 PPM

REMARKS	
SAMPLED FROM SEPERATOR	

STIFF TYPE PLOT (IN MEQ/L)



ANALYST *D. Shepherd*
D. SHEPHERD



INDUCTION - ELECTRIC LOG

15 30

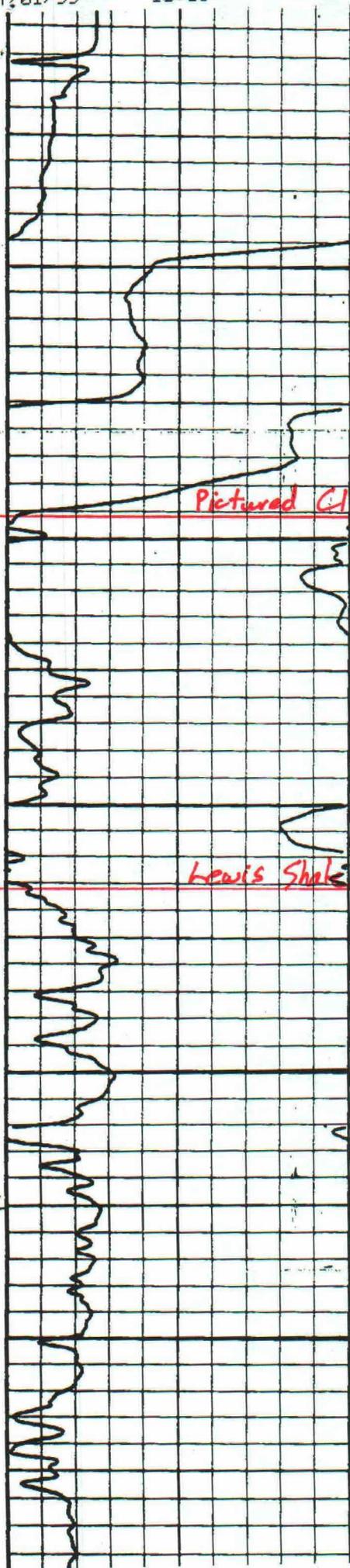
COMPANY <u>DUGAN PRODUCTION CORPORATION</u>		COMPANY <u>DUGAN PRODUCTION CORPORATION</u>
WELL <u>PITTAM POND #4</u>		WELL <u>PITTAM POND #4</u>
FIELD <u>CHA CHA GALLUP</u>		FIELD <u>CHA CHA GALLUP</u>
County <u>SAN JUAN</u> State <u>M. MEX.</u>		COUNTY <u>SAN JUAN</u> STATE <u>NEW MEXICO</u>
Location <u>690' FSL & 690' FWL</u>		Location <u>13</u> Other Services:
Sec. <u>1</u> Twp. <u>29N</u> Rge. <u>15W</u>		COMP. DENSTTY
Permanent Datum <u>GROUND LEVEL</u> Elev. <u>5220'</u>	Log Measured From <u>KELLY BUSHING, 12 Ft. Above Perm. Datum</u>	Elev. K.B. <u>5232'</u>
Drilling Measured From <u>KELLY BUSHING</u>		D.F. <u>5220'</u>
Date <u>9-26-81</u>	Run No. <u>ONE</u>	GL. <u>5220'</u>
Depth—Driller <u>4730'</u>	Depth—Welex <u>4734'</u>	
Blm. Log Inter. <u>4732'</u>	Top Log Inter. <u>200'</u>	
Casing—Driller <u>8-5/8" @ 222'</u>	Casing—Welex <u>8-5/8" @ 222'</u>	
Bit Size <u>7-7/8"</u>	Type Fluid in Hole <u>GEL/WATER</u>	
Dens. I Visc. <u>9.1 75</u>	ph Fluid Loss <u>8.5 ml</u>	
Source of Sample <u>MUD PIT</u>	R _m @ Meas. Temp. <u>5.9 @ 77°F</u>	
R _m @ Meas. Temp. <u>1.7 @ 77°F</u>	R _m @ Meas. Temp. <u>1.7 @ 77°F</u>	
R _m @ Meas. Temp. <u>3.1 @ 74°F</u>	Source R _m R _{mc} <u>MEASURED</u>	
R _m @ BHT <u>2.80 @ 170°F</u>	Time Since Circ. <u>30 MINUTES</u>	
Max. Rec. Temp. <u>170°F @ T.D.</u>	Equip. I Location <u>2892 FARMINGTON I</u>	
Recorded By <u>D. GURUIE</u>	Witnessed By <u>MR. STEVE CLARK</u>	

RECEIVED
OCT 5 - 1981
OIL CON. COM.
Dist. 3

Fold Here

Service Ticket No 098104 Remarks:									
Change in Mud Type or Additional Samples					SCALE CHANGES				
Date	Sample No.				Type Log	Depth	Scale Up Hole	Scale Down Hole	
					IEL	4732'	NO CHANGES		
Type Fluid in Hole									
Dens.	Visc.								
ph	Fluid Loss		ml						
Source of Sample					EQUIPMENT DATA				
R _m @ Meas. Temp.	@	°F	@	°F	Run No.	Tool Type and No.	Pad Type	Tool Position	Other
R _m @ Meas. Temp.	@	°F	@	°F	ONE	M19 #28609		FREE	
R _m @ Meas. Temp.	@	°F	@	°F					
Source: R _m R _{mc}									
R _m @ BHT	2.8	@ 170°F	@	°F					
R _{mc} BHT	.80	@ 170°F	@	°F					
R _{mc} BHT	1.40	@ 170°F	@	°F					

Welex does not guarantee the accuracy of any interpretation of log data, conversion of log data to physical rock parameters, or recommendations which may be given by Welex personnel or which may appear on the log or in any other form. Any user of such data, interpretations, conversions, or recommendations agrees that Welex is not responsible, except where due to gross negligence or willful misconduct, for any loss, damages, or expenses resulting from the use thereof.



Pictured Cliffs

Lewis Shale

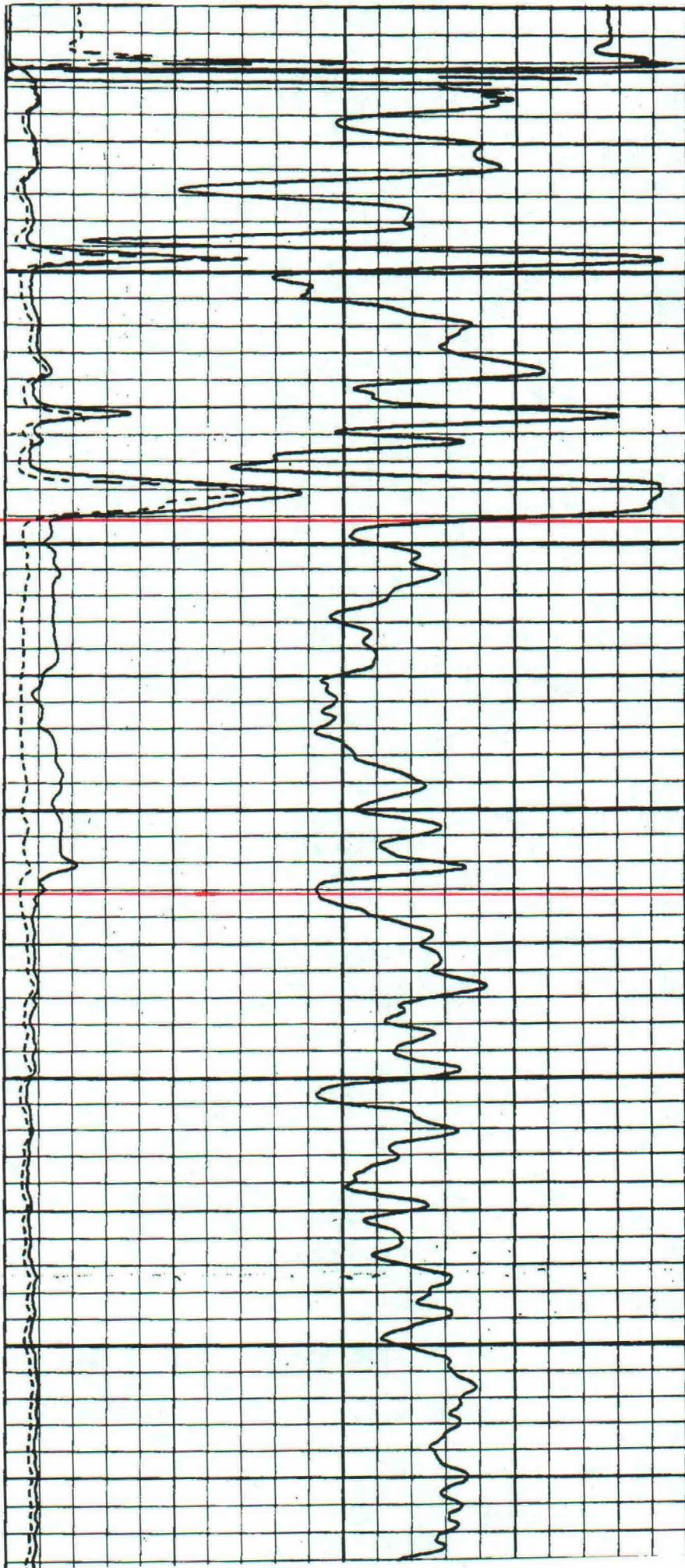
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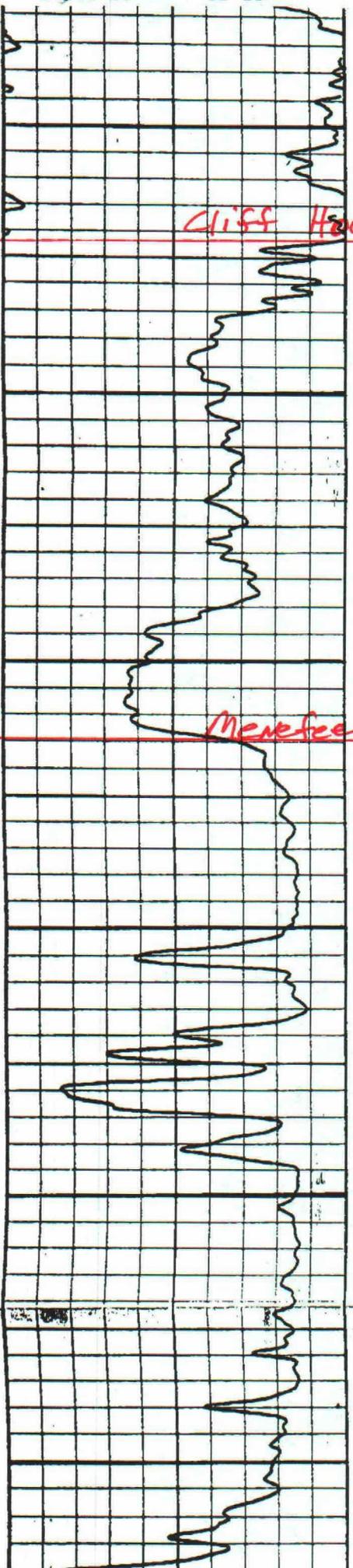
400.

500.

600.

700.





1800.

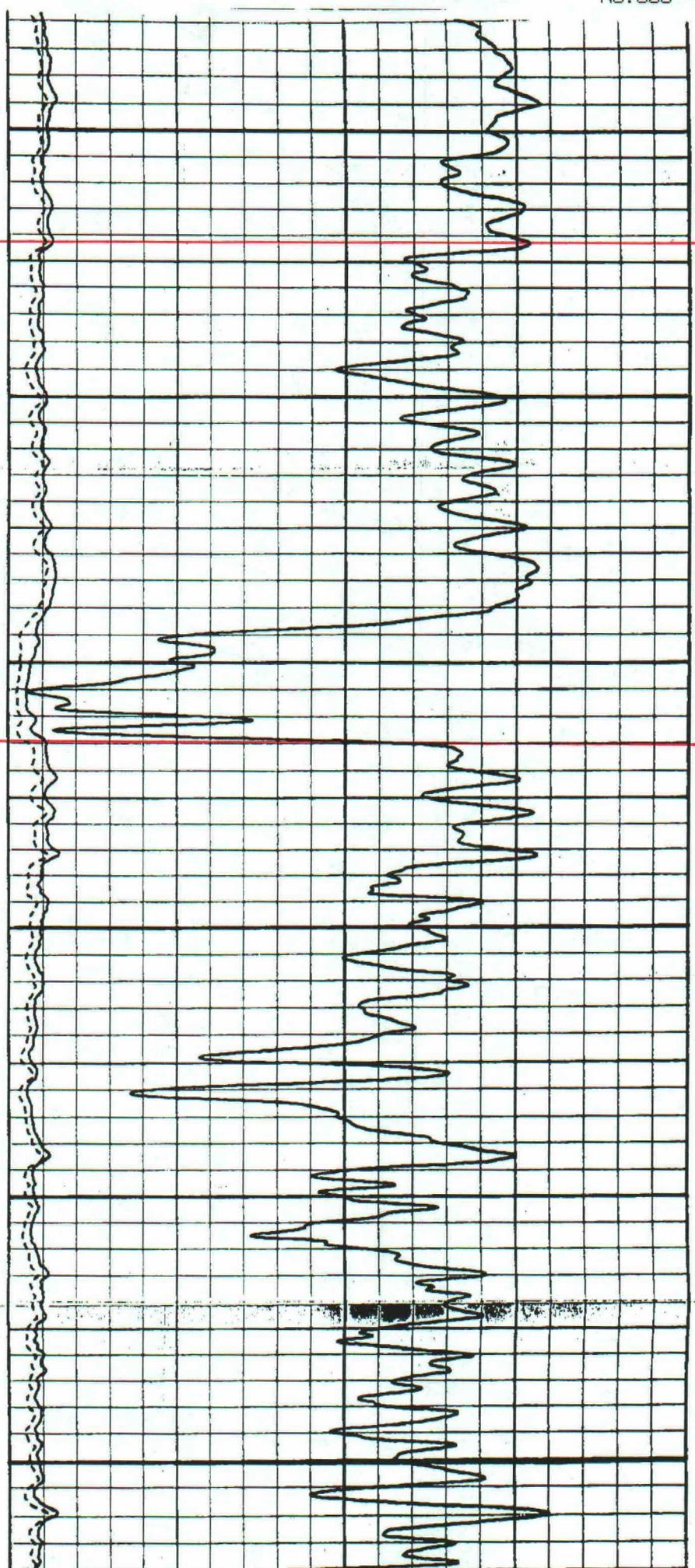
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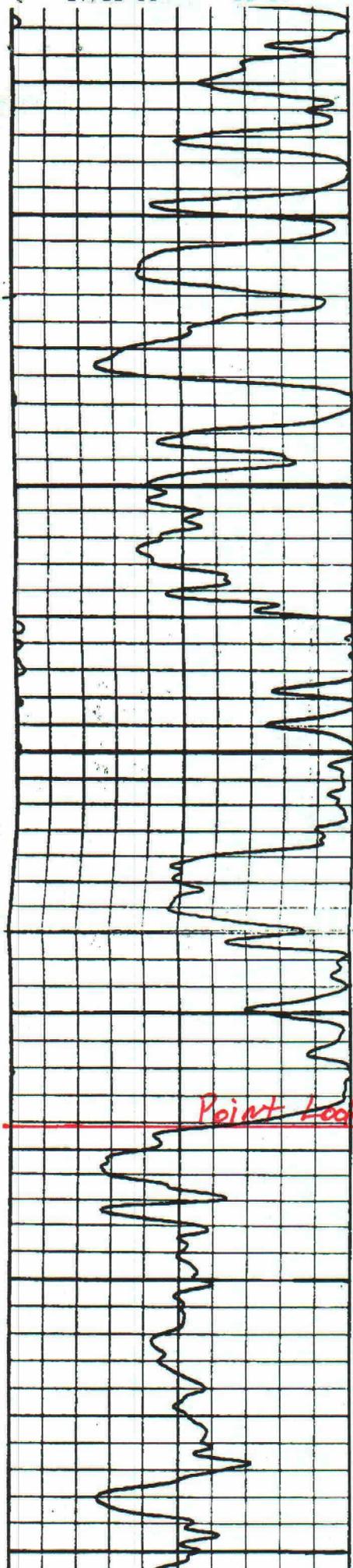
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2100.

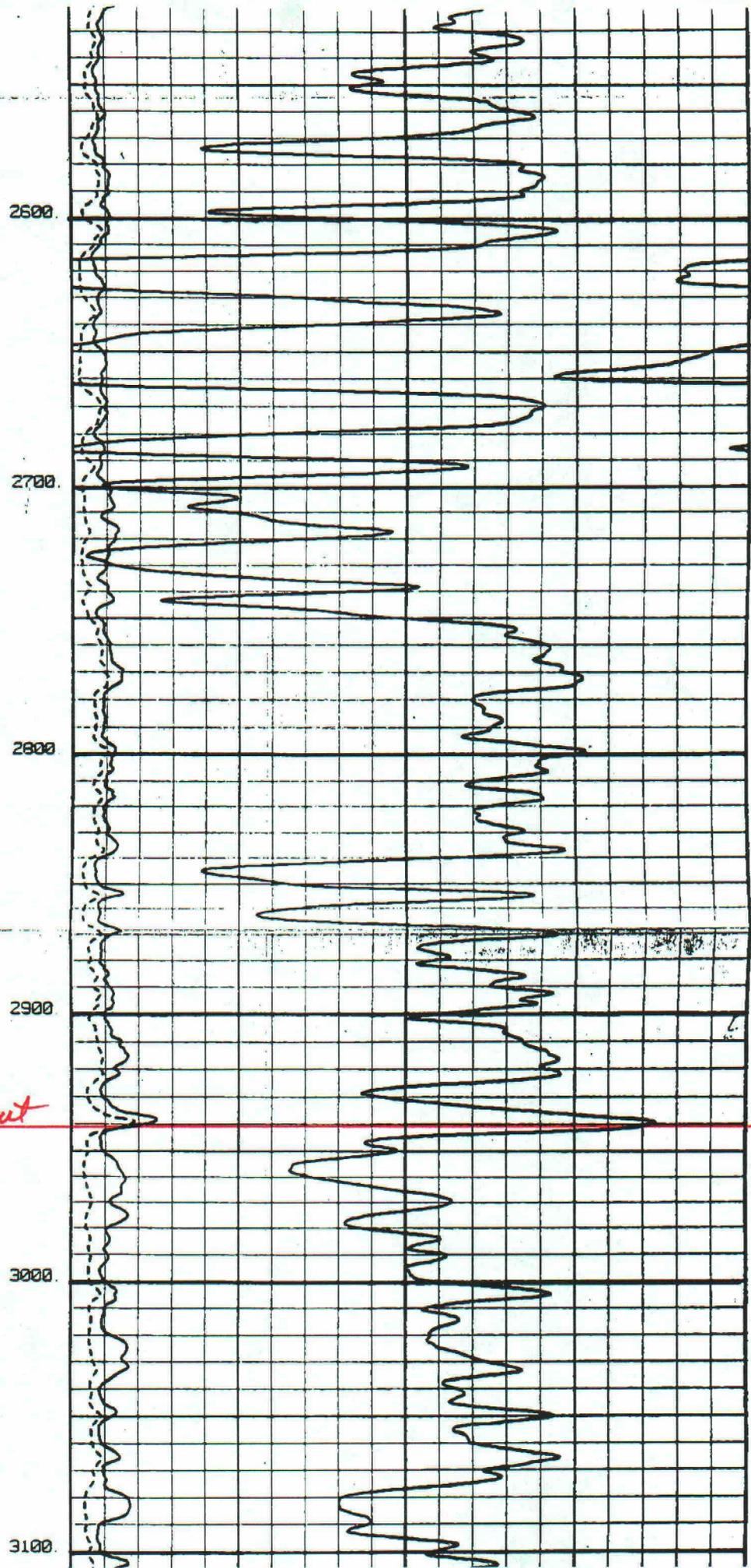
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2300.

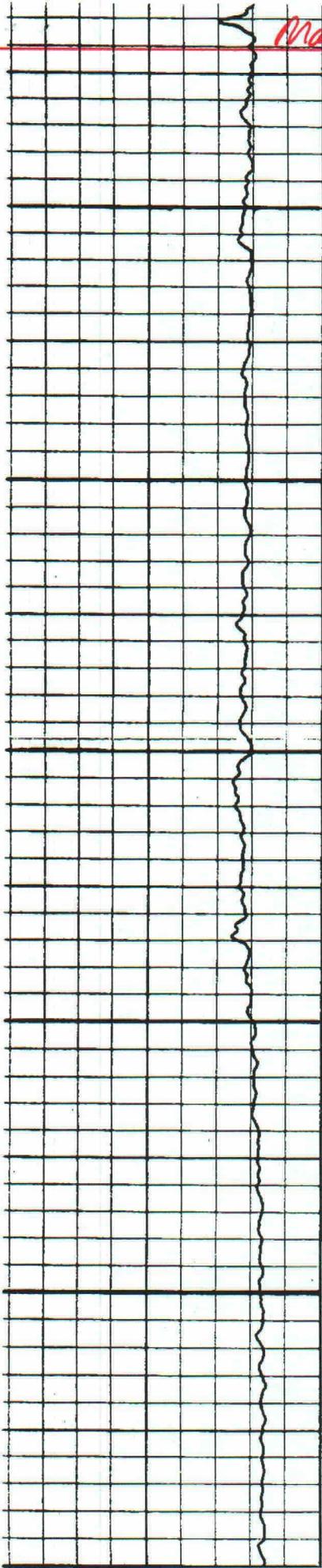




Point Lockout



Manaos



3300.

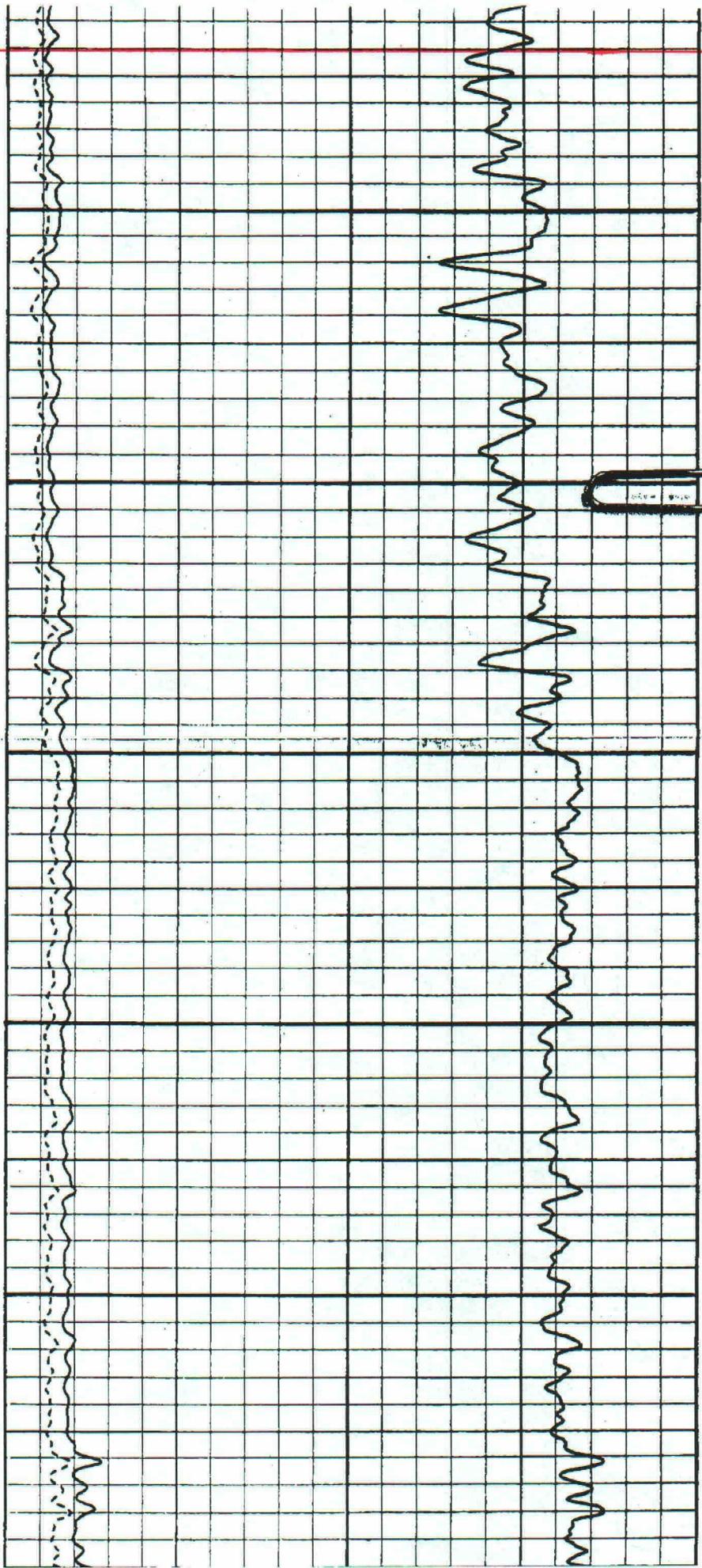
3400.

3500.

3600.

3700.

3800.

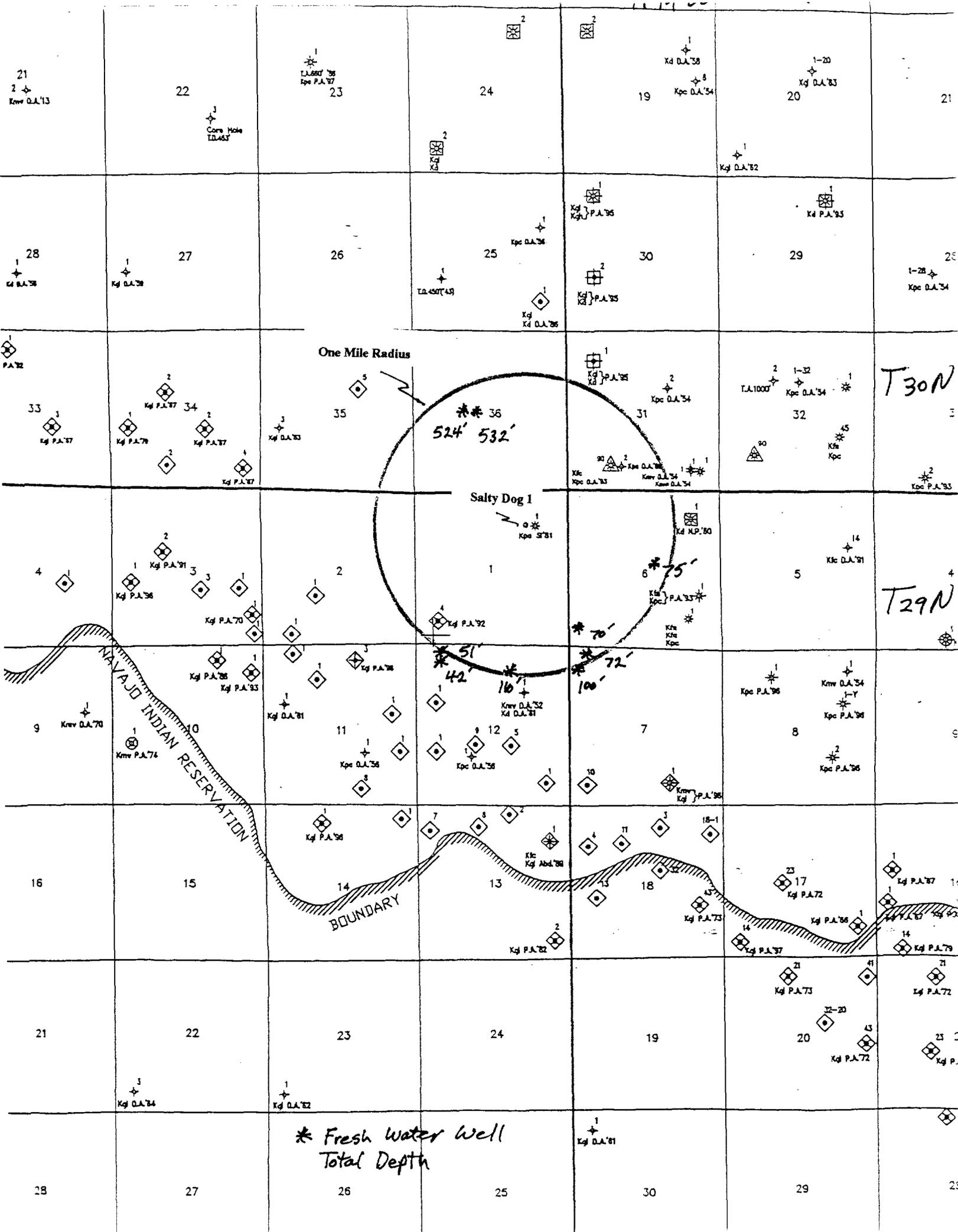


**Richardson Operating Company
West Farmington Salt Water Disposal**

SWD Well Name Salty Dog No.1
Location 1200' FNL & 1380' FEL
Sec-T-R 1-29N-15W
County, State San Juan, New Mexico
Disposal Formation Cliff House and Point Lookout

**Fresh Water Wells w/in One Mile:
(State Engineer Office)**

<u>Owner of Well</u>	<u>Address</u>	<u>City</u>	<u>Zip Code</u>	<u>Well Spot</u>	<u>Well Location Sec-T-R</u>	<u>Total Depth Feet</u>	<u>Completion Date</u>
David R. Knoll	Box 774	Kirtland	87417	E/2 NW NE	12-29N-15W	110	8/11/77
Jack Swearingen	Box 305	Kirtland	87417	SW NW NW	7-29N-14W	100	5/20/77
Western Coal Company	Box 1026	Albuquerque	87103	SW SE NW	36-30N-15W	524	4/11/78
Western Coal Company	Box 1026	Albuquerque	87103	SW SE NW	36-30N-15W	532	4/12/78
Paul Hansen	Box 822	Kirtland	87413	SW SW SW	6-29N-14W	70	7/5/81
Gordon A. Helmer	Box 1073	Kirtland	87417	NW NW	7-29N-14W	72	5/24/82
Dale Dailey	Box 1347	Kirtland	87417	W/2 SW NE	6-29N-14W	75	9/5/84
John Leo Kennedy	Box 571	Kirtland	87417	NE NW NW	12-29N-15W	51	10/30/86
Dan Booth	7881 Old Aztec Hwy	Flora Vista	87415	NE NW NW	12-29N-15W	42	11/11/86



* Fresh Water Well
 Total Depth

T30N

T29N

One Mile Radius

** 36
 524' 532'

Salty Dog 1

NAVAJO INDIAN RESERVATION
 BOUNDARY

21
 2
 Kqw D.A. 73

22

1
 L.A. 807 '38
 Kpc P.A. 77
 23

24

1
 Kd D.A. 38
 8
 Kpc D.A. 34
 19

1-20
 Kq D.A. 83
 20

21

28
 1
 Kq D.A. 38

27

26

25

30

29

25

P.A. 72

33
 1
 Kq P.A. 77

2
 Kq P.A. 77
 34
 2
 Kq P.A. 77

35

1
 Kq P.A. 76

2
 Kpc D.A. 34

1-20
 Kpc D.A. 34
 1
 Kpc D.A. 34

2
 Kpc P.A. 93

4
 1
 Kq P.A. 76

2
 Kq P.A. 76
 3
 Kq P.A. 76
 1
 Kq P.A. 76
 1
 Kq P.A. 76

2

1
 Kpc S' 81

6
 75
 Kq P.A. 73

14
 Kpc D.A. 91

4

9
 Kqw D.A. 70

1
 Kqw P.A. 74
 1
 Kq P.A. 76
 1
 Kq P.A. 76
 1
 Kq P.A. 76

1
 Kq D.A. 91

11
 1
 Kpc D.A. 36
 1
 Kq P.A. 76

4
 Kq P.A. 92
 1
 Kqw D.A. 32
 Kd D.A. 91
 1
 Kq P.A. 76
 1
 Kq P.A. 76

1
 Kq P.A. 76

1
 Kpc P.A. 96

1
 Kqw D.A. 34
 1
 Kpc P.A. 96

2
 Kpc P.A. 76

16

15

14

13

18

17

16

21

22

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24

19

20

25

3
 Kq D.A. 74

1
 Kq D.A. 92

1
 Kq D.A. 91

28

27

26

25

30

29

26



Water Analysis Report

To: Western Gas Producers

Submitted by: Halliburton Energy Services

Attention: Paul Thompson

Well Name: Fresh water well

Date: 7/6/99

Date Rec: 7/2/99

Report #: WF-990-0161

Formation: Produced Water

John Leo Kennedy, Kirtland, NM

NE NW NW Sec 12-T29N-R15W
Total Depth of Well is 51'

Specific Gravity	0.970	
pH	6.05	
Resistivity	12.48	@ 70° F
Iron (Fe)	0	Mg / L
Potassium (K)	0	Mg / L
Sodium (Na)	200	Mg / L
Calcium (Ca)	64	Mg / L
Magnesium (Mg)	15	Mg / L
Chlorides (Cl)	300	Mg / L
Sulfates (SO ₄)	0	Mg / L
Carbonates (CO ₃)	0.0	Mg / L
Bicarbonates (HCO ₃)	285	Mg / L
Total Dissolved Solids	864	Mg / L

Respectfully: Bill Loughridge

Title: Field Chemist II

Location: Farmington, NM

AFFIDAVIT OF PUBLICATION

Ad No. 41438

COPY OF PUBLICATION

STATE OF NEW MEXICO

County of San Juan:

ALETHIA ROTH LISBERGER, being duly sworn says: That she is the Classified Manager of THE DAILY TIMES, a daily newspaper of general circulation published in English at Farmington, said county and state, and that the hereto attached Legal Notice was published in a regular and entire issue of the said DAILY TIMES, a daily newspaper duly qualified for the purpose within the meaning of Chapter 167 of the 1937 Session Laws of the State of New Mexico for publication on the following day(s):

Thursday, July 7, 1999

and the cost of publication is: \$21.60

Alethia Rothlisberger

On 7-7-99 ALETHIA ROTH LISBERGER

appeared before me, whom I know personally to be the person who signed the above document.

Christine P. Droy
My Commission Expires May 3, 2008.

918 Legals
PUBLIC NOTICE

Richardson Operating Company will file an application on July 9, 1999, for approval to inject water, produced from other oil and gas wells, into the Mesaverde formation in the Salty Dog No. 1 located in the north half of the northeast quarter of Section 1, Township 29 North, Range 15 West, San Juan County, New Mexico, at a depth from 2000 feet to 3400 feet with surface injection pressure up to 540 pounds per square inch.

Surface owners and offset operators must file any objections or request for public hearing with the New Mexico Oil Conservation Division, 2040 South Pacheco Street, Santa Fe, New Mexico 87505 within 15 days of the date of this notice. The Richardson Operating Company contact person is Steve Smethie, 1700 Lincoln Street, Suite 1700, Denver, Colorado 80203, telephone 303-830-8000.

Legal No. 41438, published in The Daily Times, Farmington, New Mexico, Wednesday, July 7, 1999.