# BW - __7__

# PERMITS, RENEWALS & MODIFICATIONS

# CLOSED

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

**Fax: 1-505-394-2426**

October 19, 1999

Mr. Paul Prather
P&S Brine Sales
P.O. Box 7169
Eunice, New Mexico 88231

**Re: Mechanical Integrity Testing of Brine Supply Wells.**

This is a reminder that New Mexico Oil Conservation Division (NMOCD) will be witnessing mechanical integrity test for all brine supply wells during the time period between October 25 through November 2, 1999. A schedule was sent to each operator on September 11, 1999.

Please have your well(s) ready for testing on the date and time you are scheduled. If there is some emergency which interferes with the scheduled date and time please call and notify NMOCD. Please note the Quality Oil (Salado Brine Sales) well near Jal, NM has been re-scheduled for October 29, 1999 at 11am-3pm.

Please note that if you were scheduled to "isolate the cavern and pressure test casing, and run a cavern survey", you will have the option this time to defer this procedure and just perform the annual open hole pressure test, however no bleed-off will be allowed. The NMOCD will notify you when these other conditions will be required.

**Failure to notify NMOCD may result in your operations being suspended until testing is complete.**

If you require any further information or assistance please do not hesitate to write or call me at (505-827-7155) or notify Mr. Roger Anderson at (505-827-7152).

Sincerely Yours,

Wayne Price-Pet. Engr. Spec.
Environmental Bureau

601 W. ILLINOIS
HOBBS, NEW MEXICO 88240
(505) 392-2236
FAX (505) 392-6949

# EDDIE SEAY CONSULTING

ENVIRONMENTAL,
GEOLOGICAL & REGULATORY
SPECIALISTS

PEAK
CONSULTING SERVICES

SEP 2 1 1998
ENVIRONMENTAL BUREAU

September 15, 1998

Oil Conservation Division
Environmental Bureau
ATTN: Mark Ashley
2040 South Pacheco St.
Santa Fe, NM 87505

RE: Closure of BW-007 Brine Facility for P & S Brine

Dear Mark:

The final closure for the brine part of this facility has been completed. The well has been plugged and abandoned, all C-103's were filed. Charlie Perrin with the OCD witnessed some of the closure operations. Analysis of pit residue and fresh water was done and have been previously sent to OCD. The pit was cleaned out and disposed of at an approved OCD SWD. The liner was inspected and no leaks or tears were found. The leak detection system was checked and was dry. Fresh water was put into the pit to hold down liner. Only fresh water will be sold at the facility. All the tanks were used for fresh water and will remain on location. This should close the brine portion of this facility.

If you have any question or need additional information, please call.

Sincerely,

Eddie W. Seay, Agent

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

# OIL CONSERVATION DIVISION

310 Old Santa Fe Trail, Room 206
Santa Fe, New Mexico 87503

Form C-103
Revised 1-1-89

WELL API NO.

5. Indicate Type of Lease STATE [X] FEE [ ]

6. State Oil & Gas Lease No. M-14474

## 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.)

7. Lease Name or Unit Agreement Name: ARNOLT RAMSEY STATE

1. Type of Well: OIL WELL [ ] GAS WELL [ ] OTHER BRINE WELL

2. Name of Operator: P+S BRINE SALES

8. Well No. 6

3. Address of Operator: BOX 1769 EUNICE, N.M.

9. Pool name or Wildcat: SALT SECTION

4. Well Location
Unit Letter P : 581 Feet From The South Line and 93 Feet From The EAST Line

Section 16 Township 25 Range 37 NMPM LEA County

10. Elevation (Show whether DF, RKB, RT, GR, etc.)

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 | [X] |
| 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.

1. Rized up Pool-
2. Test Casing to 500#
3. RAN 1000' 2 3/8 Tubing
4. Pumped 30 sack cement
5. Circ. cement to surface
6. Pulled Tubing.
7. filled Top of casing W/ cement
8. INSTALLED Dry hole MARKER -
9. Cut off Dead MEN-
10. Cleaned Location

Copy

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

SIGNATURE Paul Prather TITLE Paetner DATE 6-8-98

TYPE OR PRINT NAME PAUL PRATHER TELEPHONE NO. 394-2545

(This space for State Use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

March 17, 1998

RECEIVED
APR 20 1998
OIL CONSERVATION DIVISION

New Mexico Oil Conservation Division
Environmental Bureau
ATTN: Mark Ashley
2040 South Pacheco
Santa Fe, NM 87505

RE: P & S Brine BW-007

Dear Mark:

Find within analysis which were requested for closure, the freshwater well and the fluid from the brine pit. No soil test will be done because P & S is going to leave both fresh water tanks for future use. The C-103 was sent to OCD in Hobbs for approval. Whenever we get the approval, plans will be made for P & A and final closure.

If you have any questions, please call.

Sincerely,

Eddie W. Seay

Eddie W. Seay, Agent
601 W. Illinois
Hobbs, NM 88242
(505)392-2236

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

# CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page ___ of ___

| | |
|---|---|
| Company Name: Eddie Seay Consulting | BILL TO — PO #: |
| Project Manager: Eddie W Seay | Company: |
| Address: 601 W Illinois | Attn: |
| City: Hobbs State: NM Zip: 88240 | Address: |
| Phone #: 392-2236 | City: |
| Fax #: | State: Zip: |
| Project #: P+S Brine - Paul Prather | Phone #: |
| Project Name: P+S Brine BW. 007 | Fax #: |
| Project Location: Jal N.M. | |

| LAB I.D. # | Sample I.D. | COMP(C) OR GRAB(G) | # CONTAINERS | MATRIX: GROUNDWATER | WASTEWATER | SOIL | OIL | SLUDGE | OTHER: | PRESERVATION: ACID: | ICE / COOL | OTHER: | SAMPLING: DATE | TIME | ANALYSIS REQUEST: General Chemistry | TPH | BTEX | CL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H3570-1 | #1 Fresh water well | ✓ | 1 | ✓ | | | | | | | ✓ | | 4/12 | 9am | ✓ | | | |
| -2 | #2 Fluid from Brine Pit | ✓ | 1 | ✓ | | | | | | | ✓ | | 4/12 | 9:30 | ✓ | ✓ | ✓ | ✓ |

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above-stated reasons or otherwise.

| | | | |
|---|---|---|---|
| Sampler Relinquished: Eddie W Seay | Date: 4/12 Time: 1:15 | Received By: | Phone Result ☐ Yes ☐ No Additional Fax #: |
| Relinquished By: | Date: Time: | Received By: (Lab Staff) | Fax Results: ☐ Yes ☐ No |
| Delivered By: (Circle One) UPS - Fed Ex - Bus - Other: | | Sample Condition: Cool ☐ Yes ☐ No; Intact ☐ Yes ☐ No | CHECKED BY: (Initials) |

REMARKS: Samples for closure

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
EDDIE SEAY CONSULTING
ATTN: EDDIE SEAY
601 W. ILLINOIS
HOBBS, NM 88240
FAX TO:

Receiving Date: 04/09/98
Reporting Date: 04/14/98
Project Owner: PAUL PRATHER
Project Name: P&S BRINE BW007
Project Location: JAL, NM

Sampling Date: 04/09/98
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: JS
Analyzed By: BC

| LAB NUMBER | SAMPLE ID | TPH (mg/L) | Cl (mg/L) | BENZENE (mg/L) | TOLUENE (mg/L) | ETHYL BENZENE (mg/L) | TOTAL XYLENES (mg/L) |
|---|---|---|---|---|---|---|---|
| ANALYSIS DATE: | | 04/10/98 | 04/10/98 | 04/09/98 | 04/09/98 | 04/09/98 | 04/09/98 |
| H3570-2 | FLUID FROM BRINE PIT | 16.3 | 267000 | <0.002 | <0 .002 | <0.002 | <0.006 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Quality Control | | 202 | 472 | 0.098 | 0.094 | 0.094 | 0.287 |
| True Value QC | | 200 | 500 | 0.100 | 0.100 | 0.100 | 0.300 |
| % Accuracy | | 101 | 94.4 | 97.7 | 93.9 | 93.8 | 95.6 |
| Relative Percent Difference | | 2.0 | 0.8 | 5.6 | 3.5 | 2.3 | 2.9 |

METHODS: TRPHC-EPA 600/4-79-020, 418.1;Cl-EPA 600/4-79-020 325.3 BTEX-EPA SW-846-8020

Burgess J.A. Cooke. Ph. D.

4/14/98
Date

PLEASE NOTE: **Liability and Damages.** **Cardinal's** liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by **Cardinal** within thirty (30) days after completion of the applicable service. In no event shall **Cardinal** be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by **Cardinal**, regardless of whether such claim is based upon any of the above-stated reasons or otherwise.

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
EDDIE SEAY CONSULTING
ATTN: EDDIE W. SEAY
601 W. ILLINOIS
HOBBS, NM 88240
FAX TO:

Receiving Date: 04/09/98
Reporting Date: 04/15/98
Project Owner: PAUL PRATHER
Project Name: P&S BRINE BW007
Project Location: JAL, NM

Sampling Date: 04/09/98
Sample Type: GROUNDWATER
Sample Condition: INTACT
Sample Received By: JS
Analyzed By: AH

| LAB NUMBER | SAMPLE ID | P-Alkalinity (mg/L) | T-Alkalinity (mg/L) | Hardness (mg/L) | Chloride (mg/L) | Sulfates (mg/L) | pH (s.u.) |
|---|---|---|---|---|---|---|---|
| ANALYSIS DATE | | 4/13/98 | 4/13/98 | 04/13/98 | 04/13/98 | 04/13/98 | 04/14/98 |
| H3570-1 | FRESH WATER | 0 | 180 | 260 | 56 | 111 | 7.38 |
| | WELL | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Quality Control | | NR | NR | NR | 472 | 91.0 | 7.07 |
| True Value QC | | NR | NR | NR | 500 | 83.0 | 7.00 |
| % Accuracy | | NR | NR | NR | 94.4 | 99 | 101 |
| Relative Percent Difference | | NR | NR | NR | 0.8 | 0.5 | 1.4 |
| METHODS: | EPA 600/4-79-020, | - | - | 130.2 | 325.3 | 375.4 | 150.1 |
| | Standard Method | 2320 B | 2320 B | - | - | - | - |

| LAB NUMBER | SAMPLE ID | Hydroxides (mg/L) | Carbonates (mg/L) | Bicarbonates (mg/L) | Conductivity (umhos/cm) | TDS (mg/L) |
|---|---|---|---|---|---|---|
| ANALYSIS DATE | | 4/13/98 | 04/13/98 | 04/13/98 | 04/14/98 | 04/13/98 |
| H3570-1 | FRESH WATER | 0 | 0 | 220 | 764 | 342 |
| | WELL | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Quality Control | | NR | NR | NR | 1445 | NR |
| True Value QC | | NR | NR | NR | 1413 | NR |
| % Accuracy | | NR | NR | NR | 102 | NR |
| Relative Percent Difference | | NR | NR | NR | 0.3 | NR |
| METHODS: | EPA 600/4-79-020, | - | - | - | 120.1 | 160.1 |
| | Standard Method | 2320 B | 2320 B | 2320 B | - | - |

Gayle A. Potter, Chemist

04/15/98
Date

PLEASE NOTE: **Liability and Damages**. **Cardinal's** liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by **Cardinal** within thirty (30) days after completion of the applicable service. In no event shall **Cardinal** be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by **Cardinal**, regardless of whether such claim is based upon any of the above-stated reasons or otherwise.

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

# OIL CONSERVATION DIVISION

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

Form C-103
Revised 1-1-89

WELL API NO.

5. Indicate Type of Lease STATE [X] FEE [ ]

6. State Oil & Gas Lease No. M-14474

## 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.)

7. Lease Name or Unit Agreement Name: Arnott Ramsey State

1. Type of Well: OIL WELL [ ] GAS WELL [ ] OTHER Brine well

2. Name of Operator: P & S Brine Sales

8. Well No. 6

3. Address of Operator: P.O. Box Drawer 1769 Eunice, NM

9. Pool name or Wildcat: Salt Section

4. Well Location
Unit Letter P : 581 Feet From The South Line and 93 Feet From The East Line

Section 16 Township 25 Range 37 NMPM Lea County

10. Elevation (*Show whether DF, RKB, RT, GR, etc.*)

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 | [X] | 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.

Well presently has a cast iron bridge plug set at 1000 ft.
Notify OCD before commencing.

1) Rig up unit.
2) Pressure test casing to 500#
3) Run in hole with 2 3/8" tubing to 1000 ft. and circulate cement to surface.
4) Install dry hole marker, cut anchors and clean location.

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

SIGNATURE Eddie W. Seay TITLE Agent DATE 4-6-98

TYPE OR PRINT NAME Eddie W. Seay TELEPHONE NO. 392-2236

(This space for State Use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

March 16, 1998

**Certified Mail**
**Return Receipt No. P-288-259-046**

Mr. Paul Prather
P&S Brine Sales
P.O. Box 7169
Eunice, New Mexico 88231

**RE: Discharge Plan BW-007 Closure**
**Brine Extraction Facility**
**Lea County, New Mexico**

Dear Mr. Prather:

The New Mexico Oil Conservation Division (OCD) has reviewed the Eddie Seay Consulting Services plan dated February 24, 1998 for closure of the brine extraction portion of the Jal Brine Station. The plan was submitted on behalf of Mr. Paul Prather. It contains Mr Prather's plan for closure of the brine extraction portion of the Jal Brine Station with continued use of the fresh water well and brine storage pit for fresh water sales.

The above referenced plan is approved with the following conditions:

1. Pursuant to Rule 202, OCD approval will be obtained from the OCD Hobbs District Office prior to plugging and abandonement. Approval will be requested on OCD Form C-103 "Sundry Notices and Reports on Wells" (OCD Rule 1103.A.).

2. The soils beneath all tanks that will be removed will be sampled for BTEX, TPH, and chlorides with results submitted to the OCD Santa Fe Division Office and the OCD Hobbs District Office by April 20, 1998.

3. All liquids and solids removed from the lined brine storage pit will be sampled for BTEX and TPH prior to disposal at an OCD approved site. Sample results shall be submitted to the OCD Santa Fe Division Office and the OCD Hobbs District Office by April 20, 1998.

4. If the lined brine storage pit is found to be leaking or contains any hydrocarbons, Mr. Prather will submit a remediation plan to the OCD Santa Fe Division Office with a copy to the OCD Hobbs District Office.

5. The remaining fresh water well will be sampled for major cations and anions with results submitted to the OCD Santa Fe Division Office and the OCD Hobbs District Office by April 20, 1998.

6. Mr. Prather will notify the OCD Hobbs District Office at least 72 hours in advance of all activities.

7. Upon completion of plugging and clean up restoration operations as required, Mr. Prather shall contact the OCD Hobbs District Office to arrange for an inspection of the well and location.

8. Within thirty days after completing all required restoration work, Mr. Prather shall file with the OCD Hobbs District Office, in triplicate, a record of the work done on Form C-103 as provided in Rule 1103. Mr. Prather shall also file with the OCD Santa Fe Division Office a final report to close out discharge plan BW-007. It shall contain a description of all activities. Final closure of discharge plan BW-007 will be issued upon review of all necessary reports.

9. The OCD shall not approve the record of plugging or release any bonds until all necessary reports have been filed and the location has been inspected and approved by the OCD.

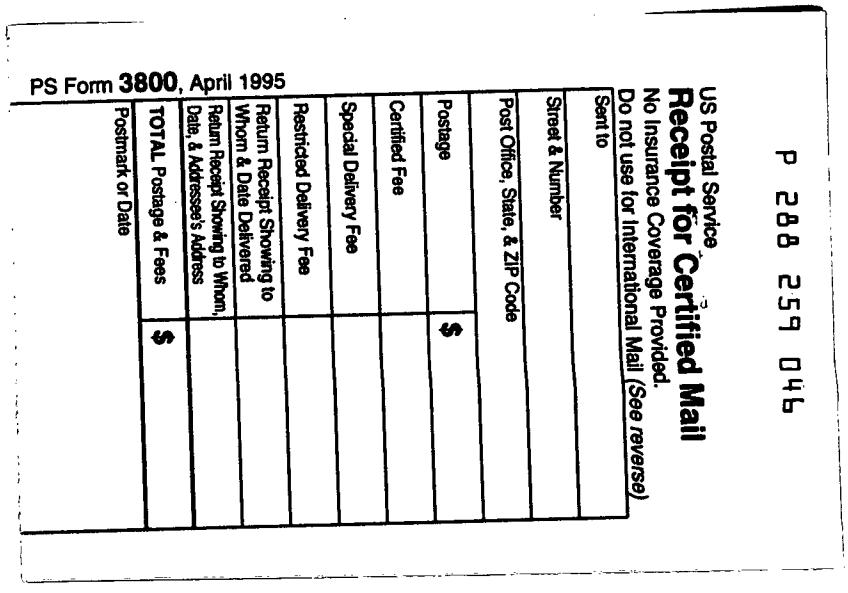
Please be advised that OCD approval does not relieve Mr. Prather of liability if contamination exists which is beyond the scope of the closure plan or if the activities fail to adequately determine the extent of contamination related to Mr. Prather's activities. In addition, OCD approval does not relieve Mr. Prather of responsibility for compliance with any other federal, state or local laws and/or regulations.

If you have any questions, please feel free to contact me (505) 827-7155.

Sincerely,

Mark Ashley
Geologist

xc: OCD Hobbs Office
Eddie Seay Consulting
601 W. Illinois
Hobbs, New Mexico 88240

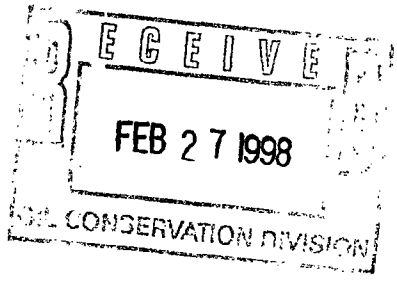


601 W. ILLINOIS
HOBBS, NEW MEXICO 88240
(505) 392-2236
FAX (505) 392-6949

# EDDIE SEAY CONSULTING

ENVIRONMENTAL,
GEOLOGICAL & REGULATORY
SPECIALISTS

PEAK
CONSULTING SERVICES




February 24, 1998

EMNRD - OCD Environmental Bureau
2040 S. Pacheco Street
Santa Fe, NM 87505
ATTN: Mark Ashley

RE: Discharge Plan BW-007
Lea Co., NM

Dear Mr. Ashley:

It is the wish of my client, Mr. Prather, to not renew the discharge plan, but to close the brine portion of the facility and only sell fresh water. All brine portions of the facility will be removed, discontinued or P & A as OCD approves. Listed are the proposed closure activities we would like to do:

1) The brine well at present has a CIBP at bottom of casing. The casing will be tested as per OCD rules and if test passes, the well will be filled from top to bottom with class C cement. Wellhead will be cut off and dry hole marker erected. Anchors will be cut and location cleaned.

2) Any tanks associated with brine storage will be removed. The soils around area will be tested for chloride content and will be picked up and disposed of at an OCD approved facility.

3) The lined brine storage pit will be vacuumed clean and all salt residue removed. The liner will be inspected and the leak detection sump will be inspected. The lined pit would then be filled with fresh water and used in the fresh water sales operations.

4) The fresh water well which is on this location, will be tested. A final report of work done will be submitted to OCD.

If you have any questions or need additional information, please call.

Sincerely,

Eddie W. Seay, Agent

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

February 5, 1998

Certified Mail
Return Receipt No. P-288-259-013

Mr. Paul Prather
P&S Brine Sales
P.O. Box 7169
Eunice, New Mexico 88231

**RE: Discharge Plan BW-007 Renewal**
**Brine Extraction Facility**
**Lea County, New Mexico**

Dear Mr. Prather:

On February 4, 1998 the New Mexico Oil Conservation Division (OCD) disapproved the P&S Brine Sales (P&S) discharge plan application to convert the existing Class II brine well (BW-007) to a Class I cavern disposal well (UIC-CLI-006). Since the Class I application has been disapproved, P&S must either renew or close the brine extraction discharge plan (BW-007) pursuant to Water Quality Control Commission (WQCC) Regulations.

P&S has until March 9, 1998 to respond to the OCD with one of the following options:

1. Renew the discharge plan by submitting the original discharge plan renewal application and one copy to the OCD Santa Fe Division Office along with a discharge plan fee of $740. A copy of the discharge plan renewal application is to be submitted to the OCD Hobbs District Office. Please make all checks payable to: NMED-Water Quality Management.

2. Close the discharge plan by submitting a closure plan that includes, at a minimum, a description of closure measures, maintenance and monitoring plans, and post-closure maintenance and monitoring. Please submit the original closure plan and one copy to the OCD Santa Fe Division Office and one copy to the OCD Hobbs District Office. The OCD must approve of the closure plan prior to the beginning of closure activities.

If you have any questions, please feel free to contact me (505) 827-7155.

Sincerely,

Mark Ashley
Geologist
xc: OCD Hobbs Office

To ....Mark..Ashley.....

**From**

DONNA PITZER

***Energy & Minerals Department***
OIL CONSERVATION DIVISION
P O Box 1980
Hobbs NM 88241

**Telephone Number** (505) 393-6161

- ☐ **For Your Files**
- ☐ **Prepare a Reply for My Signature**
- ☐ **For Your Review and Return**
- ☐ **For Your Information**
- ☑ **For Your Handling**
- ☐ **For Your Approval**
- ☐ **As Per Your Request**
- ☐ **For Your Signature**
- ☑ **Please Advise**
- ☐ **For Your Attention**

Do you have a record of a Brine Well at this Location. Please send us a copy of your well file. Thanks

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

February 5, 1998

**Certified Mail**
**Return Receipt No. P-288-259-013**

Mr. Paul Prather
P&S Brine Sales
P.O. Box ~~7169~~ 1069
Eunice, New Mexico 88231

**RE: Discharge Plan BW-007 Renewal**
**Brine Extraction Facility**
**Lea County, New Mexico**

Dear Mr. Prather:

On February 4, 1998 the New Mexico Oil Conservation Division (OCD) disapproved the P&S Brine Sales (P&S) discharge plan application to convert the existing Class II brine well (BW-007) to a Class I cavern disposal well (UIC-CLI-006). Since the Class I application has been disapproved, P&S must either renew or close the brine extraction discharge plan (BW-007) pursuant to Water Quality Control Commission (WQCC) Regulations.

P&S has until March 9, 1998 to respond to the OCD with one of the following options:

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2. Close the discharge plan by submitting a closure plan that includes, at a minimum, a description of closure measures, maintenance and monitoring plans, and post-closure maintenance and monitoring. Please submit the original closure plan and one copy to the OCD Santa Fe Division Office and one copy to the OCD Hobbs District Office. The OCD must approve of the closure plan prior to the beginning of closure activities.

If you have any questions, please feel free to contact me (505) 827-7155.

Sincerely,

Mark Ashley
Geologist
xc: OCD Hobbs Office

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

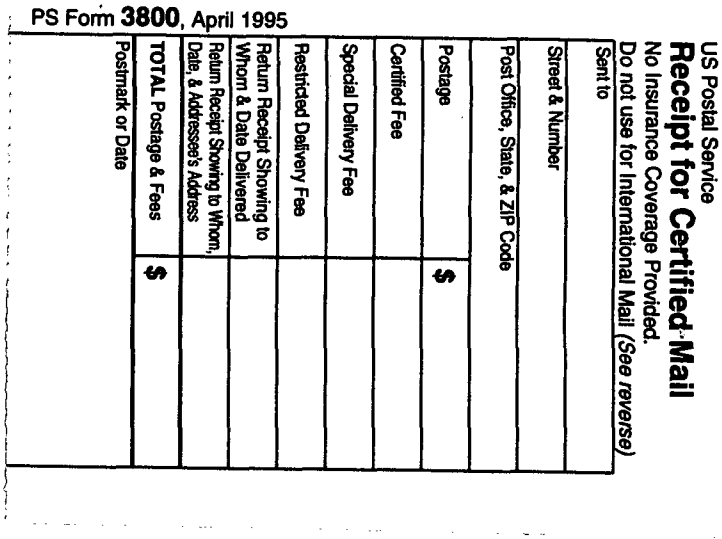
OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

February 5, 1998

**Certified Mail**
**Return Receipt No. P-288-259-013**

Mr. Paul Prather
P&S Brine Sales
P.O. Box 7169
Eunice, New Mexico 88231

**RE: Discharge Plan BW-007 Renewal**
**Brine Extraction Facility**
**Lea County, New Mexico**


PS Form 3800, April 1995

US Postal Service
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TOTAL Postage & Fees $
Postmark or Date

P 288 259 013

Dear Mr. Prather:

On February 4, 1998 the New Mexico Oil Conservation Division (OCD) disapproved the P&S Brine Sales (P&S) discharge plan application to convert the existing Class II brine well (BW-007) to a Class I cavern disposal well (UIC-CLI-006). Since the Class I application has been disapproved, P&S must either renew or close the brine extraction discharge plan (BW-007) pursuant to Water Quality Control Commission (WQCC) Regulations.

P&S has until March 9, 1998 to respond to the OCD with one of the following options:

1. Renew the discharge plan by submitting the original discharge plan renewal application and one copy to the OCD Santa Fe Division Office along with a discharge plan fee of $740. A copy of the discharge plan renewal application is to be submitted to the OCD Hobbs District Office. Please make all checks payable to: NMED-Water Quality Management.

2. Close the discharge plan by submitting a closure plan that includes, at a minimum, a description of closure measures, maintenance and monitoring plans, and post-closure maintenance and monitoring. Please submit the original closure plan and one copy to the OCD Santa Fe Division Office and one copy to the OCD Hobbs District Office. The OCD must approve of the closure plan prior to the beginning of closure activities.

If you have any questions, please feel free to contact me (505) 827-7155.

Sincerely,

Mark Ashley
Geologist
xc: OCD Hobbs Office

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

November 24, 1997

Mr. Paul Prather
P&S Brine Sales
P.O. Box 7169
Eunice, New Mexico 88231

RE: Mechanical Integrity Testing of Brine Supply Wells

Dear Mr. Paul Prather:

Enclosed is a copy of the mechanical integrity test conducted on your brine well. Please retain this copy for your records.

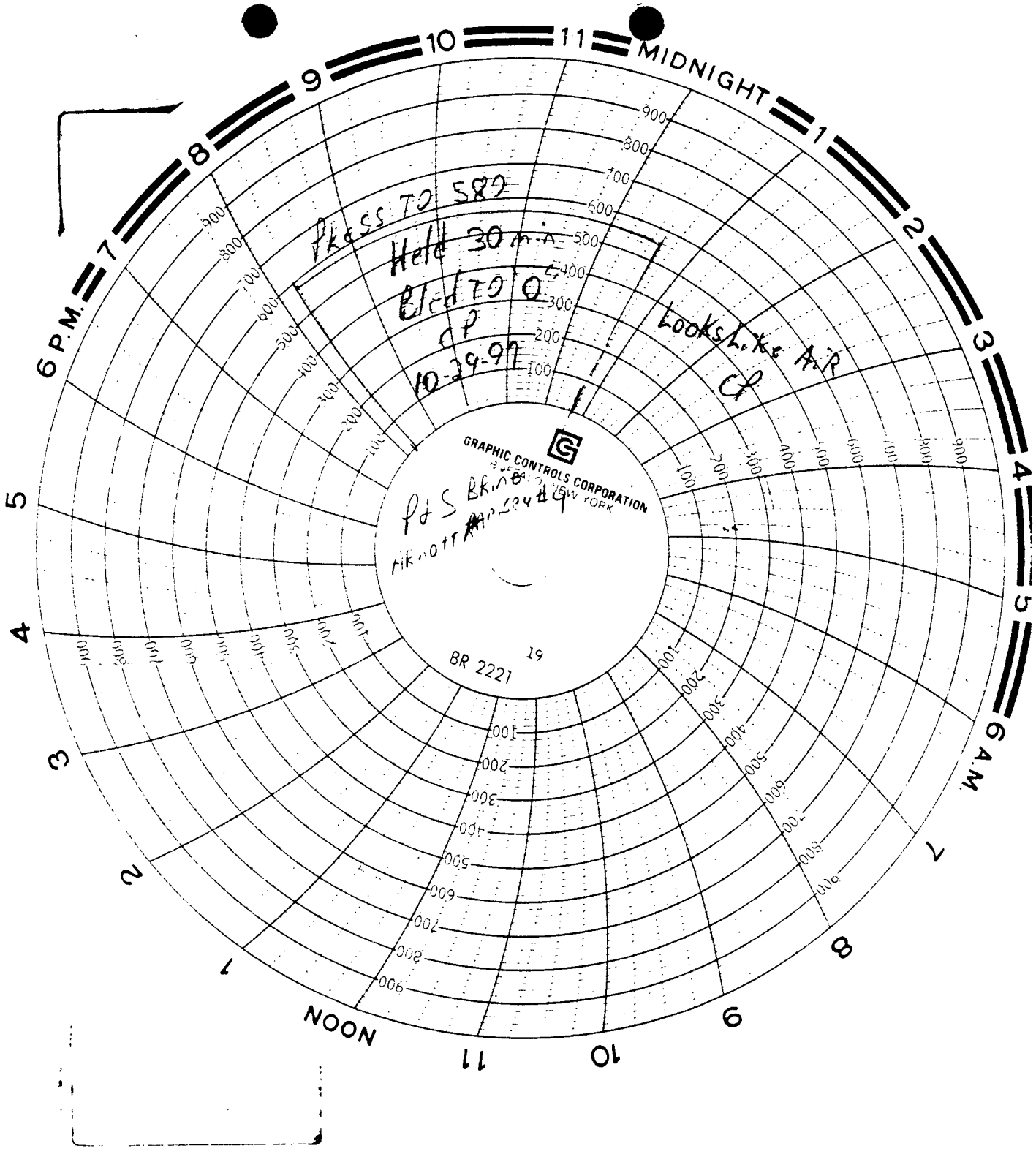
As a condition of discharge plan approval, all brine facilities are required to submit a quarterly report listing, by month, the volumes of fluids injected and produced. The New Mexico Oil Conservation Division (OCD) has not received any quarterly reports for the Eunice or the Jal brine stations. Please update all delinquent quarterly reports by January 26, 1997.

On behalf of the OCD, I would like to thank you for your time and cooperation during the testing. If you have any questions, please contact me at (505) 827-7155.

Sincerely,

Mark Ashley
Geologist

Attachment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GRAPHIC CONTROLS CORPORATION
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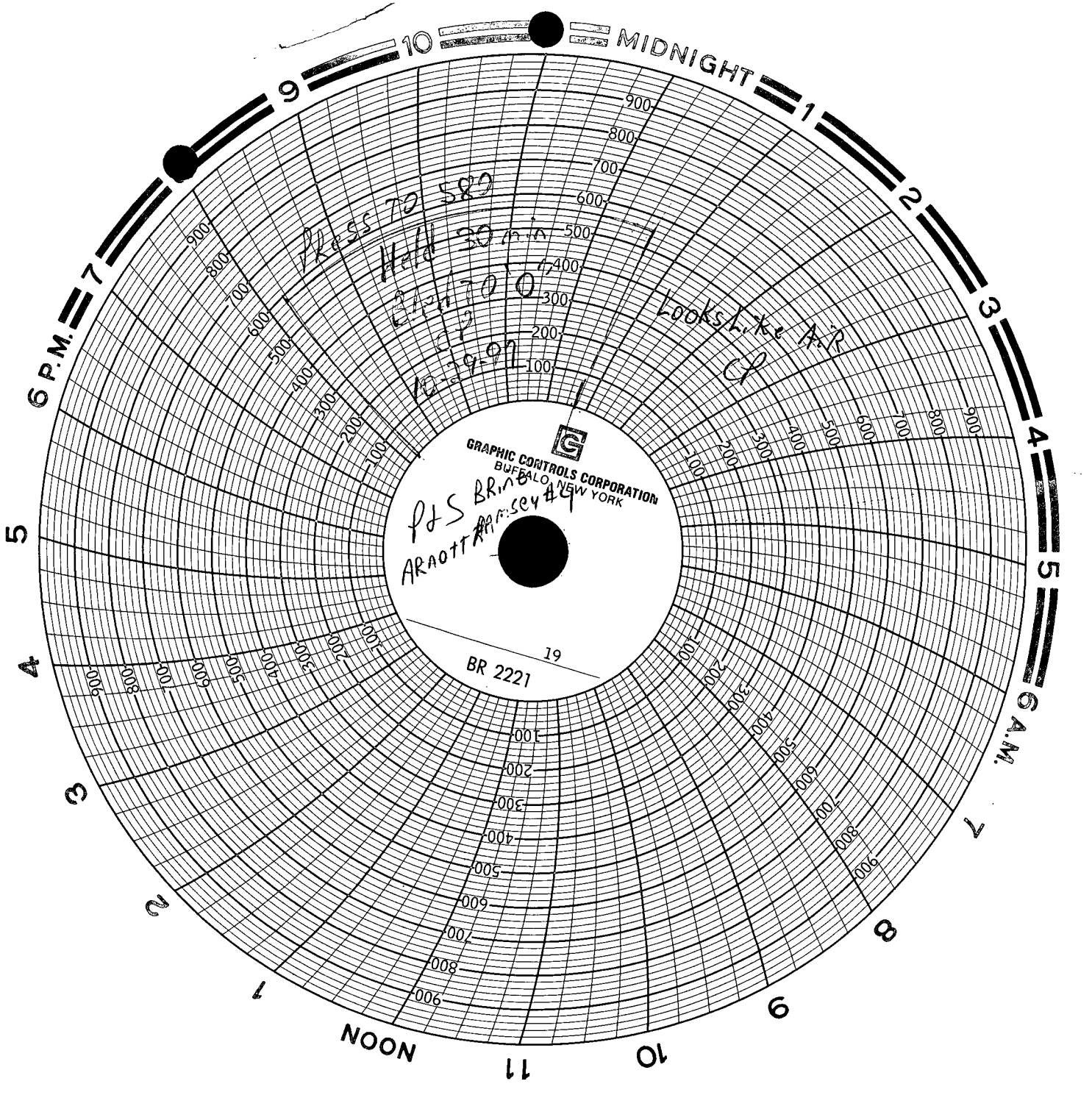
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NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

August 12, 1997

**Certified Mail**
**Return Receipt No. P-288-258-950**

Mr. Paul Prather
P&S Brine Sales
P.O. Box 7169
Eunice, New Mexico 88231

**RE: Mechanical Integrity Testing of Brine Supply Wells**

| | |
|---|---|
| **Annual Test** | **Discharge Plan Renewal Test** |
| **Eunice Brine Station BW-002** | **Jal Brine Station BW-007** |
| **Lea County, New Mexico** | **Lea County, New Mexico** |

Dear Mr. Prather:

The Underground Injection Control Program of the Federal Safe Drinking Water Act requires that operators demonstrate mechanical integrity of all injection wells by ensuring that there are no leaks in the tubing, casing, or packer, and that the injected fluid is confined within the injection zone through proper cementing.

All brine wells that operate without a packer will be required to have an annual open hole pressure test equal to 1.5 times the normal operating pressure or 300 psi, whichever is greater, for four hours with a maximum of 10 percent bleed-off allowed. Every five years or at the time of discharge plan renewals they will be required to have an open hole pressure test equal to 1.5 times the normal operating pressure or 300 psi, whichever is greater, for four hours with zero bleed-off.

All brine wells that operate with a packer will be required to have an annual casing/tubing annulus pressure test equal to 300 psi for 30 minutes.

Operators will be responsible for providing equipment and shall bear all costs incurred. The date and time of all tests will be scheduled and witnessed by the New Mexico Oil Conservation Division.

Please have the Eunice Brine Station ready for testing on September 17, 1997 at 7:00 AM, and the Jal Brine Station ready for testing on September 17, 1997 at 8:30 AM as outlined below.

For brine wells operating without a packer:

1) The cavern must be pressured up and stabilized for a period of at least 24 hours prior to testing.

2) The system shall be tested to 1.5 times the normal operating pressure or 300 psi, whichever is greater, for a period of four hours. A maximum of 10 percent bleed-off will be allowed for annual tests. Testing conducted every five years or at the time of discharge plan renewal will have zero bleed-off.

3) A continuous recording pressure chart with an 8 hour clock shall be installed on the casing/tubing annulus. The pressure range shall not be greater than 1,000 psi.

4) Have well head prepared for test. All valves should be in good working order.

5) All gauges shall be in good working order.

6) Have manpower and equipment available for pressure test.

For brine wells operating with a packer:

1) Have the casing/tubing annulus and tubing loaded with inert fluid prior to testing.

2) The casing/tubing annulus shall be tested to 300 psi for 30 minutes.

3) A continuous recording pressure chart with an 8 hour clock shall be installed on the casing/tubing annulus. The pressure range shall not be greater than 1,000 psi.

4) Have well head prepared for test. All valves should be in good working order.

5) All gauges shall be in good working order.

6) Have manpower and equipment available for pressure test.

If you have any questions regarding this matter, please feel free to contact me at (505) 827-7155.

Sincerely,

Mark Ashley
Geologist

PS Form **3800**, April 1995

US Postal Service
**Receipt for Certified Mail**
No Insurance Coverage Provided.
Do not use for International Mail *(See reverse)*

P 288 258 950

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| Sent to | |
| Street & Number | |
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| Postage | $ |
| Certified Fee | |
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| Restricted Delivery Fee | |
| Return Receipt Showing to Whom & Date Delivered | |
| Return Receipt Showing to Whom, Date, & Addressee's Address | |
| TOTAL Postage & Fees | $ |
| Postmark or Date | |

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

# MEMORANDUM OF MEETING OR CONVERSATION

| ☒ Telephone ☐ Personal | Time | Date 8-20-96 |
|---|---|---|

| Originating Party | Other Parties |
|---|---|
| EDDIE SEAY | MARK ASHLEY |

Subject P+S BRINE - JAL

Discussion P+S HAS SUBMITTED AN APPLICATION TO CONVERT THEIR BRINE FACILITY INTO A CLASS I CAVERN DISPOSAL WELL. THEY WOULD LIKE TO HAVE PERMISSION POSTPONE THE SCHEDULED 1996 MIT & DT REVIEW AND MAKE THEM BOTH PART OF THE NEW CLASS I PERMIT.

Conclusions or Agreements

WE WILL ALLOW THEIR PROPOSAL UNTIL THE CLASS I PERMIT IS APPROVED

Distribution

Signed Mark Ashley

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

August 16, 1996

Certified Mail
Return Receipt No. P-288-258-827

Mr. Paul Prather
P&S Brine Sales
P.O. Box 7169
Eunice, New Mexico 88231

**RE: Mechanical Integrity Testing of Brine Supply Wells**

| | |
|---|---|
| **Annual Test** | **Annual Test** |
| **Jal Brine Station BW-007** | **Eunice Brine Station BW-002** |
| **Lea County, New Mexico** | **Lea County, New Mexico** |

Dear Mr. Prather:

The Underground Injection Control Program of the Federal Safe Drinking Water Act requires that operators demonstrate mechanical integrity of all injection wells by ensuring that there are no leaks in the tubing, casing, or packer, and that the injected fluid is confined within the injection zone through proper cementing.

All brine wells that operate without a packer will be required to have an annual open hole pressure test equal to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for four hours with a maximum of 10 percent bleed-off allowed. Every five years or at the time of discharge plan renewals they will be required to have an open hole pressure test equal to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for four hours with zero bleed-off.

All brine wells that operate with a packer will be required to have an annual casing/tubing annulus pressure test equal to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for four hours.

Operators will be responsible for providing equipment and shall bear all costs incurred. The date and time of all tests will be scheduled and witnessed by the New Mexico Oil Conservation Division.

Please have the Eunice Brine Station ready for testing on September 19, 1996 at 8:00 AM, and the Jal Brine Station ready for testing on September 19, 1996 at 9:00 AM as outlined below.

For brine wells operating without a packer:

1) The cavern must be pressured up and stabilized for a period of at least 24 hours prior to testing.

2) The system shall be tested to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for a period of four hours. A maximum of 10 percent bleed-off will be allowed for annual tests. Testing conducted every five years or at the time of discharge plan renewal will have zero bleed-off.

3) A continuous recording pressure chart with an 8 hour clock shall be installed on both the casing/tubing annulus and tubing. The pressure range shall not be greater than 1,000 psig.

4) Have well head prepared for test. All valves should be in good working order. All casing/tubing annulus and tubing valves shall be open.

5) All gauges shall be in good working order.

6) Have manpower and equipment available for pressure test.

For brine wells operating with a packer:

1) Have the casing/tubing annulus and tubing loaded with inert fluid prior to testing.

2) The casing/tubing annulus shall be tested to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for four hours.

3) A continuous recording pressure chart with an 8 hour clock shall be installed on the casing/tubing annulus. The pressure range shall not be greater than 1,000 psig.

4) Have well head prepared for test. All valves should be in good working order.

5) All gauges shall be in good working order.

6) Have manpower and equipment available for pressure test.

If you have any questions regarding this matter, please feel free to contact me at (505) 827-7155.

Sincerely,

Mark Ashley
Geologist

P 288 258 827

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| Return Receipt Showing to Whom, Date, & Addressee's Address | |
| TOTAL Postage & Fees | $ |
| Postmark or Date | |

PS Form **3800**, April 1995

**ACKNOWLEDGEMENT OF RECEIPT OF CHECK/CASH**

I hereby acknowledge receipt of check No. 1162 dated 4/8/92,

or cash received on 4/13/92 in the amount of $ 690.00

from P+S BRINE SALES

for P+S JAL (Facility Name) BW-7 (DP No.)

Submitted by: [signature] Date: 4/13/92

Submitted to ASD by: _____ Date: _____

Received in ASD by: [signature] Date: 4/13

Filing Fee ___ New Facility ___ Renewal X

Modification ___ Other _____ (specify)

Organization Code 521.07 Applicable FY 80

To be deposited in the Water Quality Management Fund.

Full Payment X or Annual Increment ___

---

LeaCounty State Bank
P.O. Box 400 • Hobbs, New Mexico 88241

P & S BRINE SALES
P. O. BOX 1769
EUNICE, NM 88231

1162

95-183/1122

4-8 19 92

Pay to the order of NMED - Water Quality Management $ 690.00

Six Hundred Ninety dollars and NO/100 Dollars

YOUR ENDORSEMENT ON THIS CHECK ACKNOWLEDGES PAYMENT ON THE FOLLOWING ACCOUNT(S).

| | | | |
|---|---|---|---|
| (Jal) | Discharge Plan BW-7 Flat Fee | | |
| | | | |
| | | | |

R. Suzanne McReynolds

⑈000 1162⑈ ⑆122018361⑆ 0558 1001⑈

Rocky Mountain Bank Note G

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

March 30, 1992

CERTIFIED MAIL
RETURN RECEIPT NO. P-670-683-510

Mr. Paul Prather
P & S Brine Sales, Inc.
P. O. Box 1769
Eunice, New Mexico 88231

**RE: Approval of Discharge Plan BW-7**
**P & S Brine Sales Jal Station**
**Lea County, New Mexico**

Dear Mr. Prather:

The **discharge plan renewal BW-7 for P & S Brine Sales Jal Station** located in the SE/4 SE/4, Section 16, Township 25 South, Range 37 East, NMPM, Lea County, New Mexico, **is hereby approved** under the conditions contained in the enclosed attachment. The renewal application consists of the original discharge plan as approved December 18, 1982; and renewal of the discharge plan approved May 21, 1986; the renewal application dated September 17, 1991; and the materials dated January 2, 1992, submitted as supplements to the application.

The discharge plan renewal was submitted pursuant to Section 5-101.B.3 of the New Mexico Water Quality Control Commission Regulations. It is approved pursuant to Sections 5-101.A and 3-109.C. Please note Sections 3-109.E and 3-109.F which provide for possible future amendments or modifications of the plan. Please be advised that the approval of this plan does not relieve you of liability should your operation result in actual pollution of surface water, ground water, or the environment which may be actionable under other laws and/or regulations.

The monitoring and reporting shall be as specified in the enclosed attachment. Please note that Section 3-104 of the regulations requires that "When a plan has been approved, discharges must be consistent with the terms and conditions of the plan." Pursuant to Section 3-107.C you are required to notify the Director of any facility expansion, production increase, or process modification that would result in any change in the discharge of water quality or volume.

Pursuant to Section 3-109.G.4, this plan is for a period of five (5) years. This approval will expire March 30, 1997, and you should submit an application for renewal in ample time before this date. Note that under Section 5-101.G of the regulations, if a discharger submits a discharge plan renewal application at least 180 days before the discharge plan expires and is in compliance with the approved plan, then the existing discharge plan will not expire until the application for renewal has been approved or disapproved.

The discharge plan renewal application for the P & S Brine Sales Jal Station is subject to the WQCC Regulation 3-114 discharge plan fee. Every billable facility submitting a discharge plan renewal will be assessed a fee equal to the filing fee of fifty (50) dollars plus one-half of the flat fee or six-hundred and ninety (690) dollars.

The OCD has received your $50 filing fee. The flat fee for an approved discharge plan may be paid in a single payment due at the time of approval, or in equal annual installments over the duration of the discharge plan, with the first payment due at the time of approval. The flat fee (total payment or installment) is due upon receipt of this letter.

Please make all checks out to the **NMED - Water Quality Management** and send to the OCD Santa Fe Office.

On behalf of the staff of the Oil Conservation Division, I wish to thank you and your staff for your cooperation during this discharge plan review.

Sincerely,

William J. LeMay
Director

WJL/kmb

Attachment

cc: Chris Eustice - OCD Hobbs Office

**ATTACHMENT TO DISCHARGE PLAN BW-7 APPROVAL**
**P & S BRINE SALES JAL STATION**
**MONITORING AND REPORTING REQUIREMENTS**
(March 30, 1992)

1. Payment of Discharge Plan Fees: The $690 flat fee (either total payment or installment) will be paid upon receipt of this approval letter.

2. Mechanical Integrity Testing: An annual mechanical integrity test (MIT) will be conducted on the brine well and the results submitted to the OCD Santa Fe Office. Since an MIT isolating the casing from the formation was conducted in December 1991, this test is not required until your discharge plan is up for renewal in 5 years.

3. Injection/Production Volumes: A quarterly report will be submitted listings of the volume of fluids injected and produced beginning with first quarter (Jan.-March) 1992. The report will be submitted to the OCD Santa Fe Office at the end of each quarter.

4. Monitor Well Inspections: The monitor well will be checked at a minimum of monthly. The date of inspection, results, and inspectors initials well be recorded and submitted annually to the OCD Santa Fe Office.

5. Containment of Spills: Adequate containment will be maintained around all brine loading valves. The containment will be inspected and maintained to prohibit leaks, spills and overflows. Berms will be maintained around all tanks (other than freshwater) to contain one-third greater than the volume of the largest tank or all interconnected tanks.

6. Sump Inspection: The sump that collects spilled brine at the loading area will be cleaned out and visually inspected on an annual basis. Any new sumps or below-grade tanks will be approved by the OCD prior to installation.

State of New Mexico
Energy, Minerals and Natural Resources Department
OIL CONSERVATION DIVISION
P.O. Box 2088
Santa Fe, NM 87501

RECEIVED
JAN 21 1992
OIL CONSERVATION DIVISION
SANTA FE

# *DISCHARGE PLAN APPLICATION FOR BRINE EXTRACTION FACILITIES*

*(Refer to OCD Guidelines for assistance in completing the application.)*

☐ NEW ☒ RENEWAL

I. FACILITY NAME: P & S Brine Sales BW-7

II. OPERATOR: P & S Brine

ADDRESS: P.O. Box 1768 Eunice, NM 88231

CONTACT PERSON: Paul Prather PHONE: 394-2545

III. LOCATION: SE /4 SE /4 Section 16 Township 25-S Range 37-E
*Submit large scale topographic map showing exact location.*

IV. Attach the name and address of the landowner of the facility site.
The State of New Mexico

V. Attach a description of the types and quantities of fluids at the facility.

VI. Attach a description of all fluid transfer and storage and fluid and solid disposal facilities.

VII. Attach a description of underground facilities (i.e. brine extraction well).

VIII. Attach a contingency plan for reporting and clean-up of spills or releases.

IX. Attach geological/hydrological evidence demonstrating that brine extraction operations will not adversely impact fresh water.

X. Attach such other information as is necessary to demonstrate compliance with any other OCD rules, regulations and/or orders.

XI. CERTIFICATION

*I hereby certify under penalty of law that I have personnaly examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.*

Name: Paul Prather Title: Owner

Signature: Paul Prather Date: 1-2-92

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

DISCHARGE PLAN RENEWAL

1. Will adhere to OCD Rule 116 and WQQC Rule 5-208 as indicated, and file appropriate forms on same. (Attachment 1)

2. P & S Brine chose to pull tubing, run packer to base of casing and pressure test casing. The chart is enclosed. Test was witnessed by Mr. Ray Smith of the OCD. Well tested good. (Attachment 2)

   The only buried line from well to brine pit approx. 300 ft. long; 2 1/2" PVC Schedule 40, 8 yrs. old.

3. P & S has no record of production prior to purchasing brine facility. Production since acquiring facility is listed within. (Attachment 3)

   P & S would like to file production records quarterly, starting March - June - Sept. - Dec., if this is agreeable to OCD.

4. The brine storage pond was installed according to OCD specs. at that time, with the bottom contoured at 4" drop per fifty feet. Also a sand pond was put down between the liner and caliche to prevent punctures and also to enhance the migration of a leak to the lateral. If a leak is detected, pond will be drained and repaired or a double liner installed.

   Since this is an older single liner pond, we feel that weekly inspection of the monitor well sump is warranted.

   A marker will be installed to keep 1 1/2 ft. freeboard on pond. Inspection log kept at brine station. (Attachment 4)

5. Copies of analysis for fresh water and brine are included. (Attachment 5)

   Samples were taken from the load lines at fresh water tank and brine pit.

6. According to information from OCD, Hobbs office, the frac pressure of the salt formation varies from 900 to 1100 psi.

   P & S Brine uses a 7 1/2 hp electric pump to circulate product. Maximum pressure for the pump is 180 psi, normal working pressure is 50 psi. Without changing complete operation, frac pressure will never be achieved.

7. Our normal operating procedure is to inject fresh water down casing and produce brine from tubing. It is necessary to backflush or reverse flow well to keep salt buildup in tubulars. Once a month for 24 hrs. will be adequate for our operation.

8. Spill containment and collecting system presently in use at the brine system is an underground steel vessel with a pump which has a water level shut off switch. When water runs into sump, the pump puts it back into the brine pit. This system was in use when P & S took operation. The driving area was contoured so spillage would drain to the sump and be pumped back into brine storage pit. P & S will clean out and inspect sump. Also have plans to revamp loading area and collection system when it becomes necessary. (Attachment 8)

9. Loading areas were installed with poly tubs to contain leaks and spills from loading. Also a PVC line was run from each tub to the sump to prevent overflow at loading tubs. Area has been cleaned up and maintained and will be kept maintained. (Attachment 9)

10. Bond renewal enclosed. (Attachment 10)

DISTRICT I
P.O.Box 1980, Hobbs, NM 88241-1980

DISTRICT II
P.O. Drawer DD, Artesia, NM 88211-0719

DISTRICT III
1000 Rio Brazos Rd, Aztec, NM 87410

State of New Mexico
Energy, Minerals and Natural Resources Department

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

SUBMIT 2 COPIES TO APPROPRIATE DISTRICT OFFICE IN ACCORDANCE WITH RULE 116 PRINTED ON BACK SIDE OF FORM

# NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

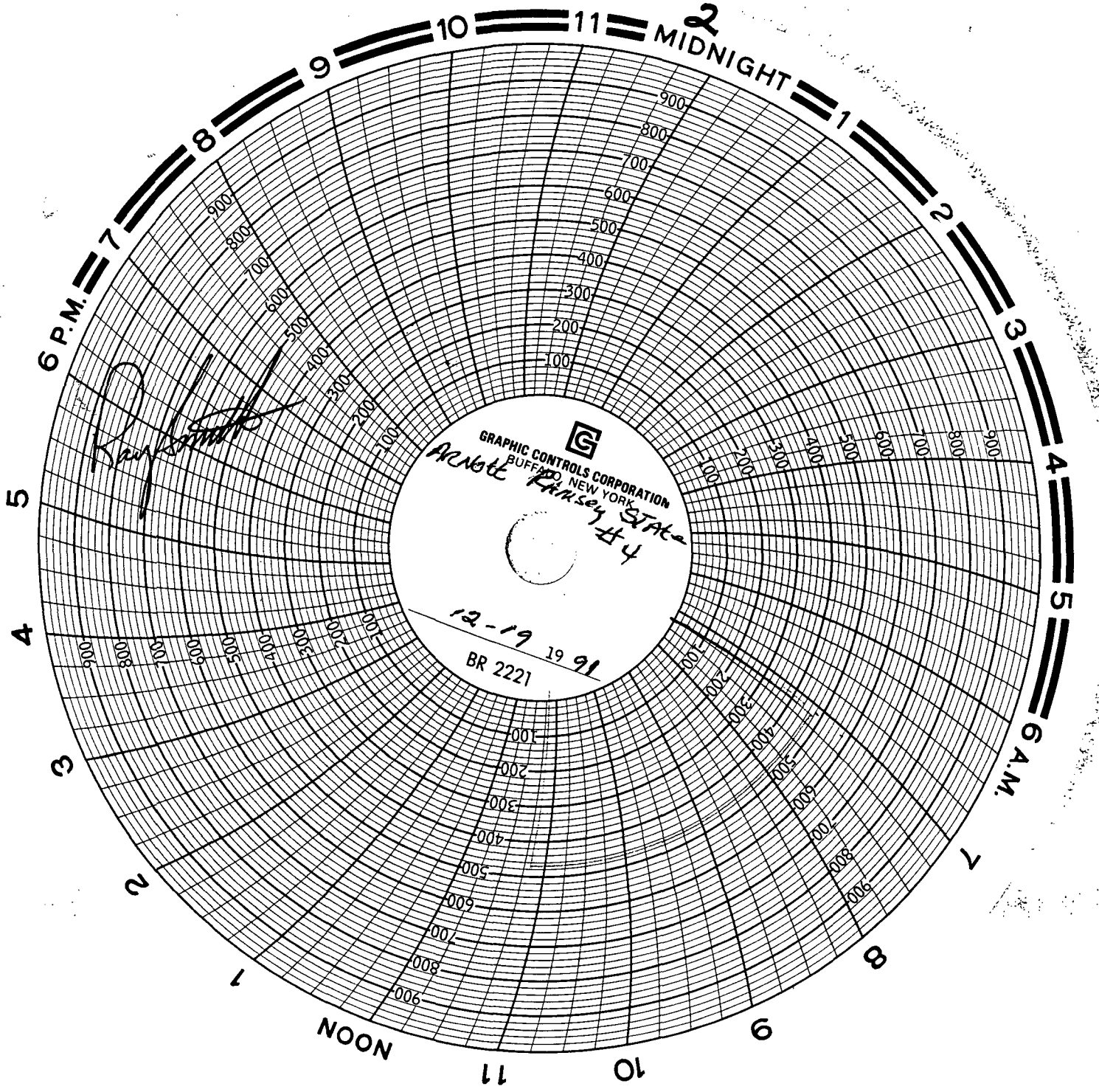
| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OPERATOR | | | | | | | | ADDRESS | | | | | TELEPHONE # |
| REPORT OF | FIRE | | BREAK | | SPILL | | LEAK | | BLOWOUT | | OTHER* | | |
| TYPE OF FACILITY | DRLG WELL | | PROD WELL | | TANK BTRY | | PIPE LINE | GASO PLNT | OIL RFY | | OTHER* | | |
| FACILITY NAME: | | | | | | | | | | | | | |
| LOCATION OF FACILITY Qtr/Qtr Sec. or Footage | | | | | | | | | SEC. | TWP. | RGE. | COUNTY | |
| DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK | | | | | | | | | | | | | |
| DATE AND HOUR OF OCCURRENCE | | | | | | | | DATE AND HOUR OF DISCOVERY | | | | | |
| WAS IMMEDIATE NOTICE GIVEN? | YES | NO | NOT REQUIRED | | IF YES, TO WHOM | | | | | | | | |
| BY WHOM | | | | | DATE AND HOUR | | | | | | | | |
| TYPE OF FLUID LOST | | | | | QUANTITY OF LOSS | | | VOLUME RECOVERED | | | | | |
| DID ANY FLUIDS REACH A WATERCOURSE? | YES | NO | QUANTITY | | | | | | | | | | |
| IF YES, DESCRIBE FULLY** | | | | | | | | | | | | | |
| DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN** | | | | | | | | | | | | | |
| DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN** | | | | | | | | | | | | | |
| DESCRIPTION OF AREA | FARMING | | GRAZING | | URBAN | | OTHER* | | | | | | |
| SURFACE CONDITIONS | SANDY | SANDY LOAM | CLAY | | ROCKY | | WET | | DRY | | SNOW | | |
| DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)** | | | | | | | | | | | | | |

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED | PRINTED NAME AND TITLE | DATE

*SPECIFY

**ATTACH ADDITIONAL SHEETS IF NECESSARY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GRAPHIC CONTROLS CORPORATION
BUFFALO, NEW YORK
Arnott Ramsey State
12-19 19 91
BR 2221

3

P & S BRINE
Jal Station

| Brine Production | Bbls. |
|---|---|
| 09-89 | 825 |
| 10-89 | 6,010 |
| 11-89 | 8,575 |
| 12-89 | 3,276 |
| 01-90 | 19,045 |
| 02-90 | 33,525 |
| 03-90 | 19,514 |
| 04-90 | 17,053 |
| 05-90 | 11,560 |
| 06-90 | 15,845 |
| 07-90 | 15,765 |
| 08-90 | 13,200 |
| 09-90 | 16,405 |
| 10-90 | 11,245 |
| 11-90 | 8,342 |
| 12-90 | 17,540 |
| 01-91 | 5,564 |
| 02-91 | 7,880 |
| 03-91 | 13,460 |
| 04-91 | 10,669 |
| 05-91 | 6,025 |
| 06-91 | 910 |
| 07-91 | 7,921 |
| 08-91 | 5,717 |
| 09-91 | 6,712 |
| 10-91 | 546 |
| 11-91 | 110 |
| Total Brine Bbls. | 283,239 |

4

# MONITOR WELL INSPECTION

| JANUARY | FEBRUARY | MARCH | APRIL |
|---|---|---|---|
| 1. | 1. | 1. | 1. |
| 2. | 2. | 2. | 2. |
| 3. | 3. | 3. | 3. |
| 4. | 4. | 4. | 4. |

| MAY | JUNE | JULY | AUGUST |
|---|---|---|---|
| 1. | 1. | 1. | 1. |
| 2. | 2. | 2. | 2. |
| 3. | 3. | 3. | 3. |
| 4. | 4. | 4. | 4. |

| SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER |
|---|---|---|---|
| 1. Steve 9/4/91 Dry | 1. Paul 10/3/91 Dry | 1. Paul 11/4/91 OK | 1. Dirk 12/5/91 OK |
| 2. Dirk 9/10/91 ok | 2. S.P. 10/11/91 Dry | 2. Eddie 11/14/91 Dry | 2. Steve 12/14/91 Dry |
| 3. Steve 9/19/91 Dry | 3. Dirk 10/17/91 OK | 3. Steve 11/21/91 Dry | 3. Paul 12/19/91 OK |
| 4. Butch 9/25 OK | 4. Steve 10/24 | 4. Butch 11/30/91 OK | 4. Butch 12/27/91 OK |

5

REACTION

REACTION CHEMICAL ENTERPRISES, INC.
P.O. BOX 3868 ODESSA, TEXAS 79760-3868
915/332-4324

# WATER ANALYSIS

COMPANY: P & S
LEASE: WATER STA.
WELL: 0
SAMPLE: BRINE

DATE OF RUN: 12-04-91
SAMPLE DATE: UNKNOWN
RUN # 1995

| | Mg./L. | Meq./L. |
|---|---|---|
| TOTAL HARDNESS - CaCO3 | 18,500.0 | |
| TOTAL ALKALINITY - CaCO3 | - | |
| TOTAL DISSOLVED SOLIDS | 238,240.4 | |
| CALCIUM - Ca | 676.0 | 33.8 |
| MAGNESIUM - Mg | 4,084.8 | 334.8 |
| SODIUM - Na | 86,212.5 | 3,748.4 |
| BARIUM - Ba | 0.0 | |
| BICARBONATE - HCO3 | 17.1 | 0.3 |
| CARBONATE - CO3 | 0.0 | |
| SULFATE - SO4 | 4,250.0 | 88.5 |
| CHLORIDE - CL | 143,000.0 | 4,028.2 |
| CARBON DIOXIDE - CO2 | 44.0 | |
| HYDROGEN SULFIDE - H2S | 0.0 | |
| TOTAL IRON - Fe | 0.0 | |
| TEMPERATURE | 75.0 | |
| pH | 7.500 | |
| SPECIFIC GRAVITY | 1.154 | |
| LBS/GAL | 9.6 | |

STABILITY INDEX (Stiff-Davis)

SI=pH-pCa-pAlk-K

| DEGREES F. | S.I. |
|---|---|
| 77 | -0.38 |
| 100 | -0.10 |
| 180 | 1.82 |

| CaSO4 | Mg./L. |
|---|---|
| SOLUBILITY : | 7,367 |
| ACTUAL : | 2,301 |
| SATURATION % : | 31.2 |

ANALYZED BY: WALLENDER

5

REACTION

REACTION CHEMICAL ENTERPRISES, INC.
P.O. BOX 3868 ODESSA, TEXAS 79760-3868
915/332-4324

# WATER ANALYSIS

COMPANY: P & S
LEASE: WATER STA.
WELL: 0
SAMPLE: FRESH

DATE OF RUN: 12-04-91
SAMPLE DATE: UNKNOWN
RUN # 1994

| | Mg./L. | Meq./L. |
|---|---|---|
| TOTAL HARDNESS - CaCO3 | 250.0 | |
| TOTAL ALKALINITY - CaCO3 | - | |
| TOTAL DISSOLVED SOLIDS | 409.0 | |
| CALCIUM - Ca | 34.0 | 1.7 |
| MAGNESIUM - Mg | 40.1 | 3.3 |
| SODIUM - Na | 40.7 | 1.8 |
| BARIUM - Ba | 0.0 | |
| BICARBONATE - HCO3 | 36.6 | 0.6 |
| CARBONATE - CO3 | 0.0 | |
| SULFATE - SO4 | 150.0 | 3.1 |
| CHLORIDE - CL | 107.6 | 3.0 |
| CARBON DIOXIDE - CO2 | 88.0 | |
| HYDROGEN SULFIDE - H2S | 0.0 | |
| TOTAL IRON - Fe | 0.0 | |
| TEMPERATURE | 75.0 | |
| pH | 8.600 | |
| SPECIFIC GRAVITY | 1.000 | |
| LBS/GAL | 8.3 | |

STABILITY INDEX (Stiff-Davis)

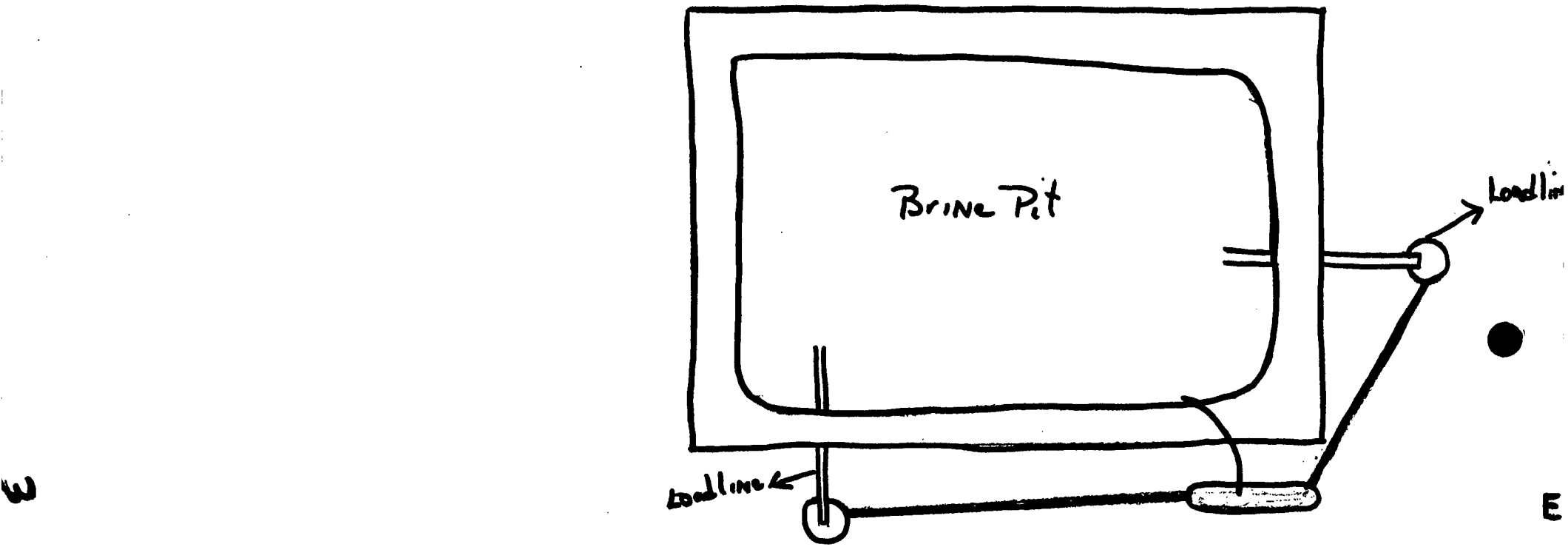
SI=pH-pCa-pAlk-K

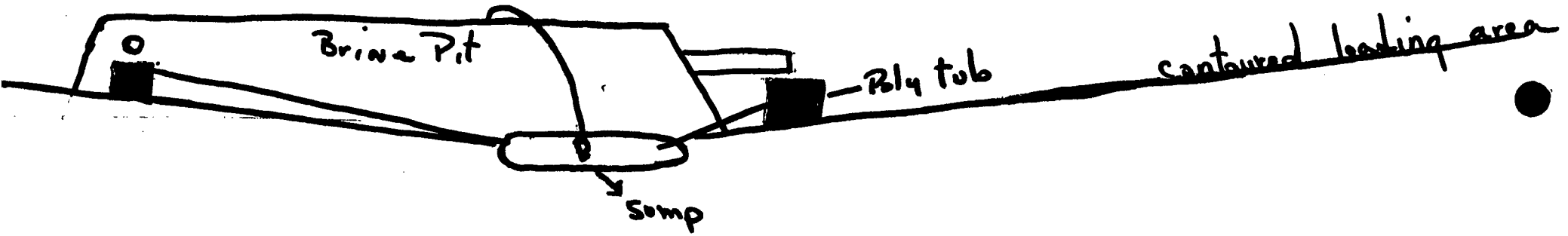
| DEGREES F. | S.I. |
|---|---|
| 77 | 0.13 |
| 100 | 0.49 |
| 180 | 1.21 |

| CaSO4 | Mg./L. |
|---|---|
| SOLUBILITY : | 1,530 |
| ACTUAL : | 116 |
| SATURATION % : | 7.6 |

ANALYZED BY: WALLENDER

8+9


Brine Pit
Loadline
Loadline
W
E


Brine Pit
Blg tub
contoured loading area
Sump

S

UNDERWRITERS INDEMNITY COMPANY

8 Greenway Plaza, Suite 1450
Houston, Texas 77046

# PREMIUM NOTICE — CONTINUOUS FORM BOND

| Principal and Address | Bond No. | Premium Period | Billing Date |
|---|---|---|---|
| P & S Brine Sales dba Paul Prather<br>P.O. Box 769<br>Eunice, NM 88231 | B01942 | 10-6-91 to 10-6-92 | 10-24-91 |
| | Amount of Bond | Premium Charge | Program Code |
| | $ 5,000 | $ 250 | |
| | Description of Bond | | |
| | One-Well Plugging Bond | | |
| General Agent and Address | Obligee and Address | | |
| Leavell/Danford Ins. Agcy., Inc.<br>P.O. Box 1889<br>Eunice, NM 88231 | State of New Mexico | | |

The bond described above is continuous in form. The indicated premium for the next premium period will be charged to your account unless we are furnished with proper evidence of termination of our liability prior to the beginning of the premium term.

This premium notice does not create a new obligation. The company's liability under said bond is not cumulative and its aggregate liability under said bond on account of all defaults committed during the term of said bond shall not in any event exceed the amount of said bond.

PRODUCER

Leavell/Danford Ins. Agcy., Inc.
P.O. Box 1889
Eunice, NM 88231

UN1002 3/88

CERTIFICATE OF AUTHORITY NO. 11164

# GENERAL POWER OF ATTORNEY

## CERTIFIED COPY

KNOW ALL MEN BY THESE PRESENTS: That **UNDERWRITERS INDEMNITY COMPANY**, a corporation organized and existing under the laws of the State of Texas, and having its principal office in the City of Houston, Texas, does hereby constitute and appoint:

ROY C. DIE

its true and lawful attorney-in-fact to execute, seal and deliver for and on its behalf as surety, any and all bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof, which are or may be allowed, required or permitted by law, statute, rule, regulation, contract or otherwise, in an amount not to exceed:

**********FIFTY THOUSAND AND NO/100 DOLLARS**********

and the execution of all such instrument(s) in pursuance of these presents, shall be binding upon said **UNDERWRITERS INDEMNITY COMPANY** as fully and amply, to all intents and purposes, as if the same had been duly executed and acknowledged by its regularly elected officers at its principal office.

This Power of Attorney is executed, and may be cerified to and may be revoked, pursuant to and by authority of Article V, Section 6(C) of the By-Laws adopted by the Board of Directors of **UNDERWRITERS INDEMNITY COMPANY**, at a meeting called and held on the 23rd day of January 1985, of which the following is a true transcript of said Section 6(C):

"The President or any Vice President, Assistant Vice President, Secretary or Resident Secretary shall have power and authority

(1) To appoint Attorneys-in-fact, and to authorize them to execute on behalf of the Company, and attach the Seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof, and

(2) to appoint special Attorneys-in-fact, who are hereby authorized to certify to copies of any power-of-attorney issued in pursuance of this section and/or any of the By-laws of the Company, and

(3) to remove, at any time, any such Attorney-in-fact or Special Attorney-in-fact and revoke the authority given to him."

Further, this Power of Attorney is signed and sealed by facsimile pursuant to resolution of the Board of Directors of said Company adopted at a meeting duly called and held on the 23rd day of January, 1985, of which the following is a true excerpt:

"Now therefore the signatures of such officers and the seal of the Company may be affixed to any such power of attorney or any certificate relating thereto by facsimile, and any such power of attorney or certificate bearing such facsimile signatures or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by facsimile signatures and facsimile seal shall be valid and binding upon the Company in the future with respect to any bond or undertaking to which it is attached."

IN TESTIMONY WHEREOF, **UNDERWRITERS INDEMNITY COMPANY** has caused this instrument to be signed and its corporate seal to be affixed by its authorized officer, E. H. Frank, III, on this the third day of March, 1987.

E. H. Frank, III President

STATE OF TEXAS
COUNTY OF HARRIS

On this the 3rd day of March, 1987, before me came the individual who executed the preceding instrument, to me personally known, and, being duly sworn, said that he is the therein described and authorized officer of **UNDERWRITERS INDEMNITY COMPANY**; that the seal affixed to said instrument is the Corporate Seal of said Company; that the said Corporate Seal and his signature were duly affixed by order of the Board of Directors of said Company.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal, at the City of Houston, Texas, the day and year first above written.

Mary Williams NOTARY PUBLIC, Harris County, Texas

**CERTIFICATION**

I, the undersigned officer of **UNDERWRITERS INDEMNITY COMPANY**, do hereby certify that I have compared the foregoing copy of the Power of Attorney and affidavit, and the copy of the Section of the By-Laws of said Company as set forth in said Power of Attorney, and that the same are correct transcripts thereof, and of the whole of the said originals, and that the said Power of Attorney has not been revoked and is now in full force and effect.

IN TESTIMONY WHEREOF, I have hereunto set my hand this 6th day of October, 19 89

Pat Doehring Assistant Secretary

Only a certified copy of Power of Attorney bearing the Certificate of Authority No. printed in red on the upper right corner is binding. Photo-copies, carbon copies or other reproductions of this document are invalid and not binding upon the Company.

**ANY INSTRUMENT ISSUED IN EXCESS OF THE PENALTY AMOUNT STATED ABOVE IS TOTALLY VOID AND WITHOUT VALIDITY.**

UNI020 (3/89)

Form O & G B-1
Adopted 6-17-77
Revised 10-1-78

# STATE OF NEW MEXICO

## ONE-WELL PLUGGING BOND

FOR CHAVES, EDDY, LEA, McKINLEY, RIO ARRIBA, ROOSEVELT, SANDOVAL, AND SAN JUAN COUNTIES ONLY

BOND NO. B01942
(For Use of Surety Company)

AMOUNT OF BOND $5,000.00

COUNTY Lea

NOTE: For wells less than 5,000 feet deep, the minimum bond is $5,000.00*
For wells 5,000 feet to 10,000 feet deep, the minimum bond is $7,500.00*
For wells more than 10,000 feet deep, the minimum bond is $10,000.00

* Under certain conditions, a well being drilled under a $5,000.00 or $7,500.00 bond may be permitted to be drilled as much as 500 feet deeper than the normal maximum depth, i.e., a well being drilled under a $5,000.00 bond may be permitted to go to 5,499 feet, and a well being drilled under a $7,500.00 bond may be permitted to go to 10,500 feet (See Rule 101)

File with Oil Conservation Division, P.O.Box 2088, Santa Fe 87504

KNOW ALL MEN BY THESE PRESENTS:

That P & S BRINE SALES DBA PAUL PRATHER, (An individual) (a partnership) (a corporation organized in the State of New Mexico, with its principal office in the city of Eunice, State of New Mexico, and authorized to do business in the State of New Mexico), as PRINCIPAL, and UNDERWRITERS INDEMNITY COMPANY, a corporation organized and existing under the laws of the State of Texas, and authorized to do business in the State of New Mexico, as SURETY, are held firmly bound unto the State of New Mexico, for the use and benefit of the Oil Conservation Division of New Mexico pursuant to Section 65-3-11, New Mexico Statutes Annotated, 1953 Compilation, as amended, in the sum of FIVE THOUSAND AND NO/100---------- Dollars lawful money of the United States, for the payment of which, well and truly to be made, said PRINCIPAL and SURETY hereby bind themselves, their successors and assigns, jointly and severally, firmly by these presents.

The conditions of this obligation are such that:

WHEREAS, The above principal has heretofore or may hereafter enter into oil and gas leases, or carbon dioxide ($CO_2$) gas leases, or helium gas leases with the State of New Mexico; and

WHEREAS, The above principal has heretofore or may hereafter enter into oil and gas leases, or carbon dioxide ($CO_2$) gas leases, or helium gas leases on lands patented by the United States of America to private individuals, and on lands otherwise owned by private individuals; and

WHEREAS, The above principal, individually, or in association with one or more other parties, has commenced or may commence the drilling of one well not to exceed a depth of 1269' feet, to prospect for and produce oil or gas, or carbon dioxide ($CO_2$) gas or helium gas, or does own or may acquire, own or operate such well, or such well started by others on land embraced in said State oil and gas leases, or carbon dioxide ($CO_2$) leases, or helium gas leases, and on land patented by the United States of America to private individuals, and on land otherwise owned by private individuals, the identification and location of said well being Arnott Ramsey State #4-P SE¼
(Here state exact legal subdivision by 40-acre tract or lot)
Section 16, Township 25S (North) (South), Range 37E (East) (West), N.M.P.M. Lea County, New Mexico.

NOW, THEREFORE, If the above bounden principal and surety or either of them or their successors or assigns, or any of them, shall plug said well when dry or when abandoned in accordance with the rules, regulations, and orders of the Oil Conservation Division of New Mexico in such way as to confine the oil, gas, and water in the strata in which they are found, and to prevent them from escaping into other strata;

THEN, THEREFORE, This obligation shall be null and void; otherwise and in default of complete compliance with any and all of said obligations, the same shall remain in full force and effect.

10-17-89
Mailed original to [illegible]
Copy mailed to insured. &

P & S BRINE SALES DBA PAUL PRATHER
PRINCIPAL
P.O. Box 769
Eunice, NM 88231
Address

By Paul D. Prather
Signature

Title

(Note: Principal, if corporation, affix corporate seal here.)

UNDERWRITERS INDEMNITY COMPANY
SURETY
8 Greenway Plaza, Suite 1450
Houston, TX 77046
Address

By Roy C. Die Attorney-in-Fact

(Note: Corporate surety affix corporate seal here.)

## ACKNOWLEDGEMENT FORM FOR NATURAL PERSONS

STATE OF New Mexico )
COUNTY OF Lea ) ss.

On this 6th day of October, 19 89, before me personally appeared Paul D. Prather, to me known to be the person (persons) described in and who executed the foregoing instrument and acknowledged that he (they) executed the same as his (their) free act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and seal on the day and year in this certificate first above written.

Rhonda Danford
Notary Public

June 17, 1993
My Commission expires

## ACKNOWLEDGEMENT FORM FOR CORPORATION

STATE OF _____ )
COUNTY OF _____ ) ss.

On this 6th day of October, 19 89, before me personally appeared _____, to me personally known who, being by me duly sworn, did say that he is _____ of _____ and that the foregoing instrument was signed and sealed on behalf of said corporation by authority of its board of directors, and acknowledged said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and seal on the day and year in this certificate first above written.

Notary Public

My Commission expires

## ACKNOWLEDGEMENT FORM FOR CORPORATE SURETY

STATE OF Texas )
COUNTY OF Harris ) ss.

On this 6th day of October, 1989, before me appeared Roy C. Die, to me personally known, who, being by me duly sworn, did say that he is Attorney-in-Fact of Underwriters Indemnity Company and that the foregoing instrument was signed and sealed on behalf of said corporation by authority of its board of directors, and acknowledged said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and seal on the day and year in this certificate first above written.

Doris Williams Shirley
Notary Public

June 4, 1993
My Commission Expires

(Note: Corporate surety must attach power of attorney.)

APPROVED BY:

OIL CONSERVATION DIVISION OF NEW MEXICO

By _____

Date _____

OIL CONSERVATION DIVISION
RECEIVED
'91 NOV 12 AM 10 14

## ACKNOWLEDGEMENT OF RECEIPT OF CHECK/CASH

I hereby acknowledge receipt of check No. 1105 dated 10/29/91,
or cash received on 11/4/91 in the amount of $ 50.00
from P&S BRINE SALES
for P&S TAL BRINE STATION BW-7
(Facility Name) (DP No.)
Submitted by: Raymond C. Anderson Date: 11/4/91
Submitted to ASD by: Dorothy Montoya Date: 11/7/91
Received in ASD by: _____ Date: _____

Filing Fee X New Facility ___ Renewal X
Modification ___ Other _____
(specify)

Organization Code 521.07 Applicable FY 80 th

To be deposited in the Water Quality Management Fund.

Full Payment ___ or Annual Increment ___

---

Lea County State Bank
P.O. Box 400 • Hobbs, New Mexico 88241

P & S BRINE SALES
P. O. BOX 1769
EUNICE, NM 88231

1105

95-183/1122

10-29 19 91

Pay to the order of NMED - Water Quality Management $ 50.00

Fifty dollars and NO/100 Dollars

YOUR ENDORSEMENT ON THIS CHECK ACKNOWLEDGES PAYMENT ON THE FOLLOWING ACCOUNT(S).

| | | | |
|---|---|---|---|
| | Filing Fee | | |
| | Discharge Plan Fee - BW7 | | |
| | | | |
| | | | |

R. Suzanne McReynolds

⑈000 1105⑈ ⑆122018361⑆ 0558 1006⑈

Brass Mountain Bank Note G

Lea County State Bank
P.O. Box 400 • Hobbs, New Mexico 88241

P & S BRINE SALES
P. O. BOX 1769
EUNICE, NM 88231

1105

95-183/1122

10-29 1991

Pay to the order of NMED - Water Quality Management $50.00

Fifty dollars and no/100 Dollars

YOUR ENDORSEMENT ON THIS CHECK ACKNOWLEDGES PAYMENT ON THE FOLLOWING ACCOUNT(S)

| | | |
|---|---|---|
| Filing Fee | | |
| Discharge Plan Fee - BW7 | | |
| | | |
| | | |

P. Suzanne McReynolds

⑈000 1105⑈ ⑆122018361⑆ 0558 1001⑈

Rocky Mountain Bank Note G

Mr. Paul Prather
P & S Brine Sales, Inc.
P. O. Box 1769
Eunice, New Mexico 88231

RECEIVED
NOV 04 1991
OIL CONSERVATION DIV.
SANTA FE

**RE: Discharge Plan Fee for BW-7**
**P & S Brine Sales, Inc.**

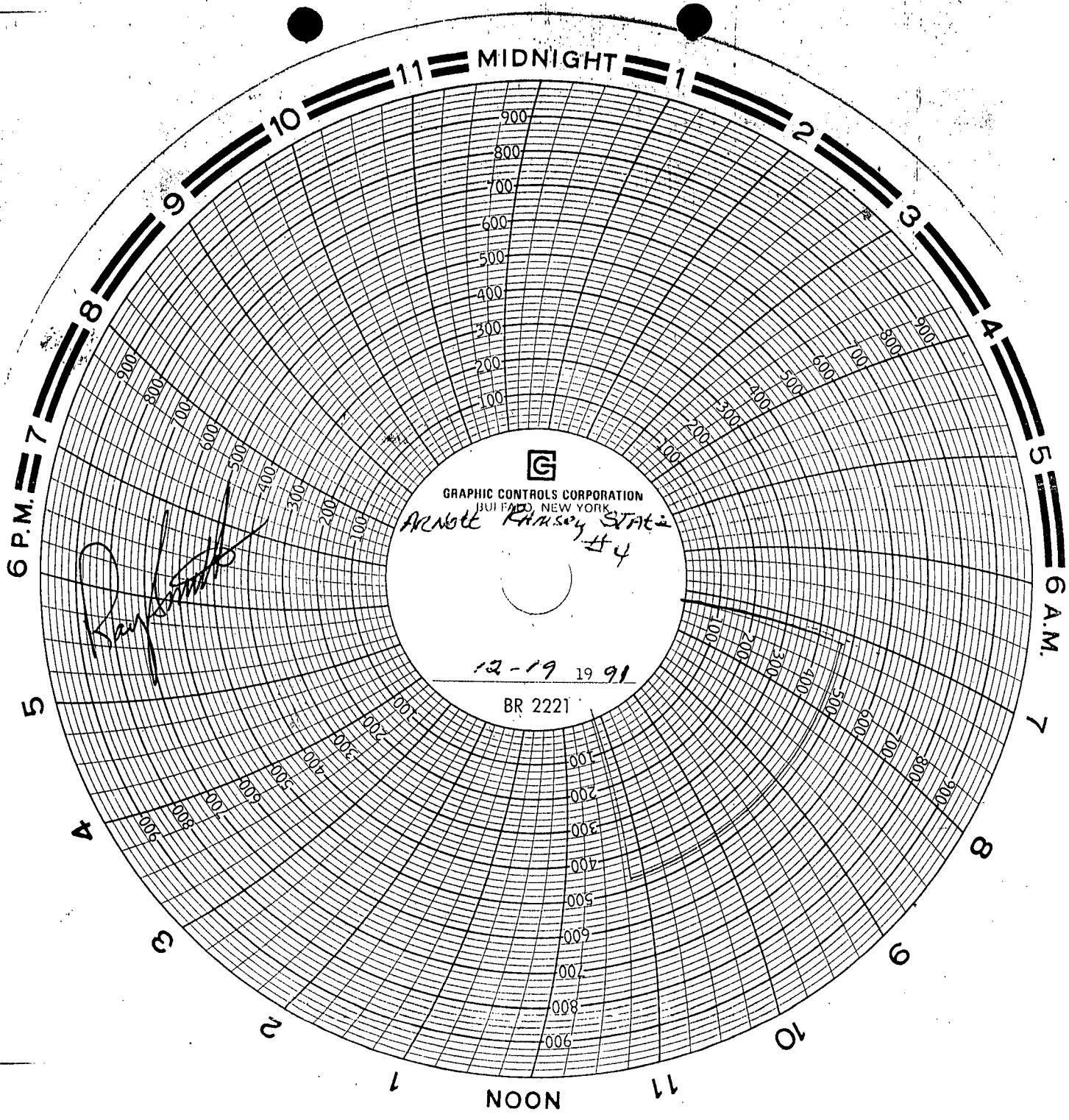
Dear Mr. Prather:

Pursuant to the New Mexico Water Quality Control Commission (WQCC) Regulation 3-114 "every billable facility submitting a discharge plan for approval, modification or renewal shall pay the fees specified in this section to the Water Quality Management Fund." Enclosed is a copy of WQCC Rule 3-114 effective as of August 18, 1991.

The Oil Conservation Division (OCD) requested a discharge plan renewal application for the P & S Brine Sales Jal Station on August 14, 1991, prior to the effective date of the WQCC Rule 3-114. The OCD received your discharge plan (BW-7) renewal application on September 20, 1991, which is after the effective date of the WQCC discharge plan fee regulation 3-114.

The discharge plan renewal application for the P & S Brine Sales Jal Station is subject to the WQCC regulation 3-114 discharge plan fee. Every billable facility submitting a discharge plan renewal will be assessed a fee equal to the filing fee of fifty (50) dollars plus one-half of the flat fee or six-hundred and ninety (690) dollars.

The $50 filing fee is due immediately and is nonrefundable. The flat fee for an approved discharge plan may be paid in a single payment due at the time of approval, or in equal annual installments over the duration of the discharge plan, with the first payment due at the time of approval.




R&S Brine
Sol station

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

October 21, 1991

**CERTIFIED MAIL**
**RETURN RECEIPT NO. P-106-675-373**

Mr. Paul Prather
P & S Brine Sales, Inc.
P. O. Box 1769
Eunice, New Mexico 88231

**RE: Discharge Plan Fee for BW-7**
**P & S Brine Sales, Inc.**

Dear Mr. Prather:

Pursuant to the New Mexico Water Quality Control Commission (WQCC) Regulation 3-114 "every billable facility submitting a discharge plan for approval, modification or renewal shall pay the fees specified in this section to the Water Quality Management Fund." Enclosed is a copy of WQCC Rule 3-114 effective as of August 18, 1991.

The Oil Conservation Division (OCD) requested a discharge plan renewal application for the P & S Brine Sales Jal Station on August 14, 1991, prior to the effective date of the WQCC Rule 3-114. The OCD received your discharge plan (BW-7) renewal application on September 20, 1991, which is after the effective date of the WQCC discharge plan fee regulation 3-114.

The discharge plan renewal application for the P & S Brine Sales Jal Station is subject to the WQCC regulation 3-114 discharge plan fee. Every billable facility submitting a discharge plan renewal will be assessed a fee equal to the filing fee of fifty (50) dollars plus one-half of the flat fee or six-hundred and ninety (690) dollars.

The $50 filing fee is due immediately and is nonrefundable. The flat fee for an approved discharge plan may be paid in a single payment due at the time of approval, or in equal annual installments over the duration of the discharge plan, with the first payment due at the time of approval.

Please make all checks out to the **NMED - Water Quality Management** and send to the OCD Santa Fe Office. If you have any questions, please do not hesitate to contact me at (505) 827-5824.

Sincerely,

Kathy M. Brown

Kathy M. Brown
Geologist

Enclosure

xc: OCD Hobbs Office

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Ecological Services
Suite D, 3530 Pan American Highway, NE
Albuquerque, New Mexico 87107

OIL CONSERVATION DIVISION
RECEIVED
'91 OCT 15 AM 10 01

October 9, 1991

Mr. William J. Lemay
Director, New Mexico Energy, Minerals
and Natural Resources Department
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87504-2088

Dear Mr. Lemay:

The U.S. Fish and Wildlife Service (Service) has reviewed the Public Notice dated September 24, 1991, regarding the effects of granting a State of New Mexico groundwater discharge permit on fish, shellfish, and wildlife resources in New Mexico.

The Service has determined there are no wetlands or other environmentally sensitive habitats that will be adversely affected by the following activity.

(BW-7) - P & S Brine Sales, Eunice, New Mexico

If you have any questions, please call Richard Roy at (505) 883-7877.

Sincerely,

Richard J. Donaldson

for Jennifer Fowler-Propst
Field Supervisor

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals and Natural Resources Department,
Forestry and Resources Conservation Division, Santa Fe, New Mexico
Regional Administrator, U.S. Environmental Protection Agency, Dallas, Texas
Regional Director, U.S. Fish and Wildlife Service, Fish and Wildlife
Enhancement, Albuquerque, New Mexico

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

October 15, 1991

**CERTIFIED MAIL**
**RETURN RECEIPT NO. P-106-675-371**

Mr. Paul Prather
P & S Brine Sales, Inc.
P. O. Box 1769
Eunice, New Mexico 88231

**RE: Discharge Plan BW-7**
**P & S Brine Sales, Inc.**

Dear Mr. Prather:

The Oil Conservation Division (OCD) received your discharge plan renewal application dated September 17, 1991, for your Jal Brine Station. With the exception of a change in name from Permian Brine Sales to P & S Brine Sales, all of this information has been on file with the OCD since May 10, 1984. A majority of the required information is either missing, out of date, or does not meet the current OCD rules and regulations. In addition, P & S Brine Sales failed to address any of the OCD comments stated in their letter dated August 14, 1991.

The purpose of a discharge plan is to prevent and/or stop groundwater contamination from effluent or leachate discharges. This consists of more than simply submitting outdated paperwork. The OCD takes great care in reviewing discharge plans and we are more than willing to work with P & S Brine Sales in developing a satisfactory discharge plan.

Please address all of the following comments which were previously stated in our discharge plan renewal request dated August 14, 1991.

1. **Notification of Spills**

Under Part XI. of your discharge renewal application you stated notification of spills or releases would be "to Oil Commission within hours". All unauthorized discharges (ie. major leaks and spills), must be reported to the OCD District Office within 48 hours of the event (WQCC Rule 5-208). Commit to report all unauthorized discharges to the OCD District Office within 48 hours.

2. **Mechanical Integrity Testing**

Pursuant to revised OCD guidelines for discharge plans at brine facilities, all wells must be pressure tested (open- hole) to 500 psi for 4 hours on an annual basis. A pressure test isolating the casing from the formation using either a bridge plug or a packer must be conducted at least once every 5 years or during well workovers.

The results from a current pressure test will be required prior to the approval of any brine facility discharge plan application or renewal. If the immediate test is performed using the open-hole method than a pressure test isolating the casing from the formation is required within the next 1 1/2 years. An OCD representative must be on site to witness all pressure tests and we request 10 days before the test to allow us to make arrangements.

The MIT chart enclosed in P & S Brine Sales renewal application is dated July 6, 1983. Submit a proposal for testing and ensuring the mechanical integrity of the well accorking to the above requirements. Also, submit information on any buried brine pipelines including age and material of the lines.

3. **Volumes of Injection Fluids and Brine**

The OCD requires a quarterly report listing, by month, of the volume of fluids injected and produced for comparison to detect underground losses. The OCD has no quarterly volume reports on file for P & S Brine Sales (or Permian Brine Sales) Jal Station. Submit a proposal and schedule for reporting injection fluid and brine production volumes.

In your renewal application you state that the calculated diameter of the brine cavern is 26 feet based on the total volume of brine produced through 1983. To calculate the current size of the cavity the OCD must have the date of first brine production and the total volume of brine produced to date. This information is necessary to evaluate subsidence potential for your brine station. Submit the required information.

4. **Brine Storage Pond**

The OCD is concerned over the potential for leaks in your single-lined brine storage pond. A letter from Permian Brine Sales to the EID dated August 20, 1984 states that the liner rests on a caliche substrate. Is there any type of protective substance between the caliche and the liner which would prevent the caliche from puncturing a hole in the liner? The OCD is also concerned about the ability of a leak to be detected by the leak detection system. Provide evidence that a leak in your pond would migrate to the leak detection lateral/sump and not travel directly down to groundwater. P & S Brine Sales did not address this issue at all in the discharge plan renewal application.

To adequately detect leaks at present, the OCD requires that the monitor well (sump) be checked monthly. A record of the date of inspection, results, and inspectors initials must be submitted annually to the OCD, at the same time the annual pressure test results are submitted. Commit to monthly inspections of your monitor well and annual submission of the results. Note, if a leak is detected in your brine storage pond the OCD must be notified within 48 hours.

The freeboard of your pond in the southeast corner was less than one foot. Because various weather conditions could cause brine to spill over the top of the pond, the OCD requires that you keep a minimum of one and one-half (1-1/2) foot of freeboard in your pond. Commit to maintaining a minimum of 1-1/2 foot of freeboard in your pond.

5. **Freshwater Analysis**

The OCD requires a current analysis of your freshwater supply well **and** produced brine. Your discharge plan renewal application did not have an analysis for produced brine, and the freshwater analysis you submitted was performed by Permian Brine Sales in April of 1984. Analysis will be for concentrations of major cations/anions and Total Dissolved Solids (see OCD Guidelines for Brine Facilities section VII.C.4.). Include the location and method of sampling. Submit the required analyses of your injection and production fluids.

6. **Maximum Injection Pressure.**

Pursuant to WQCC Regulations Section 5-206, the maximum injection pressure at the wellhead shall not initiate new fractures or propagate existing fractures in the continuing zone. Your discharge plan renewal application states that up through 1983 the operating pressure was 200 psi. What is your current operating pressure? What is your maximum injection pressure and how does this value compare with the fracture pressure of the salt? What mechanism do you have to ensure that the maximum value will no be exceeded?

7. **Operating Procedures**

The OCD requires that all one-well brine extraction operations inject freshwater down the annulus and recover brine up the tubing. In your discharge plan renewal application you state that freshwater is injected down both the tubing and the casing. In addition, the OCD inspection of your facility on February 6, 1991, revealed that your well was valved to inject freshwater down the tubing and produce brine out of the annulus. Submit a plan/commitment for operating procedures which meet the OCD requirements.

Reverse flow is only allowed once a month for 24 hours for clean-out. If an alternative operating method is desired then a written request must be submitted to the OCD which describes the proposed operating procedures and how the mechanical integrity of the casing will be guaranteed.

8. **Spill Collection/Containment System**

Your discharge plan renewal application contained no information on your spill collection system presently in use. Submit materials detailing the spill containment and collection system currently in operation. Include drawing and diagrams and elaborate on the materials and sizes of the various components of the system. Note that the OCD requires that all new underground tanks (ie.sumps) have positive leak detection. All existing sumps must be cleaned out and visually inspected on an annual basis.

9. **Brine Loading Area**

Your discharge plan renewal application did not address how you will contain brine spilled at the loading area. As previously stated, the loading area has had consistent spillage identified repeatedly by both OCD and EID staff. This area must be cleaned-up and have containment to keep spilled brine off of the ground surface. Submit a proposal to contain spills at your brine loading area. Provide an explanation and diagrams detailing how spilled brine is to be contained; include paving and curbing where appropriate and indicate where the spilled brine drains to.

10. **Plugging Bond**

The $5000 single-well plugging bond included in your discharge plan renewal is on the old OCD bond form which does not include brine wells. You must either have your plugging bond transferred onto the new form, or obtain a new single well plugging bond. The correct bond forms were enclosed in the original OCD discharge plan renewal request. Again, I have enclosed the proper bond forms.

Submitting the materials requested above is necessary prior to further review of your discharge plan renewal application.

If you have any questions, please do not hesitate to contact me at (505) 827-5824.

Sincerely,

Kathy M. Brown
Geologist

Enclosures

xc: OCD Hobbs Office

THE REPRODUCTION OF

THE

FOLLOWING

DOCUMENT ( S )

CANNOT BE IMPROVED

DUE TO

THE CONDITION OF

THE ORIGINAL

STATE OF NEW MEXICO
County of Bernalillo ss

Thomas J. Smithson being duly sworn declares and says that he is National Advertising manager of the **Albuquerque Journal** , and that this newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chaper 167, Session Laws of 1937, and that payment therefore has been made or assessed as court costs; that the notice, a copy of which is hereto attached, was published in said paper in the regular daily edition,

for 1 times, the first publication being on the 3 day

of Oct, 1991, and the subsequent consecutive

publications on ....., 1991.

Thomas J. Smithson

Sworn and subscribed to before me, a Notary Public in and for the County of Bernalillo and State of New Mexico, this 3 day of Oct, 1991.

PRICE $24.27

Statement to come at end of month.

CLA-22-A (R-12/91) ACCOUNT NUMBER C81184

OFFICIAL SEAL
Bernadette Ortiz
BERNADETTE ORTIZ
NOTARY PUBLIC-NEW MEXICO
FILED WITH SECRETARY OF STATE
My Commission Expires 12-18-93

NOTICE OF PUBLICATION
STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission Regulations, the following discharge plan renewal application has been submitted to the Director of the Oil Conservation Division, State Land Office Building, P.O. Box 2088, Santa Fe, New Mexico 87504-2088, Telephone, (505) 827-5800:

(BW-7) P & A X Brine Sales, Paul Prather, P.O. Box 1768, Eunice, New Mexico, 88231, has submitted a renewal application for the previously approved discharge plan for their insitu extraction brine well facility (formerly owned by Permian Brine Sales Inc.). The P & S Brine Sales Jal Station is located in the SE/4, SE/4, Section 16, Township 25, South, Range 37 East, NMPM, Lea County, New Mexico. Fresh water is injected into the Salado Formation at an approximate depth of 1260 feet and brine is extracted with an average total dissolved solids concentrations of about 280,000 mg/L. Groundwater most likely to be affected by an accidental discharge is at a depth of 400 feet with a total dissolved solids concentration of 1025 mg/L. Pockets of ground water may exist in the area at depths as shallow as 50 feet, with higher or lower concentrations of TDS. The discharge plan addresses how spills, leaks, and other accidental discharges to the surface will be managed.

Any interested person may obtain further information from the Oil Conservation Discharge Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. The discharge plan application may be viewed at the above address between 8:00 a.m. and 5:00 p.m., Monday through Friday. Prior to ruling on any proposed discharge plan or its modification, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and public hearing may be requested by any interested person. Requests for public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest. If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 24th day of September, 1991.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION
s/William J. Lemay
Director

Journal: October 3, 1991

# Affidavit of Publication

STATE OF NEW MEXICO )
) ss.
COUNTY OF LEA )

**Joyce Clemens** being first duly sworn on oath deposes and says that he is **Adv. Director** of THE LOVINGTON DAILY LEADER, a daily newspaper of general paid circulation published in the English language at Lovington, Lea County, New Mexico; that said newspaper has been so published in such county continuously and uninterruptedly for a period in excess of Twenty-six (26) consecutive weeks next prior to the first publication of the notice hereto attached as hereinafter shown; and that said newspaper is in all things duly qualified to publish legal notices within the meaning of Chapter 167 of the 1937 Session Laws of the State of New Mexico.

That the notice which is hereto attached, entitled

**Notice Of Publication**

and numbered ..... in the

..... Court of Lea County, New Mexico, was published in a regular and entire issue of THE LOVINGTON DAILY LEADER and not in any supplement thereof, once each week on the same day of the week, for **one (1)** consecutive weeks, beginning with the issue of **October 1**, 19**91** and ending with the issue of **October 1**, 19**91**.

And that the cost of publishing said notice is the sum of $**29.76** which sum has been (Paid) (~~Assessed~~) as Court Costs

Joyce Clemens

Subscribed and sworn to before me this **15th** day of **October**, 19**91**.

Mrs. Jean Jenkins
Notary Public, Lea County, New Mexico

My Commission Expires **Sept. 28**, 19**94**.

LEGAL NOTICE
NOTICE OF PUBLICATION
STATE OF NEW MEXICO ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 24th day of September, 1991.

STATE OF NEW Mexico OIL CONSERVATION DIVISION
WILLIAM J. LEMAY,
Director

SEAL

Published in the Lovington Daily Leader October 1, 1991.

## NOTICE OF PUBLICATION

## STATE OF NEW MEXICO
## ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
## OIL CONSERVATION DIVISION

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GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 24th day of September, 1991.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

S E A L

WILLIAM J. LEMAY, Director

10/90

State of New Mexico
Energy, Minerals and Natural Resources Department
OIL CONSERVATION DIVISION
P.O. Box 2088
Santa Fe, NM 87501

OIL CONSERVATION DIVISION
RECEIVED
'91 SEP 20 AM 9 38

*DISCHARGE PLAN APPLICATION FOR OILFIELD SERVICE FACILITIES*

*(Refer to OCD Guidelines for assistance in completing the application.)*

I. TYPE: INSITU BRINE MINING WELL

II. OPERATOR: P & S BRINE SALES

ADDRESS: P. O. BOX 1768 EUNICE, NM 88231

CONTACT PERSON: PAUL PRATHER PHONE: 394-2545

III. LOCATION: SE /4 SE /4 Section 16 Township 25-S Range 37-E
Submit large scale topographic map showing exact location.

IV. Attach the name and address of the landowner of the facility site.
THE STATE OF NEW MEXICO

V. Attach a description of the facility with a diagram indicating location of fences, pits, dikes, and tanks on the facility.

VI. Attach a description of all materials stored or used at the facility.

VII. Attach a description of present sources and quantites of effluent and waste solids.
NONE

VIII. Attach a description of current liquid and solid waste collection/treatment/disposal procedures.
NONE

IX. Attach a description of proposed modifications to existing collection/treatment/disposal systems.
NONE

X. Attach a routine inspection, maintenance plan and reporting to ensure permit compliance.

XI. Attach a contingency plan for reporting and clean-up of spills or releases.
NOTIFICATION TO OIL COMMISSION WITHIN HOURS

XII. Attach geological/hydrological evidence demonstrating that disposal of oil field wastes will not adversely impact fresh water.

XIII. Attach such other information as is necessary to demonstrate compliance with any other OCD rules, regulations and/or orders.

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: PAUL PRATHER Title: OWNER

Signature: Paul Prather Date: 9-17-91

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

## INTRODUCTION

P & S Brine Sales, Inc. operates an insitu brine mining well in southeastern Lea County, approximately two miles east of Jal on state highway no. 128. The legal description of this site is: SE/4 SE/4, Section 16, Range 37-E, Township 25-S, (see map No. 1). The well is designated as P & S Brine Sales, - Arnott Ramsey State No. 4. The well was completed in 1981 and has been in continuous operation since that date.

The produced brine is used primarily in oil field operations as a drilling fluid and as a "kill" fluid. (To neutralize well bore pressures in producing wells for workover maintenance.) Smaller amounts of brine are sold to industry for the regeneration of zeolite water softeners. Fresh water is also sold at this site for industrial purposes. Drawing No. 1, is a sketch of the operations area.

## DEVELOPMENT OF THE BRINE WELL

The brine well was completed in March 1981. It was drilled to 1269' with a 7-7/8" bit. 5½" = 17#/ft casing was set at 1258' in an anhydrite stringer in the Salado salt section. The casing was cemented with 400 sacks of Class H cement with 2% $CACL_2$. The cement was circulated to 60' and was cemented from the surface to this depth through 1" pipe. The cement plug was drilled out at 1271' and the casing string tested to 500 PSI.

The well was drilled to a T.D. of 1591' with a 4-3/4" bit. 2-7/8" tubing was run to 1582' in the open hole. See New Mexico Oil Conservation Division, well reports form C-103, well completion report and log, form C-105 and drawing No. 2, attached.

A mechanical integrity test on this brine well was performed on July 6, 1983 and reported to the Oil Conservation Commission. A copy of this test is attached.

## WATER WELL

The water well located on the site, furnishes fresh water for the solution mining of the brine. See Drawing No. 1. This well was drilled several years ago by the pervious owner and no records are available

of the original drilling. However, P & S Brine has established the depth as 459'. A 5 hp 45 GPM submersible pump is landed at 418'. The static water level stands at 250'.

This water well is used for monitoring purposes. A recent analysis of the water is attached. At this depth, it would indicate the well producing water from either the Santa Rosa or Chinle formations of the Triassic. Conductance tests of the well water are periodically observed to check for any contamination. The most recent April 24, 1984 indicated 11,000 M MHOS.

BRINE PRODUCTION PROCEDURES

The fresh water from the water well is produced into the 1,000 bbl fresh water storage tank. A 10hp submersible pump with capacity of 60 GPM is submerged in the fresh water storage tank and discharges at 200 PSI to either the tubing or casing of the brine well through approximately 400' of 2-3/8" O.D. fiberglass line pipe (rated at 450 PSI). This flow pattern indicates the flow is reversible in the well. The produced brine discharges from the well to the brine storage pit through approximately 300' of 2-3/8" O.D. PVC, Sch. 40 line pipe. Truck loading is accomodated at both the brine pit for brine and at the 1,000 bbl storage tank for fresh water. From the volume of brine produced and sold since initial operations began, a calculated maximum diameter of the cavern is 26'. Brine production for 1983 averaged 8800 bbl/month.

BRINE WELL PLUGGING AND ABANDONMENT

Plugging will be accomplished by using one Baker Model S cast iron bridge plug. This plug is set by lowering it down the casing on an electric wire line to the predetermined depth, just above the casing shoe. This plug is made with two sets of slips, one above and one below the plug body, and a solid steel guide shoe at the base of the plug. The plug is disengaged from the wire line setting tool and the slips actuated by firing a power charge within the setting tool. This plug then provides a pressure seal. After the plug has been set the casing will be evacuated of mud and/or other fluids by air displacement. Then a calculated volume of Class C cement slurry will be pumped down the casing until it is completely filled. The exposed casing, at the surface, will be sealed by welding a steel plate over the open end of the casing.

The salt formations in West Texas and New Mexico are always overlain with a relatively thick section (20' to 50') of anhydrite. This impervious and insoluable formation material provides an excellent casing seat and after cementing a perfect seal that prevents the circulation of fluids from the salt cavern to the upper formations behind the casing. Consequently, setting the bridge plug at this point in the casing (opposite an anhydrite lens) and filling with cement protects the overlying formations from contamination should a casing failure occur at some future time.

AREA OF REVIEW

Applying the criteria, as stated in the Water Control Commission Regulations, Section 5-202-B-2; the regulations state "...where the well field production at all times exceeds injection to produce a net withdrawal;" then a one-quarter mile area of review shall prevail. Since the production of saturated brine by fresh water solution mining results in a 7.14% increase in produced fluid over injection fluid these conditions provide compliance with the above regulations.

Below is a listing of all wells within the area of review.

1. P & S Brine - Arnott Ramsey No. 2 P & A Brine Well
2. P & S Brine - Arnott Ramsey No. 3 P & A Brine Well

The plugging and abandonment reports of these wells, as reported to the oil conservation division are attached. Also, please refer to the recent letter dated March 30, 1984 from P & S Brine Sales, Inc. by Mr. R.D. Hickerson to Paige Grant.

3. Gulf - Arnott Ramsey No. 7; 610' FSL, 660' FEL, Sec 16 8-5/8" csg @ 376' - 230 sx cement; producing oil well. 4½" csg @ 3700' - 1580 sx cement
4. Mobil - Federal No. 2X; 660' FSL, 330 FWL, Sec 15 8-5/8" csg @ 1060' - 500 sx cement; 5½" csg @ 3700' - 1,000 sx cement; producing oil well.

There are five residences, across state highway No. 128 to the south of the brine station, in the NE/4 of Sec 21, see Map 2; all have water wells.

A trailer house has been recently located immediately east of the brine station in the SE/4 of Sec 15. However, this residence obtains water from the city of Jal's water line, parallelling the state highway on the north, producing water from the city well in the SW/4 of Sec 13, R-37-E, TWP 25 S.

NOTE

The following descriptions, figures and maps have been liberally abstracted and reproduced from "Ground Water Report 6 - Geology and Ground Water Conditions or Southern Lea County, New Mexico", by Alexander Nicholson, Jr. and Alfred Clebsch, Jr.

## GEOLOGY AND HYDROLOGY

Southern Lea County overlies a large subsurface structural feature known as the Permian Basin. Oil exploration have revealed highly complex subsurface geology involving rocks ranging from the Precambrian and Early Paleozoic to the Permian Age. However, the early Paleozoic has little significance relating to potable and industrially usable ground waters in this area. The oldest formations exposed in this area are Triassic in age; the only other rocks to be seen at the surface are Tertiary and Quaternary in age. Only the Mesozic and younger formations yield potable water. See Table No. 3.

Figure No. 1 shows the distribution of geologic units exposed in the Jal area. The contacts between the Ogallala and Quaternary Alluvium formations are generalized because of poor exposures, due to the large areas covered by drift sand.

### STRATIGRAPHY

The southwestern part of the county overlies the Delaware Basin and the eastern part overlies the Central Basin platform. Between these two areas is the back-reef or shelf area. See Table No. 3. These general areas are defined on the basis of sedimentary depositional environments that existed during Permian time. The boundary between the basin and shelf areas is fairly sharp being marked by a complex of reef deposits; the boundary between the shelf area and the platform is transitional.

Since the earlier Palezoic formations are not revelant to this report, the description of these older formations will be omitted and this outline shall begin with the upper Permian.

The salt section, being mined at the Jal site, is the Salado formation and is assigned to the middle section of the Ochoa series of the upper Permian. This series is chiefly evaporite deposits. The lower most formation of this series is the Castile formation, which is chiefly

anhydrite with some halite beds. Overlying the Castile is the Salado formation, which extends across both the Deleware and Midland Basins and across the Central Basin platform; it ranges in thickness from zero to 2,000 feet. The formation is mainly halite containing some anhydrite stringers. The Rustler formation overlies the Salado and usually has a massive anhydrite bed at its base but also includes red beds and salt.

A sequence of red beds overlie the Rustler, consisting of micaeous red silt stone, shale and sandstone and are commonly cemented with gypsum. The age of these beds have been assigned to both the Permian and Triassic by various geologists based on localities of study. The lower section is called the Dewey Lake and is differeniated from the upper section by a zone of coarse, frosted quartz grains in the lower ten feet. The upper section is referred to as the Tecovas formation.

The hydrologic significance of these red beds is not completely understood, however, it is doubtful that any wells in Lea County produce water from them.

The Mesozic is represented in the area only by the Upper Triassic rocks of the Dockum group. This group is divisible into the Santa Rosa sandstone and the Chinle formation. The Santa Rosa is the principal aquifer in the western part of the county. The Chinle also provides an underground source of water both of these formations are at depths of 400+ feet and are highly mineralized.

The Cenozoic period is represented by the Ogallala formation of the Tertiary of Plicoene age. It underlies most of the county and ranges in thickness from a few inches to 300 feet. It is chiefly a calcareous, unconsolidated sand but contains clay, silt and gravel. The Ogallala is one of the major aquifers in this area.

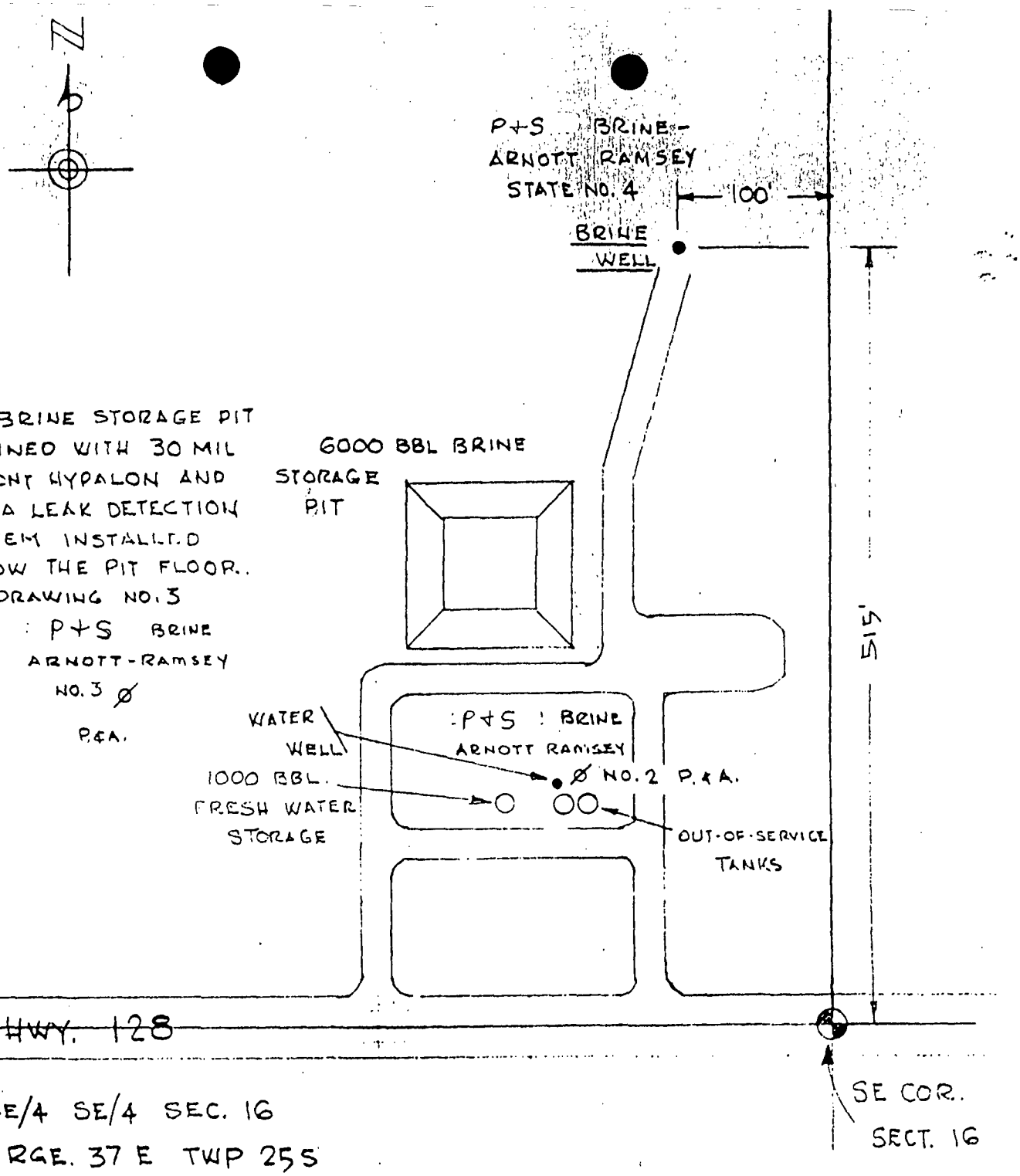
The Quaternary age sediments are present in southern Lea County in the form of alluvial deposits, probably of both Pleistocene and recent age and dune sands of recent age. The alluvium was deposited in topographically low areas where the Ogallala formation had been stripped away. The dune sands mantle the older alluvium and the Ogallala over most of the area. These Quaternary alluvial deposits vary in thickness from 15 to 30 feet and are an important source of ground water in the eastern part of the county, especially along the major drainages.

Figure No. 2 shows the water table elevations in Tertiary and Quaternary formations and the areal boundaries of these aquifers. The figure also indicates the Piezometric countours and areal extent of the Triassic formations.

Figure No. 13 shows a typical cross-section of an area immediately north of the Jal brine station site. These type of depressions, an erosional feature, are found throughout this area. These features are formed both by subsidence and sub-surface collapse resulting from solution of the evaporites.

DRAINAGE

There is no integrated drainage in southern Lea County, hence there is no through-going drainage to the Pecos River to the west and south. All stream courses are ephemeral and only one, Monument Draw has significant length; it traverses the eastern part of the county from north to south for approximately 35 miles and extends into Texas. See Figure No. 3.




THE BRINE STORAGE PIT IS LINED WITH 30 MIL DUPONT HYPALON AND HAS A LEAK DETECTION SYSTEM INSTALLED BELOW THE PIT FLOOR. SEE DRAWING NO. 3

P+S BRINE
ARNOTT-RAMSEY
NO. 3 ∅
P&A.

SE/4 SE/4 SEC. 16
RGE. 37 E TWP 25 S
LEA CO. NEW MEXICO

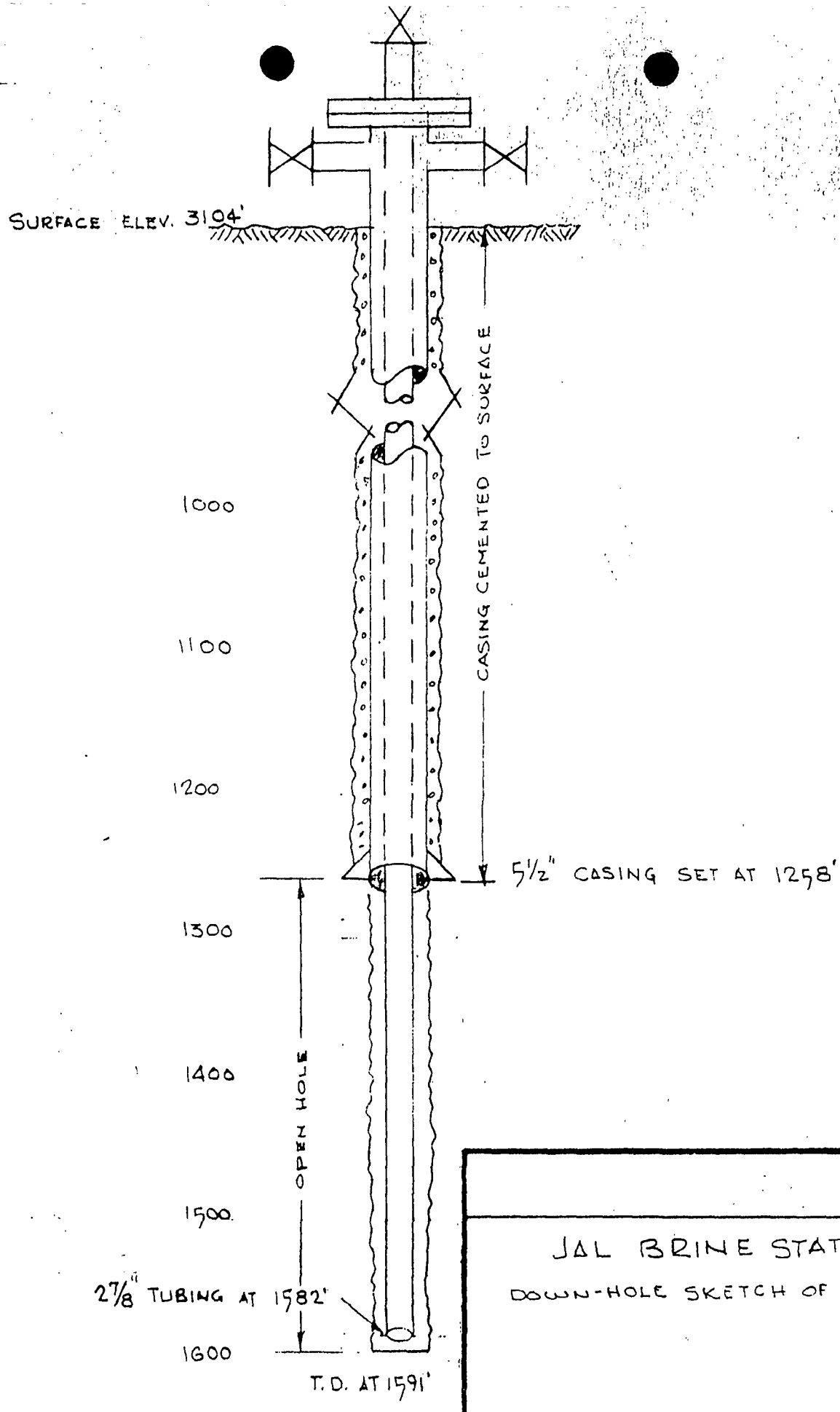
SCALE 1" = 100'

LAYOUT OF OPERATING FACILITIES

JAL BRINE STATION

BY: R.C. McCUTCHAN
TEX. P.E. 9844

DRAWING NO.: 1



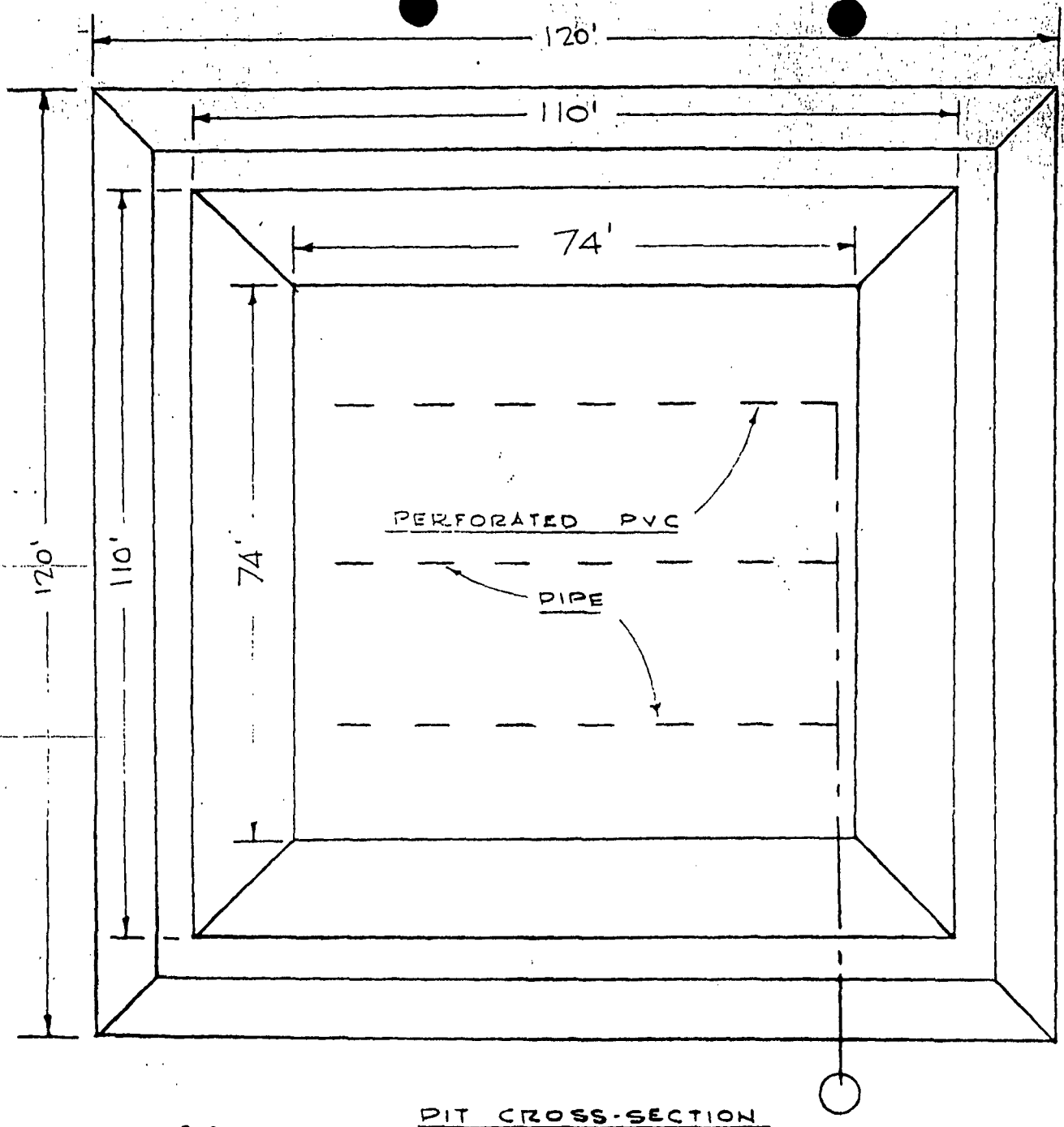

# JAL BRINE STATION

DOWN-HOLE SKETCH OF BRINE WELL

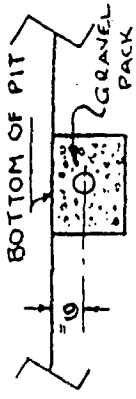
BY:
R.C. McCUTCHAN
TEX. P.E. 9844

DRAWING NO.:
2

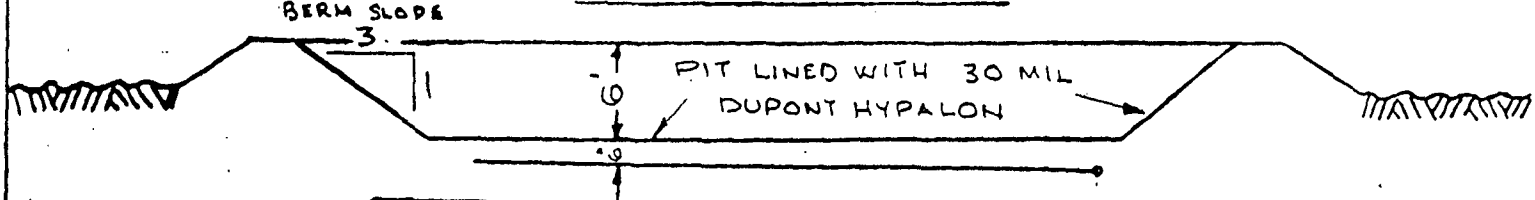
# BRINE STORAGE PIT




CROSS-SECTION OF LEAK DETECTION PIPING



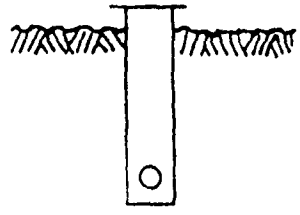

PIT CROSS-SECTION




NO SCALE

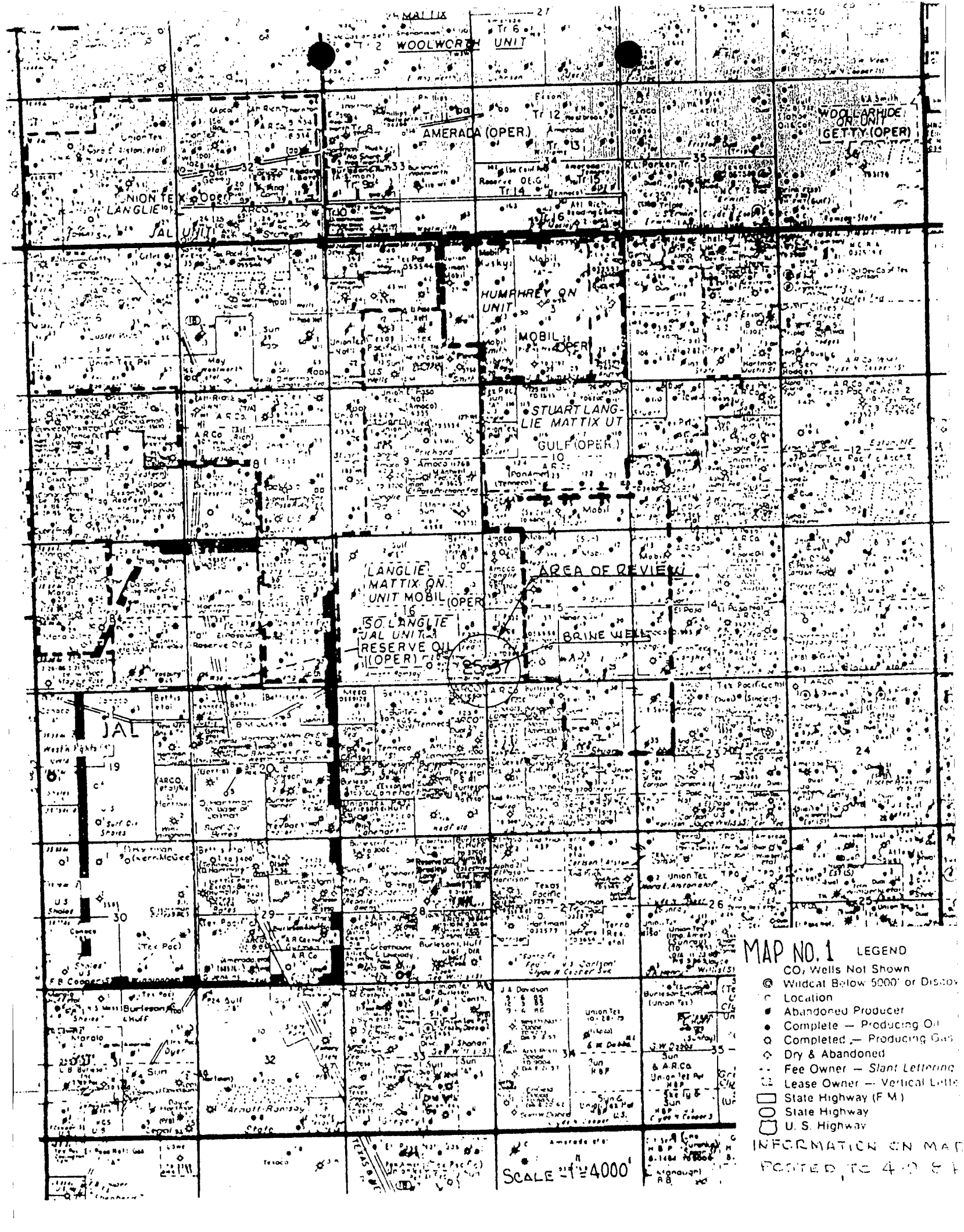
DETAILS OF BRINE STORAGE PIT
JAL BRINE STATION

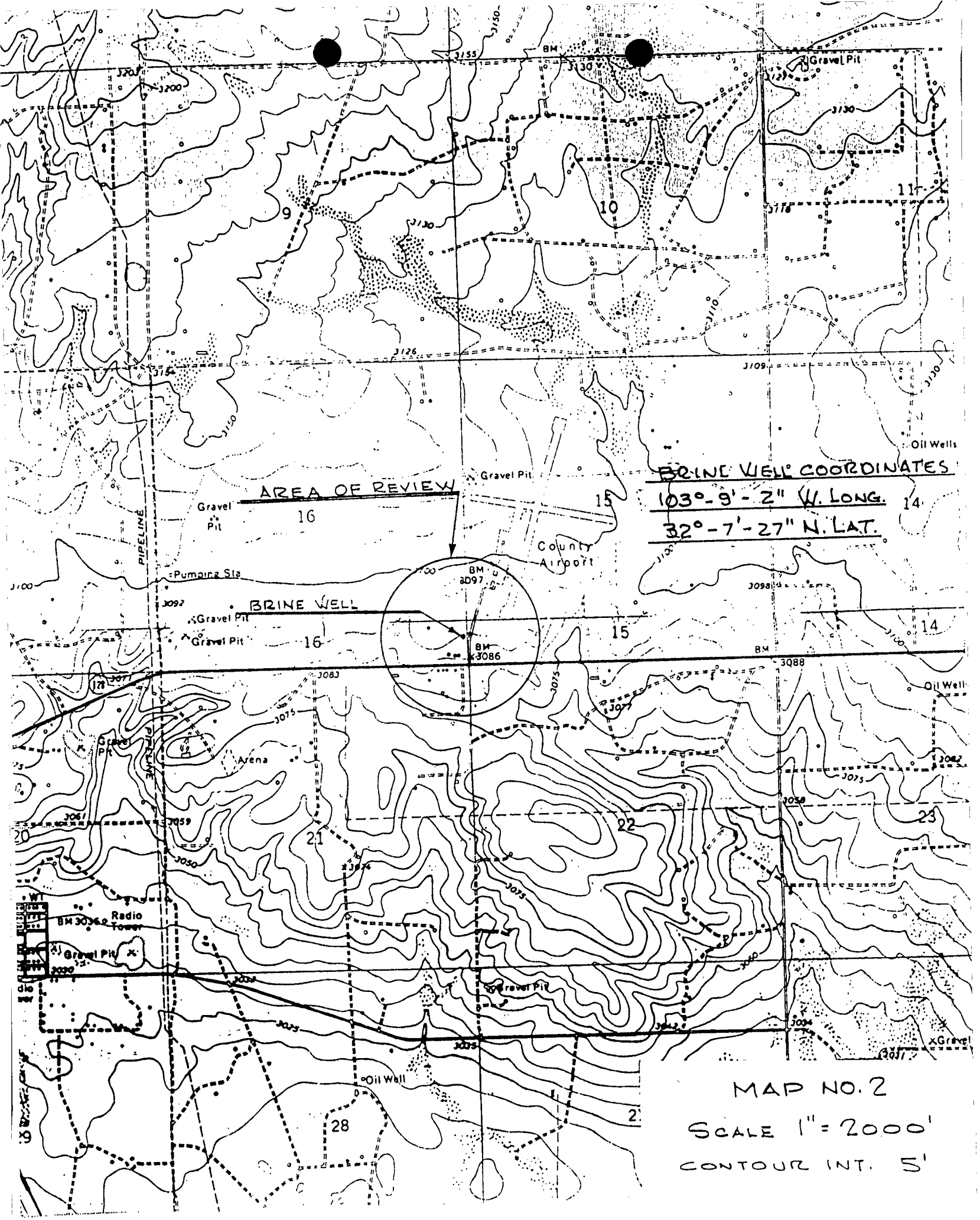
| | | |
|---|---|---|
| | BY R.C. McCUTCHAN TEX. P.E. 9844 | DRAWING NO 3 |



LEAK DETECTION SUMP

Form 203 5-57—88017-D


MATTIX
WOOLWORTH UNIT
AMERADA (OPER.)
WOOLARHOE UNIT
GETTY (OPER)
UNION TEX. (OPER)
LANGLIE JAL UNIT
HUMPHREY ON UNIT
MOBIL OPER.
STUART LANGLIE MATTIX UT
GULF (OPER.)
LANGLIE MATTIX ON. UNIT MOBIL (OPER)
SO. LANGLIE JAL UNIT RESERVE OIL (OPER)
AREA OF REVIEW
BRINE WELLS
JAL
Arnott-Ramsay
Texaco
Amerada
Scale 1" = 4000'
MAP NO. 1 LEGEND
CO2 Wells Not Shown
Wildcat Below 5000' or Discov
Location
Abandoned Producer
Complete — Producing Oil
Completed — Producing Gas
Dry & Abandoned
Fee Owner — Slant Lettering
Lease Owner — Vertical Lette
State Highway (F.M.)
State Highway
U. S. Highway
INFORMATION ON MAP
POSTED TO 4-0 &




MAP NO. 2

SCALE 1" = 2000'

CONTOUR INT. 5'

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

| NO. OF COPIES RECEIVED | | |
|---|---|---|
| DISTRIBUTION | | |
| SANTA FE | | |
| FILE | | |
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| LAND OFFICE | | |
| OPERATOR | | |

OIL CONSERVATION DIVISION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Jal #4

Form C-103
Revised 10-1-78

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: M14474

## 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.)

OIL WELL [ ] GAS WELL [ ] OTHER- Brine Well

7. Unit Agreement Name:

Name of Operator: Permian Brine Sales & Service, Inc.

8. Farm or Lease Name: Arnott Ramsey State

Address of Operator: P.O. Box 1591 Odessa, Texas 79760

9. Well No.: 4

Location of Well: UNIT LETTER P, 515 FEET FROM THE South LINE AND 100 FEET FROM THE East LINE, SECTION 16 TOWNSHIP 25S RANGE 37E NMPM.

10. Field and Pool, or Wildcat: Wildcat

15. Elevation (Show whether DF, RT, GR, etc.)

12. County

16. 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 [ ] | | COMMENCE DRILLING OPNS. [ ] | PLUG AND ABANDONMENT [ ] |
| PULL OR ALTER CASING [ ] | CHANGE PLANS [ ] | CASING TEST AND CEMENT JOB [X] | |
| OTHER [ ] | | OTHER [ ] | |

17. 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.

Open Hole Drilled to 1269'
17# - 5½" casing cemented with 400 sacks
Class H with 2% $CaCl_2$
Circulated to 60' - cemented
0-60' through 1" pipe - waited 48 hours.
Drilled out cement plug to 1271' - tested casing and cement.
Held 500# for 30 minutes.
Drilled ahead to 1591 feet, and hung 2 7/8 tubing in open hole @ 1582 ft.

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

SIGNED A.L. Hickerson TITLE President DATE 3-18-81

A.L. Hickerson

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

| DISTRIBUTION | |
|---|---|
| SANTA FE | |
| FILE | |
| U.S.G.S. | |
| LAND OFFICE | |
| OPERATOR | |

NEW MEXICO OIL CONSERVATION COMMISSION

# WELL COMPLETION OR RECOMPLETION REPORT AND LOG

Form C-105
Revised 10-1-78

Indicate Type of Lease: STATE [X] FEE [ ]

State Oil & Gas Lease No.: M-4474

1a. TYPE OF WELL
b. TYPE OF COMPLETION
OIL WELL [ ] GAS WELL [ ] DRY [ ] OTHER
NEW WELL [ ] WORK OVER [ ] DEEPEN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] OTHER

7. Unit Agreement Name

8. Farm or Lease Name: Arnott Ramsey State

2. Name of Operator: Permian Brine Sales & Service, Inc.

9. Well No.: 4

3. Address of Operator: P.O. Box 1591, Odessa, Texas 79760

10. Field and Pool, or Wildcat: Wildcat

4. Location of Well
UNIT LETTER P LOCATED 515 FEET FROM THE South LINE AND 100 FEET FROM THE East LINE OF SEC. 16 TWP. 25S RGE. 37E NMPM

12. County: Lea

| 15. Date Spudded | 16. Date T.D. Reached | 17. Date Compl. (Ready to Prod.) | 18. Elevations (DF, RKB, RT, GR, etc.) | 19. Elev. Casinghead |
|---|---|---|---|---|
| 10-8-80 | 3-10-81 | 3-10-81 | 3104 G.L. | 3106 |

| 20. Total Depth | 21. Plug Back T.D. | 22. If Multiple Compl., How Many | 23. Intervals Drilled By | Rotary Tools | Cable Tools |
|---|---|---|---|---|---|
| 1591' | 1582 | - | → | 120-1591 | 0-120 |

24. Producing Interval(s), of this completion — Top, Bottom, Name
Salt Section Open Hole 1258-1591

25. Was Directional Survey Made: NO

26. Type Electric and Other Logs Run: NONE

27. Was Well Cored: NO

28. CASING RECORD (Report all strings set in well)

| CASING SIZE | WEIGHT LB. FT. | DEPTH SET | HOLE SIZE | CEMENTING RECORD | AMOUNT PULLED |
|---|---|---|---|---|---|
| 5 1/2" | 17# | 1258' | 7 7/8 | 400 SX | NONE |

29. LINER RECORD

| SIZE | TOP | BOTTOM | SACKS CEMENT | SCREEN |
|---|---|---|---|---|
| | | | | |

30. TUBING RECORD

| SIZE | DEPTH SET | PACKER SET |
|---|---|---|
| | | |

31. Perforation Record (Interval, size and number)
Open Hole 1258-1591

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

| DEPTH INTERVAL | AMOUNT AND KIND MATERIAL USED |
|---|---|
| | |

33. PRODUCTION

| Date First Production | Production Method (Flowing, gas lift, pumping — Size and type pump) | Well Status (Prod. or Shut-in) |
|---|---|---|
| | | |

| Date of Test | Hours Tested | Choke Size | Prod'n. For Test Period → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Gas — Oil Ratio |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| Flow Tubing Press. | Casing Pressure | Calculated 24-Hour Rate → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Oil Gravity — API (Corr.) |
|---|---|---|---|---|---|---|
| | | | | | | |

34. Disposition of Gas (Sold, used for fuel, vented, etc.)

Test Witnessed By

35. List of Attachments

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED A.L. Hickerson TITLE President DATE 3-11-81

A.L. Hickerson

This form is to be filed with the appropriate district office of the Commission not later than [redacted] days after the completion of any newly-drilled or deepened well. It shall be accompanied by [redacted] copy of all electrical and radioactivity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filled in quintuplicate except on state land, where six copies are required. See Rule 1105.

## INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

| Southeastern New Mexico | | | Northwestern New Mexico | | |
|---|---|---|---|---|---|
| T. Anhy 1035 | T. Canyon | | T. Ojo Alamo | T. Penn. "B" | |
| T. Salt 1155 | T. Strawn | | T. Kirtland-Fruitland | T. Penn. "C" | |
| B. Salt | T. Atoka | | T. Pictured Cliffs | T. Penn. "D" | |
| T. Yates | T. Miss | | T. Cliff House | T. Leadville | |
| T. 7 Rivers | T. Devonian | | T. Menefee | T. Madison | |
| T. Queen | T. Silurian | | T. Point Lookout | T. Elbert | |
| T. Grayburg | T. Montoya | | T. Mancos | T. McCracken | |
| T. San Andres | T. Simpson | | T. Gallup | T. Ignacio Qtzte | |
| T. Glorieta | T. McKee | | Base Greenhorn | T. Granite | |
| T. Paddock | T. Ellenburger | | T. Dakota | T. | |
| T. Blinebry | T. Gr. Wash | | T. Morrison | T. | |
| T. Tubb | T. Granite | | T. Todilto | T. | |
| T. Drinkard | T. Delaware Sand | | T. Entrada | T. | |
| T. Abo | T. Bone Springs | | T. Wingate | T. | |
| T. Wolfcamp | T. | | T. Chinle | T. | |
| T. Penn. | T. | | T. Permian | T. | |
| T Cisco (Bough C) | T. | | T. Penn. "A" | T. | |

## OIL OR GAS SANDS OR ZONES

No. 1, from ..... to ..... No. 4, from ..... to .....

No. 2, from ..... to ..... No. 5, from ..... to .....

No. 3, from ..... to ..... No. 6, from ..... to .....

## IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from 450 To 475' to 260 feet. .....

No. 2, from ..... to ..... feet. .....

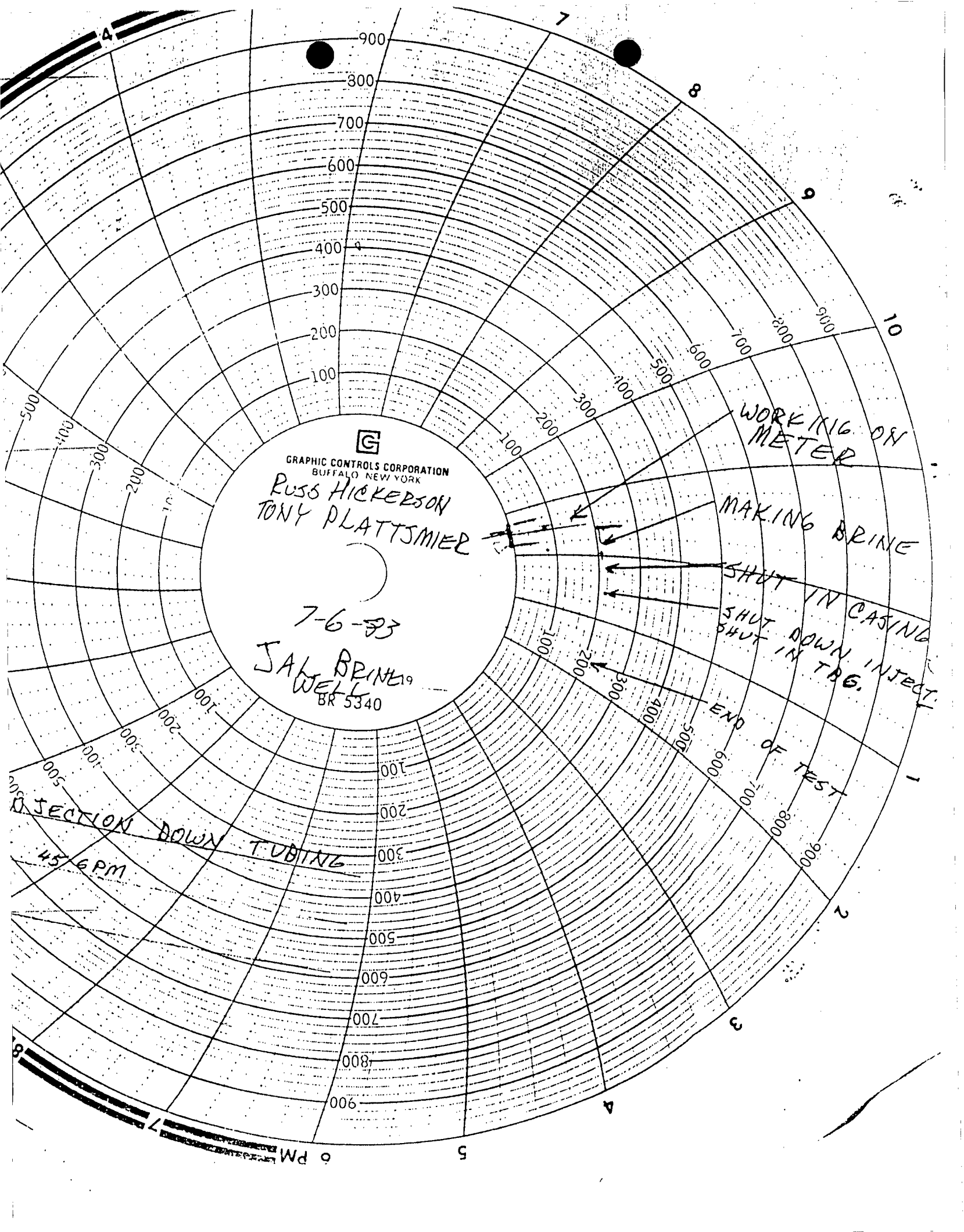
No. 3, from ..... to ..... feet. .....

No. 4, from ..... to ..... feet. .....

## FORMATION RECORD (Attach additional sheets if necessary)

| From | To | Thickness in Feet | Formation | From | To | Thickness in Feet | Formation |
|---|---|---|---|---|---|---|---|
| 0 | 10 | 10 | Caliche | | | | |
| 10 | 60 | 50 | Sand | | | | |
| 60 | 1035 | 975 | Red Beds | | | | |
| 1035 | 1155 | 120 | Rustler Anhydrite | | | | |
| 1155 | 1591 | 436 | Salt With Shale And Anhydrite Stringers | | | | |

EXHIBIT 1


GRAPHIC CONTROLS CORPORATION
BUFFALO NEW YORK
RUSS HICKERSON
TONY PLATTSMIER
7-6-93
SALT BRINE
WELL
BR 5340
WORKING ON METER
MAKING BRINE
SHUT IN CASING
SHUT DOWN INJECT
SHUT IN TBG.
END OF TEST
INJECTION DOWN TUBING
45 GPM

12. The test for mechanical integrity of the underground casing and cavern is accomplished by pressuring the well to 1 ½ times the normal operating pressure. This is done by pumping fresh water into the well, through the tubing while the casing outlet is closed. A record of the volume of fresh water pumped and the time required to reach the test pressure is recorded. The well is then shut-in and is left in this condition for at least four hours. The pressures are monitored on a pressure recorder at the well site.

Small reductions in the test pressure, during the test period, are the result of salt entering solution. This process is influenced by the downhole conditions in the salt strata. If the well has a large cavern capacity and has not been circulated at high volume rates in the recent past, the fluid in the underground system is fully saturated. Therefore, the volume of fresh water required to pressure the cavern will be comparatively less than under the opposite conditions. The shut-in pressure will also indicate minimum change, over the test period, due to the fact that the comparatively small amount of fresh water entering solution will not materially effect the huge volume of saturated brine in the cavern. Conversely, if brine has been produced at a high rate immediately preceeding the test then, not only is the water used for pressuring entering solution, but some of the previously pumped fresh water for brine production is also dissolving salt, and thus enlarging the cavern during the pressure test.

TABLE 3. STRATIGRAPHIC UNITS IN SOUTHERN LEA COUNTY, N. MEX.

| Geologic age | | Geologic unit | Thickness (ft) | General character | Water-bearing properties |
|---|---|---|---|---|---|
| Cenozoic Quaternary | Recent and Pleistocene | Sand | 0–30± | Dune sand, unconsolidated stabilized to drifting, semiconsolidated at depth; fine- to medium-grained. | Above the zone of saturation, hence, does not yield water to wells. Aids recharge to underlying formations by permitting rapid infiltration of rainwater. |
| | | Alluvium | 0–400± | Channel and lake deposits; alternating thickbedded calcareous silt, fine sand, and clay; thickest in San Simon Swale; less than 100 feet thick in most places. | Saturated and highly permeable in places in east end of Laguna Valley. Forms continuous aquifer with Ogallala formation. Wells usually yield less than 30 gpm. Locally above the water table. |
| Cenozoic Tertiary | Pliocene | Ogallala | 0–300± | Semiconsolidated fine-grained calcareous sand capped with thick layer of caliche; contains some clay, silt, and gravel. | Major water-bearing formation of the area. Unsaturated in many localities, such as north side of Grama Ridge, west side of Eunice Plain, Antelope Ridge area, and Rattlesnake Ridge. Greatest saturated thickness along east side of Eunice Plain, west of Monument Draw, where wells yield up to 30 gpm. Highest yields, up to 700 gpm, obtained from wells along south edge of Eunice Plain, east of Jal. |
| Mesozoic Cretaceous | | Undifferentiated | 35± | Small isolated and buried residual blocks of limestone, about 3 miles east of Eunice. | Possibly small isolated bodies of water locally. |
| Mesozoic Triassic | Dockum group | Chinle formation | 0–1,270± | Claystone, red and green; minor fine-grained sandstones and siltstones; underlies all of eastern part of southern Lea County area; thins westward; absent in extreme west. | Yields small quantities of water from sandstone beds. Yields are rarely over 10 gpm. Water has high sulfate content. |
| | | Santa Rosa sandstone | 140–300± | Sandstone, chiefly red but locally white, gray, or greenish-gray; fine- to coarse-grained; exposed in extreme west; underlies Cenozoic rocks in western part of area, and is present at depth in eastern part. | Yields small quantities of water over most of the area. Some wells are reported to yield as much as 100 gpm. Water has high sulfate content. |
| Paleozoic | Permian or Triassic | Undifferentiated | 90–400+ | Siltstone, red, shale, and sandstone; present at depth under all of southern Lea County. | No wells are known to be bottomed in the red beds. Probably can yield very small quantities of high-sulfate water. |
| Paleozoic | Ordovician through Permian | | 6,500–17,000± | Thick basin deposits ranging in character from evaporites to coarse clastics; thinnest on the east side of the area over the Central basin platform, thickest toward the southwest. | No presently usable water supply available from these rocks. Source of highly mineralized oil-field waters. |
| Precambrian | | | | Granite, granodioritic and other igneous and metamorphic rocks; complex structure. | Not hydrologically significant. |

## TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX.

LOCATION NUMBER: Explanation in section on well-numbering system.

OWNERS: EPNG, El Paso Natural Gas Co.; MCRA, Maljamar Cooperative Repressuring Agreement.

AQUIFER: Tr, Triassic rocks; To, Ogallala formation; Qal, Quaternary alluvium.

DEPTH OF WELL: M, measured; all other depths are reported.

ALTITUDE: Altitudes interpolated from topographic maps. Probable error less than 10 feet.

WATER LEVEL: Measured depths are given to nearest tenth of a foot; reported depths are given to nearest foot. All are non-pumping water levels except as noted otherwise in remarks column.

SURFACE DIAMETER OF WELLS: Expressed in inches unless otherwise indicated. Diameters of cased, drilled wells are given in inches. Diameters and rectangular dimensions of dug wells are given in feet.

METHOD OF LIFT: Lw, lift pump, windmill powered; Li, lift pump, internal-combustion-engine powered; Le, lift pump electrically driven; Te, turbine pump, electrically driven; Ti, turbine pump, internal-combustion-engine powered; Je, jet pump, electrically driven; N, unequipped or partly equipped.

USE OF WATER: D, domestic; L, domestic use other than drinking, such as watering lawns and gardens; P, public supply; I, irrigation; In, industrial; S, stock; N, none; O, observation.

REMARKS: EY, reported estimated yield; gpm, gallons per minute; gpd, gallons per day; MWP, measured while pumping; PR, pumped recently; WBZ, water-bearing zone.

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16.32.27.441 | Buffalo Oil Co. | To | 265 | 4,300 | 200(?) | — | — | 8⅝ | — | In | Perforations 194-254 feet. |
| 35.400 | Drew Taylor | To | 246M | 4,265 | 160(?) | — | — | 8¼ | Te | In,D | Taylor well 2. Northwest well of 3. EY 60-80 gpm. |
| 17.32.2.433 | MCRA | To | 200 | 4,240 | 60 | 1948 | — | 7 | Te | In,D | Well 6. EY 50 gpm. |
| 2.434 | MCRA | To | 192 | 4,240 | 60 | 6- 1-50 | 1948 | 7 | Te | In,D | Well 5. EY 50 gpm. |
| 2.443 | MCRA | To | 190 | — | — | — | — | 7 | Te | In,D | Well 7. EY 50 gpm. |
| 3.140 | Buffalo Oil Co. | To | — | — | — | — | — | — | — | In | Buffalo-Taylor well 3. Chemical analysis in table 8. |
| 3.320a | do. | To | — | 4,250 | 175.6 | 7-21-54 | — | 6 | N | N | Buffalo-Taylor well 2. Nearby well pumping. |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 17.32.4.442 | W. Taylor | Qal | — | 4,180 | 82.9 | 6- 3-54 | — | 6 | N | N | — |
| 11.231 | MCRA | To | 139 | 4,180 | — | — | 1947 | 7 | Te | In,D | Well 4. |
| 17.32.11.233 | MCRA | To(?) | 140 | 4,200 | 70 | 9-20-47 | — | 8 | Li | In,D | Well 2. EY 9 gpm. |
| 11.411 | MCRA | To(?) | 200 | 4,170 | 70 | 6-15-46 | — | 8 | Te | In,D | Well 1. EY 90 gpm. |
| 11.411a | MCRA | To(?) | 130 | — | 70 | 9-23-47 | — | 8 | Li | In,D | Well 3. EY 50 gpm. |
| 17.33.13.341 | Potash Co. of America | To | 252M | 4,124 | 149.7 | 11-20-53 | 1952 | 6 | N | O | — |
| 18.322 | Kewanee Oil Co. | To | 220 | 4,230 | — | — | — | 10¾ | Te | In,D | Two wells. Chemical analysis in table 8. |
| 26.422 | Phillips Oil Co. | To | — | 4,125 | 161.2 | 11-20-53 | 1950 | 8 | N | In,O | — |
| 28.110 | — | To | 241M | 4,185 | 198.0 | 5-11-54 | — | 7 | N | N | — |
| 30.124 | Walter Williams | Qal | — | 4,045 | 70.0 | 7-29-54 | — | 7 | Lw | S | PR |
| 18.33.14.111 | — | Qal | 40M | 3,965 | 35.8 | 6- 3-54 | — | 5 | N | N | — |
| 19.142 | — | Tr(?) | — | 3,820 | >140 | 12- 9-58 | — | 4 | Lw | S | — |
| 34.133 | — | Tr | 200M | 3,760 | 177.4 | 12- 9-58 | — | 8½ | N | N | — |
| 19.32.8.200 | — | Tr | — | 3,650 | 365.3 | 12- 9-58 | — | 7½ | Lw | S | Chemical analysis in table 8. |
| 36.100 | W. M. Snyder | Tr | 485 | 3,565 | — | — | — | — | Li | D,S | — |
| 19.33.5.213 | — | Tr | — | 3,710 | >299 | 12- 9-58 | — | — | Lw | S | — |
| 26.244 | Mark Smith | Qal | 101 | 3,600 | 92.9 | 7- 1-54 | — | — | Lw | D,S | MWP |
| 19.34.9.114 | Scharbauer Cattle Co. | Tr(?) | 53 | 3,790 | 28.6 | 6- 3-54 | — | 6 | Lw | S | Chemical analysis in table 8. |
| 31.131 | Clark Scharbauer | Qal | — | 3,625 | 65.8 | 7- 1-54 | — | 6 | Lw | S | MWP |
| 19.35.5.121 | Gene Dalmont | To | 88 | 3,890 | 50 | 7-28-54 | — | 8 | Ti | I | — |
| 5.234 | Jules Smith | To | 90 | 3,860 | 35 | — | — | — | Lw | D,S | — |
| 10.113 | N. T. Roberts | To | 36 | 3,860 | 19.9 | 7-28-54 | — | 6 | Lw | S | EY 5 gpm. |
| 12.444 | — | Qal | — | 3,740 | 34.2 | 7-28-54 | — | 3 ft. | Lw | S | — |
| 19.35.17.122 | J. D. Roberts | Qal | 50 | 3,855 | 29.9 | 7-28-54 | — | 3×3 ft. | Lw | D,S | Dug 0-30 feet; drilled 30-50 feet. |
| 22.334 | — | Qal | — | 3,740 | 23.5 | 7-28-54 | — | 8 | Lw | N | — |
| 24.121 | — | Qal | — | 3,735 | 28.6 | 11-16-53 | — | 6 ft. | N | N | — |
| 25.424 | — | Qal | — | 3,675 | 22.6 | 11-16-53 | — | — | N | N | Uncased shothole. |
| 25.434 | — | Qal | — | 3,660 | 22.8 | 11-16-53 | — | 6 | Lw | S | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 19.36.5.233 | Tom Green | To | 60 | 3,815 | 52.3 | 7-28-54 | — | — | Lw | D,S | — |
| 19.313 | — | Qal | 44.6M | 3,685 | 18.6 | 11-16-53 | — | — | N | N | Uncased shothole. |
| 20.111 | Tom Green | Qal | — | 3,695 | 25.7 | 7-28-54 | — | — | Lw | S | EY 10 gpm. PR |
| 25.123 | — | To | 43M | 3,680 | 16.0 | 3-18-54 | — | 6 | N | N | Northwest well of six. Chemical analysis in table 8. |
| 19.36.26.224 | J. E. Weir | Qal | 12.7M | 3,650 | 6.7 | 5- 7-54 | — | 4×5 ft. | N | N | At Monument Spring. |
| 28.422 | Mrs. Abi Hall | To | 52M | 3,720 | 36.6 | 3-18-54 | — | 7 | N | N | — |
| 28.441 | do. | To | 27M | 3,680 | 22.7 | 3-18-54 | — | 6 | N | N | — |
| 32.110 | S. P. Jordan | Qal | 32 | 3,645 | 19 | 11-20-29 | — | — | — | — | Chemical analysis in table 8. |
| 32.324 | — | Qal | 30 | 3,630 | 27.2 | 7-28-54 | — | 4×4 ft. | Lw | N | — |
| 19.37.4.110 | V. Linam | To | 29 | 3,680 | 21 | 9-19-29 | — | — | — | — | Chemical analysis in table 8. |
| 18.111 | Amerada Oil Co. | To | 134 | 3,705 | 35 | 9- -47 | 1947 | 10¾ | Ti | D | Monument District Camp. WBZ 67-108 feet, 112-125 feet. EY 385 gpm. |
| 18.331 | EPNG | To | — | 3,710 | 51.9 | 3-18-54 | — | 10 | N | N | — |
| 20.242 | Humble Oil Co. | — | 80 | 3,660 | Dry | — | 1937 | — | N | N | Plugged and abandoned. |
| 21.132 | do. | To | 67 | 3,635 | — | — | 1937 | — | — | — | State "D" well 2. EY 30 gpm. |
| 19.37.25.422 | — | To | — | 3,600 | 40 | 4- 6-54 | — | — | Lw | S | — |
| 29.333 | — | Qal | — | 3,595 | 13.3 | 7-28-54 | — | 7 | Lw | D | MWP |
| 29.344 | Hobbs School district | Qal | 30± | — | 21.5 | 3-23-60 | — | 8 | Te | P | — |
| 29.344a | do. | Qal | 30± | — | — | — | — | 6 | Te | P | Chemical analysis in table 8. |
| 30.113 | Continental Oil Co. | Qal | 60 | 3,660 | — | — | — | — | Te | D | Pumps dry in summer. |
| 20.32.1.322 | W. M. Snyder | Qal | 30 | 3,510 | 21.8 | 7- 1-54 | — | 6 | Li | S | Water not potable. |
| 18.235 | Freeport Sulfur Co. | Tr | 400 | 3,450 | 89.2 | 3-24-54 | 1954 | 8 | Li | In | WBZ 215-243 feet. |
| 27.144 | Joel Frey | Qal | 25 | 3,545 | 12.3 | 6-11-54 | — | — | Lw | N | — |
| 30.142 | — | Qal | — | 3,530 | 9.9 | 6-11-54 | — | 8⅝ | N | N | Located in sink. |
| 36.214 | Mrs. Bingham | Qal | 60 | 3,588 | 46.6 | 6- 6-55 | 1950 | 7¼ | Lw | D | West well of three. |
| 20.33.15.221 | — | Tr | — | 3,570 | 336.1 | 4-20-55 | — | 4 | Li | N | — |
| 24.122 | D. C. Berry | Tr | 700± | 3,630 | 300± | — | — | 10 | Lw | S | — |
| 20.34.17.334 | Mark Smith | Tr | 200 | 3,635 | 140 | 7- 1-54 | 1940 | 10 | Lw | S | MWP |
| 22.223 | D. C. Berry | Tr | 235 | 3,655 | — | — | — | 10 | Lw | S | — |
| 20.35.1.221 | J. L. Wood | Qal | 35 | 3,655 | 24.5 | 11-16-53 | — | 4×4 ft. | N | O | — |
| 31.113 | Leo Sims | To | 85 | 3,740 | 68.4 | 6-25-54 | — | 6 | Lw | S | PR |
| 33.433 | do. | To | 135 | 3,700 | 94.1 | 6-25-54 | — | 7 | Lw | S | MWP |
| 35.333 | do. | To | 105 | 3,690 | 88.9 | 4-15-54 | — | — | Lw | D,S | MWP Southeast well of two. |
| 20.36.1.412 | Amerada Oil Co. | Qal | 72M | 3,565 | 33.1 | 5-30-54 | — | 7 | N | N | — |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20.36.5.321 | — | Qal | — | 3,635 | 28.3 | 11-16-53 | — | 6 | Lw | S | — |
| 12.141 | — | Qal | 40 ± M | 3,550 | 29.5 | 3-25-54 | — | — | Lw | S | — |
| 12.222 | Sunray Oil Co. | Qal | 56 | 3,560 | 29.0 | 3-30-54 | — | 7 | Lw | I, | Water not potable. |
| 20.36.15.222 | Continental Oil Co. | Tr | 700 | 3,575 | — | — | — | - | Ln | D | — |
| 15.421 | H. S. Record | Qal | 50 | 3,575 | 35.7 | 3-30-54 | 1938 | 8½ | Lw | S | Water not potable. MWP. Chemical analysis in table 8. |
| 24.423 | — | Qal | 50 ± M | 3,540 | 36.4 | 3-25-54 | — | 7 | Lw | In | Water used to soak wooden tanks. |
| 25.312 | Stanolind Oil and Gas Co. | Tr | 225 | 3,550 | 117.3 | 3-25-54 | — | 6 | Lw | D | — |
| 26.244 | Amerada Oil Co. | Tr | 265 | 3,555 | — | — | — | 7½ | Li | In | Water used for oil well drilling. |
| 32.112 | Leo Sims | Tr | 612 | 3,640 | 300 | 4-15-54 | — | — | Lw | S | — |
| 35.244 | Humble Oil Co. | Tr | 230 | 3,550 | — | — | 1938 | — | — | In | Federal Fopeano well 2. EY 18 gpm. |
| 20.27.3.341 | — | Qal | — | 3,560 | 19.5 | 4- 1-54 | — | 7½ | Lw | S | Water not potable. |
| 20.37.4.111 | Jim Cooper | Qal | 40 | 3,560 | — | — | — | — | Je | L | Chemical analysis in table 8. |
| 4.221 | Nolan and Lane | Qal | 45 | 3,555 | 31.4 | 4- 2-54 | 1940 | 6 | Lw | D | Chemical analysis in table 8. |
| 4.314 | — | Qal | 48M | 3,550 | 32.8 | 4- 2-54 | — | 8 | N | N | — |
| 4.341 | Humble Oil Co. | Qal | 106 | 3,550 | — | — | 1935 | — | — | — | Plugged and abandoned. |
| 4.444 | — | Qal | 30 ± M | 3,560 | 23.5 | 4- 1-54 | — | 8 | N | N | — |
| 5.333 | Amerada Oil Co. | Qal | 75 | 3,555 | — | — | 1954 | 7 | Ti | In | WBZ 55-65 feet. |
| 7.133 | — | Qal | — | 3,555 | 27.1 | 3-29-54 | — | 8½ | N | N | — |
| 7.241 | — | Qal | 28.5M | 3,550 | 26.4 | 3-29-54 | — | 8½ | N | N | About 70 feet northwest of windmill. |
| 7.434 | — | Qal | — | 3,540 | 25.2 | 3-30-54 | — | 8½ | Lw | S | MWP. |
| 8.321 | Amerada Oil Co. | Qal | 86 | 3,550 | 30 | 1 23-54 | 1951 | 7 | Tu | In | Reportedly had no measurable drawdown at 50 gpm. |
| 20.37.8.424 | Tidewater Oil Co. | Qal | 62 | 3,545 | 25.9 | 3-22-54 | — | — | Li | D | EY less than 1 gpm. |
| 9.110 | W. H. Laughlin | Qal | 53 | 3,558 | 34.0 | 11-16-53 | — | 4×6 ft. | N | O | — |
| 9.331 | Skelly Oil Co. | Qal | — | 3,545 | 18.0 | 3-22-54 | — | 7 | N | N | — |
| 13.321 | Earl Kornegay | Qal(?) | 78M | 3,545 | 75.7 | 4- 2-54 | — | — | Lw | S | — |
| 16.144 | — | Qal | 56M | 3,525 | 13.2 | 2- 8-53 | — | 6 | N | N | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 17.131 | — | Qal | — | 3,540 | 24.8 | 4- 1-54 | — | 7½ | Lw | N | — |
| 20.431 | — | Qal | 40 | 3,510 | 24.1 | 3-26-54 | — | 12 | Lw | S | PR |
| 21.400 | — | Qal | — | 3,500 | 43.0 | 3-26-54 | — | 7 | N | N | — |
| 28.122 | Gulf Oil Corp. | Qal | 60 | 3,500 | 29.3 | 3-26-54 | — | 7 | N | N | — |
| 28.244 | — | Qal | 42±M | 3,490 | 37.4 | 3-26-54 | — | 6 | Lw | S | PR |
| 29.111 | Mid-Continent Petroleum Co. | Qal | — | 3,520 | 43.8 | 3-25-54 | — | 7 | N | N | — |
| 31.144 | Humble Oil Co. | Qal | 144 | 3,600 | — | — | — | — | — | — | WBZ gray sand, 60-98 feet. |
| 20.37.31.211 | Humble Oil Co. | Qal | 125 | 3,540 | Dry | — | — | — | — | — | Penetrated red beds at 40 feet. |
| 35.441 | Continental Oil Co. | Qal | 63M | 3,480 | 53.4 | 3-23-54 | — | 12 | N | N | — |
| 36.330 | do. | Qal | 120 | — | — | — | — | — | Te | In,D | One of two wells supplying pump station for lease houses. |
| 20.38.6.143 | — | To | — | 3,575 | 45.9 | 4- 6-54 | — | — | Lw | S | PR |
| 7.222 | William Walker | To(?) | 112 | — | — | — | — | 24 | Ti | I | — |
| 7.411 | A. E. Galloway | To(?) | 125 | — | — | — | — | — | Ti | I | — |
| 8.231 | City of Eunice | Qal | — | 3,570 | — | — | — | — | Te | P | West well of two. EY 600 gpm. |
| 8.232 | do. | Qal | — | 3,570 | — | — | — | — | Te | P | East well of two. |
| 8.311 | A. E. Galloway | Qal | 125 | 3,570 | 64.1 | 4- 2-54 | — | — | Ti | I | — |
| 9.124 | — | Qal | 40±M | 3,570 | 35.2 | 4- 2-54 | — | — | Lw | S | — |
| 11.414 | — | To | 33M | 3,565 | 30.7 | 12- 9-53 | — | 3½ ft. | N | N | — |
| 20.38.12.244 | — | To | — | 3,565 | 43.7 | 12- 7-53 | — | 6½ | N | N | — |
| 16.133 | Earl Kornegay | Qal | — | 3,560 | 50 | 3-22-54 | — | — | Lw | S | — |
| 17.113 | Amerada Oil Co. | Qal | 120 | 3,565 | — | — | 1951 | 7 | Ti | In | EY 40 gpm. |
| 17.141 | Earl Kornegay | Qal | 105±M | 3,555 | 59.3 | 3-22-54 | — | 7 | N | N | — |
| 17.142 | do. | Qal | 96M | 3,555 | 57.2 | 3-22-54 | — | — | N | N | — |
| 17.333 | Amerada Oil Co. | Qal | 116 | — | — | — | — | 7 | Ti | In | EY 35 gpm. |
| 17.334 | do. | Qal | 168 | 3,550 | 72.8 | 3-22-54 | — | — | N | N | — |
| 18.242 | do. | Qal | 124 | 3,565 | 50 | 3- -52 | — | 7 | Je | D | EY 17 gpm. |
| 19.320 | Continental Oil Co. | Qal | 115 | 3,545 | 78.8 | 4- 2-54 | — | 8 | Le | D | Chemical analysis in table 8. |
| 31.341 | — | Qal | 70±M | 3,490 | 66.7 | 3-23-54 | — | 6 | N | N | — |
| 20.39.7.133 | — | To | — | 3,565 | 43.6 | 12- 7-53 | — | 7½ | N | N | — |
| 18.344 | Earl Kornegay | To | 60±M | 3,540 | 46.2 | 12- 9-53 | — | — | N | N | Located northwest of windmill. |
| 21.33.2.231 | The Texas Co. | Tr | 1,150 | 3,810 | — | — | — | — | Li | D | Chemical analysis in table 8. |
| 21.33.2.422 | D. C. Berry | To | 120 | 3,805 | 107.2 | 6-28-54 | — | — | Lw | D | Chemical analysis in table 8. |
| 2.442 | do. | To | — | 3,800 | 72.9 | 6-28-54 | — | 10 | Lw | S | Located on west side of sink and west of earthen tank. |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21.33.2.442a | do. | To | — | — | — | — | — | — | Lw | D,S | Located on east side of earthen tank. Chemical analysis in table 8. |
| 18.112 | do. | To | — | 3,900 | 143.0 | 6-21-54 | — | — | Lw | S | — |
| 28.124 | San Simon Ranch | Tr | 224 | 3,690 | 179.5 | 6-30-54 | — | 7½ | N | N | "Standard" well. |
| 21.34.8.422 | do. | To | 120 | 3,705 | 105.8 | 6-30-54 | — | — | Lw | S | — |
| 13.324 | Wilson Oil Co. | Tr | 335 | 3,655 | 200 | 1943 | 1943 | — | Li | D | — |
| 25.225 | do. | To | 220 | 3,660 | 150 | 1954 | — | — | Li | In,D | — |
| 21.34.24.222 | Mid-Continent Oil Co. | Tr(?) | 125 | 3,655 | — | — | — | — | Li | D | — |
| 35.233 | San Simon Ranch | To | 80M | 3,665 | 67.0 | 6- 6-55 | — | 7¼ | N | N | "Christmas" well. |
| 21.35.1.122 | Amerada Oil Co. | Tr | 312 | 3,550 | 175 | 6- 7-54 | 1954 | 7 | Li | In | EY 9 gpm. |
| 7.211 | Wilson Oil Co. | Tr | 430 | 3,700 | 340 | 1940(?) | 1940 | — | Li | D | One of two water wells at Wilson Camp. |
| 14.111 | San Simon Ranch | Tr | 250 | 3,580 | 147.3 | 6- 7-55 | — | 6 | Lw | S | "Scharbauer" well. |
| 24.223 | do. | Tr | — | 3,620 | 205.7 | 4-14-54 | — | — | Lw | S | — |
| 27.321 | — | To | — | 3,615 | 21.8 | 12- 8-58 | — | — | N | N | — |
| 27.321a | — | To | — | 3,620 | — | — | — | — | Lw | S | Chemical analysis in table 8. |
| 21.35.30.411 | San Simon Ranch | To | 58M | 3,630 | 35.6 | 11-25-53 | — | 7½ | Lw | S | — |
| 21.36.9.222 | W. L. Van Noy | Tr | 447 | 3,605 | <350 | — | — | 8 | Li | P | EY 6 gpm. Public supply for Oil Center. Chemical analysis in table 8. |
| 10.112 | Humble Oil Co. | Tr | 495 | — | — | — | — | — | N | N | WBZ sand, 385-395 feet. |
| 19.222 | Pacific-Western Oil Co. | To(?) | 230M | 3,630 | 216.0 | 1- 7-54 | — | 8 | N | N | — |
| 25.235 | Frontier Country Club | To | 200 | 3,555 | 139.0 | 4-22-55 | 1955 | 8⅝ | — | — | Unfinished well. Recently bailed. |
| 28.243 | — | To | 197M | 3,585 | 174.5 | 1-15-54 | — | 6¾ | N | N | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21.36.29.144 | Humble Oil Co. | To(?) | 305 | 3,630 | — | — | 1935 | — | N | N | WBZ sand, 225-305 feet. |
| 33.223 | — | To | 215±M | 3,590 | 205.5 | 11-12-53 | — | 6½ | N | N | — |
| 36.242 | W. M. Snyder | To | — | 3,505 | 113.3 | 1-15-54 | — | 6 | Lw | S | MWP |
| 21.37.6.244 | — | To | — | 3,495 | 70.3 | 3-23-54 | — | 8 | Li | — | — |
| 10.211 | Continental Carbon Black Co. | Qal | 76 | 3,440 | 26 | 1953 | 1945 | 8 | Te | In,D | — |
| 11.311 | — | Qal | 77M | 3,426 | 39.1 | 12- 8-53 | — | 7¼ | N | N | — |
| 12.341 | Terry and McNeil | Qal | 100 | 3,450 | 76.3 | 10- 2-53 | — | 7 | Ti | In | — |
| 13.111 | Western Oil Field Corp. | Qal | 185 | 3,425 | 60 | 10- 2-53 | 1953 | — | — | — | Drilled for oil. |
| 14.123 | — | Qal | — | 3,420 | 25.4 | 12- 8-53 | — | 6 | Lw | S | — |
| 18.442 | T. Davis | To | 125 | 3,510 | 99.7 | 1-10-54 | — | 7 | Ti | D,S | — |
| 21.111 | — | To | — | 3,460 | 73.1 | 1-10-54 | — | 7¾ | N | N | — |
| 21.37.22.211 | — | To | 49M | 3,420 | 37.7 | 4-21-55 | — | — | N | N | — |
| 22.413 | — | To | — | 3,410 | 75.0 | 10- 1-53 | — | 7 | N | N | — |
| 23.211 | Skelly Oil Co. | To(?) | 81 | 3,420 | 42.5 | 10- 1-53 | 1948 | — | N | N | Skelly Eunice Plant 2, well 1. Initial yield, 55 gpm. |
| 23.213 | do. | To(?) | 83 | 3,410 | 45.8 | 10- 1-53 | 1948 | — | N | N | Skelly Eunice Plant 2, well 2. |
| 23.231 | do. | To(?) | 84 | 3,410 | 43.0 | 10- 1-53 | 1948 | — | N | N | Skelly Eunice Plant 2, well 3. Initial yield, 100 gpm. |
| 23.233 | do. | To(?) | 81 | 3,405 | 44.1 | 10- 1-53 | 1948 | — | N | N | Skelly Eunice Plant 2, well 4. Initial yield, 60 gpm. |
| 23.300 | Gulf Oil Corp. | To | 100 | 3,390 | 59 | 5-31-50 | 1948 | 10¾ | Te | In,D | Gulf Eunice Gasoline Plant, well 22. |
| 21.37.23.331 | — | To | — | 3,385 | 72.9 | 10- 1-53 | — | 8½ | N | N | — |
| 23.331a | Gulf Oil Corp. | To | 96 | 3,390 | 61 | 5-31-50 | — | 7 | Te | In,D | Gulf Eunice Plant, well 23. |
| 26.325 | do. | To | 101 | 3,365 | 64 | 12- 3-48 | — | — | Te | In,D | Gulf Eunice Plant, Cone well 1 |
| 26.400 | do. | Qal | 160 | 3,365 | 53 | 7-23-51 | — | 5⅜ | N | N | Gulf Eunice Plant, well 5. |
| 27.232 | do. | To | 99 | 3,400 | 62 | 1948 | 1948 | 7 | Te | In,D | Gulf Eunice Plant, well 14. Initial yield, 55 gpm. |
| 27.241 | do. | To | 150 | 3,385 | 60 | 1948 | — | 7 | N | N | Gulf Eunice Plant, well 4. |
| 30.414 | — | To | — | 3,480 | 101.6 | 1-11-54 | — | — | Lw | In | — |
| 32.121 | Skelly Oil Co. | To | 92M | 3,400 | 90.7 | 1-15-54 | — | 6½ | N | N | — |
| 33.110 | City of Eunice | To | 130 | 3,450 | — | — | — | 6 | N | N | Old public-supply well. WBZ 90-130 feet. Chemical analysis in table 8. |
| 21.37.33.111 | Magnolia Oil Co. | To | 110(?) | 3,450 | 103.8 | 12-10-53 | — | 6 | Ti | In,D | Water used for oil well flooding. Chemical analysis in table 8. |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21.37.33.210 | City of Eunice | Tr | 350 | 3,430 | — | 1911 | — | 6 | N | N | Old public-supply well. WBZ 320-350 feet. Chemical analysis in table 8. EY 10 gpm. |
| 33.211 | — | To | 103M | 3,430 | 99.6 | 11-12-53 | — | 10¾ | N | N | — |
| 33.233 | City of Eunice | To | 135 | 3,435 | 100 | 1944 | — | 8 | Te | P | City well 1. Perforated 100-130 feet. Chemical analysis in table 8. |
| 35.423 | Gulf Oil Corp. | Qal | 110 | 3,375 | 61 | 5-17-50 | — | 10¾ | Te | In,D | Gulf Eunice Plant, well 21. |
| 35.442 | do. | Qal | 87 | 3,360 | 59 | 11-14-51 | — | 7 | Te | In,D | Gulf Eunice Plant, well 17. WBZ sand and gravel, 65-74 feet. |
| 21.37.36.144 | P. Wallach | Qal | 66 ± M | 3,370 | 47.8 | 10- 9-53 | — | 6 | Lw | S | — |
| 36.344 | do. | Qal | — | 3,360 | 49.8 | 10- 9-53 | — | 8¾ | Lw | S | — |
| 21.38.6.133 | Ray McNeil | Qal | 90+ | 3,550 | 79.4 | 12- 7-53 | — | 7 | N | N | — |
| 6.133a | do. | To | 90? | — | — | — | — | — | Lw | — | Chemical analysis in table 8. |
| 6.133b | do. | To | 108 | — | — | — | — | — | N | N | do. |
| 8.144 | Humble Oil Co. | — | 133 | 3,565 | Dry | — | — | — | — | — | Plugged and abandoned. |
| 22.33.13.200 | San Simon Ranch | Tr | 508 | 3,510 | — | — | — | — | Lw | S | WBZ 420-470 feet. |
| 22.34.12.111 | do. | Qal | 62 | 3,530 | 48 | — | 1951 | — | Lw | D,S | — |
| 12.114 | do. | Qal | 16M | 3,515 | 12.6 | 3-17-54 | — | — | Lw | S | Is an infiltration tunnel about 70 feet long and 5 feet in diameter feeding 2 windmills, 1 centrifugal pump and 1 siphon. |
| 22.36.1.333 | Gulf Oil Co. | To | 150 | 3,490 | 111.2 | 11-12-53 | — | — | Li | L | Chemical analysis in table 8. |
| 2.444 | — | — | — | — | — | — | — | — | Lw | S | Chemical analysis in table 8. |
| 8.443 | United Carbon Co. | Tr | 1,000 ± | 3,580 | 700 | — | — | 8 | Le | In,D | Three wells. EY 30 gpm each. Chemical analysis in table 8. |
| 11.224 | Texas-Pacific Coal and Oil Co. | To | 120+ | 3,500 | 113.8 | 11-12-53 | — | 8 | Lw | D | Chemical analysis in table 8. |
| 13.222 | Ohio Oil Co. | Tr(?) | — | 3,455 | Flowing | — | — | 7 | N | N | Capped and flowing. |
| 25.434 | R. L. Robinson | To | — | 3,430 | 118.5 | 11-23-53 | — | — | Li | S | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 22.36.35.314 | do. | To | 197 | 3,490 | 187.4 | 11-23-53 | — | — | Lw | S | — |
| 1.152 | G. Sims | Qal | — | 3,350 | 47.6 | 10-14-53 | — | — | N | N | Open, uncased hole. |
| 1.440 | do. | Qal | — | — | — | — | — | — | Lw | S | Chemical analysis in table 8. |
| 2.442 | Humble Oil Co. | Qal | 86M | 3,360 | 53.3 | 10- 9-53 | — | 7 | N | N | Initial yield, 68 gpm. |
| 3.133 | Sinclair Oil and Gas Co. | To | 120 | 3,425 | 90 | — | 1946 | — | Je | D | — |
| 3.134 | do. | — | 52M | 3,420 | Dry | 9-28-53 | — | — | N | N | — |
| 3.440 | Cities Service Oil Co. | To | — | 3,390 | 75.8 | 9-29-53 | — | 7½ | N | N | — |
| 4.211 | City of Eunice | To | 155 | 3,445 | 110 | 1953 | 1953 | 10 | Te | P | Well 12. Initial yield, 100 gpm; yield in 1953, 60 gpm. |
| 4.213 | do. | To | 155 | 3,440 | 114.8 | 3- 6-54 | 1952 | 10 | Te | P | Well 11. EY 60 gym. |
| 4.214a | Eunice Cemetery Assoc. | To | 115±M | 3,435 | 108.2 | 9-29-53 | — | 6½ | N | N | — |
| 22.37.4.233 | City of Eunice | To | 155 | 3,435 | 110 | 1951 | 1951 | 8 | Te | P | Well 9. |
| 4.421 | Sinclair Oil and Gas Co. | To | 114±M | 3,430 | 90.1 | 9-28-53 | — | 7⅝ | N | N | — |
| 4.424 | Skelly Oil Co. | To | 164 | — | <139 | — | 1950 | 8⅝ | Ti | In,D | Skelly Eunice Plant 1, well 13. Initial yield, 150 gpm; dropped to 20 gpm. |
| 8.441 | Shell Oil Co. | To | 168 | 3,400 | 60 | 1953 | 1936 | 6⅝ | Lw | D | — |
| 9.313a | Humble Oil Co. | To | 166M | 3,400 | 72.7 | 9-29-53 | 1944 | 9½ | N | N | Humble—J. L. Greenwood well 2. |
| 9.331 | do. | To | 160 | — | — | — | 1945 | 7⅝ | Te | D | Humble—J. L. Greenwood well 4. |
| 9.333 | do. | To | 172 | — | — | — | 1946 | 4 | Te | In | Humble—J. L. Greenwood well 5. Water used for oil well flooding. |
| 22.37.9.441 | Humble Oil Co. | To | 104±M | 3,410 | 85.5 | 9-29-53 | 1940 | 6⅝ | N | N | Humble—J. L. Greenwood well 1. |
| 10.213 | Gulf Oil Corp. | To | 220 | 3,400 | 100 | 1950 | — | — | Lw | D | Gulf-Brunson lease well. |
| 10.320 | Skelly Oil Co. | To | — | 3,395 | 81.0 | 9-29-53 | — | 11½ | N | N | — |
| 11.324 | — | Qal | 100M | 3,350 | 45.3 | 10-16-53 | 1952 | 5 | N | N | — |
| 11.444 | Leo Sims | Qal | — | 3,345 | 58.7 | 10-16-53 | — | 8⅝ | Lw | S | — |
| 12.114 | G. Sims | Qal | 84M | 3,340 | 53.9 | 10-14-53 | — | 7 | N | N | — |
| 12.443 | do. | Qal | 59M | 3,335 | 53.9 | 10-14-53 | — | 15 | N | N | — |
| 12.443a | do. | Qal | 59M | 3,335 | 53.3 | 10-14-53 | — | — | N | N | Uncased and open. |
| 15.333 | H. O. Sims | To | — | 3,380 | 81.0 | 9- -53 | — | 4¾ | Lw | D,S | — |
| 16.432 | Skelly Oil Co. | To | 135 | — | — | — | — | 7 | Ti | In,D | Skelly Eunice Plant 1, well 11. EY 40 gpm. |
| 16.443 | do. | To | 136 | 3,385 | 80.9 | 9-28-53 | 1947 | 8⅝ | Ti | In,D | Skelly Eunice Plant 1, well 10. |
| 22.37.21.221 | — | To(?) | — | 3,380 | 76.5 | 9- -53 | — | 6⅝ | N | N | — |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 22.37.21.421 | — | To(?) | — | 3,360 | 62.0 | 9- -53 | — | 4½ | N | N | — |
| 22.331 | Skelly Oil Co. | To(?) | 115± | 3,350 | 69.0 | 9-29-53 | 1949 | — | Ti | In,D | Skelly Eunice Plant 1, well 12. EY 40 gpm. |
| 23.233 | Leo Sims | Qal | 77M | 3,345 | 55.0 | 10-14-53 | — | 14 | N | N | Open and uncased. |
| 23.441 | O. I. Boyd | Qal | 70± | 3,335 | 55.3 | 10-12-53 | — | — | Lw | S | Dug. |
| 23.441a | do. | Qal | 70± | 3,335 | 55.2 | 10-12-53 | — | 7½ | N | N | — |
| 24.133a | G. Sims | Qal | 127M | 3,322 | 59.3 | 4-21-55 | — | 10 | Li | N | — |
| 24.133b | do. | Qal | 80 | — | — | — | — | — | Lw | N | Chemical analysis in table 8. |
| 25.313 | Marshal Drinkard | Qal | 69M | 3,300 | 50.1 | 10-14-53 | 1945 | 13½ | N | N | — |
| 27.334b | Skelly Oil Co. | Qal | 127M | 3,335 | 54.4 | 9- -53 | — | 8½ | N | N | Skelly Eunice Plant 1, well 9. |
| 27.410 | do. | To? | 182 | — | — | — | — | 7 | Te | In,D | EY 25 gpm. Perforations 150-170 feet. |
| 22.37.28.323 | Clower Drilling Co. | Qal | — | 3,353 | 66.1 | 9- -53 | — | 9¼ | N | N | — |
| 34.221 | Humble Oil Co. | Qal and Tr | 229 | 3,520 | — | — | 1938 | — | — | In | WBZ 58-61 feet, 138-146 feet, 185-192 feet. EY 22 gpm. |
| 36.141a | Tom Linebury | Qal | 40 | 3,300 | 32.2 | 10-12-54 | — | — | Lw | S | — |
| 36.141b | do. | Qal | 46 | 3,300 | 31.1 | 6- 3-55 | — | 6 | N | N | — |
| 22.38.18.234 | The Texas Co. | Tr | 386M | 3,360 | 180 | 10- -53 | 1953 | — | Li | In | WBZ gray sand, 325-380 feet. EY 20 gpm. |
| 19.222 | do. | Tr | — | 3,365 | 146.0 | 10-14-53 | — | 7 | N | N | — |
| 23.32.4.222 | C. H. and W. O. James | Tr | 550 | 3,630 | — | — | 1931 | 8 | Lw | S | EY 10 gpm. |
| 21.222 | Frank and Charles James | Tr | 550 | 3,700 | 500 | — | — | 8 | Li | S | — |
| 23.33.12.322 | San Simon Ranch | Tr | 400 | 3,685 | — | — | 1953 | — | Lw | S | WBZ 370-400 feet. |
| 23.33.28.334 | Brinninstool | Tr | 575 | 3,675 | 500 | — | — | — | Lw | D,S | EY 2.5 gpm. |
| 23.34.1.444 | San Simon Ranch | Qal | 144±M | 3,360 | 137.3 | 11-25-53 | — | 6 | N | N | — |
| 31.340 | Continental Oil Co. | Tr | 678 | 3,620 | — | — | 1953 | 8 | Li | In | EY 47 gpm. Chemical analysis in table 8. |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 23.35.27.444 | — | To | — | 3,480 | 117.2 | 3- -53 | — | 7 | N | N | — |
| 23.36.15.414 | J. E. Matkins | To(?) | 230 | 3,390 | 148.4 | 12- 4-53 | — | 6 | Lw | D,S | — |
| 16.343 | do. | Tr | 1,100 | 3,465 | 150 | 1952 | — | — | Lw | S | — |
| 22.434 | Texas Pacific Coal and Oil Co. | To | 210±M | 3,395 | 188.6 | 12- 1-53 | — | 8½ | N | N | — |
| 23.111 | do. | To | — | 3,370 | 143.6 | 12- 4-53 | — | 8 | Li | In | — |
| 31.233 | J. Combass | To | — | — | — | — | — | — | Lw | S | Chemical analysis in table 8. |
| 23.36.35.211 | J. Combass | To | 170 | 3,330 | 123.0 | 3- -53 | — | 6½ | N | N | — |
| 36.341 | EPNG | To | 250 | 3,330 | 124 | — | — | 10¾ | Ti | In,D | Jal Plant 4, well 8. |
| 36.342 | EPNG | To | 261 | 3,330 | 120 | — | 1952 | — | Ti | In,D | Jal Plant 4, well 7. |
| 23.37.2.133 | — | To | — | 3,304 | 62.8 | 10-16-53 | — | — | N | N | — |
| 2.422 | — | Qal | — | 3,295 | 64.1 | 6- 3-55 | — | 6 | Lw | S | — |
| 3.421 | H. O. Sims | To | 80 | 3,295 | 64.1 | 10-16-53 | — | — | Lw | D,S | — |
| 4.114 | — | To | 84—M | 3,341 | 81.8 | 12- 3-53 | — | 5½ | N | N | — |
| 4.211 | Skelly Oil Co. | Tr(?) | 226 | 3,340 | — | — | 1947 | 10¾ | Lc | D | H. O. Sims Camp well 1. EY 10 gpm. |
| 6.144 | — | To | — | 3,375 | 102.9 | 12- 3-53 | — | 6½ | Lw | S | — |
| 20.333 | Bert Steeler | Qal(?) | 177 | 3,300 | 117 | — | 1939 | — | Lw | D,S | — |
| 25.132 | M. L. Goins | To(?) | — | 3,215 | 28.3 | 10-15-53 | — | 7 | Lw | S | — |
| 27.441 | — | Qal | — | 3,270 | 78.3 | 3- 4-53 | — | 5½ | Lw | S | — |
| 23.37.31.442 | EPNG | To(?) | 173 | 3,300 | 118 | 1952 | 1952 | 12½ | Tc | In,D | Jal Plant 4, well 4. |
| 32.122 | — | To(?) | — | 3,300 | 99.0 | 7-23-54 | — | 6 | Lw | S | — |
| 32.331 | EPNG | To(?) | 173 | 3,310 | — | — | — | 20 | Tc | In,D | Jal Plant 4, well 1. WBZ 115-171 feet. EY 40 gpm. |
| 33.122 | — | To(?) | 120M | 3,310 | 91.2 | 3- 4-53 | — | 9 | N | N | — |
| 23.38.5.233 | Humble Oil Co. | Tr | 400M | 3,385 | 189.8 | 10-15-53 | 1943 | 7½ | N | N | W. F. Scarbrough well 1. EY 14 gpm. |
| 8.214 | Tom Linebury | Tr | — | 3,372 | 198.3 | 10-15-53 | — | 6½ | Lw | D,S | — |
| 24.32.5.322 | Frank James | Tr | 550 | 3,650 | — | — | — | 10 | Lw | D,S | — |
| 10.344 | do. | Qal | 60 | 3,588 | 31.1 | 6- 3-55 | 1910 | 6 | Lw | S | Located in sink. |
| 33.422 | Richard Ritz | Tr | 367M | 3,510 | 313.4 | 2-18-58 | — | 12 | Lw | S | EY 0.25 gpm. |
| 24.33.10.113 | Carl Johnson | Qal | 36±M | 3,595 | 24.6 | 11-27-53 | — | 6½ | Lw | S | — |
| 24.33.23.311 | — | Tr | 232M | 3,565 | 208.6 | 11-27-53 | — | 9½ | N | N | — |
| 24.444 | — | Qal | — | 3,530 | 16.9 | 11-27-53 | — | 5½ | Lw | S | — |
| 33.231 | Carl Johnson | Qal | — | 3,460 | 93.2 | 3-17-54 | — | 6 | Lw | D,S | — |
| 24.34.4.111 | — | To | — | 3,570 | 51.3 | 6- 3-55 | — | — | Lw | S | — |
| 5.444 | — | To | 78(?) | 3,590 | 66.6 | 4-21-55 | — | — | Lw | N | — |
| 10.112 | Madera Ranch | To | 83M | 3,525 | 71.8 | 4-27-53 | — | 6 | N | N | — |
| 10.422 | do. | To | 94M | 3,315 | 63.2 | 4-27-53 | — | 7½ | N | N | — |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 24.34.35.122 | do. | Tr | 258M | 3,410 | 223.9 | 3-29-53 | — | 6 | Lw | S | — |
| 24.35.30.341 | do. | Tr | 150±M | 3,320 | 139.6 | 11-27-53 | — | 6 | Lw | S | — |
| 24.36.3.111 | — | To | — | 3,400 | 181.1 | 3-12-53 | — | 7½ | N | N | — |
| 3.333 | Charles Whitten | To(?) | 190±M | 3,390 | 181.1 | 3-12-53 | — | 11½ | N | N | — |
| 9.133 | do. | To | 230 | 3,395 | 195.0 | 3- 6-53 | 1948 | 7 | N | N | — |
| 13.314 | Humble Oil Co. | To | 160 | — | — | — | 1941 | — | — | — | WBZ sand, 138-158 feet. EY 10 gpm. |
| 24.36.15.222 | Canmex Oil Co. | To | 200 | 3,370 | 181.3 | 3-12-53 | 1937 | 7 | Lw | D | — |
| 22.220 | Continental Oil Co. | Tr | 692 | 3,340 | — | — | — | 8¼ | Li | D | A. H. Meyers "A" well 1. Intake set at about 475 feet. Maximum yield 6 gpm. |
| 23.222 | — | To | — | 3,345 | 147.9 | 3- 6-53 | — | 6¼ | Lw | I | Measurement made inside pipe column. |
| 27.221 | J. R. Wilson | To | — | 3,320 | 122.9 | 3- 6-53 | — | 10 | N | N | — |
| 24.37.5.111 | EPNG | To | 175 | 3,275 | 111 | 9- 8-52 | 1952 | 10¾ | Te | In,D | Jal Plant 4, well 6. |
| 7.431 | Fowler Hair | To | 132M | 3,300 | 119.9 | 3- 6-53 | — | 6¼ | N | N | — |
| 10.123 | Trinity Production Co. | Tr | 747 | 3,260 | 120 | 2- -53 | 1953 | — | Li | In | EY 42 gpm. Chemical analysis in table 8. |
| 14.211 | Fowler Hair | To(?) | 72M | 3,205 | 64.5 | 3- 3-53 | — | 5 | N | N | — |
| 24.37.16.342 | — | To | 106M | 3,235 | 67.7 | 3-11-53 | — | 9 | N | N | — |
| 16.423 | Humble Oil Co. | To | 150 | 3,240 | — | — | 1951 | 6⅝ | Te | D | Fowler-Ellenburger Camp well 1. WBZ 90-150 feet. |
| 17.422 | Fowler Hair | To | 92M | 3,260 | 86.5 | 3- 4-53 | — | 7½ | N | N | — |
| 19.234 | — | To | 124M | 3,290 | 117.4 | 3- 5-53 | — | 10 | Lw | S | — |
| 21.444 | Dollarhide Water Co. | To | 74M | 3,210 | 69.6 | 3- 2-53 | — | 7½ | N | N | — |
| 25.322 | Fowler Hair | To | — | 3,136 | 76.1 | 3- 3-53 | — | 6½ | Lw | D,S | — |
| 34.320 | Plains Production Co. | To | 75±M | 3,160 | 56.8 | 3- 2-53 | — | 12 | N | N | — |
| 25.33.20.443 | — | Tr | — | 3,395 | 200-250 | 8-18-58 | — | 6 | Lw | D,S | — |
| 31.244 | Nick Ritz | Tr | 320 | 3,400 | 257.5 | 7-26-54 | — | 8 | Lw | S | — |
| 25.34.1.132 | Madera Ranch | Tr | 300+ | 3,385 | 231.0 | 4-15-53 | — | 6 | N | N | — |

# JAL BRINE STATION

## GEOLOGIC & HYDROLOGIC FIGURES

# EXPLANATION

QUATERNARY — Pleistocene and Recent

Sand

*Thin cover of drift sand in most places; locally dunes 20-40 feet high*

Qal

Alluvium

*Sand and gravel along dry washes; silt and sand in lake beds; includes some wind-deposited sand around depressions*

TERTIARY — Pliocene

To

Ogallala formation

*Chiefly sand, poorly to well-cemented with calcium carbonate; contains some clay, silt, and gravel; capped in most places by caliche*

Ku

Cretaceous rocks, undifferentiated

*Slumped blocks of buff, tan, or white fossiliferous limestone*

Upper Triassic

TRc TRs TRd

Dockum group

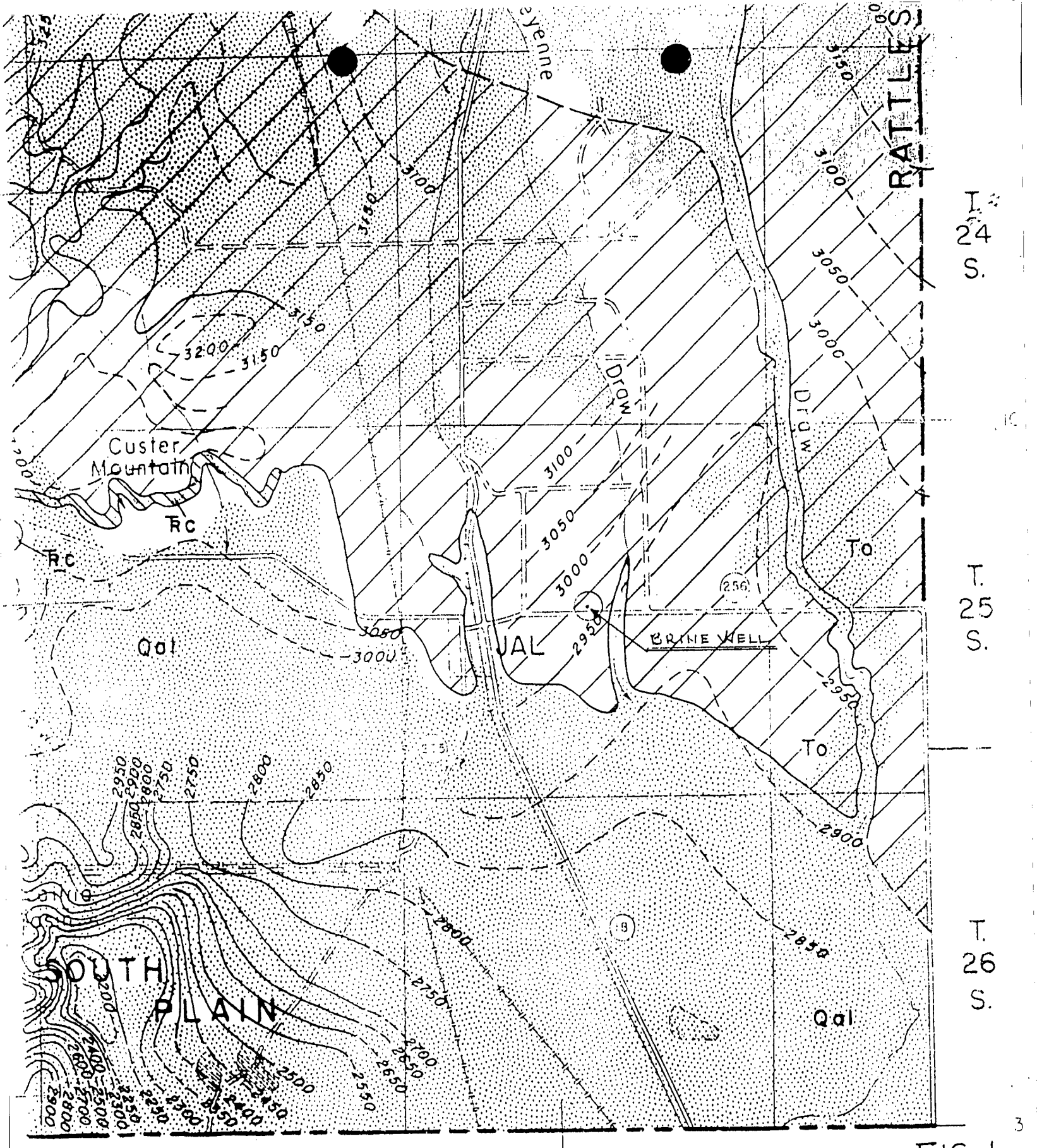
TRc-*Chinle formation, red and green claystone, minor siltstone, and fine-grained sandstone;* TRs-*Santa Rosa sandstone, red to white poorly sorted, coarse-grained, crossbedded sandstone;* TRd-*rocks of the Dockum group, undifferentiated*

3500

Contours on the red-bed surface

*Dashed where approximate or inferred. Contour interval 50 feet. Datum mean sea level*

FIG. 1 EXPLA.




WINKLER COUNTY

SCALE 1" = 2 MILES

Geology by Alexander Nicholson, Jr., 195
Contours on buried red-bed surface
compiled by Alexander Nicholson, Jr.,
Alfred Clebsch, Jr., and S R Ash from

FIG. 1

# EXPLANATION

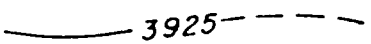
$\frac{150}{252}$ ○

Water well

*Upper figure is depth to water; lower figure is depth of well. Open circles are wells finished in Tertiary or Quaternary rocks; solid circles are wells finished in Triassic rocks*

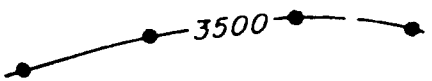
F = Flowing
R = Reported
P = Water level measured while pumping
D = Dry
? = Uncertainty as to aquifer
> = More than
< = Less than

(See tables 6 and 7 for detailed well data.)



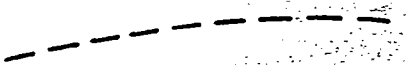

Water-table contour in Tertiary or Quaternary rocks

*Dashed where inferred or uncertain. Contour interval 25 feet. Datum mean sea level*



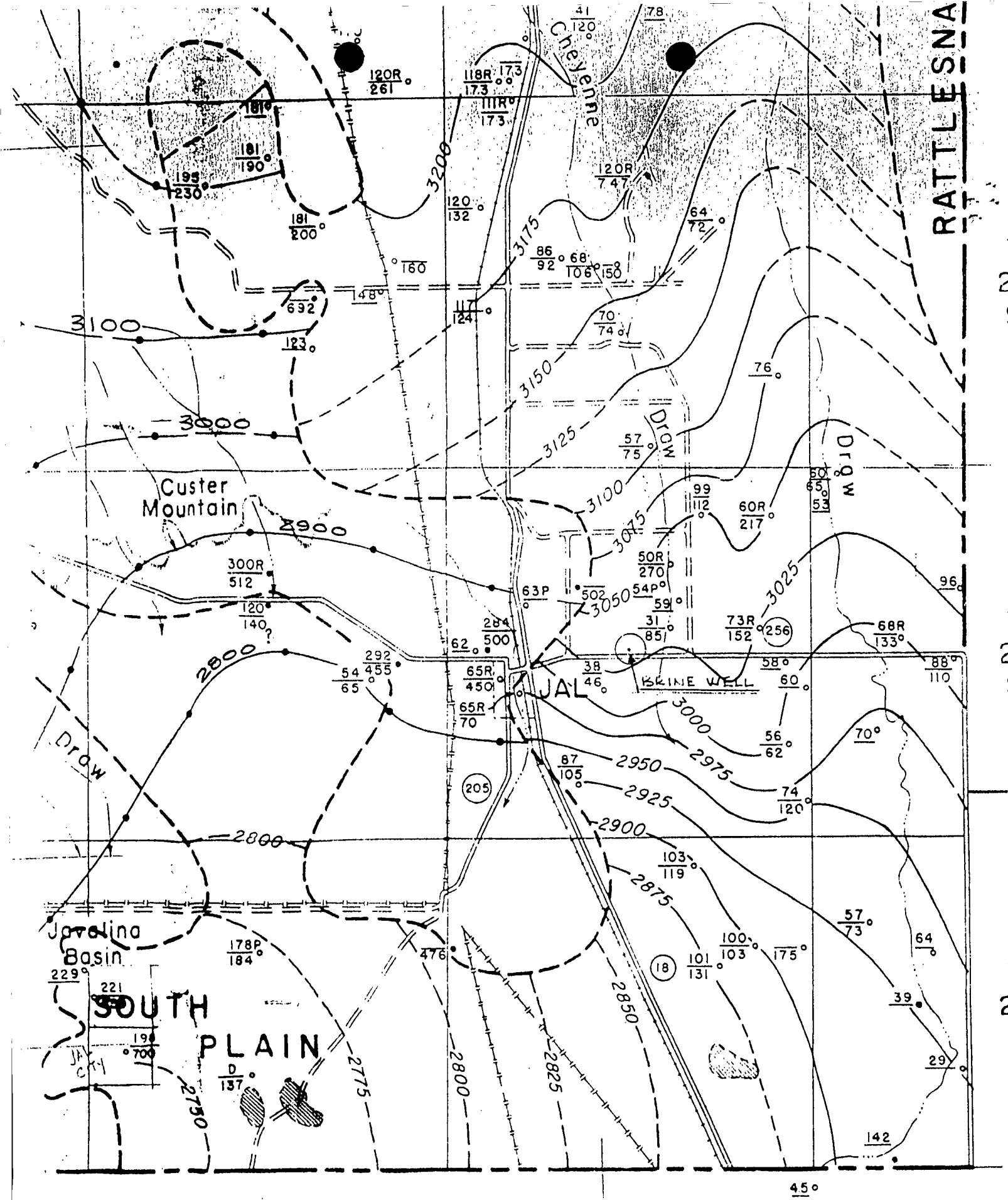

Water-table or piezometric contour on water body in Triassic aquifers

*Dashed where inferred or uncertain. Contour interval 100 feet. Datum mean sea level*



Approximate position of boundary between Triassic rocks and saturated Tertiary and Quaternary rocks

FIG. 2 EXPLA.




SCALE 1" = 2 MILES

103°10'

FIG. 2

WINKLER COUNTY

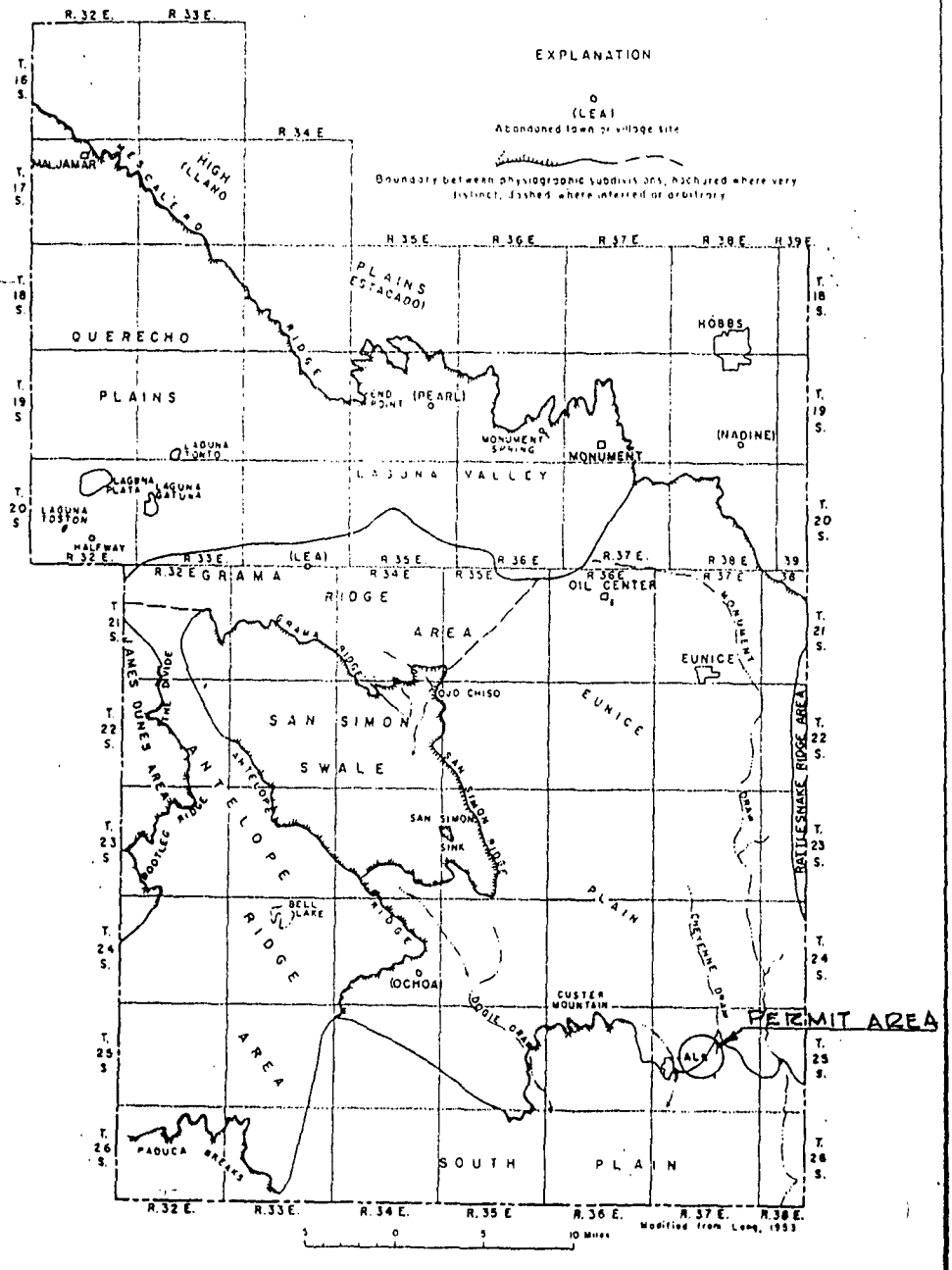



*Figure 3*

PHYSIOGRAPHIC SUBDIVISIONS OF SOUTHERN LEA COUNTY, N. MEX.

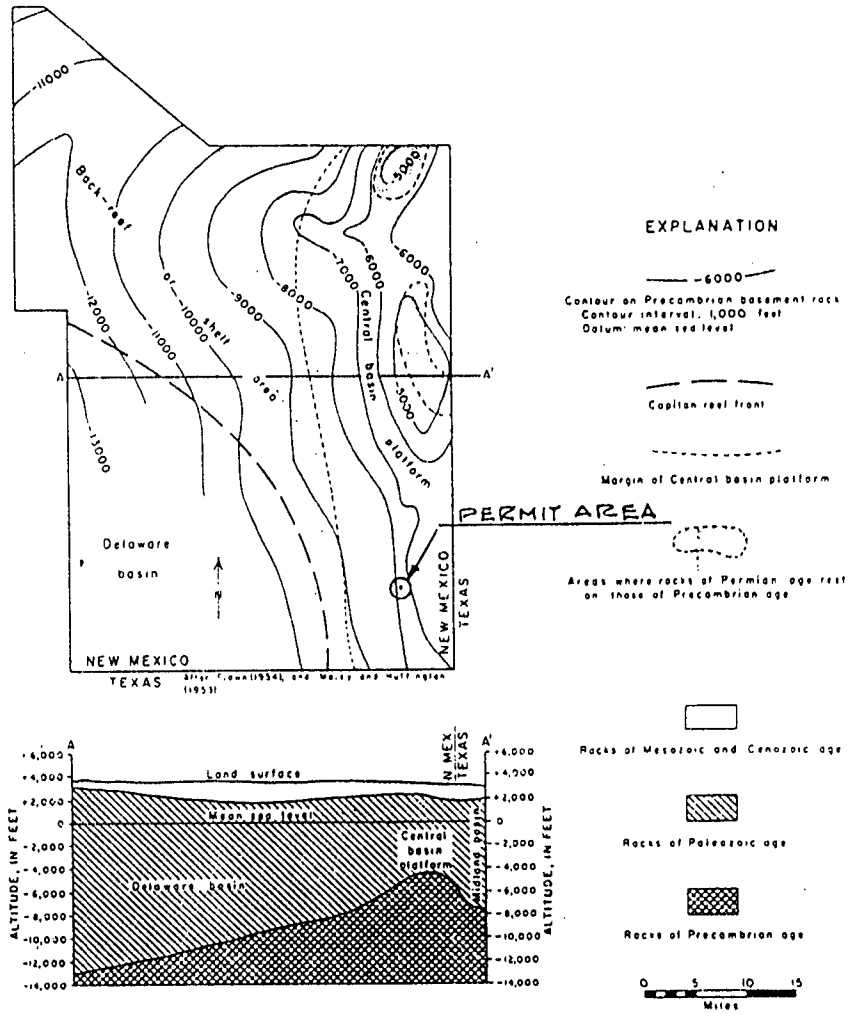



Figure 13

STRUCTURE MAP AND CROSS SECTION OF THE DELAWARE BASIN AND CENTRAL BASIN PLATFORM, LEA COUNTY, N. MEX.

JAL BRINE STATION

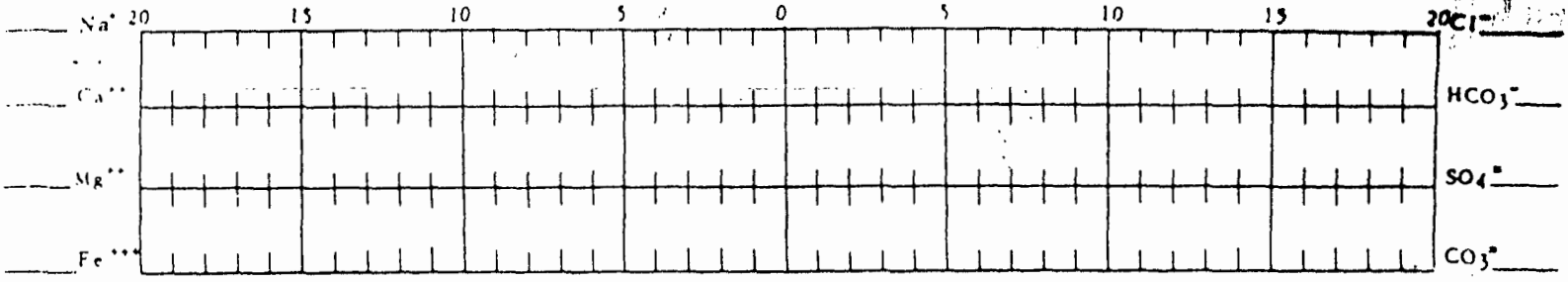
WELL PLUGGING AND ABANDONMENT
REPORTS

COMPANY

| FIELD | | | | COUNTY OR PARISH | | |
|---|---|---|---|---|---|---|
| LEASE OR UNIT: Jal | | WELL(S) NAME OR NO.: 1# MONITOR WELL | | WATER SOURCE (FORMATION) | | |
| DEPTH, FT. | UNIT, F | SAMPLE SOURCE | TEMP, F | WATER, BBL/DAY | OIL, BBL/DAY | GAS, MMCF/DAY |
| DATE SAMPLED | TYPE OF WATER: ☐ PRODUCED ☐ SUPPLY ☐ WATERFLOOD ☐ SALT WATER DISPOSAL | | | | | |

## WATER ANALYSIS PATTERN

(NUMBER BESIDE ION SYMBOL INDICATES me/l* SCALE UNIT)




## DISSOLVED SOLIDS

| CATIONS | me/l* | mg/l* |
|---|---|---|
| Total Hardness | 7.2 | |
| Calcium, Ca++ | .2 | 4.0 |
| Magnesium, Mg++ | 1.0 | 12.2 |
| Iron (Total) Fe+++ | | |
| Barium, Ba++ | | |
| Sodium, Na+ (calc.) | 21 | 483.0 |
| | | |
| **ANIONS** | | |
| Chloride, Cl- | 11.3 | 400.0 |
| Sulfate, SO4= | 4.4 | 212.5 |
| Carbonate, CO3= | | |
| Bicarbonate, HCO3- | 6.5 | 396.5 |
| Hydroxyl, OH- | | |
| Sulfide, S= | <1 | |

## DISSOLVED GASES

| | |
|---|---|
| Hydrogen Sulfide, $H_2S$ | _____ mg/l* |
| Carbon Dioxide, $CO_2$ | _____ mg/l* |
| Oxygen, $O_2$ | _____ mg/l* |

## PHYSICAL PROPERTIES

| | |
|---|---|
| pH | 7.8 |
| Eh (Redox Potential) | _____ MV |
| Specific Gravity | _____ |
| Turbidity, JTU Units | _____ |
| Total Dissolved Solids (calc.) | 1025 mg/l* |
| Stability Index @___F | _____ |
| @___F | _____ |
| $CaSO_4$ Solubility @___F | _____ mg/l* |
| @___F | _____ mg/l* |
| Max. $CaSO_4$ Possible (calc.) | _____ mg/l* |
| Max. $BaSO_4$ Possible (calc.) | _____ mg/l* |
| Residual Hydrocarbons | _____ ppm(Vol/Vol |

CONDUCTANCE 11,000 MMHOS

## SUSPENDED SOLIDS (QUALITATIVE)

Iron Sulfide ☐ Iron Oxide ☐ Calcium Carbonate ☐ Acid Insoluble ☐

*REMARKS AND RECOMMENDATIONS:*

change bad OK

received
4-30-84

*NOTE: me/l and mg/l are commonly used interchangeably for epm and ppm respectively. Where epm and ppm are used, corrections should be made for specific gravity.

| FWS ENGINEER | DIST. NO. | ADDRESS | OFFICE PHONE | HOME PHONE |
|---|---|---|---|---|
| ANALYZED (Perry) | DATE 4/11/84 | DISTRIBUTION ☐ CUSTOMER ☐ AREA OR ☐ DISTRICT OFFICE ☐ DIST. ENGINEER OR ☐ DIST. LAB ☐ DIST. SALES SUPERVISOR | | |

# P & S Brine Sales

PUMPER CHECKS WELL DAILY

| Sun | Mon | Tue. | Wed. | Thur. | Fri. | Sat. |
|---|---|---|---|---|---|---|
| | | ✓ | ✓ | ✓ | ✓ | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | ✓ | ✓ | ✓ | ✓ | ✓ | |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| | ✓ | | | | | |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | | | | | |

September, 1991

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

August 14, 1991

**CERTIFIED MAIL**
**RETURN RECEIPT NO. P-756-666-149**

Mr. Paul Prather
P & S Brine Sales, Inc.
P. O. Box 1769
Eunice, New Mexico 88231

**RE: Discharge Plan BW-7 (formerly DP-324)**
**Transfer of ownership from Permian Brine Sales, Inc. to P & S Brine Sales, Inc.**

Dear Mr. Prather:

The Oil Conservation Division (OCD) has been informed that P & S Brine, Inc. has purchased the Permian Brine Sales Jal Station located in Section 16, Township 25 South, Range 37 East, NMPM, Lea County, New Mexico. Pursuant to the Water Quality Control Commission (WQCC) Regulation 3-111, prior to the transfer of a facility with an approved discharge plan, the transferor (Permian Brine Sales) shall notify the transferee (P & S Brine) in writing of the existence of the discharge plan, and provide to the director a copy of the notification and proof that it has been received by the transferee. Upon assuming either ownership or possession of the facility, the transferee shall have the same rights and responsibilities under the discharge plan as were applicable to the transferor.

The OCD has not received a written notification of transfer of the Permian Brine Sales Jal Station and associated discharge plan. However, if P & S Brine has indeed purchased the facility, then they have also inherited the discharge plan, whether they were notified or not. The existing discharge plan is expired and lacks several OCD requirements. If this facility continues to have potential or actual effluent or leachate discharges and you wish to continue operations (assuming P & S now owns the facility), then you are required to renew the discharge plan.

The ground water discharge plan, BW-7, for The Permian Brine Sales Jal Station was approved by the Director of the Environmental Improvement Division (EID) on May 21, 1986. This discharge plan was required and submitted pursuant to Water Quality Control Commission (WQCC) regulations and was approved for a period of five years. The approval expired on May 21, 1991. Authority to administer the brine program was transferred from the EID back to the Oil Conservation Division (OCD) in 1989 with staffing approved in 1990. Please note the new discharge plan number BW-7, formerly DP-324, which will be the permanent designation used in all future correspondence.

Since your discharge plan has expired, please submit your application for renewal of plan approval within sixty (60) days of receipt of this letter. Please indicate whether you have made, or intend to make, any changes in your discharge system, and if so, please include these modifications in your application for renewal. To assist you in preparation of your renewal application, I have enclosed an application form and a copy of the OCD's Guidelines for the Preparation of Ground Water Discharge Plans at Brine Extraction Facilities, revised May 1991, and a copy of the Water Quality Control Commission Regulations.

The OCD visited your operation on February 6, 1991, as part of an extensive multi-facility inspection trip that week. Because of scheduling problems, and the numerous facilities visited, we were unable to notify you of the date and time of arrival in advance. Although not required, our agency generally notifies operators in advance giving time of arrival; in this instance it was not possible to do so.

The following comments are based on observations during the OCD site visit on February 6, 1991, and on additional requirements detailed in the guidelines. Please address these comments in your discharge plan renewal application.

1. <u>Transfer of Commitment</u>

   Notwithstanding the transfer of jurisdiction of brine wells to OCD, all prior commitments to EID concerning reporting and notification remain in effect. Note that all unauthorized discharges (ie. major leaks and spills), need to be reported to the OCD within 48 hours of the event (WQCC Rule 5-208). Commit to report all unauthorized discharges to the OCD within 48 hours.

2. Mechanical Integrity Testing

Pursuant to revised OCD guidelines for discharge plans at brine facilities, all wells must be pressure tested (open-hole) to 500 psi for 4 hours on an annual basis. A pressure test isolating the casing from the formation using either a bridge plug or a packer must be conducted at least once every 5 years or during well workovers.

The results from a current pressure test will be required prior to the approval of any brine facility discharge plan application or renewal. If the immediate test is performed using the open-hole method than a pressure test isolating the casing from the formation is required within the next 1 1/2 years. An OCD representative must be on site to witness all pressure tests and we request 10 days before the test to allow us to make arrangements.

Permian Brine Sales previously committed to annual pressure tests on their brine well. The last pressure test (open-hole) that the OCD has on file for the Arnott Ramsey State No. 4 Well was performed on February 25, 1988. Submit a proposal for testing and ensuring the mechanical integrity of the well. Also, submit information on any buried brine pipelines including age and material of the lines.

3. Volumes of Injection Fluids and Brine

The OCD requires a quarterly report listing, by month, of the volume of fluids injected and produced for comparison to detect underground losses. The OCD has no quarterly volume reports on file for either Permian Brine Sales Jal Station nor P & S Brine Sales. Submit a proposal and schedule for reporting injection fluid and brine production volumes. Also, submit the date of first brine production and the total volume of brine produced to date. This information is necessary to evaluate subsidence potential for your brine station.

4. Brine Storage Pond

The OCD is concerned over the potential for leaks in your single-lined brine storage pond. A letter from Permian Brine Sales to the EID dated August 20, 1984 states that the liner rests on a caliche substrate. Is there any type of protective substance between the caliche and the liner which would prevent the caliche from puncturing a hole in the liner? The OCD is also concerned about the ability of a leak to be detected by the leak detection system. Provide evidence that a leak in your pond would migrate to the leak detection lateral/sump and not travel directly down to groundwater.

If a leak is detected in the future, the pond will be drained to below the level of the leak, the OCD will be notified, and the ability of the pond to be adequately repaired will be evaluated by the OCD. If replacement of the liner is needed, a double liner shall be installed. To adequately detect leaks at present, the OCD requires that the monitor well (sump) be checked bimonthly. Record the date of inspection, results, and inspectors initials in a log. A copy of log entries will be submitted annually to the OCD, at the same time the annual pressure test results are submitted.

The freeboard of your pond in the southeast corner was less than one foot. Because various weather conditions could cause brine to spill over the top of the pond, the OCD requires that you keep a minimum of one and one-half (1-1/2) foot of freeboard in your pond.

Submit the appropriate information and commitments addressing the issues above.

5. **Freshwater Analysis**

The OCD requires a current analysis of your freshwater supply well and produced brine. The last analysis of the freshwater well that the OCD has on file is dated July 25, 1984. Analysis will be for concentrations of major cations/anions and Total Dissolved Solids (see OCD Guidelines for Brine Facilities section VII.C.4.). Include the location and method of sampling. Submit a plan and schedule for analyses of your injection and production fluids.

6. **Maximum Injection Pressure.**

Pursuant to WQCC Regulations Section 5-206, the maximum injection pressure at the wellhead shall not initiate new fractures or propagate existing fractures in the continuing zone. Submit information detailing your average operating pressure, a proposed maximum injection pressure, a measured and/or calculated fracture pressure for the zones being injected into, and a plan to ensure the fracture value will not be exceeded.

7. **Operating Procedures**

During the inspection of your facility on February 6, 1991, the OCD staff observed that your well was valved to inject freshwater down the tubing and produce brine out of the annulus. The OCD requires that all one-well brine extraction operations inject freshwater down the annulus and recover brine up the tubing. Reverse flow will be allowed for up to

once a month for 24 hours for clean-out. If an alternative operating method is desired then a written request must be submitted to the OCD which describes the proposed operating procedures and how the mechanical integrity of the casing will be guaranteed. Submit a plan detailing your operating procedures.

8. Spill Collection/Containment System

The OCD requires additional information concerning your spill collection system presently in use. In a letter dated from Permian Brine Sales dated February 24, 1986, they submitted two drawing detailing their proposed spill containment and collection system (copies enclosed). The OCD has no records on file that these plans were completed as designed. Submit materials detailing the spill containment and collection system currently in operation. Include drawing and diagrams and elaborate on the materials and sizes of the various components of the system. Note that the OCD requires that all new underground tanks (ie.sumps) have positive leak detection. All existing sumps must be cleaned out and visually inspected on an annual basis.

9. Brine Loading Area

The loading area showed evidence of brine discharges to the ground surface specifically around the truck loading valves. Past inspections by both the OCD and EID staff indicate repeated spillage of brine in the loading area. This area must be cleaned-up and have containment to keep spilled brine off of the ground surface. Submit a proposal to contain spills at your brine loading area. Provide an explanation and diagrams detailing how spilled brine is to be contained; include paving and curbing where appropriate and indicate where the spilled brine drains to.

10. Plugging Bond

Your commitment for plugging and abandonment is adequate; however, your $5000 single-well plugging bond is on the old OCD bond form which does not include brine wells. You must either have your plugging bond transferred onto the new form, or obtain a new single well plugging bond. Enclosed is the correct bond form.

Addressing the above items in your application for renewal of your discharge plan will accelerate the review and response time of your application. Note that the completed and signed application form must be submitted with your discharge plan renewal request.

If you no longer have any actual or potential discharges a discharge plan renewal is not needed, please notify this office. If you have any questions, please do not hesitate to contact Kathy Brown at (505) 827-5824.

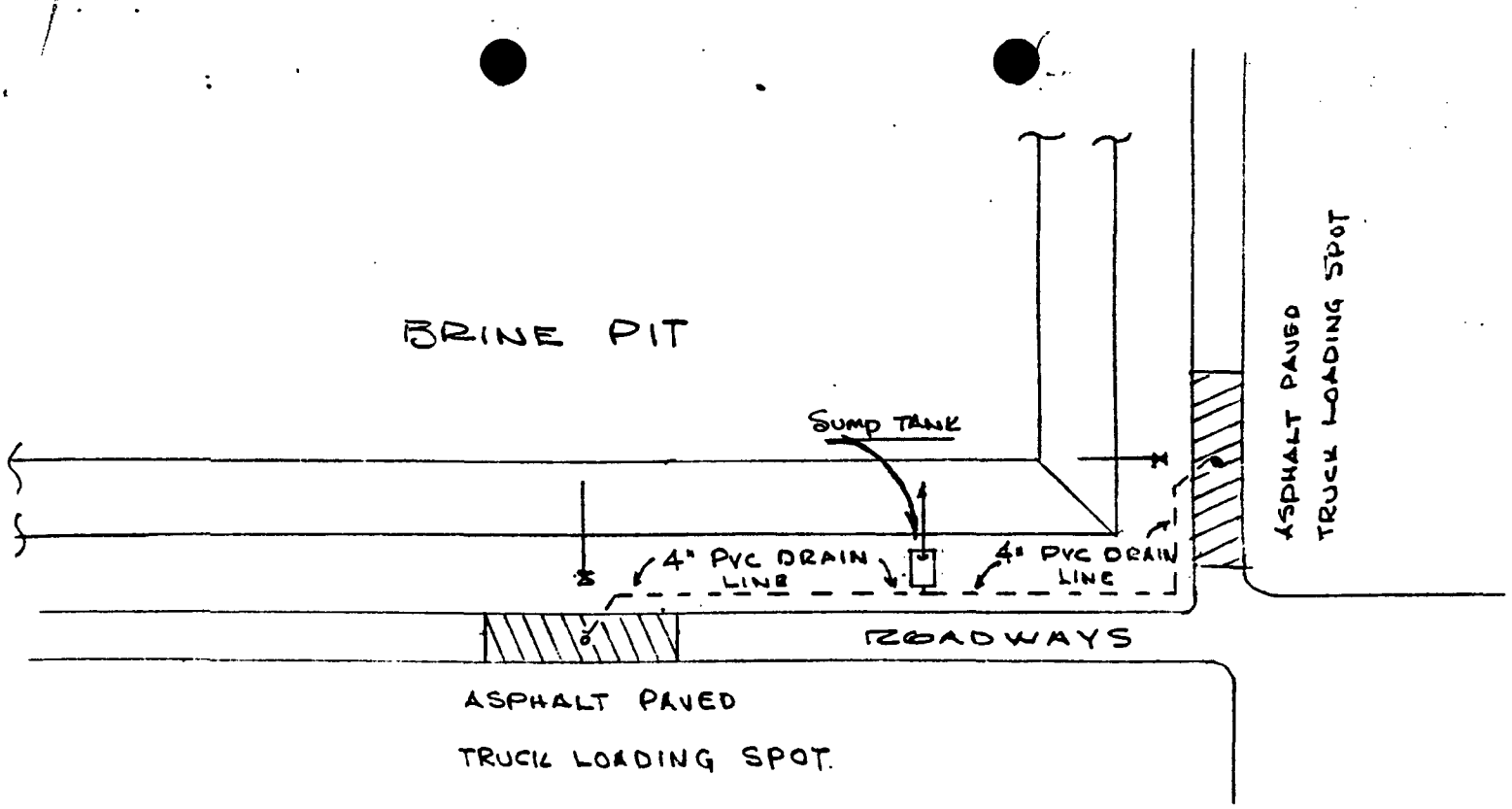
Sincerely,

David G. Boyer, Hydrogeologist
Environmental Bureau Chief

DGB/KMB

Enclosures

xc: OCD Hobbs Office

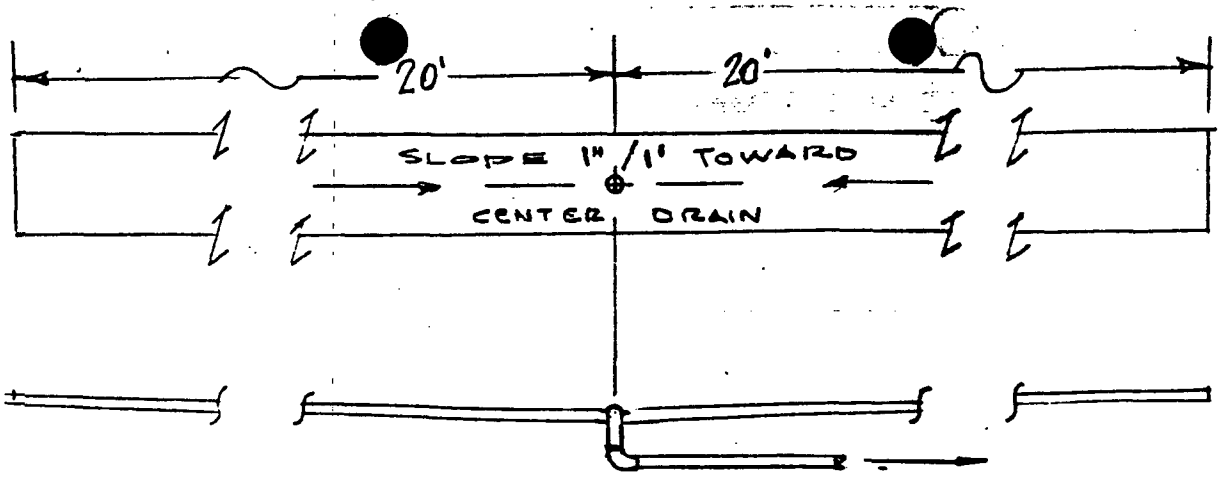


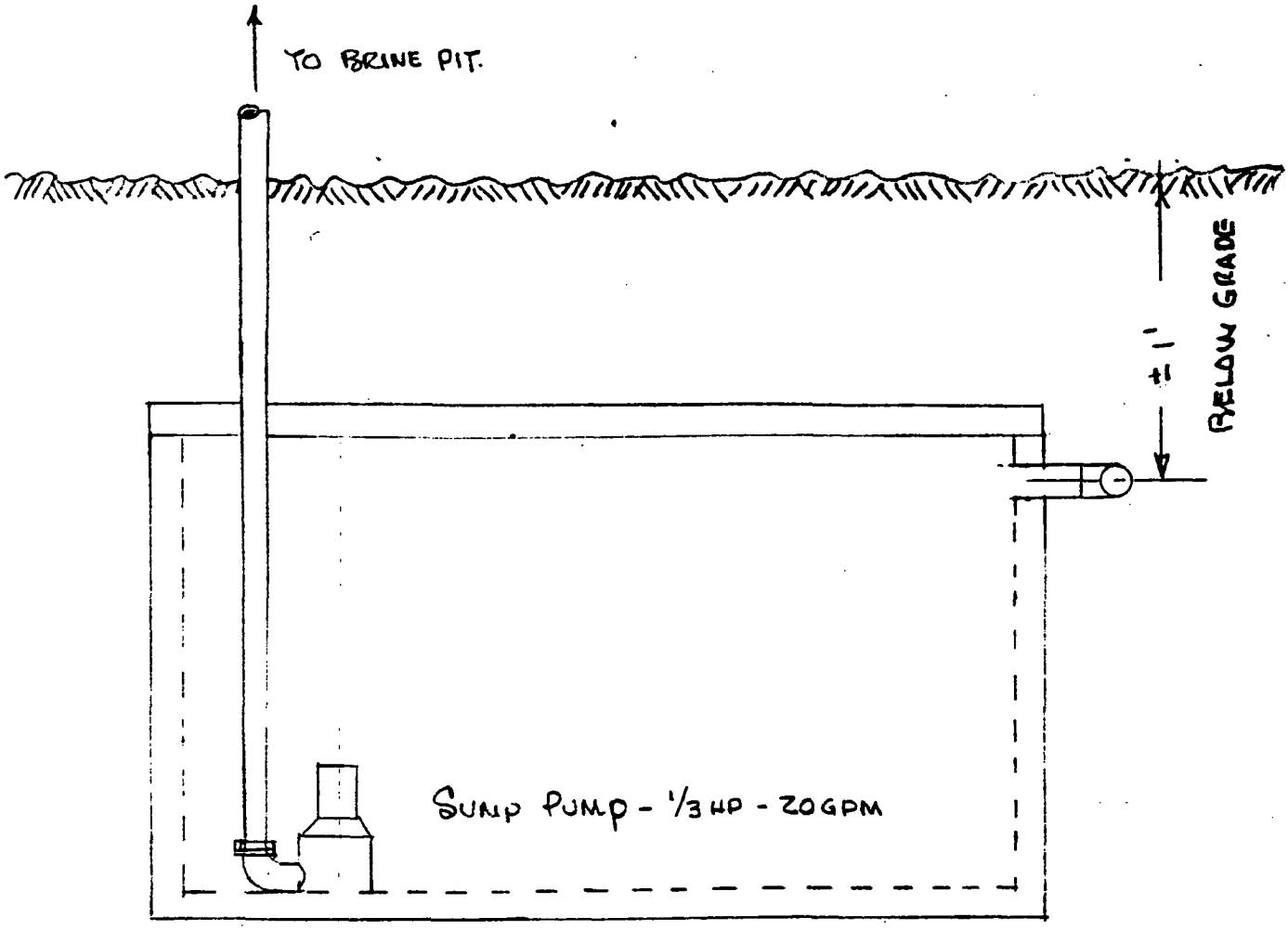

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

PROPOSED TRUCK LOADING & BRINE SPILL RECOVERY FACILITIES

JAL BRINE STATION

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 2-21-86 | R.C. McCUTCHAN Tex. P.E. 9844 | 4 |




4' x 7'-8" x 5'-3" DEEP
PRECAST REENFORCED
CONCRETE SUMP TANK

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

# TYPICAL BRINE LOADING SPOT WITH SPILL DRAIN & SUMP TANK DETAILS JAL BRINE STATION

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 2-21-86 | R.C. McCutchan TEX. P.E. 9844 | 5 |

OIL CONSERVATION DIVISION
RECEIVED
91 AUG 16 AM 9 05

**PERMIAN BRINE SALES, INC.**

24-HOUR SERVICE/TEXAS - OKLAHOMA BRINE - FRESHWATER - DISPOSAL

6067 W. TENTH ST. • ODESSA, TEXAS 79763
(915) 381-0531 (915) 563-4730 FAX (915) 381-9316

August 12, 1991

Mr. David G. Boyer, Hydrogeologist
Environmental Bureau Chief
State of New Mexico
Energy, Minerals and Natural Resources Dept
PO Box 2088
State Land Office Building
Santa Fe, New Mexico 87504

Dear Mr. Boyer:

We sold our Jal Brine Station on September 1, 1989 to Mr. Paul Prather of P & S Brine Sales, PO Drawer 1769, Eunice, New Mexico.

Please direct all further correspondance to them.

If you have any questions, please call me at 915-381-0531.

Sincerely,

PERMIAN BRINE SALES, INC.

R.D. Hickerson
President

RDH/rdw

Enclosure

STATE OF NEW MEXICO

OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

[X] Telephone [ ] Personal | Time | Date 8-13-91

Originating Party: Eddie Seay

Other Parties:

Subject: Permian Brine Sales - Tal Station Change in Ownership

Discussion: No longer owned by Russell D. Hickerson. Now owned by Paul Prather who also owns P&S Brine.

Mr. Paul Prather
P&S Brine Sales Inc. ⇒
P.O. Box 17609
Eunice, NM 88231
505-394-2545.

Need to get Permian Brine Sales DP renewal letter sent to Mr. Prather. Sent to Hickerson on 8-6-91

Conclusions or Agreements

Will send him the renewal letter.
Spoke with secretary on 8-13-91 and told her to inform him letter will be sent.

Distribution

Signed Kathy Brown

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

August 6, 1991

**CERTIFIED MAIL**
**RETURN RECEIPT NO. P-756-666-897**

Mr. Russell D. Hickerson
Permian Brine Sales, Inc.
Route 3, Box 3033
Odessa, Texas 79763

**RE: Discharge Plan BW-7 (formerly DP-324)**
**Permian Brine Sales, Jal Station**

Dear Mr. Hickerson:

On May 21, 1986, the ground water discharge plan, BW-7, for the Permian Brine Sales Jal Station located in Section 16, Township 25 South, Range 37 East, NMPM, Lea County, New Mexico, was approved by the Director of the Environmental Improvement Division (EID). This discharge plan was required and submitted pursuant to Water Quality Control Commission (WQCC) regulations and was approved for a period of five years. The approval expired on May 21, 1991. Authority to administer the brine program was transferred from the EID back to the Oil Conservation Division (OCD) in 1989 with staffing approved in 1990. Please note the new discharge plan number BW-7, formerly DP-324, which will be the permanent designation used in all future correspondence.

If your facility continues to have potential or actual effluent or leachate discharges and you wish to continue operations, you must renew your discharge plan. Since your discharge plan has expired, please submit your application for renewal of plan approval within sixty (60) days of receipt of this letter. Please indicate whether you have made, or intend to make, any changes in your discharge system, and if so, please include these modifications in your application for renewal. To assist you in preparation of your renewal application, I have enclosed an application form and a copy of the OCD's Guidelines for the Preparation of Ground Water Discharge Plans at Brine Extraction Facilities, revised May 1991, and a copy of the Water Quality Control Commission Regulations.

The OCD visited your operation on February 6, 1991, as part of an extensive multi-facility inspection trip that week. Because of scheduling problems, and the numerous facilities visited, we were unable to notify you of the date and time of arrival in advance. Although not required, our agency generally notifies operators in advance giving time of arrival; in this instance it was not possible to do so.

The following comments are based on observations during the OCD site visit on February 6, 1991, and on additional requirements detailed in the guidelines. Please address these comments in your discharge plan renewal application.

1. **Transfer of Commitment**

Notwithstanding the transfer of jurisdiction of brine wells to OCD, all prior commitments to EID concerning reporting and notification remain in effect. Note that all unauthorized discharges (ie. major leaks and spills), need to be reported to the OCD within 48 hours of the event (WQCC Rule 5-208). Commit to report all unauthorized discharges to the OCD within 48 hours.

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Pursuant to revised OCD guidelines for discharge plans at brine facilities, all wells must be pressure tested (open-hole) to 500 psi for 4 hours on an annual basis. A pressure test isolating the casing from the formation using either a bridge plug or a packer must be conducted at least once every 5 years or during well workovers.

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Permian Brine Sales previously committed to annual pressure tests on their brine well. The last pressure test (open-hole) that the OCD has on file for Permian's Arnott Ramsey State No. 4 Well was performed on February 25, 1988. Submit a proposal for testing and ensuring the mechanical integrity of the well. Also, submit information on any buried brine pipelines including age and material of the lines.

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Sincerely,

David G. Boyer, Hydrogeologist
Environmental Bureau Chief

DGB/KMB

Enclosures

xc: OCD Hobbs Office

BW-7 (DP-324)

INVENTORY OF SOLUTION MINING WELLS -- OIL CONSERVATION DIVISION, 1991

## I. OPERATOR/LOCATION INFORMATION

Operator: Permian Brine Sales, Inc. Mr. A.L. Hickerson / Mr. Russell D. Hickerson (Pres.) / R.C. McCutchan

Address: Route 3, Box 3033

Odessa, Texas 79763 Phone: 332-0531

Facility Permian Brine Sales Jal Station

T. 25S R. 37E Sec. 16 SE 1/4 of SE 1/4 P

County: Lea (OCD Hobbs District) 2½ mi East of Jal on Highway 128

Purpose of well (brine supply, LPG storage, potash dissolution)

Brine Supply

## II. DRILLING/SITING INFORMATION

Contractor: Arnott Ramsey State No. 4

Date drilling started _____ Date ~~drilling~~ completed March 1981

Drilling method Rotary (120'-1591') Cable (0'-120')

Ground Surface Elevation 3104' KB Elevation _____

Total depth of hole 1591'

Attach schematic of well, include open hole interval, perforations, etc.

Type of drilling fluid _____

Describe all casing tests performed to date 5½" tested March 1981 to 500psi. for 30 min.

July 6, 1983 - 218psi for 1hr 10min., 1.3% fall-off (open-hole).

11-28-84: 325 psi for 2 hours; 1.5% fall off (open-hole).

8-26-86: 218 psi for 2 hours (open hole)

1-28-87: 185 psi for 2 hours (open-hole)

5-21-87: 175 psi for 2 hours (open-hole)

2-25-88: 200psi for 2¼ hours (open hole)

CASING, TUBING AND CEMENTING RECORD

| From | To | Size of Hole | Size of Casing | Weight per Foot | Sacks of Cement | Estimated Top of cmt. |
|---|---|---|---|---|---|---|
| 0' | 1258' | 7 7/8" | 5 1/2" | 17#/ft J-55 | 400 sx Class H w/ 2% CaCl2 (Cement 60' to surface from 1" pipe @ surface) | 60' |
| 0' | 1582' | 4 3/4" | 2 7/8" | | | |

Open Hole from 1258 - 1591'

Is site within ~~1/2~~ 1/4 mile of another well? Is so, explain. Yes; 2 P&A brine wells (Permian - Arnott Ramsey, No. 2 & 3); 2 producing oil wells (Gulf Arnott Ramsey, No. 7 & Mobil Federal No. 2x); 3 resident water wells south of Hwy 128 in NE/4 Sec. 21. Within 1/2 mile also have Burleson-Huff Arco No. 24 & 2 other oil wells.

Type of well-head equipment _____

Comments (include problems encountered while drilling, loss of circulation, deviation of hole from vertical, centralizers, used, tools lost or stuck, fracturing techniques used, etc.)

Completed in 1981 (march). 515' FSL, 100' FEL in Section 16, T25S, R37E.

Bond # 610 057411 2 ⇒ U.S. Fire Insurance Co.

Old form

## III. FORMATION INFORMATION

Formation Record

| From | To | Thickness | Formation (name, description) |
|---|---|---|---|
| 0' | 10' | 10' | Caliche |
| 10' | 60' | 50' | Sand |
| 60' | 1035' | 975' | Red Beds |
| 1035' | 1155' | 120' | Rustler Anhydrite |
| 1155' | 1591' | 436' | Salt with Shale & Anhydrite Stringers |

Logs (specify type) _____

_____

_____

Identify where logs are on file _____

_____

_____

## IV. AQUIFER INFORMATION

Aquifers in Immediate Area

| From | To | Aquifer Description | Amount of Water entering hole | Quality of Water |
|---|---|---|---|---|
| ±50' | —— | Quaternary sands & gravels; Ogallala eroded away @ site (via Hickerson) | | |
| 250' | —— | TR Chinle/Santa Rosa - Red beds, shales (fresh water supply well) | | ~~[illegible] ppm TDS~~ 1000-1200 ppm TDS |

EID Public Notice - Groundwater @ 400' with TDS 1025 mg/l and maybe small pockets of groundwater as shallow as 50' with higher & lower TDS.

Quaternary (Pleistocene & Recent) Alluvial 15'-30' deposits in low areas stripped of Ogallala - interm. & recent dune sands covering it all
Tertiary (Miocene) - Ogallala Fm. Calcareous, unconsolidated sand w/ clay, silt & gravel
Upper Tr ⇒ Chinle & Santa Rosa (400'+) Red beds, highly mineralized

Note: If water quality analysis are available please attach.*

Source of aquifer description FW-Supply Well? Monitor Well - 4/24/84 TDS 1025 ppm, Cl 400 ppm; 8/2/84 TDS 1184 ppm Cl 312 ppm

Source of water level and quality data Monitor Well drilled 1967 (TD 500')

Depth water first encountered during drilling ~400', SWL ~250' prob. Santa Rosa Chinle

Direction of water gradient North

Explain any evidence of water contamination 8/23/84 - Complaint to EID by Cramer, Dakar (neighbor) to south of Highway stating well went bad about 1980; tested in 1982 - TDS 141,312 ppm; Cl 88000 ppm. Other neighbors (Bowington-Mosely) well also went bad. SWL = 50'.

EID Testing 11-84: Mosely Well TDS - 3594 ppm Cl - 1190 ppm
Cramer Well TDS - 74,714 ppm Cl - 43,762 ppm

State Engineer (3-4-86) feels contamination is from N-NW from an abandoned brine disposal pit used prior to 1965

## V. PRODUCTION/BRINE STORAGE INFORMATION

Method of production (describe fully) Freshwater goes to 1000 bbl storage tank & then to brine well via a 10 hp submersible pump (in tank) through 400' of 2 3/8" (OD) fiberglass pipe (rated @ 450 psi) down well bore, back up, through 300' of 2 3/8" (OD) PVC pipe (sch. 40 line), to brine pit (6000 bbl capacity) lined with 30 mil dupont hypalon. Injection pressure 218 #; avg. 175 #-180 #

Was well used previously for some purpose other than brine supply _____

If so, explain _____

Use of brine Drilling fluids - TDS 292,860 ppm

Source of injection water (be specific) Freshwater well at facility, 460' TD TDS 900 ppm. 5 hp 45 GPM submersible pump @ 418'. Static water level = 250'. Santa Rosa or Chinle (R)

Date of first production 1981

Volume of brine produced to date _____

Weight of salt removed to date _____

Calculated size and shape of cavity to date _____

Explain any evidence of subsidence and any subsidence monitoring _____

Brine storage facilities (describe) Brine is stored in a 120'x120'x6' storage pit (6000 bbl capacity) lined with 30 mil dupont hypalon.

Explain how brine storage pit is being monitored for leakage Leak detection sump connected to 3 PVC perforated pipes on a gravel surface.

Explain brine loading procedures _____

Explain fresh water loading procedures Sold on site for industrial purposes. Loaded to ~~tanks~~ trucks through valve on 1000-bbl freshwater storage tank.

## VI. ABANDONMENT/PLUGGING RECORDS

Date well abandoned/plugged N/A

Reason for well abandonment or plugging N/A

Method of plugging or proposed plugging (describe fully, include amounts of cement, etc. top, plug type, depth, etc.) Set cast iron bridge plug at top of casing shoe and filling cased hole with Class C cement slurry & welding a steel plate over the open end of the casing

List all conduits in the area of review. Include completion and plugging records.

PBS- Permian Brine Sales

## VII. CHRONOLOGY OF EVENTS

9-9-82: OCD requires Discharge Plan

11-8-82: PBS submits Discharge Plan.

12-18-82: OCD approves PBS ~~DP~~ GWB-6 Discharge plan.

7-7-83
Commit to perform annual pr. test and notify w/in 48 hours any loss of injection pressure + loss of brine return.

4-17-84: EID requires DP including WQCC Part IV requirements

5-7-84: PBS submits DP

7-9-84: EID responds to DP submittal & requests add'l info.

8-20-84: PBS submits responses to EID's questions

8-29-84: EID notification to PBS of shallow water contamination

8-31-84: EID's response to PBS's (8-20-84) answers to questions

10-31-84: PBS responds to EID's letter 8-31-84.

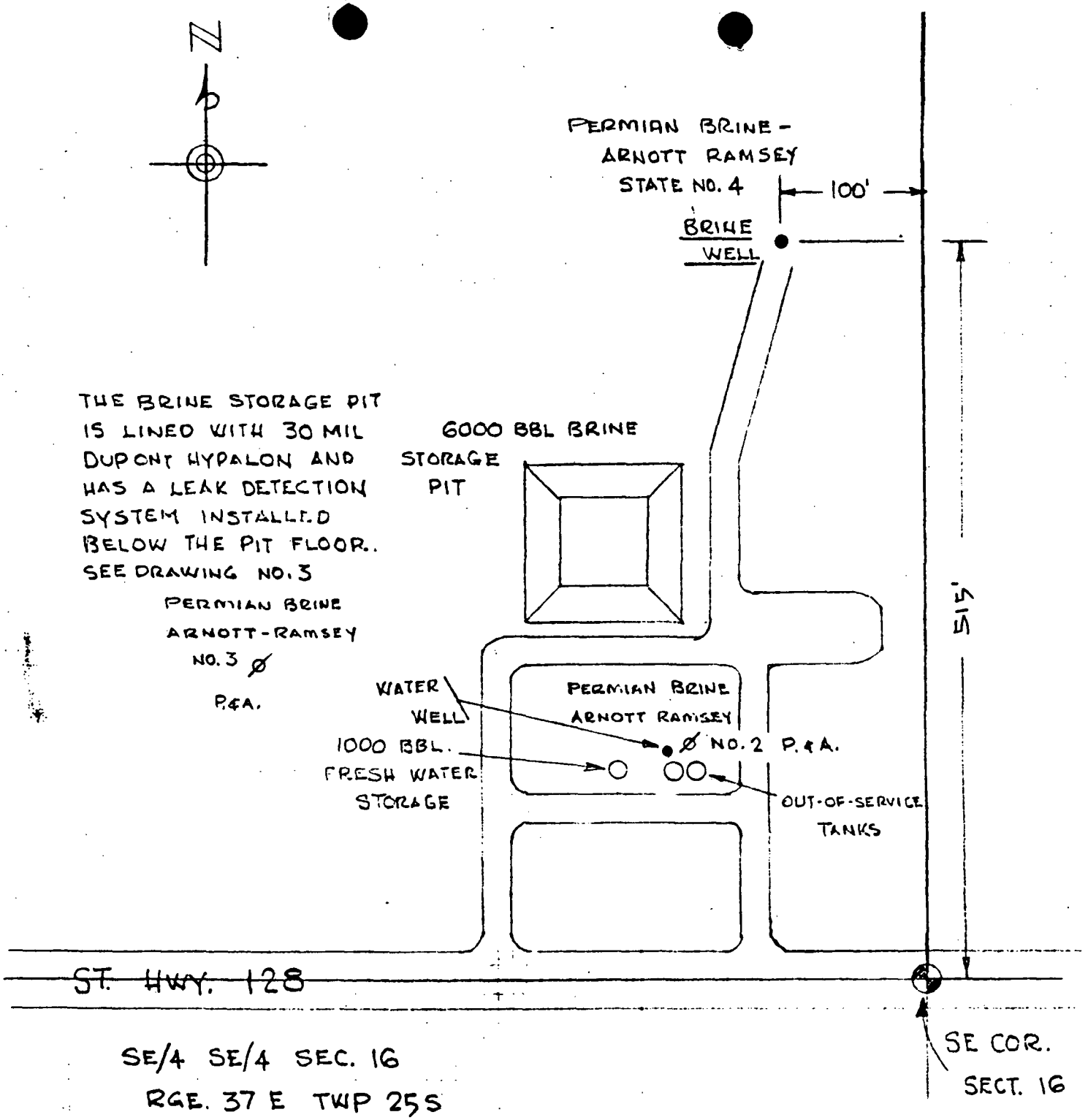
11-6-84: PBS responds to EID's letter 8-29-84

1-2-85: EID responds to PBS 2 letters & various correspondence * during 1985 concerning contamination of 2 water wells to South.

2-24-86: PBS commits to 1/4 ~~ly~~ edly pressure tests & submits spill collection plans.

5-21-86: EID approves DP-324; Expires 5-21-91

8-14-87: EID approves yearly pressure tests




SE/4 SE/4 SEC. 16
RGE. 37 E TWP 25S
LEA CO. NEW MEXICO

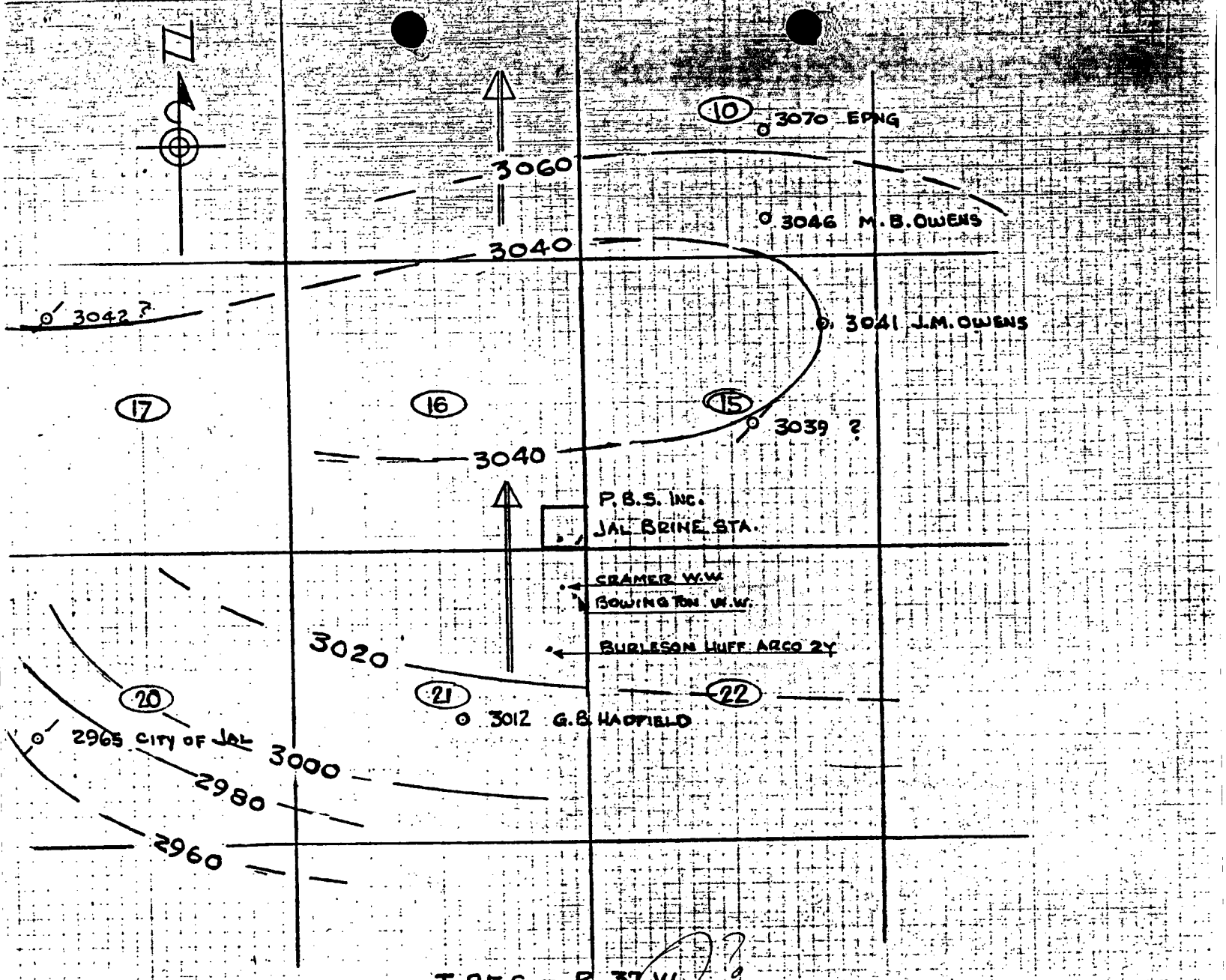
SCALE 1" = 100'

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

LAYOUT OF OPERATING FACILITIES

SAL BRINE STATION

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 4-18-84 | R.C. McCUTCHAN TEX. P.E. 9844 | 1 |




T 25 S - R 37 W

SCALE 1" = 2640'

**AQUIFERS**

o OGALLALA

o QUATERNARY

HYDRAULIC GRADIENT

? UNKNOWN OWNER

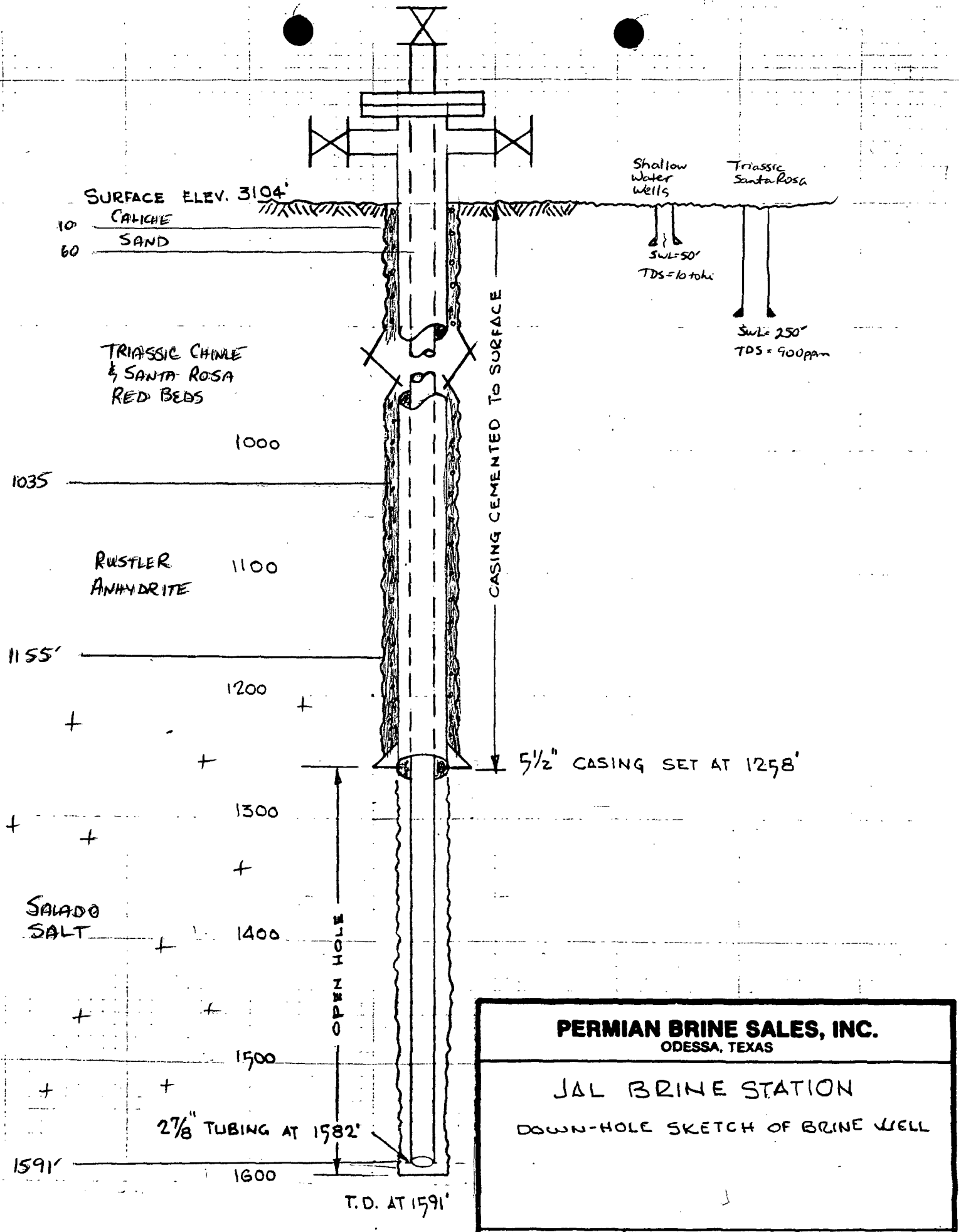
DATA FROM: TABLE 6 RECORDS OF WELLS IN SOUTHERN LEA CO., N. MEX. P. 85. "GEOLOGY AND GROUND-WATER CONDITIONS IN SOUTHERN LEA COUNTY, NEW MEXICO" NICHOLSON & CLEBSCH

RECEIVED
NOV 13 1984
GROUND WATER/HAZARDOUS WASTE BUREAU

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

# HYDRAULIC GRADIENT
## SOUTHERN LEA COUNTY
## NEW MEXICO

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 9-17-84 | R.C. MCCUTCHAN TEX P.E. 9844 | J-1 REV |




**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

# JAL BRINE STATION

DOWN-HOLE SKETCH OF BRINE WELL

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 4-18-84 | R.C. McCUTCHAN TEX. P.E. 9844 | 2 |

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

December 6, 1989

**CERTIFIED MAIL**
**RETURN RECEIPT REQUESTED**

Mr. Russell D. Hickerson
PERMIAN BRINE SALES-JAL
Route 3, Box 3033
Odessa, Texas 79763

***RE: Delegation of Responsibilities Brine Manufacturing Operations***

*Dear Mr. Hickerson:*

On June 13, 1989, the Water Quality Control Commission (WQCC) transferred the responsibility for the administration and enforcement of Commission regulations at brine manufacturing operations, including all brine production wells, holding ponds and tanks, from the Environmental Improvement Division (EID) to the Oil Conservation Division (OCD). The OCD has jurisdiction over all manufactured brine once it is transported, used or disposed of off brine plant premises for use in or directly related to oil and gas operations regulated by OCD. OCD regulates brine injection through its Class II Underground Injection Control (UIC) Program if the brine is used in the drilling for or production of oil and gas. EID shall regulate brine injection through its UIC Program if the brine is used for other purposes.

Brine production facilities that were transferred to OCD's jurisdiction must operate pursuant to an approved and current discharge plan. The discharge plan renewal process will be continued by OCD Environmental Bureau Staff. Approximately eight (8) months before the expiration date of an approved discharge plan, the discharger will be notified of the pending expiration of the plan. The discharge plan review process can, depending on circumstances, take several months. If the holder of an approved discharge plan submits a renewal application at least 180 days before discharge plan expiration, and the discharger is in compliance with his approved plan on the date of expiration, then the existing plan will not expire until the renewal application has been approved or disapproved.

Guidelines to aid you in determining what will be required for the renewal of your discharge plan are bring prepared. When the guidelines are finalized, they will be supplied to each operator of a brine production facility.

The OCD requires that any person, firm corporation or association that is in ownership of an oil, gas, or service well in the State of New Mexico shall furnish the Division with a surety bond in an amount prescribed in the OCD regulations. The current bond for well less than 5000 feet deep in Chaves, Eddy, Lea and Roosevelt Counties is $5000. I am enclosing the OCD bond forms for your use. All surety bonds previously submitted to the OCD did not include brine wells. Those surety bonds submitted to the EID must be changed to the OCD. Once the proper bond form are received and approved, all other sureties and bonds can be cancelled.

If you have any questions, please do not hesitate to contact me at (505) 827-5884.

Sincerely,

Roger C. Anderson
Environmental Engineer

RCA/sl

Enclosures

CC: Artesia District Office
Hobbs District Office

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 8, BOX 3033

ODESSA, TEXAS
79763

PHONE 332-0531



RECEIVED
DEC 27 1988
GROUND WATER BUREAU


December 20, 1988

Kevin Lambert - Hydrologist
Environmental Improvement Division
1190 St. Francis Drive
Santa Fe, NM 87503

RE: Your letter dated December 14, 1988

Dear Mr. Lambert:

Sorry we missed you during the station inspection. It seems as though telephone calls between you and our operator were missed all the way around.

Due to budget constraints, we cannot keep our stations as neat as we would like to, however, we will meet all permit requirements. The spill/drain system will be cleaned up.

The three tanks you mentioned are fresh water tanks and are in service at this time.

If you have any questions or I can be of assistance, please call me at 915-332-0531.

Sincerely,

PERMIAN BRINE SALES, INC.

R.D. Hickerson
President

RDH/rdt

PS. Please note our new mailing address:
Rt 8 Box 3033 Odessa, Tx 79763

NEW MEXICO
HEALTH AND ENVIRONMENT
DEPARTMENT

**ENVIRONMENTAL IMPROVEMENT DIVISION**
**Harold Runnels Bldg.-1190 St. Francis Drive**
**Santa Fe, New Mexico 87503**

Richard Mitzelfelt
Director

GARREY CARRUTHERS
*Governor*
CARLA L. MUTH
Secretary
MICHAEL J. BURKHART
Deputy Secretary

December 14, 1988

Russell D. Hickerson
Operations Manager
Permian Brine Sales
Rt. 3, Box 3033
Odessa, Texas 79763

Dear Mr. Hickerson:

The Underground Injection Control staff of the New Mexico Environmental Improvement Division Ground Water Section would like to thank you for your cooperation during our recent inspection of Permian Brine Sales brine facility. A copy of the inspection form is attached for your reference.

Deficiencies noted during the inspection are as follows:

1. Ponding of brine and produced waters noted. Facility should be free of ponded brine or produced waters, facility should be inspected frequently, and spillage cleaned up when detected.

2. Spill collection systems needs to be cleaned and upgraded. Collection tank not functional, spillage containment inadequate.

Thank you for your continued cooperation. Should you have any questions feel free to contact me (827-2902) or John Parker (827-0027).

Sincerely,

Kevin A Lambert

Kevin Lambert
Hydrologist
Ground Water Section - UIC Program

KL/mw

Enclosure

| No. of Samples | Ion |
|---|---|
| 1 | Na |
| 1 | K |
| 1 | Ca |
| 1 | Mg |
| 1 | Cl |
| 1 | HCO3 |
| 1 | CO3 |
| 1 | SO4 |
| 1 | TDS |
| //// | //// |
| | NO3+ NO2 |
| | NH3 |
| | kjeld N |
| //// | //// |
| | As |
| | Ba |
| | Cd |
| | CN |
| | Cr |
| | F |
| | Pb |
| | Hg |
| | Se |
| | Ag |
| | U |
| | V |
| | Ra 226 |
| | Ra 228 |
| //// | //// |
| | Cu |
| | Fe |
| | Mn |
| | Phenols |
| | Zn |
| //// | //// |
| | Al |
| | B |
| | Co |
| | Mo |
| | Ni |
| //// | //// |
| | pH |
| | Conduct. |
| | |
| | |
| | |
| | |
| | |
| | |

# FIELD TRIP REPORT
## GROUND WATER SECTION

SLD USER CODES

County Eddy/Lea

Ground Water: 59300

$NO_3$, HC & Toxics: 59600

UIC: 59500

FACILITY VISITED

Name of Facility: 20 Brine Facilities & Climax Chemical

Location: Carlsbad/Hobbs in Southeast NM

Discharge Plan Number: DP- See Below

Type of Operation: Brine Production / Chemical Manufacturing

ENVIRONMENTAL IMPROVEMENT DIVISION FIELD VISIT

EID Inspector(s): Lambert

Date of Inspection or Visit: 12/5-8/88

Discharger's Representative Present During EID Visit:

Name:

Title or Position:

Purpose of Visit:

a. Evaluation of Proposed Discharge Plan _____

b. Compliance Inspection of Discharge with Approved Plan _____

c. Other (specify) _____

Inspection Activities During Field Visit:

a. Inspection of Facilities or Construction (specify)

b. Sampling of Effluents (give sampling locations)

c. Sampling of Ground Water (give names or locations of wells)
Sampled M.W. at Marathon

d. Evaluation of geology, soils, water levels or other physical characteristics of the location (specify)

e. Other (specify)

Observations and Information Obtained during the Visit:
The 20 Brine Facilities & Climax are listed below by DP#. See Individual File for specifics

ACTION REQUIRED

| # | # | # | # | # |
|---|---|---|---|---|
| | 323 | 354 | 370 | 298 |
| 318 | 324 | 355 | 371 | 426 |
| 319 | 325 | 360 | 372 | |
| 320 | 326 | 361 | 394 | |
| 321 | 351 | 369 | 401 | |
| 322 | | | | |

# BRINE STATION INSPECTION FORM

DATE 12/7 1988 1530 EID INSPECTOR Lambert
FACILITY Permian Brine Sales LOCATION Jal
FACILITY REP ON SITE _____ COUNTY Lea

WELL OPERATION 1 well valved for reversal to control salt buildup

WELL IS INJECTING: ✓ THROUGH ANNULUS __ THROUGH TUBING
SOURCE OF FRESH WATER _____
TRACE INJECTION/PRODUCTION LINES Underground

WELL HEAD PRESSURE _____ PSIG PUMP PRESSURE _____ PSIG
LEAKS AROUND WELL OR PUMP None Looks OK

STORAGE AREA

FOR PONDS: 1 pond brine storage
GENERAL LINER APPEARANCE Hypalon Lined OK

AMOUNT OF FREEBOARD ± 2 foot
ANY SIGN OF OVERFLOW OR LEAKS yes on southside just above liner
LEAK DETECTION SYSTEM __ FLUIDS __ DRY

FOR TANKS: 3 tanks don't appear to be in use Nothing major
GENERAL APPEARANCE _____
LABLED PLAINLY __ YES __ NO
BERMED TO PREVENT RUNOFF __ YES __ NO
CHECK CONTENTS TO ASSURE PROPER FLUID/LABLE MATCH _____

NUMBER OF TANKS FOR BRINE ____ FRESH WATER ____

LOADING AREA Spill collection system Needs cleaning loops to by Plugged Needs grading

| | | |
|---|---|---|
| PROPERLY GRADED AND BERMED TO CONTAIN SPILLAGE | __ YES | ✓ NO |
| ANY EVIDENCE OF RECENT SPILLAGE | ✓ YES | __ NO |
| DOES FACILITY HAVE A SPILL COLLECTION SYSTEM | ✓ YES | __ NO |
| ANY EVIDENCE OF OIL SPILLING/DUMPING | ✓ YES | __ NO |

Area needs general clean up brine spillage in front of tanks regenerating Source unknown Approx

MONITORING WELLS some produced water spillage

DEPTH _____ FT STATIC WATER LEVEL _____ FT BELOW CASING 150' from pond
SAMPLED THIS VISIT __ YES __ NO TEMP _____ Ec _____

COMMENTS Facility OK Same as last year
Not much activity Need regrading, cleanout collection system, Basic site maintenance and clean up Looks like junkyard

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3. BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531



RECEIVED
MAR 24 1988
GROUND WATER/HAZARDOUS WASTE BUREAU


March 15, 1988

New Mexico Health and Environment
Box 968
Santa Fe, NM 78504-0968

Attn: Kevin Lambert

RE: Pressure Test DP-324

Dear Mr. Lambert:

Attached is the test chart for our annual Mechanical Integrity Test. The well passed.

If you have any questions, please call me at 915-332-0531.

Sincerely,

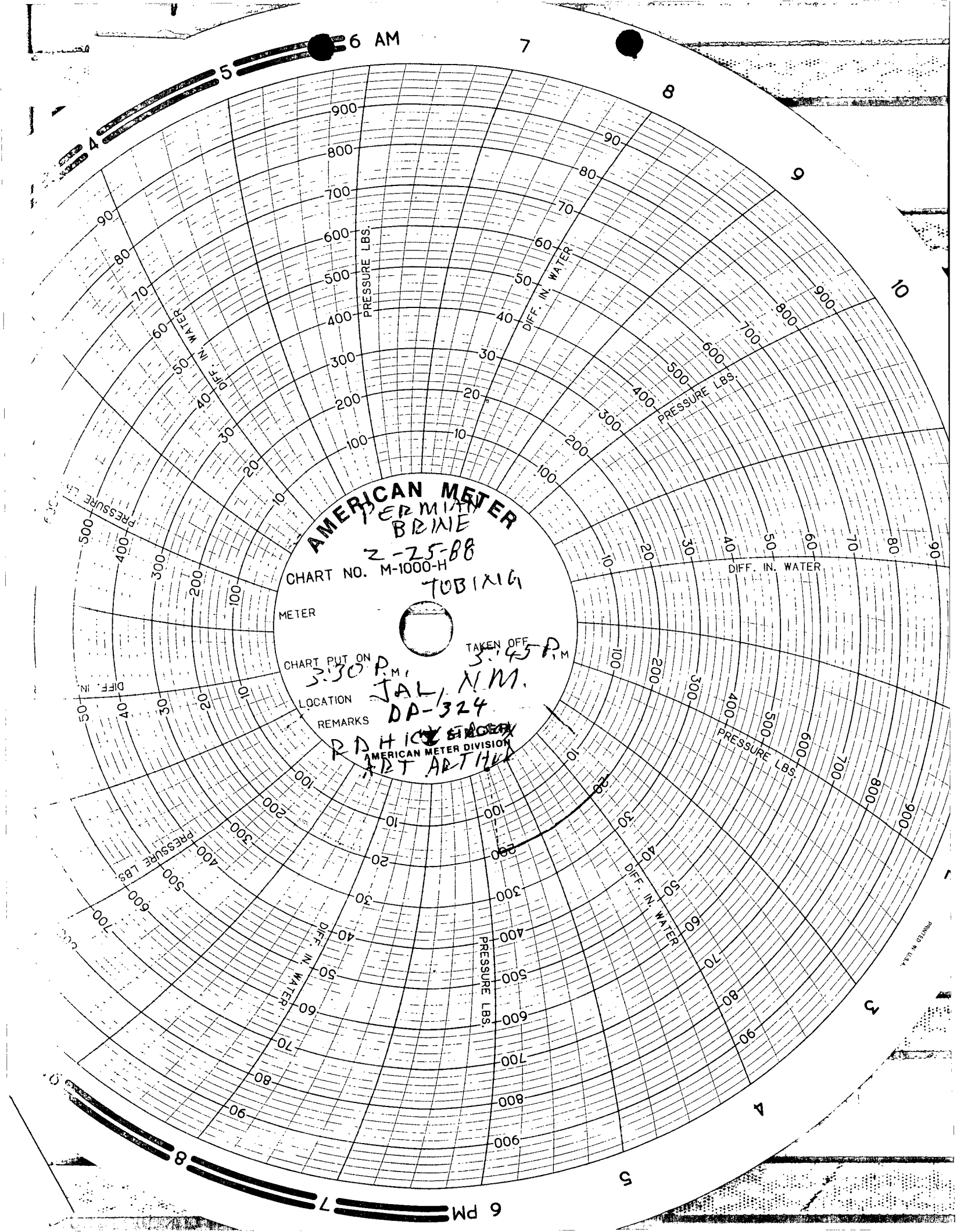
PERMIAN BRINE SALES, INC.

R.D. Hickerson rdt

R.D. Hickerson
President

RDH/rdt

Attachments


6 AM
7
8
9
10
4
5
6 PM
AMERICAN METER
PERMIAN BRINE
2-25-88
CHART NO. M-1000-H
TUBING
METER
CHART PUT ON 3:30 P.M.
TAKEN OFF 3:45 P.M.
LOCATION JAL, N.M.
DP-324
REMARKS
RADIC STROBER
AMERICAN METER DIVISION
ART ARTHUR
PRESSURE LBS.
DIFF. IN. WATER
PRINTED IN U.S.A.

NEW MEXICO
HEALTH AND ENVIRONMENT
DEPARTMENT

Post Office Box 968
Santa Fe, New Mexico 87504-0968

ENVIRONMENTAL IMPROVEMENT DIVISION

Michael J. Burkhart
Director

GARREY CARRUTHERS
Governor

LARRY GORDON
Secretary

CARLA L. MUTH
Deputy Secretary

December 31, 1987

Russell D. Hickerson
Permian Brine Sales
Rt. 3, Box 3033
Odessa, TX 79763

Dear Mr. Hickerson:

The Underground Injection Control staff of the New Mexico Environmental Improvement Division Ground Water Section would like to thank you for your cooperation during our recent inspection of Permian Brine Sales brine facility. A copy of the inspection form is attached for your reference. Deficiencies noted during the inspection are as follows:

1. Ponding of brine and produced waters noted. Facility should be free of ponded brine or produced waters, facility should be inspected frequently, and spillage cleaned up when detected.

2. Spill collection system needs to be upgraded. Collection tank not functional, spillage containment inadequate.

Thank you for your continued cooperation. Should you have any questions feel free to contact me (827-2902) or John Parker (827-0027).

Sincerely,

John W. Parker

for Kevin Lambert
Hydrologist
Ground Water Section

KL:JP:egr

Enclosure

# BRINE STATION INSPECTION FORM

DATE 12/2 1987 EID INSPECTOR Lambert/Parker
FACILITY Permian Brine Sales LOCATION SAL
FACILITY REP ON SITE None COUNTY LEA

## WELL OPERATION

WELL IS INJECTING: ✓ THROUGH ANNULUS __ THROUGH TUBING
SOURCE OF FRESH WATER Well Water
TRACE INJECTION/PRODUCTION LINES

WELL HEAD PRESSURE _____ PSIG PUMP PRESSURE _____ PSIG
LEAKS AROUND WELL OR PUMP None

## STORAGE AREA

FOR PONDS:
GENERAL LINER APPEARANCE Looks Good

AMOUNT OF FREEBOARD 2-3 ft
ANY SIGN OF OVERFLOW OR LEAKS None
LEAK DETECTION SYSTEM ✓ __ FLUIDS __ DRY Remove debris from pond "weeds"

FOR TANKS:
GENERAL APPEARANCE
LABLED PLAINLY __ YES __ NO
BERMED TO PREVENT RUNOFF __ YES __ NO
CHECK CONTENTS TO ASSURE PROPER FLUID/LABLE MATCH

NUMBER OF TANKS FOR BRINE ____ FRESH WATER ____

## LOADING AREA

| | | |
|---|---|---|
| PROPERLY GRADED AND BERMED TO CONTAIN SPILLAGE | __ YES | ✓ NO |
| ANY EVIDENCE OF RECENT SPILLAGE | ✓ YES | __ NO |
| DOES FACILITY HAVE A SPILL COLLECTION SYSTEM | ✓ YES | __ NO |
| ANY EVIDENCE OF OIL SPILLING/DUMPING | ✓ YES | __ NO |

Spill collection system needs to be cleaned & upgraded

## MONITORING WELLS yes

DEPTH _____ FT STATIC WATER LEVEL _____ FT BELOW CASING
SAMPLED THIS VISIT __ YES __ NO TEMP _____ Ec _____

COMMENTS Needs a great deal of housekeeping
Evidence of brine spillage & oil spillage
Facility is in general disrepair

NEW MEXICO
HEALTH AND ENVIRONMENT
DEPARTMENT

Post Office Box 968
Santa Fe, New Mexico 87504-0968

GARREY CARRUTHERS
Governor

LARRY GORDON
Secretary

CARLA L. MUTH
Deputy Secretary

P-573 875 223

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

U.S.G.P.O. 153-506

| | |
|---|---|
| Sent to Russell Hickerson | |
| Street and No. Rt 3, Box 3033 | |
| P.O., State and ZIP Code Odessa, TX | |
| Postage | $ |
| Certified Fee | |
| Special Delivery Fee | |

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

August 14, 1987

Russell D. Hickerson
Operations Manager
Permian Brine Sales, Inc.
Rt. 3, Box 3033
Odessa, TX 79763

Re: Monitoring and Reporting Requirements of DP-324

Dear Mr. Hickerson:

The Environmental Improvement Division (EID) has received your letter dated July 24, 1987, and evaluated your request that future pressure tests be done on a yearly basis instead of quarterly as stated in your approved ground water discharge plan (DP-324).

Based on available information, the EID has no objection to changing your monitoring and reporting requirements to reflect your request. No public notice is necessary since the change does not represent a significant modification to your discharge plan. Consequently, find enclosed an updated monitoring and reporting form showing your new requirements.

Be aware that your next pressure test is due May 1988.

If you have any questions, please do not hesitate to write me at the address listed on the letterhead or call (505) 827-2902.

Sincerely,

John Parker

for Kevin Lambert
Hydrologist
Ground Water Section - UIC Program

KL:egr

Enclosure: M & R Form

cc: Garrison McCaslin, EID District IV Manager, Roswell

# MONITORING AND REPORTING FORM

ALL BLANKS MUST BE COMPLETED.

CHECK ALL APPLICABLE BOXES

ORIGINAL DP: X
ORIG. DP PEND. APPROV: ___
RENEWAL: ___
RENEWAL PEND: ___
MODIFICATION: ___
MODIFICATION PENDING: ___

DISCHARGE PLAN NUMBER: 324

SIC NUMBER: ___

EID DISTRICT: IV

NAME OF FACILITY: Permian Brine Sales, Inc. - Jal Brine Station

LOCATION OF FACILITY: Jal, New Mexico

ALTERNATE OR PAST NAME OF FACILITY: ___

CITY OR CLOSEST TOWN: Jal USGS QUAD: ___

COUNTY: Lea TWP: 25S RGE: 37E SEC: 16

CONTACT PERSON: Hickerson (LAST NAME), Russell D. (FIRST NAME) TITLE: Operations Manager

ADDRESS OF CONTACT PERSON: Rt. 3, Box 3033, Odessa, TX 79763

TELEPHONE: 915-332-0531

TYPE OF FACILITY: Brine extraction

MEANS OF DISCHARGE ( LAGOON, LEACH FIELD, OTHER -SPECIFY ): Lagoon

REVIEWER: ( CURRENT ) Lambert (LAST NAME), Kevin (FIRST NAME)

DATE APPROVED: May 21, 1986 DATE OF EXPIRATION: May 21, 1991

MONITORING REQ: ( COMMENT, IF NECESSARY, ON BACK )

| SAMPLING SITE OR ID | STORET CODE ( SAMP. SITE ) | PARAMETER(S) | DATE DUE |
|---|---|---|---|
| Brine extraction well | | Pressure test | May 31 |
| | | | |
| | | | |

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531


July 24, 1987

New Mexico Health and Environment
Box 968
Santa Fe, New Mexico 78504-0968


RECEIVED
AUG 05 1987
GROUND WATER/HAZARDOUS WASTE
BUREAU


ATTN: Kevin Lambert

RE: Pressure Test on Jal Station

Dear Sirs:

Find enclosed our Jal pressure test chart dated May 21, 1987. We apologize for our tardiness in submitting the chart.

As discussed with you at the January 28, 1987 test, we request that future tests be conducted on a yearly basis.

If you have any questions, please do not hesitate to give me a call.

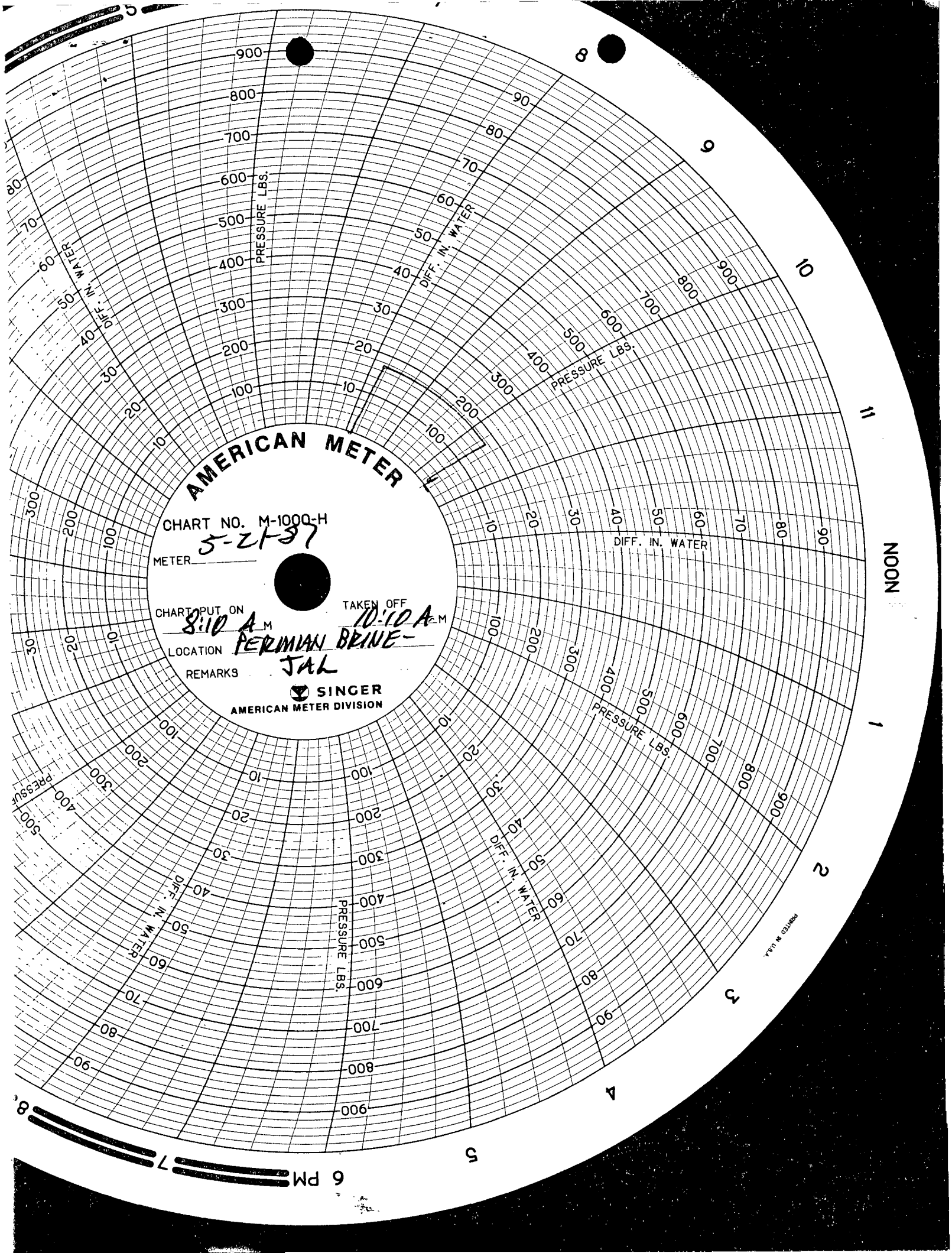
Very Truly Yours,

PERMIAN BRINE SALES, INC.

Russell D. Hickerson
Operations Manager

RDH/scr

Enclosure


AMERICAN METER
CHART NO. M-1000-H
5-21-97
METER
CHART PUT ON
8:10 A M
TAKEN OFF
10:10 A M
LOCATION
PERMIAN BRINE-
JAL
REMARKS
SINGER
AMERICAN METER DIVISION
PRESSURE LBS.
DIFF. IN. WATER
NOON
6 PM
PRINTED IN U.S.A.

NEW MEXICO
HEALTH AND ENVIRONMENT
DEPARTMENT

Post Office Box 968
Santa Fe, New Mexico 87504-0968

GARREY CARRUTHERS
Governor

LARRY GORDON
Secretary

CARLA L. MUTH
Deputy Secretary

February 6, 1987

R.D. Hickerson
Operations Manager
Permian Brine Sales, Inc.
Rt. 3, Box 3033
Odessa, TX 79763

RE: Pressure Test DP-324

Dear Mr. Hickerson:

Please find enclosed a copy of the pressure test chart for January 28, 1987.

Be aware that your next pressure test is due May 1987, according to your monitoring and reporting requirements presented in the EID letter of May 21, 1986.

If you have any questions, please do not hesitate to contact me at the address listed on the letterhead or at telephone number (505) 827-2902.

Sincerely,

Kevin Lambert

Kevin Lambert
Hydrologist
Ground Water Section -
Underground Injection Control

KL:egr

Enclosure

cc: Garrison McCaslin, EID District IV Manager, Roswell

EQUAL OPPORTUNITY EMPLOYER

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531



RECEIVED
FEB 03 1987
GROUND WATER/HAZARDOUS WASTE BUREAU


January 29, 1987

Environmental Improvement Division
P.O. Box 968
Santa Fe, New Mexico 87504-0968

Re: Pressure Test
DP-324
Section 16, T-25-S
R-37-E
Lea County, New Mexico

Dear Sirs:

Jerry Koschal, Kevin Lambert, and I conducted a successful mechanical integrity test on the above captioned well on January 28, 1987.

E.I.D. meters were used and they have the chart. The test pressure was 185#.

Please send me a copy of the chart for our records.

If you have any questions, please contact me and thank you for your cooperation in advance.

Sincerely,
PERMIAN BRINE SALES, INC.

R.D. HICKERSON
OPERATIONS MANAGER

RDH/law

| No. of Samples | Ion |
|---|---|
| | Na |
| | K |
| | Ca |
| | Mg |
| | Cl |
| | HCO3 |
| | CO3 |
| | SO4 |
| | TDS |
| //////// | //////////// |
| | NO3+ NO2 |
| | NH3 |
| | kjeld N |
| //////// | //////////// |
| | As |
| | Ba |
| | Cd |
| | CN |
| | Cr |
| | F |
| | Pb |
| | Hg |
| | Se |
| | Ag |
| | U |
| | V |
| | Ra 226 |
| | Ra 228 |
| //////// | //////////// |
| | Cu |
| | Fe |
| | Mn |
| | Phenols |
| | Zn |
| //////// | //////////// |
| | Al |
| | B |
| | Co |
| | Mo |
| | Ni |
| //////// | //////////// |
| | pH |
| | Conduct. |
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# FIELD TRIP REPORT
## GROUND WATER SECTION

SLD USER CODES
Ground Water: 59300
$NO_3$, HC, & Toxics: 59600
UIC: 59500

County Eddy. Lea

FACILITY VISITED
Name of Facility: Loco Hills Brine Co., Simco-McCasland, Permian Brine, KTS Brine
Location: Loco Hills, Eunice, Jal, Crossroads

Discharge Plan Number: DP- 394, 326, 324, 355
Type of Operation: Brine Production Facilities

ENVIRONMENTAL IMPROVEMENT DIVISION FIELD VISIT
EID Inspector(s): Lambert and Koschal
Date of Inspection or Visit: 1/26/87 - 1/29/87
Discharger's Representative Present During EID Visit:
Name: Maloney, ~~Patterson, Hickerson-Price, Stern~~
Title or Position: Mgrs/Owners
Purpose of Visit:
a. Evaluation of Proposed Discharge Plan
b. Compliance Inspection of Discharge with Approved Plan
c. Other (specify) Pressure Test Brine Wells
Inspection Activities During Field Visit:
a. Inspection of Facilities or Construction (specify)

Ran Pressure Tests. KTS was not done due to break in fresh water line. Will do next time in area

b. Sampling of Effluents (give sampling locations)

c. Sampling of Ground Water (give names or locations of wells)

d. Evaluation of geology, soils, water levels or other physical characteristics of the location (specify)

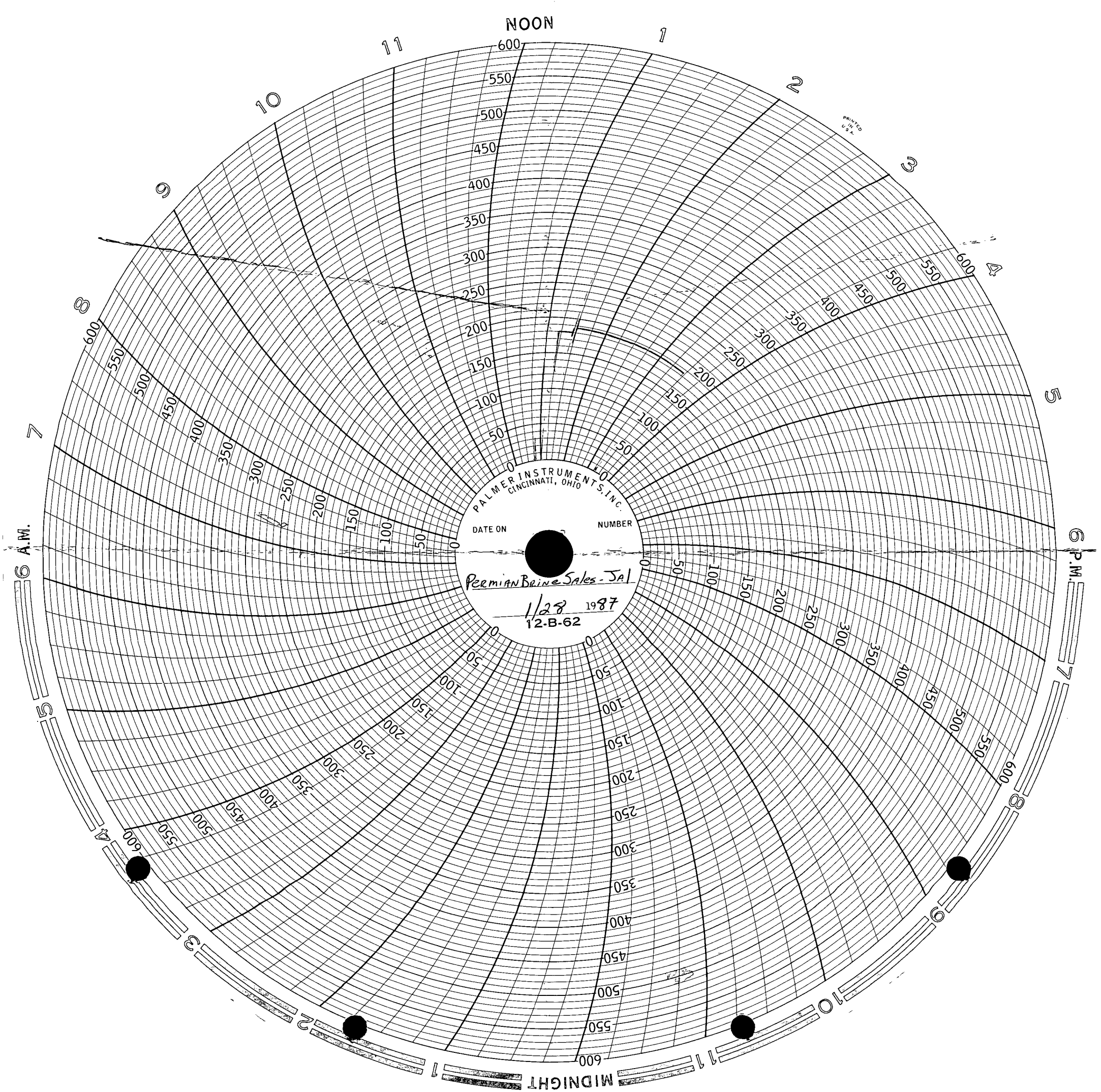
e. Other (specify)

Observations and Information Obtained during the Visit:

Ran 3 of 4 pressure tests. Unable to run 4th due to break in fresh water line which prevents us from pressuring up. Well

ACTION REQUIRED

Also was to able to get in touch w/ a contact of Marathon Road Water Station. Will be able to commun deficiency in '86 M&R Requirements


NOON
MIDNIGHT
6 A.M.
6 P.M.
PRINTED IN U.S.A.
PALMER INSTRUMENTS, INC.
CINCINNATI, OHIO
DATE ON
NUMBER
PERMIAN BRINE SALES - JAL
1/28 1987
12-B-62

# BRINE STATION INSPECTION FORM

DATE 12/10 1986 EID INSPECTOR Lambert, Koschal Baker
FACILITY Permian ~~Corp~~ Brine Sales LOCATION JAL T25S R37E Sec 16
FACILITY REP ON SITE None Available COUNTY LEA
DP-~~324~~ 324 Lease Name Arnott Ramsey phone# 915-332-0531

## WELL OPERATION

WELL IS INJECTING: __ THROUGH ANNULUS __ THROUGH TUBING
SOURCE OF FRESH WATER ? Water Well
TRACE INJECTION/PRODUCTION LINES Buried Lines

WELL HEAD PRESSURE _____ PSIG PUMP PRESSURE _____ PSIG
LEAKS AROUND WELL OR PUMP None
Unable to inspect pump house locked

## STORAGE AREA

FOR PONDS:
GENERAL LINER APPEARANCE Hypalon Liner Fair Condition Need better fence around pond
AMOUNT OF FREEBOARD ~ 2 ft
ANY SIGN OF OVERFLOW OR LEAKS None
LEAK DETECTION SYSTEM __ FLUIDS __ DRY No leak detection system

FOR TANKS:
GENERAL APPEARANCE Fresh Water Tank Only
LABLED PLAINLY __ YES __ NO
BERMED TO PREVENT RUNOFF __ YES X NO
CHECK CONTENTS TO ASSURE PROPER FLUID/LABLE MATCH

NUMBER OF TANKS FOR BRINE ____ FRESH WATER 1

## LOADING AREA

| | | |
|---|---|---|
| PROPERLY GRADED AND BERMED TO CONTAIN SPILLAGE | __ YES | X NO (7' small pad inadequate; bermed) |
| ANY EVIDENCE OF RECENT SPILLAGE | X YES | __ NO (nothing major) |
| DOES FACILITY HAVE A SPILL COLLECTION SYSTEM | __ YES | X NO |
| ANY EVIDENCE OF OIL SPILLING/DUMPING | __ YES | X NO |

## MONITORING WELLS

DEPTH _____ FT STATIC WATER LEVEL _____ FT BELOW CASING
SAMPLED THIS VISIT __ YES __ NO TEMP _____ Ec _____

COMMENTS General Appearance Poor, Need Major Surface Housekeeping
Needs Loading Area - Bermed w/ Collection Sump
Need to upgrade electrical system

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531


8-26-86


RECEIVED
SEP 04 1986
GROUND WATER/HAZARDOUS WASTE BUREAU


Environmental Improvement Division
P.O. Box 968
Santa Fe, New Mexico 87504- 0968

Re: Mechanical Integrety Test

Dear Mr. Lambert:

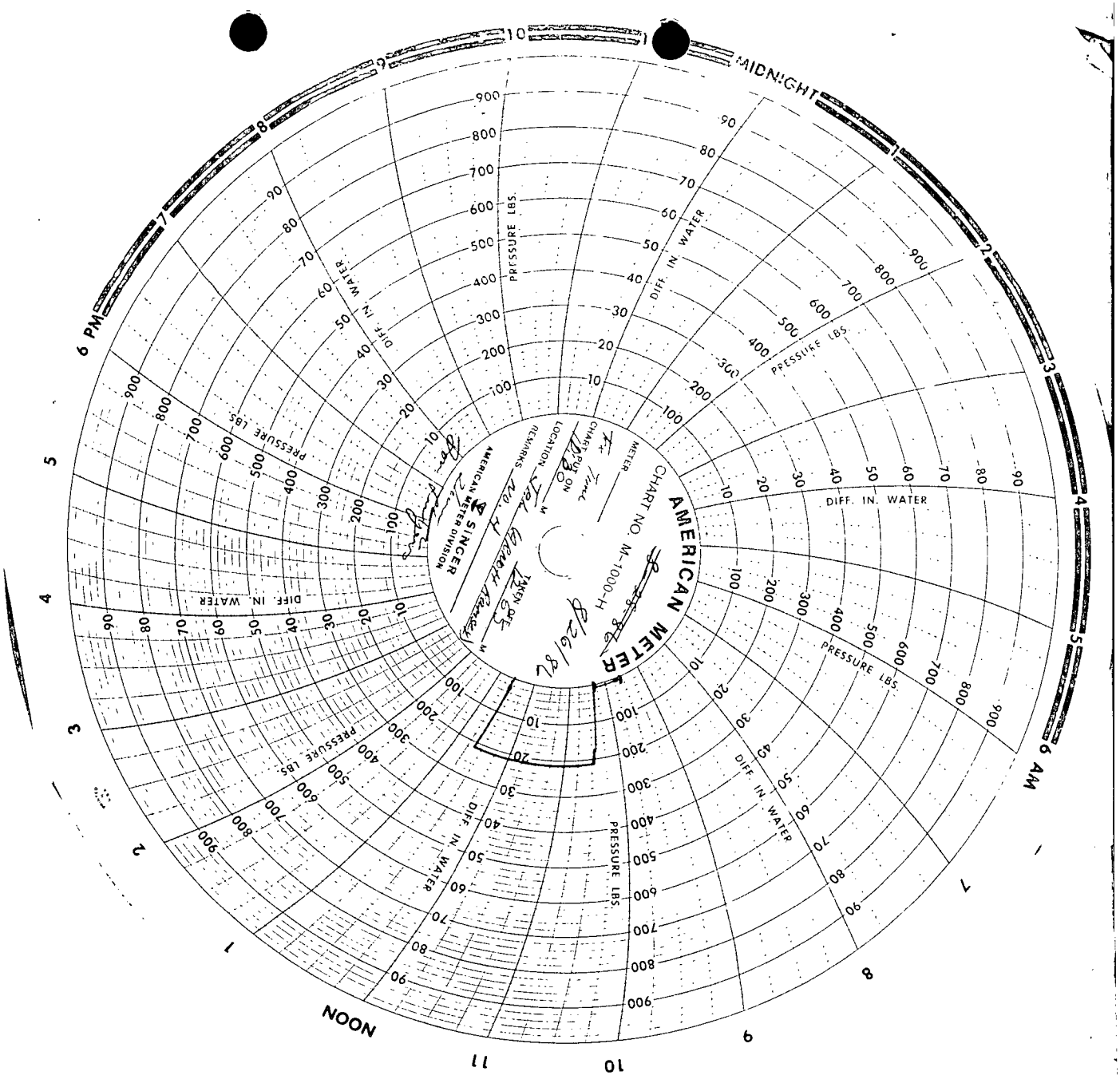
A mechanical integrety test has been run on the brine well at the Jal Brine Station. The test proved that the well has mechanical integrety. Enclosed is the pressure chart from the well test.

If you have any questions, feel free to contact me.

Sincerely,
PERMIAN BRINE SALES, INC.

Rodger Weathers
Field Rep.
915-332-0531

RCS/law
Enc.


AMERICAN METER
CHART NO. M-1000-H
METER
LOCATION
REMARKS
CHART PUT ON
M
AMERICAN METER DIVISION
SINCER
MIDNIGHT
NOON
6 PM
6 AM
PRESSURE LBS.
DIFF. IN WATER
DIFF IN WATER
PRESSURE LBS.

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

P. O. BOX 1591

ODESSA, TEXAS
79760

PHONE 332-0531


## MECHANICAL INTEGRITY TEST REPORT

Station JAL (ARNOTT RAMSEY) Date 8-26-86

Station Number # 4 Witness _____

Run By Rodger Weathers Witness E.I.D SIGNATURE ON CHART.

Normal Operating Pressure 180 PSI

Depth of Well 1591'

Pressure attained in Test 220 PSI

Rate of Injection (approximate) 45 gpm

Pressuring up time 20 min.

Static test time 2 hrs.

Pounds of decline ~~0~~

Percentage of decline ~~0~~

REMARKS 0 percentage of decline Indicates Casing, Cement & Cavern Shows a Sound Mechanical Integrity Test.

STATE OF NEW MEXICO
HEALTH ENVIRONMENT

# MEMORANDUM

DATE: 8-28-86

TO: Kevin Lambert, Ground Water Section

FROM: Don Lutjens, Hobbs Field Office

SUBJECT: PERMIAN BRINE SALES - PRESSURE TEST

RECEIVED
SEP 02 1986
GROUND WATER HAZARDOUS WASTE BUREAU

The normal operating pressure is 180 psi; the test was run at 218 psi. At 2 hrs. the pressure showed no delta so we agreed that it could be discontinued at that time. Rodger Weathers will send you the complete report from Texas.

dl

pc Files - Hobbs EID

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

P. O. BOX 1591 ODESSA, TEXAS 79760 PHONE 332-0531


Chuck Green
Texas Department of Water Resources
Box 13087
Capitol Station
Austin, Texas 78711


RECEIVED
SEP 02 1986
GROUND WATER HAZARDOUS WASTE BUREAU


## MECHANICAL INTEGRITY TEST REPORT

Station Jal (Arnott Ramsy 4#) Date 8-26-86

Station Number #4 Witness Don Luttjens

Run By Rodge Weathers Witness Rodge Weathers

Normal Operating Pressure 180 PSI

Depth of Well 1591' TD

Pressure attained in Test 220 PSI

Rate of Injection (approximate) 45 gpm

Pressuring up time 20 min

Static test time 2 hrs

Pounds of decline 0

Percentage of decline 0

REMARKS Location: East of Jal, NM East of #18 on #128 about 2 miles, On North side of hiway #128 just SW of the Jal airport

MEMORANDUM OF MEETING OR CONVERSATION

| ☒ Telephone ☐ Personal | Time | Date 8/15/86 |
|---|---|---|
| Originating Party | | Other Parties |
| To: Russ Hickerson 915-~~332~~ 332-0531 | | |
| From: Kevin Lambert | | |

Subject
Permian Brine Sales -
Inviting to come out for Pressure Test due Aug 30

Discussion
11:07am Busy
3:07pm Busy
1:40pm Not in left message
3:11pm Looking @ 8/26 ~10am was inviting EID along Told him EID Central Office staff couldn't make it but will ask field office staff if they could send somebody. If no one from EID makes it just send us the pressure chart as required w/ any documentation you feel relevant to the pressure test

Kevin Lambert

Conclusions or Agreements
8/18/86 Hobbs field office
Rolf Ruffner Informed him of the upcoming pressure test and asked if someone from their office could be present If not please notify Permian Brine Sales - Russ H that they would be unable to attend and they should go ahead without E.I.D's presence.

Distribution

Signed Kevin Lambert

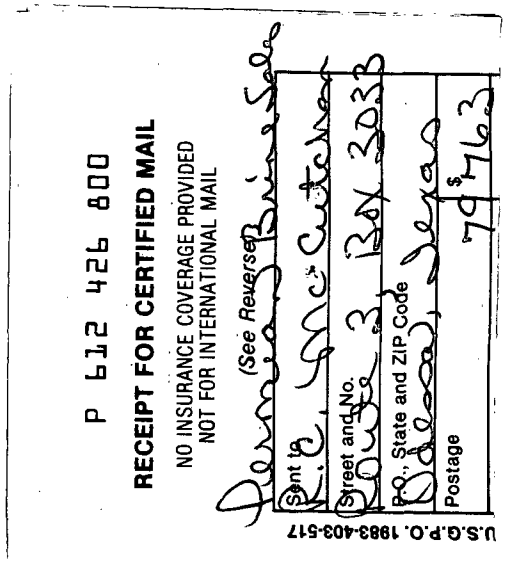
HEALTH ENVIRONMENT department

STATE OF NEW MEXICO

ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020

TONEY ANAYA
GOVERNOR

DENISE D. FOR
DIRECTOR




CERTIFIED MAIL - RETURN RECEIPT REQUESTED

May 21, 1986

R.C. McCutchan, Engineer
Permian Brine Sales, Inc.
Route 3, Box 3033
Odessa, Texas 79763

RE: Discharge Plan (DP-324) Approval

Dear Mr. McCutchan:

The discharge plan (DP-324) for the brine extraction well located in Section 16, T25S, R37E, Lea County, New Mexico is hereby approved. The approved discharge plan consists of the plan dated May 7, 1984, and the materials received August 20, 1984; October 31, 1984; November 6, 1984; November 30, 1984; February 24, 1986; and May 12, 1986 submitted as supplements to the discharge plan.

The discharge plan was submitted pursuant to Section 3-106 and 5-101 of the N.M. Water Quality Control Commission Regulations. It is approved pursuant to Section 3-109. Please note subsections 3-109.E. and 3-109.F., which provide for possible future amendment of the plan. Please be advised that the approval of this plan does not relieve you of liability should your operation result in actual pollution of surface or ground waters which may be actionable under other laws and/or regulations.

The monitoring and reporting shall be as specified in the discharge plan and supplements thereto. These requirements are summarized on the attached sheet(s). Any inadvertent omissions from this summary of a discharge plan monitoring or reporting requirement shall not relieve you of responsibility for compliance with that requirement.

Please note that Section 3-104 of the regulations requires that "When a plan has been approved, discharges must be consistent with the terms and conditions of the plan."

Pursuant to subsections 3-109.G.4., this plan approval is for a period of five (5) years. This approval will expire May 21, 1991, and you should submit an application for new approval in ample time before that date.

On behalf of the staff of the Ground Water Section, I wish to thank you (and your staff and/or consultants) for your cooperation during this discharge plan review.

Sincerely,

Karl Soxa

for/ Ernest Rebuck
Bureau Chief
Ground Water/Hazardous Waste Bureau

ER/DJ/mp

cc: Gary McCaslin, Manager, EID District IV, Roswell
Roelf Ruffner, EID Field Office, Hobbs

MONITORING AND REPORTING FORM

ALL BLANKS MUST BE COMPLETED.

CHECK ALL APPLICABLE BOXES

ORIGINAL DP: X
ORIG. DP PEND. APPROV: ___
RENEWAL: ___
RENEWAL PEND: ___
MODIFICATION: ___
MODIFICATION PENDING: ___

DISCHARGE PLAN NUMBER: 324

SIC NUMBER: ___

EID DISTRICT: IV

NAME OF FACILITY: Permian Brine Sales, Inc. - Jal Brine Station

LOCATION OF FACILITY: Jal, New Mexico

ALTERNATE OR PAST NAME OF FACILITY: ___

CITY OR CLOSEST TOWN: Jal USGS QUAD: ___

COUNTY: Lea TWP: 25S RGE: 37E SEC: 16

CONTACT PERSON: McCutchan (LAST NAME), R.C. (FIRST NAME) TITLE: Engineer

ADDRESS OF CONTACT PERSON: Route 3, Box 3033; Odessa, Texas 79763

TELEPHONE: 915-332-0531

TYPE OF FACILITY: Brine extraction

MEANS OF DISCHARGE ( LAGOON, LEACH FIELD, OTHER -SPECIFY ): Lagoon

REVIEWER: ( CURRENT ) Jones (LAST NAME), Doug (FIRST NAME)

DATE APPROVED: May 21, 1986 DATE OF EXPIRATION: May 21, 1991

MONITORING REQ: ( COMMENT, IF NECESSARY, ON BACK )

| SAMPLING SITE OR ID | STORET CODE ( SAMP. SITE ) | PARAMETER(S) | DATE DUE |
|---|---|---|---|
| Brine extraction | well | Pressure test | Feb. 28; May 31; Aug. 30; Nov. 30 |
| | | | |
| | | | |

| SAMPLING SITE OR ID | STORET CODE ( SAMP. SITE ) | PARAMETER(S) | DATE DUE |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

COMMENTS:

| | YES | NO |
|---|---|---|
| PRE - 1977 DISCHARGER | ___ | X |

| OTHER APPLICABLE PERMITS: | YES | NO |
|---|---|---|
| RCRA | ___ | ___ |
| RADIOACTIVE MAT. | ___ | ___ |
| NPDES | ___ | ___ |
| UST | ___ | ___ |

FOR EID USE ONLY

STATUS OF DP:

| | |
|---|---|
| ACTIVE: | X |
| WITHDRAWN: | ___ |
| EXPIRED, NOT RENEWED: | ___ |
| INACTIVE: | ___ |
| NOT YET APPROVED: | ___ |

SEND REPORTS TO:

GROUND WATER SECTION
EID: GROUND WATER/HAZARDOUS WASTE BUREAU
P.O. BOX 968
SANTA FE, NM 87504-0968

REVISED: 4/4/86

# E I D  B U C K S L I P

CHECK ONE:

/XX/ LETTER TO R.C. McCutchan, Engineer
for Ernest Rebuck's signature

/ / MEMO TO _____

/ / PRESS RELEASE

/ / OTHER

SUBJECT: Permian Brine Sales, Inc.

DRAFTED BY: Doug Jones DJ 5/20/86 (Date)

CONCURRENCES:

| NAME: | | INITIAL | DATE REC'D | DATE APPROVED |
|---|---|---|---|---|
| Karl Souder | Sect. Mgr. | KQS | 5/20 | 5/20 |
| Ernest Rebuck | Bur. Chief | KQS | 5/20 | 5/20 |
| Richard Holland | Dep. Dir. | | | |
| Denise Fort | Director | | | |

FINAL DECISION NEEDED BY _____ (date) BECAUSE _____

COMMENTS BY DRAFTER OR REVIEWER(S):

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531



RECEIVED
MAY 19 1986
GROUND WATER/HAZARDOUS WASTE BUREAU


May 12, 1986

Mr. Doug Jones
Environmental Improvement Division
P.O. Box 968
Santa Fe, N.M. 87504-0968

Dear Mr. Jones:

In response to your letter of April 25, 1986, we wish to advise that the following plans have been made:

We shall construct the brine spill facility as described and shown by the drawings,in our letter of February 24, 1986. It is planned to complete this construction project by July 2, 1986.

To advise you further, we plan to conduct the first quarterly pressure test on the brine well at the Jal Brine Station on this date also.

If this date is not compatible with your schedule, please advise.

Very truly yours,
PERMIAN BRINE SALES, INC.

R.C. MCCUTCHAN
ENGINEER


RECEIVED
MAY 16 1986
E.I.D. PROGRAM SUPPORT BUREAU


RCM/law

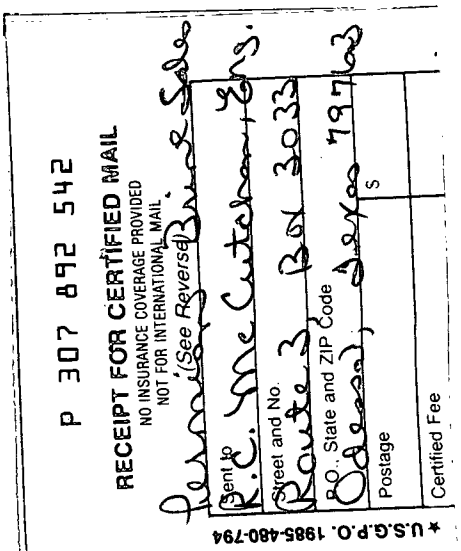
TONEY ANAYA
GOVERNOR

DENISE D. FOR
DIRECTOR

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO

ENVIRONMENTAL IMPROVEMENT DIVISIO
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020




CERTIFIED MAIL - RETURN RECEIPT REQUESTED

April 25, 1986

R.C. McCutchan, Engineer
Permian Brine Sales, Inc.
Route 3, Box 3033
Odessa, Texas 79763

RE: Jal Brine Station Discharge Plan (DP-324)

Dear Mr. McCutchan:

I have assumed responsibility for Discharge Plan No. 324 while Paige Morgan is on maternity leave. In accord with her suggestions, I have the following comments and questions regarding your letter dated February 24, 1986:

1) Pursuant to your letter, you have opted to perform quarterly pressure tests on the brine well rather than install a monitor well. Please submit a schedule indicating months when the tests will be conducted and when reports will be submitted to EID. I suggest testing in January, April, July, and October with reports due the end of the following month. Also, please commit to providing EID with at least 5 days notice prior to testing and to allow EID the opportunity to be present during testing.

2) The plans and specifications for the brine spill catchment facility indicate that it will be suitable for that purpose. On what date do you expect the construction of the facility to be completed?

If you have any questions, please contact me at the above address or telephone number 827-2903.

Sincerely,

Doug Jones

Doug Jones
Water Resource Specialist
Ground Water Section

DJ/mp

cc: Garrison A. McCaslin, Manager, EID District IV, Roswell
Roelf Ruffner, EID Field Office, Hobbs

STATE OF NEW MEXICO

STATE ENGINEER OFFICE

ROSWELL

S. E. REYNOLDS
STATE ENGINEER

RECEIVED
MAR 5 1986
GROUND WATER/HAZARDOUS WASTE
BUREAU

DISTRICT II
909 E. 2nd STREET
P.O.BOX 1717
ROSWELL, NEW MEXICO 88201

March 4, 1986

Paige Morgan
Environmental Improvement Division
Box 968
Santa Fe, New Mexico 87501

Dear Paige:

I am sending you a copy of a water table map which was prepared in the Doom-Mathis salt water contamination case. This area is located northeast of Section 21, Township 25 South, Range 37 East, where your contaminated wells are located.

I am also submitting a map of our basic data collection showing the elevation of the top of the Triassic Formation. The area you are interested in has not been contoured by this office. Also submitted are copies of our Chemical Quality data for Township 25 South, Range 37 East. We do not have data on the quality of the produced brine.

Based on my experience with similar problems in the same general area, I am reasonably certain that the source of contamination for the Cramer-Boyington wells lies to the north and is probably North-Northwest. This opinion is based on the fact that the water table and the bed rock both slope South-Southeast. The most likely source is an old abandoned brine disposal pit which was in use prior to 1965. Other possible sources are improperly plugged oil or gas wells, migration of salt water behind oil well casing strings or through oil well casing leaks of producing wells or with similar problems in salt water disposal wells.

I am sorry to have been so slow in replying to your letter of February 11, 1986. I would also like to thank you for the information that you sent me. I doubt that the method described by Mast will be of much help in the Lea County area but I would not rule it out completely.

Yours truly,

James I. Wright
Field Engineer

JIW/tmg
Encls.
cc Brad Compton

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 915 PHONE 332-0531



RECEIVED
MAR 3 1986
GROUND WATER HAZARDOUS WASTE BUREAU


February 24, 1986

Mrs. Paige Morgan
Water Resources Specialist
Environmental Improvement Division
P.O. Box 968
Santa Fe, New Mexico 87504-0968

Dear Mrs. Morgan:

This will acknowledge your letter of February 12, 1986 and our subsequent phone conversation on February 20, 1986, regarding supplemental information requested for Permian Brine's discharge plan at our Jal Brine Station.

Your suggestion that we either drill a monitor well to the shallow aquifer near the brine well or conduct quarterly pressure tests on the brine well has been considered in the light of our present day to day operations. As you know, oil well drilling activities in the West Texas - Eastern New Mexico areas are rapidly declining and consequently our brine sales are also adversely affected. Therefore, we are curtailing all capital expenditures except those that are absolutely required to comply with the environmental edicts. Faced with these economic realities, at this time, we prefer the alternative of quarterly pressure testing. However, if, at some future date, drilling activities increase, we would be agreeable to drilling the monitor well.

We discussed the shallow aquifer water well pumping capacities in this area with Jim Wright of the Roswell State Engineer's office. He predicted 15 to 20 gpm capacities. Since these volumes are marginal for our operations, this has further influenced our decision to use the pressure testing.

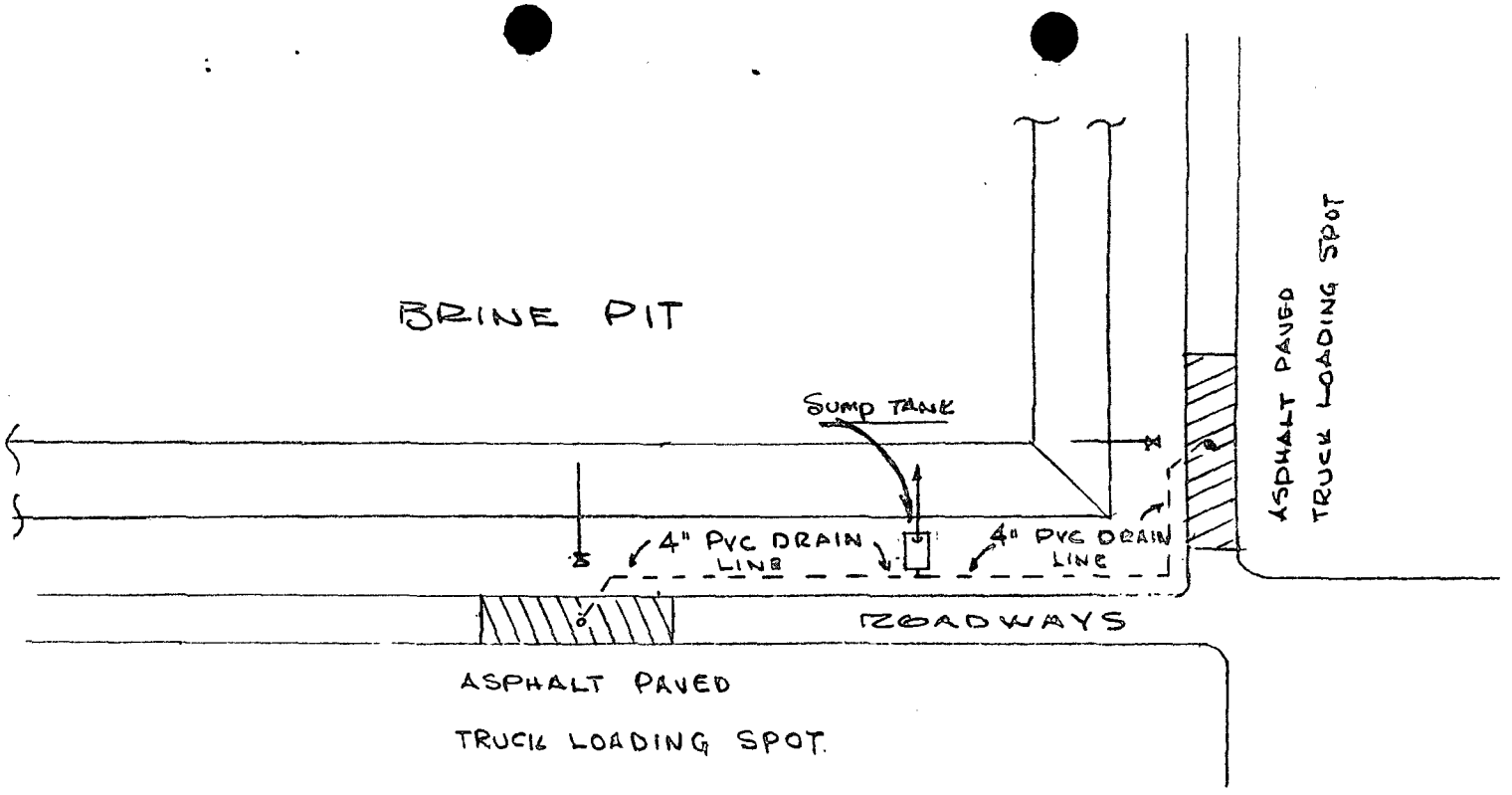
Attached are Permian Brine drawing's No. 4 and No. 5 showing the proposed brine spill facilities for the Jal Brine Station. To prevent the pumping of oil saturated truck bottoms in the surface spill basins, we have elected to use a buried pre-cast, re-enforced concrete sump tank. This tank will be equipped with an electric motor driven sump pump with high and low level float switches.

We sincerely hope these proposals will meet with your approval. However, if further information is required please let us hear from you.

Yours very truly,
PERMIAN BRINE SALES, INC.

R.C. MC CUTCHAN
ENGINEER

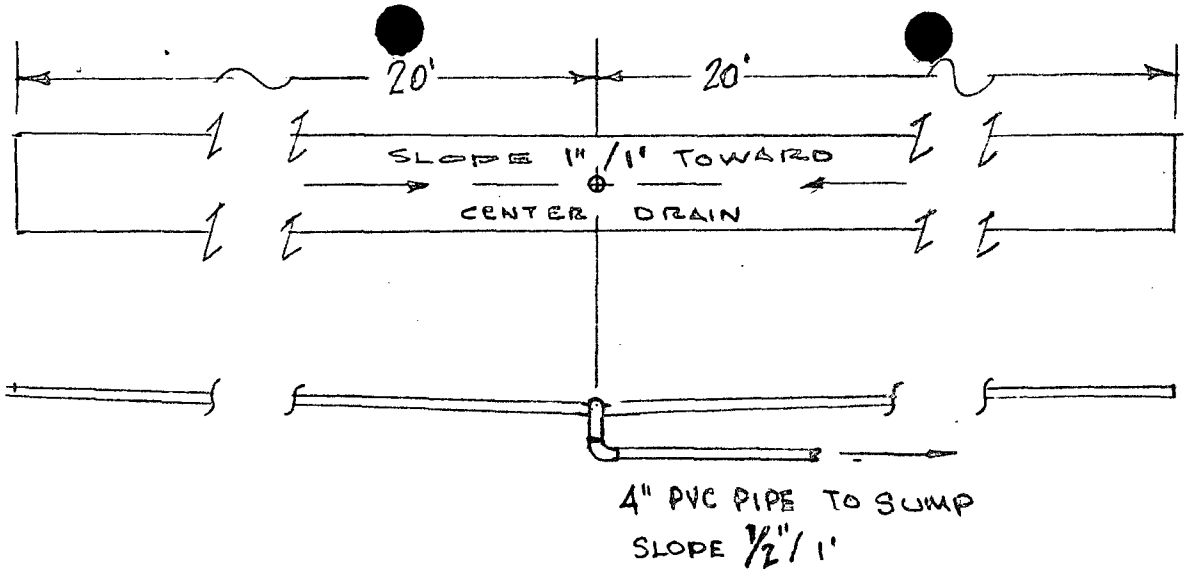
RCM/law
Enc.

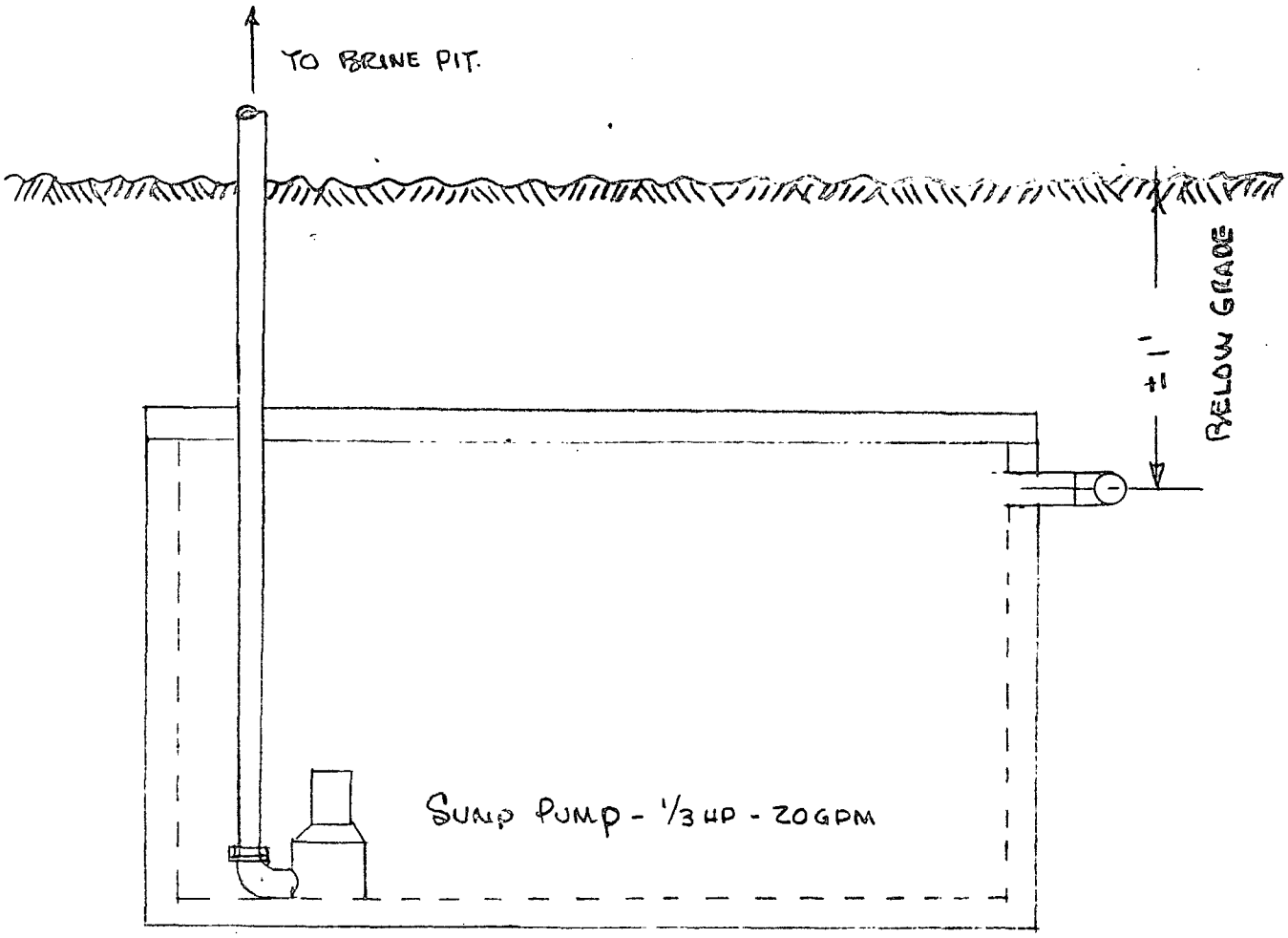



**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

PROPOSED TRUCK LOADING & BRINE SPILL RECOVERY FACILITIES
JAL BRINE STATION

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 2-21-86 | R.C. McCUTCHAN TEX. P.E. 9844 | 4 |




4' x 7'-8" x 5'-3" DEEP
PRECAST REENFORCED
CONCRETE SUMP TANK

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

# TYPICAL BRINE LOADING SPOT WITH SPILL DRAIN & SUMP TANK DETAILS JAL BRINE STATION

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 2-21-86 | R.C. McCutchan, Tex. P.E. 9844 | 5 |

TONEY ANAYA
GOVERNOR

DENISE D. FORT
DIRECTOR

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO

ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020

February 12, 1986

R.C. McCutchan, Geologist
Permian Brine Sales, Inc.
Route 3 Box 3033
Odessa, TX 79763

Dear Mr. McCutchan:

The enclosed letter will inform you of efforts on the part of this and other agencies to determine the source of contamination of the water wells immediately south of the Permian Brine Sales' Jal brine station. It is clear that there will be no rapid answer to this question, but we intend to pursue all leads.

In the meantime, it has been over a year since our last communication on finalizing the discharge plan for the Jal station, and I would like to complete these negotiations. My letter to you of January 2, 1985 stands unchanged, with the following exceptions:

> 6.a (1) Since your water supply well in the Santa Rosa Formation is pumped on a regular basis and would therefore induce any leakage from the brine well at that depth to move relatively rapidly in its direction, it may serve as a monitor well for deeper leaks. If the monitor well option is used, a shallow well should still be installed at close proximity to (within fifty feet of) the brine well.
>
> conditions of aproval: a) no longer applies.

I look forward to your early reply.

Sincerely,

Paige Grant Morgan
Water Resource Specialist

PGM:pgm

cc: Garrison McCaslin, EID District IV Manager

TONEY ANAYA
GOVERNOR

DENISE D. FORT
DIRECTOR

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO

ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020

February 11, 1986

Jim Wright
State Engineer's Office
Box 1717
Roswell, NM 88201

Dear Mr. Wright:

Thank you for your interest and the information you have provided regarding the brine contamination of the Bowington/Mosley and Cramer/Dakan wells in Section 21, T25S R37E, east of Jal. I enclose the article on determining the source of an incident of brine contamination that I referred to during our phone conversation last Friday. A summary of efforts to date to track the source of contamination of the above-named wells appears below.

The Hobbs Office of OCD was contacted about the contamination problem early in 1983. Jerry Sexton of OCD reports that the contamination had occurred at least six years previously. In order to search for a likely source of the contamination, OCD ran 84 "bradenhead" pressure tests on oil/gas wells and produced water injection wells in Sections 15, 16, 21 and 22. All received a clean bill of health except Union Texas Harrison #2-I22-24(sic)-37, which had a "very small" waterflow. Based chiefly on these pressure tests and the plugging records for wells in Section 21, Mr. Sexton concluded that the problem did not originate in the oilfield.

The EID received the complaint of contamination of the Mosely and Cramer wells in late August, 1984. Mosley reported that his well had started "going bad" around 1980, and they had it analysed in 1982: TDS was reported then as 14,312 mg/L and chloride as 8300 mg/L. Subsequent interviews with Mosley indicated that the problem began in 1978 or 1979. By 1980, the water had started killing fruit trees at the Bowington residence. Cramer thought he recalled the former owner of his place (Dakan) saying that the problem with his well came on very suddenly - one morning there were salt deposits in the vegetable garden he had irrigated the night before. Cramer believed this may have taken place in 1979.

Judging by the analyses conducted by Mosley, by the OCD, EID and Permian Brine (required by EID), the trend since 1982 has been toward a decrease in dissolved solids, including chloride, in the Mosley well, and an increase in contamination of the Cramer well. The most recent analyses of samples from both wells are enclosed. See also the enclosed location map, prepared by Permian Brine under a requirement by this office to research the problem.

In November, 1984, EID conducted an electromagnetic terrain conductivity survey over an area approximately 2000 feet south from Hwy. 128 by 1500 feet east-west, centered on the contaminated wells, searching for a "bull's eye" of high conductivity that would identify the source of contamination of the Mosley and Cramer

wells. Results were inconclusive, due in part perhaps to scanning at too shallow a depth, in part to the complex nature of the alluvial aquifer in that locale, and in part to interference from the numerous pipelines, powerlines and other sources of cultural interference in the area. Subsequently, I was stumped on what other approach to take to track the source of contamination until the enclosed article by Vernon Mast appeared in last summer's Ground Water Monitoring Review.

I have followed the method described by Mast to the extent of determining sodium-to-chloride (Na/Cl) ratios in the contaminated wells, the brine produced at Permian Brine Co.'s Jal Brine Station, brine produced at other brine stations in Lea and Eddy Counties, and brine originating as "produced water" in oil/gas wells in the vicinity of the contaminated wells. All information except that for produced water was taken from EID files; the analysis for Permian Brine Co.'s brine and for brine at several other brine stations is slightly suspect, due to an imbalance between the millequivalents of anions and cations reported in the analysis. The produced water data was published in Table 9, Part B of Nicholson and Clebsch, Geology and Ground-Water Conditions in Southern Lea County. The information is summarized below:

| Source | Date | Na/Cl |
|---|---|---|
| Mosely well, NE/4 NE/4 NE/4 Section 21, T25S R37E | 9/17/84 | 0.21 |
| as above | 11/28/84 | 0.30 |
| Cramer well, NE/4 NE/4 NE/4 Section 21, T25S R37E | 11/28/84 | 0.54 |
| Permian Brine Co. brine storage lagoon, SE/4 SE/4 SE/4 Section 16, T25S R37E | 11/28/84 | 0.51 |
| Permian Brine Co. fresh water supply well, SE/4 SE/4 SE/4 Section 16, T25S R37E | 7/25/84 | 1.14 |
| 16 brine stations | approx. 1978-1985 | 0.62 - 0.65 in 11 samples; other 5 values 0.31, 0.36, 0.47, 0.52, 0.54 |
| Produced water from Crosby Pool, T25S R37E (pay zone: Devonian) | ca. 1956 | 0.48 |
| Produced water from Jalmat Pool, T21 thru 26S, R35 thru 37E (pay zone: Yates-Seven Rivers) | ca. 1956 | 0.86 |
| Produced water from Langlie-Mattix Pool, T22 thru 26S, R36, 37E (pay zone: Yates, Seven Rivers Queen) | ca. 1956 | 0.55 |

Clearly, the Na/Cl ratio alone does not provide a sufficient "fingerprint" to identify the contamination source by that means. It would be necessary to get into comparisons of ion "factor pairs" using Mast's matrix algebra to determine the probable source of contamination of the Cramer and Mosley wells using Mast's method. To do so, I will need major-ions analysis for produced water that has been generated and/or disposed of upgradient of the contaminated wells. This information may be hard to come by for wells no longer in operation - I am under the impression that complete major-ions analyses have rarely been conducted for produced water. If you have such data for the disposal pits in Section 15 and 16 which you mentioned during our phone conversation of February 10th as having been identified as the source in a fresh water contamination case some five years ago, I would be interested in receiving that and any other information related to that case.

I look forward to conferring with you further on this matter.

Sincerely,

Paige Morgan

Paige Grant Morgan
Water Resource Specialist
Ground Water Section

PGM:pgm

cc: Richard Perkins, Program Manager, EID Ground Water Surveillance Section
Jami Bailey, OCD Environmental Bureau
R.C. McCutchan, Permian Brine Sales Inc.
Ken Mosely
Billy Wayne Cramer

note: copy also sent to EID District III Manager, Harrison McCaslin.

2/10/86: Jim Wright, SEO Roswell called in response to our 2/6 conversation about chloride contamination east of Jal. He reported that he had located a log that was probably for one of the contaminated wells:

owned by White (at time of filing)
located NE¼NE¼NE¼ Sec 21 T25S R37E
indicates water located in sand & gravel at 120 feet
log was from White's memory, not drilling log

The SEO worked on a case of brine contamination in a shallow aquifer in same township, Sec 15 & 16 about five years ago. Problem was traced to produced water disposal pits. I asked for details - he will send.

He pointed out that shallow aquifer contains channels of high permeability, ridges blocking flow, valleys collecting it - not a homogeneous, isotropic medium! Explanation for very different levels of contamination between

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

TONEY ANAYA
GOVERNOR

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88240
(505) 393-6161

February 3, 1986

MEMO TO: Jamie Bailey

FROM: Jerry Sexton

SUBJECT: WATER CONTAMINATION SECTION 21, T25S, R37E
Lea County

Attached are the following records from our files on the above case.

1) Chloride map of area from State Engineers
2) Water samples we collected or anayzed
3) Results of bradenhead test
4) How the wells were plugged and abandoned in Sec. 21, T25S, R37E
5) Letters of correspondence from myself on the situation

It was my opinion that the contamination came from the brine wells or from the brine pit at the well. We saw no evidence that it was an oil related problem.

In a meeting with Mr. Bowington at which Eddie Seay and I explained our thoughts and offered any technical help he wanted if he wished to determine additional liability.

The contamination had occurred at least 6 years before we were contacted and I felt contamination was not occurring at the time we were brought into the case.

In a similar case with Triassic water at Jal in the 1970's we attempted to trace where the contamination came from with no success.

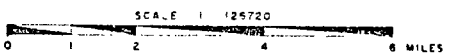
## LEGEND

● = Alluvium or Ogallala well

◆ = Triassic well

■ = Rustler well

ORIDE CONTENT OF GROUNDWATER IN SELECTED WELLS IN SOUTHEASTERN NEW MEXICO - 1965.

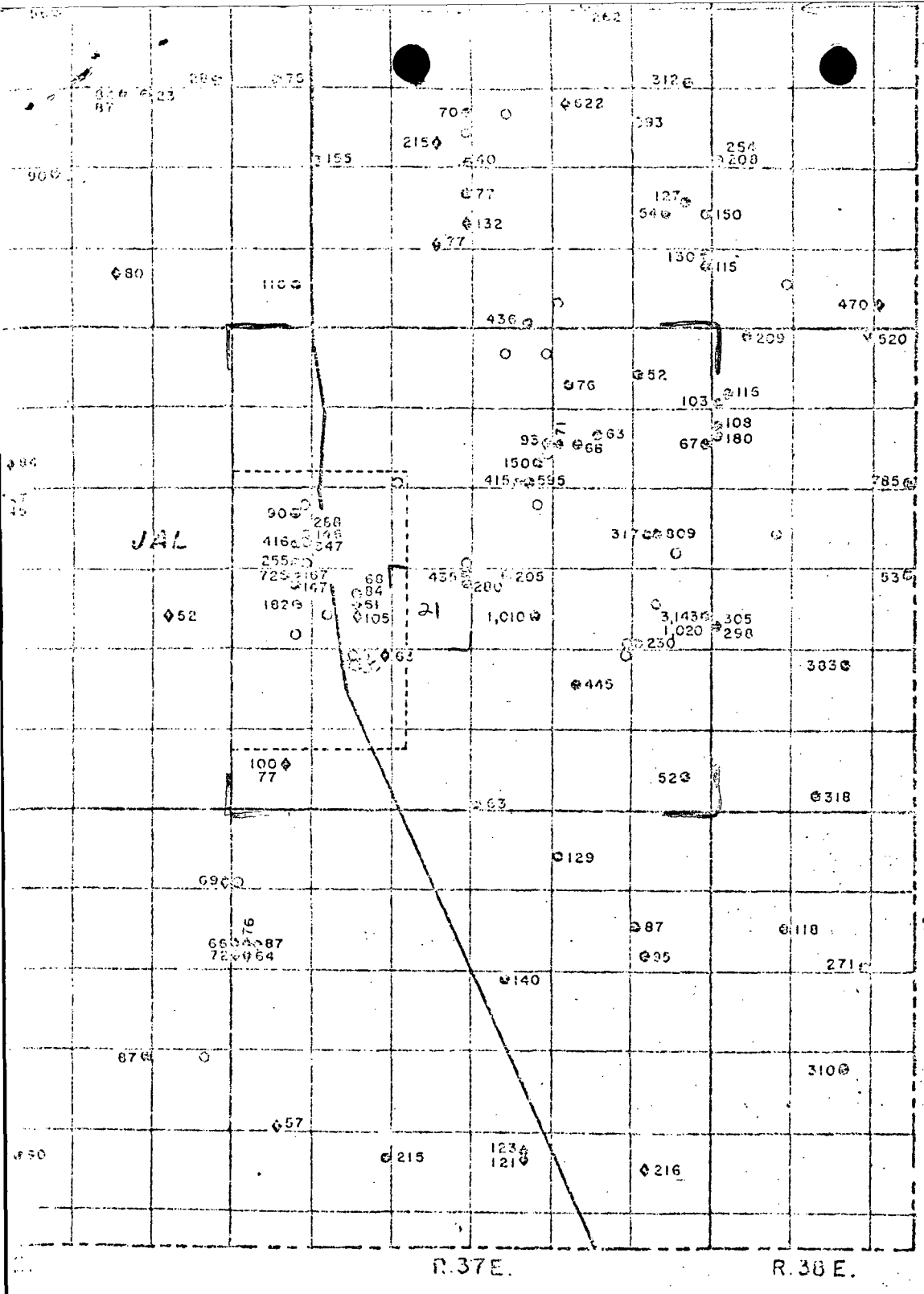



Mexico State Engineer Office

February 27, 1979

Sheet 6 of 6

QW - 95 - D


T. 24 S.
T. 25 S.
T. 26 S.
R. 37 E.
R. 38 E.
JAL
21

STATE OF NEW MEXICO
# ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

TONEY ANAYA
GOVERNOR

March 7, 1984

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88240
(505) 393-6161

Mr. Ralph Bowington
Box 95
Jal, NM 88252

Dear Sir:

Since our meeting in early February concerning your contaminated water well, we have obtained some information about cost of drilling monitor wells. Also, some material from the State Engineers concerning water tables and redbed formations were obtained as well as our well file. At your request and convenience, we will meet and talk about helping you.

If you have any questions, please contact Eddie W. Seay at 393-6161.

Very truly yours,

OIL CONSERVATION DIVISION

Jerry Sexton
Supervisor, District I

JS/ES/ed

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

TONEY ANAYA
GOVERNOR

March 13, 1984

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88240
(505) 393-6161

Permian Brine Sales
Route 3, Box 3033
Odessa, Texas 79763

SUBJECT: Final Inspection Plugged Brine Wells
Arnott Ramsey #2-P 16-25-37
Arnott Ramsey #3-P 16-25-37

Gentlemen:

In response to your notice that the above-listed brine wells were ready for final inspection, our Field Inspector checked the surface location on March 9, 1984. It was observed that you did not have the regulation dry-hole marker installed. This should be corrected.

The regulation of brine wells has been transferred from the Oil Conservation Division to the EID. When the above has been corrected you should notify Mr. Dave Boyer with the EID in Santa Fe at: P.O. Box 968, Santa Fe, NM 87504 (Phone 505-984-0020)

Very truly yours,

OIL CONSERVATION DIVISION

Jerry Sexton
Supervisor, District I

ed

cc: File

RESULTS OF BRADENHEAD SURVEY RUN
JUNE 1983 -- Sec 15,16,21 & 22 T25, R37

As a result of a contaminated water well in Unit H of Sec 21, T25S, R37E, *(see below) the OCD ran bradenhead tests on all wells located in Sections 15,16,21 & 22, T25S, R37E to determine if possible problem could be identified.

57 producing wells were tested -- Union Texas Harrison #2-I 22-25-37 was only well that had any waterflow and it was very small.

27 injection wells were tested -- No waterflows or tubing/packer leaks indicated.

4 brine wells checked -- Brinninstool Langlie Fed Brine well P-14-25-37 was injecting down casing & producing brine out tubing -- pit & location looked good

Permian Brine Sales & Service
Arnott Ramsay St Brine Well #4-P 16-25-37 -- well has been operated by injecting fresh water down tbg and brine out casing -- improper method Liner in pit OK and monitor hole dry.

Arnott Ramsay Brine #2-P 16-25-37
Well not in use -- Company claimed well was plugged, but not plugged properly -- had wooden plug at 400 ft. Drilled out and no other plug found -- Set CIBP @ 1140 (7-7-83)

Arnott Ramsay Brine Well #3-P 16-25-37
This well was not in use and is being plugged. Set CIPB at 1145 (7-7-83)

* Sonny Dakan Well water analyzed 39.760 ppm cl.

* Bowington well water analyzed 7,100 ppm cl.

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Form C-105
Revised 1-1-65

# NEW MEXICO OIL CONSERVATION COMMISSION
# WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5a. Indicate Type of Lease: State ☐ Fee ☒

5. State Oil & Gas Lease No.

1a. TYPE OF WELL: OIL WELL ☐ GAS WELL ☐ DRY ☒ OTHER

b. TYPE OF COMPLETION: NEW WELL ☐ WORK OVER ☐ DEEPEN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ OTHER

7. Unit Agreement Name

8. Farm or Lease Name: Arco

2. Name of Operator: Burleson and Huff

9. Well No.: No. 2

3. Address of Operator: P.O. Box 1579 Midland, Texas 79701

10. Field and Pool, or Wildcat: Langlie=Mattix

4. Location of Well

UNIT LETTER H LOCATED 1980 FEET FROM THE North LINE AND 330 FEET FROM THE East LINE OF SEC. 21 TWP. 25 RGE. 37 NMPM

12. County: Lea

| 15. Date Spudded | 16. Date T.D. Reached | 17. Date Compl. (Ready to Prod.) | 18. Elevations (DF, RKB, RT, GR, etc.) | 19. Elev. Casinghead |
|---|---|---|---|---|
| 11-4-'75 | 11-10-'75 | 11-10-75 Dry | 3077 Gr. | |

| 20. Total Depth | 21. Plug Back T.D. | 22. If Multiple Compl., How Many | 23. Intervals Drilled By | Rotary Tools | Cable Tools |
|---|---|---|---|---|---|
| 1200 | - | - | → | X | |

24. Producing Interval(s), of this completion — Top, Bottom, Name

None Dry Hole

25. Was Directional Survey Made: No

26. Type Electric and Other Logs Run: None

27. Was Well Cored: No

28. CASING RECORD (Report all strings set in well)

| CASING SIZE | WEIGHT LB./FT. | DEPTH SET | HOLE SIZE | CEMENTING RECORD | AMOUNT PULLED |
|---|---|---|---|---|---|
| 8 5/8 | 30 # | 937 ' | 10 3/4 | 350 sx circulated | none |
| | | | | | |
| | | | | | |
| | | | | | |

29. LINER RECORD

| SIZE | TOP | BOTTOM | SACKS CEMENT | SCREEN |
|---|---|---|---|---|
| None | | | | |
| | | | | |

30. TUBING RECORD

| SIZE | DEPTH SET | PACKER SET |
|---|---|---|
| None | | |
| | | |

31. Perforation Record (Interval, size and number)

None

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

| DEPTH INTERVAL | AMOUNT AND KIND MATERIAL USED |
|---|---|
| | |
| | |
| | |
| | |

33. PRODUCTION

| Date First Production | Production Method (Flowing, gas lift, pumping — Size and type pump) | Well Status (Prod. or Shut-in) |
|---|---|---|
| | | |

| Date of Test | Hours Tested | Choke Size | Prod'n. For Test Period → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Gas—Oil Ratio |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| Flow Tubing Press. | Casing Pressure | Calculated 24-Hour Rate → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Oil Gravity — API (Corr.) |
|---|---|---|---|---|---|---|
| | | | | | | |

34. Disposition of Gas (Sold, used for fuel, vented, etc.)

Test Witnessed By

35. List of Attachments: Inclination Report

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED [signature] TITLE Co- Owner DATE June 10, 1976

## INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Commission not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

## INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

| Southeastern New Mexico | | | | Northwestern New Mexico | | | |
|---|---|---|---|---|---|---|---|
| T. Anhy | 954' | T. Canyon | | T. Ojo Alamo | | T. Penn. "B" | |
| T. Salt | 1020 | T. Strawn | | T. Kirtland-Fruitland | | T. Penn. "C" | |
| B. Salt | | T. Atoka | | T. Pictured Cliffs | | T. Penn. "D" | |
| T. Yates | | T. Miss | | T. Cliff House | | T. Leadville | |
| T. 7 Rivers | | T. Devonian | | T. Menefee | | T. Madison | |
| T. Queen | | T. Silurian | | T. Point Lookout | | T. Elbert | |
| T. Grayburg | | T. Montoya | | T. Mancos | | T. McCracken | |
| T. San Andres | | T. Simpson | | T. Gallup | | T. Ignacio Qtzte | |
| T. Glorieta | | T. McKee | | Base Greenhorn | | T. Granite | |
| T. Paddock | | T. Ellenburger | | T. Dakota | | T. | |
| T. Blinebry | | T. Gr. Wash | | T. Morrison | | T. | |
| T. Tubb | | T. Granite | | T. Todilto | | T. | |
| T. Drinkard | | T. Delaware Sand | | T. Entrada | | T. | |
| T. Abo | | T. Bone Springs | | T. Wingate | | T. | |
| T. Wolfcamp | | T. | | T. Chinle | | T. | |
| T. Penn. | | T. | | T. Permian | | T. | |
| T Cisco (Bough C) | | T. | | T. Penn. "A" | | T. | |

FORMATION RECORD (Attach additional sheets if necessary)

| From | To | Thickness in Feet | Formation | From | To | Thickness in Feet | Formation |
|---|---|---|---|---|---|---|---|
| 0 | 954 | 954 | Red Beds, sand, and line | | | | |
| 954 | 1020 | 66' | Anhydrite | | | | |
| 1020 | 1200 | 180 | Salt | | | | |

| | | |
|---|---|---|
| E | | |
| .G.S. | | |
| NG. OFFICE | | |
| E ATOR | | |

5a. Indicate Type of Lease
State ☐ Fee ☒

5. State Oil & Gas Lease No.

# 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.)

7. Unit Agreement Name

OIL WELL ☐ GAS WELL ☐ OTHER- Dry Hole

Name of Operator
Lewis B. Burleson, Inc.

8. Farm or Lease Name
Arco

Address of Operator
P.O. Box 2479 Midland, TX 79702

9. Well No.
2

Location of Well
UNIT LETTER H , 1980 FEET FROM THE North LINE AND 330 FEET FROM THE East LINE, SECTION 21 TOWNSHIP 25 RANGE 37 NMPM.

10. Field and Pool, or Wildcat
Langlie-Mattix

15. Elevation (Show whether DF, RT, GR, etc.)
3077GR

12. County
Lea

## Check Appropriate Box To Indicate Nature of Notice, Report or Other Data

| NOTICE OF INTENTION TO: | | | | SUBSEQUENT REPORT OF: | | | |
|---|---|---|---|---|---|---|---|
| FORM REMEDIAL WORK | ☐ | PLUG AND ABANDON | ☐ | REMEDIAL WORK | ☐ | ALTERING CASING | ☐ |
| TEMPORARILY ABANDON | ☐ | | | COMMENCE DRILLING OPNS. | ☐ | PLUG AND ABANDONMENT | ☐ |
| PULL OR ALTER CASING | ☐ | CHANGE PLANS | ☐ | CASING TEST AND CEMENT JOB | ☐ | | |
| OTHER | ☐ | | | OTHER | ☐ | | |

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.

1) Set 8 5/8" CIBP at 930' with cement cap.
2) Set 8 5/8" CIBP at 300' with cement cap.
3) Set 10 sack cement plug at surface.
4) Install marker and return location to original contour.
5) This well has already been inspected.

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

SIGNED _____ TITLE President DATE 7-15-83

APPROVED BY Ronald M Gatlin TITLE OIL & GAS INSPECTOR DATE AUG 31 1983

CONDITIONS OF APPROVAL, IF ANY:

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Form C-105
Revised 1-1-65

# NEW MEXICO OIL CONSERVATION COMMISSION
# WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5a. Indicate Type of Lease: State ☐ Fee XX

5. State Oil & Gas Lease No.

1a. TYPE OF WELL: OIL WELL X ☐ GAS WELL ☐ DRY ☐ OTHER

b. TYPE OF COMPLETION: NEW WELL X ☐ WORK OVER ☐ DEEPEN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ OTHER

7. Unit Agreement Name

8. Farm or Lease Name: Arco

2. Name of Operator: Burleson & Huff

9. Well No.: 2-Y

3. Address of Operator: P. O. Box 935, Midland, Texas 79701

10. Field and Pool, or Wildcat: Langlie-Mattix

4. Location of Well

UNIT LETTER H LOCATED 660 FEET FROM THE East LINE AND 1770 FEET FROM

North LINE OF SEC. 21 TWP. 25-S RGE. 37-E NMPM

12. County: Lea

| 15. Date Spudded | 16. Date T.D. Reached | 17. Date Compl. (Ready to Prod.) | 18. Elevations (DF, RKB, RT, GR, etc.) | 19. Elev. Casinghead |
|---|---|---|---|---|
| 11-20-75 | 12-1-75 | 12-19-75 | 3075.6 GR | 3075.6 |

| 20. Total Depth | 21. Plug Back T.D. | 22. If Multiple Compl., How Many | 23. Intervals Drilled By → | Rotary Tools | Cable Tools |
|---|---|---|---|---|---|
| 3500' | 3480' | 1 | | X | |

24. Producing Interval(s), of this completion — Top, Bottom, Name: 3365-3375 Queen

25. Was Directional Survey Made: No

26. Type Electric and Other Logs Run: Dual Laterolog and Compensated Neutron-Formation Density

27. Was Well Cored: No

28. CASING RECORD (Report all strings set in well)

| CASING SIZE | WEIGHT LB./FT. | DEPTH SET | HOLE SIZE | CEMENTING RECORD | AMOUNT PULLED |
|---|---|---|---|---|---|
| 8-5/8" | 28 | 807 | 11 | 375 sx - circulated | |
| 4-1/2" | 9.5 | 3500 | 7-7/8 | 250 sx - top of salt | |
| | | | | | |
| | | | | | |

29. LINER RECORD

| SIZE | TOP | BOTTOM | SACKS CEMENT | SCREEN |
|---|---|---|---|---|
| | | | | |
| | | | | |

30. TUBING RECORD

| SIZE | DEPTH SET | PACKER SET |
|---|---|---|
| 2 | 3295 | 3296 |
| | | |

31. Perforation Record (Interval, size and number)

1 shot per foot, 3365 - 3375' , 11 holes

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

| DEPTH INTERVAL | AMOUNT AND KIND MATERIAL USED |
|---|---|
| 3365 - 3375 | 1000 gal acid |
| 3365- 3375 | 20,000 gal gel water & 22,500 # sand |
| | |

33. PRODUCTION

| Date First Production | Production Method (Flowing, gas lift, pumping — Size and type pump) | Well Status (Prod. or Shut-in) |
|---|---|---|
| 12-19-75 | flowing | Prod. |

| Date of Test | Hours Tested | Choke Size | Prod'n. For Test Period → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Gas — Oil Ratio |
|---|---|---|---|---|---|---|---|
| 12-22-75 | 24 | 3/4 | | 12 | 45.31 | 5 | 3776:1 |

| Flow Tubing Press. | Casing Pressure | Calculated 24-Hour Rate → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Oil Gravity — API (Corr.) |
|---|---|---|---|---|---|---|
| 25# to 50# | packer | | 12 | 45.31 | 5 | 36° |

34. Disposition of Gas (Sold, used for fuel, vented, etc.): To be sold to El Paso, possibly, no contract

Test Witnessed By: Lewis B. Burleson

35. List of Attachments: Logs and Direction Survey

36. *I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.*

SIGNED [signature] TITLE Co-Owner DATE 12-23-75

## INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Commission not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

## INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

| Southeastern New Mexico | | | | Northwestern New Mexico | | | |
|---|---|---|---|---|---|---|---|
| T. Anhy | 920 | T. Canyon | | T. Ojo Alamo | | T. Penn. "B" | |
| T. Salt | 1050 | T. Strawn | | T. Kirtland-Fruitland | | T. Penn. "C" | |
| B. Salt | 2585 | T. Atoka | | T. Pictured Cliffs | | T. Penn. "D" | |
| T. Yates | 2745 | T. Miss | | T. Cliff House | | T. Leadville | |
| T. 7 Rivers | 3052 | T. Devonian | | T. Menefee | | T. Madison | |
| T. Queen | 3310 | T. Silurian | | T. Point Lookout | | T. Elbert | |
| T. Grayburg | | T. Montoya | | T. Mancos | | T. McCracken | |
| T. San Andres | | T. Simpson | | T. Gallup | | T. Ignacio Qtzte | |
| T. Glorieta | | T. McKee | | Base Greenhorn | | T. Granite | |
| T. Paddock | | T. Ellenburger | | T. Dakota | | T. | |
| T. Blinebry | | T. Gr. Wash | | T. Morrison | | T. | |
| T. Tubb | | T. Granite | | T. Todilto | | T. | |
| T. Drinkard | | T. Delaware Sand | | T. Entrada | | T. | |
| T. Abo | | T. Bone Springs | | T. Wingate | | T. | |
| T. Wolfcamp | | T. | | T. Chinle | | T. | |
| T. Penn. | | T. | | T. Permian | | T. | |
| T Cisco (Bough C) | | T. | | T. Penn. "A" | | T. | |

## FORMATION RECORD (Attach additional sheets if necessary)

| From | To | Thickness in Feet | Formation | From | To | Thickness in Feet | Formation |
|---|---|---|---|---|---|---|---|
| 0 | to | 970 | Red beds | | | | |
| 970 | to | 1050 | Anhydrite | | | | |
| 1050 | to | 2745 | Salt & Anhydrite | | | | |
| 2745 | to | 3052 | Dolomite, Anhydrite & sand | | | | |
| 3052 | to | 3310 | Dolomite & Anhydrite | | | | |
| 3310 | to | 3500 | sand, dolomite & anhydrite | | | | |

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NEW MEXICO OIL CONSERVATION COMMISSION

Form C-103
*Supersedes Old C-102 and C-103*
Effective 1-1-65

5a. Indicate Type of Lease
State ☐ Fee ☒

5. State Oil & Gas Lease No.

## 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. OIL WELL ☐ GAS WELL ☐ OTHER- P & A

7. Unit Agreement Name

2. Name of Operator
Atlantic Richfield Company

8. Farm or Lease Name
B.T. Lanehart

3. Address of Operator
P. O. Box 1978, Roswell, New Mexico 88201

9. Well No.
1

4. Location of Well
UNIT LETTER H . 2310 FEET FROM THE North LINE AND 990 FEET FROM THE East LINE, SECTION 21 TOWNSHIP 25-S RANGE 37-E NMPM.

10. Field and Pool, or Wildcat
Jalmat-Yates

15. Elevation *(Show whether DF, RT, GR, etc.)*
3071' GR

12. County
Lea

16. 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 ☐ | | COMMENCE DRILLING OPNS. ☐ | PLUG AND ABANDONMENT ☒ |
| PULL OR ALTER CASING ☐ | CHANGE PLANS ☐ | CASING TEST AND CEMENT JOB ☐ | |
| OTHER ☐ | | OTHER ☐ | |

17. 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.

This well has been plugged and abandoned as follows:

Set 8-5/8" CIBP @ 2650'. Loaded hole w/170 bbls of fresh water gel mud. Spotted 35 sk cement plug 2650-2540'; 35 sk cement plug 1200-1090'. Placed 10 sk cement plug in top of well and erected dry hole marker. All casing strings remain intact. All gel mud contained 25 sx gal/100 bbls of water.

Your office will be notified when location is ready for inspection.

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

SIGNED A D Gutches TITLE Dist. Drlg. Supervisor DATE 2/21/73

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

FORMATION RECORD

| FROM | TO | THICKNESS IN FEET | FORMATION |
|---|---|---|---|
| 0 | 35 | 35 | Caliche |
| 35 | 55 | 20 | Sand |
| 55 | 125 | 70 | R R W 70-75 |
| 125 | 150 | 25 | Blue shale |
| 150 | 220 | 70 | R R |
| 220 | 230 | 10 | Limy sand |
| 230 | 320 | 90 | R R, caving badly |
| 320 | 350 | 30 | Sandy lime |
| 350 | 385 | 35 | Sand 10 BWPH |
| 385 | 400 | 15 | Gray sandy lime |
| 400 | 500 | 100 | Sand, gradual increase to HFW |
| 500 | 530 | 30 | Sharp sand |
| 530 | 565 | 35 | Sand |
| 565 | 570 | 5 | R R |
| 570 | 605 | 35 | Sand & RR |
| 605 | 615 | 10 | R sand |
| 615 | 700 | 85 | RR |
| 700 | 710 | 10 | Sand & RR |
| 710 | 720 | 10 | RR |
| 720 | 730 | 10 | Hard sand |
| 730 | 750 | 20 | Red sand |
| 750 | 770 | 20 | RR |
| 770 | 810 | 40 | Hard red shale |
| 810 | 835 | 25 | Hard red sand |
| 835 | 840 | 5 | Red shale |
| 840 | 920 | 80 | RR |
| 920 | 1035 | 115 | Anhydrite |
| 1035 | 1038 | 3 | White shale |
| 1038 | 1043 | 5 | Sand HFW 1040 |
| 1043 | 1050 | 7 | Lime |
| 1050 | 1060 | 10 | Red shale |
| 1060 | 1065 | 5 | RR |
| 1065 | 1070 | 5 | Anhydrite |
| 1070 | 1145 | 75 | RR |
| 1145 | 1175 | 30 | Anhydrite |
| 1175 | 1190 | 15 | Anhydrite & RR |
| 1190 | 1205 | 15 | RR |
| 1205 | 1225 | 20 | Anhydrite 1225-1218 Sd LM |
| 1218 | 1223 | 5 | Anhydrite & salt |
| 1223 | 1227 | 4 | Potash |
| 1227 | 1234 | 7 | Anhydrite & xxix RR |
| 1234 | 1265 | 31 | Anhydrite |
| 1265 | 1285 | 20 | Salt |
| 1285 | 1300 | 15 | Salt & RR |
| 1300 | 1445 | 145 | Salt |
| 1445 | 1460 | 15 | Potash |
| 1460 | 1465 | 5 | Salt |
| 1465 | 1480 | 15 | Anhydrite |
| 1480 | 1565 | 85 | Salt |
| 1565 | 1635 | 70 | Salt & potash |
| 1635 | 1690 | 55 | Salt |
| 1690 | 1700 | 10 | Anhydrite |
| 1700 | 1720 | 20 | Salt |
| 1720 | 1733 | 13 | Anhydrite |
| 1733 | 1770 | 37 | Anhydrite & salt |
| 1770 | 1995 | 225 | Salt |
| 1995 | 2015 | 20 | Anhydrite & salt |
| 2015 | 2060 | 45 | Anhydrite |
| 2060 | 2087 | 27 | Salt |
| 2087 | 2195 | 108 | Anhydrite |
| 2195 | 2235 | 40 | Salt |
| 2235 | 2320 | 85 | Anhydrite & salt |
| 2320 | 2358 | 38 | Salt |
| 2358 | 2415 | 57 | Anhydrite |
| 2415 | 2590 | 175 | Salt |
| 2590 | 2605 | 15 | Anhydrite 2605 - 2610 Sd LM |
| 2610 | 2620 | 10 | Anhydrite & lime |
| 2620 | 2650 | 30 | Lime |
| 2650 | 2691 | 41 | Lime & Anhydrite |
| 2691 | 2751 | 60 | Lime |
| 2751 | 2804 | 53 | Gray shale 2804-2801 Halliburton Measurment |
| 2801 | 2802 | 1 | Gray shale |
| 2802 | 2814 | 12 | Sandy shale, slight show gas 2810-14 |
| 2814 | 2823 | 9 | Chaly sand |
| 2823 | 2878 | 55 | Sandy shale |
| 2878 | 2885 | 7 | Shale & lime shells |
| 2885 | 2910 | 25 | Lime |
| 2910 | 2917 | 7 | Lime & shale |
| 2917 | 2927 | 10 | Broken lime |
| 2927 | 2936 | 9 | Lime & shale |
| 2936 | 2944 | 8 | Soft sand, show oil & gas 2936-44 |
| 2944 | 2957 | 13 | shale |
| 2957 | 2974 | 17 | Sandy shale, show gas 2960-69 |
| 2974 | 3004 | 30 | Shale |
| 3004 | 3025 | 21 | Lime |
| 3025 | 3035 | 10 | Sand, gas 3025-32, perhaps 1 million cu.ft. |
| 3035 | 3049 | 14 | Lime |
| 3049 | 3053 | 4 | Gas sand |
| 3053 | 3065 | 12 | Sand |
| 3065 | 3070 | 5 | Oil sand |
| 3070 | 3075 | 5 | Sand more gas 3073-75 |
| 3075 | 3080 | 5 | Lime |

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88240
(505) 393-6161

April 15, 1983

Mr. Ralph Bowington
Box 95
Jal, NM 88252

Dear Mr. Bowington:

Attached is a copy of the chloride analysis run on the sample obtained from your domestic water well on April 11, 1983.

We plan to do some further testing in the area and will keep you advised of our findings.

Very truly yours,

OIL CONSERVATION DIVISION

Jerry Sexton
Supervisor, District I

ed

Attachment

ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
HOBBS, NEW MEXICO

# WATER ANALYSIS

Well Ownership: RALPH BOWINGTON  Well No. water well

Land Status: State ____  Federal ____  Fee X

Well Location: Unit Letter A, Section 21, T 25 S, R 37 E

Type Well: Domestic water well sub.  Depth 110 feet.

Well Use: Domestic

Sample Number: 1  Date Taken: 4-11-83

Taken By: Eddie Seay

*Specific Conductance: ____ m/ɷ

Total dissolved Solids: ____ PPM.

Chlorides: 7,100 PPM.

Sulfates: ____ PPM.

Ortho-phosphates: ☐ V.Low ☐ Low ☐ Medium ☐ High

Sulfides: ☐ None ☐ Low ☐ Medium ☐ High

____ : ____

Date Analyzed: 4-12-83  By: Eddie W Seay
Oil Conservation Division

Water Level: 56 feet

REMARKS:

1 ml 3550 x 2.0 = 7100 ppm Chlorides

All well information obtained from Mr. Bowington, Box 95, Jal, NM 88252

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

April 15, 1983

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88240
(505) 393-6161

Mr. Sonny Dakan
Box 670
Jal, NM 88252

Dear Mr. Dakan:

Attached is a copy of the chloride analysis run on the sample obtained from your domestic water well on April 13, 1983.

We plan to do some further testing in the area and will keep you advised of our findings.

Very truly yours,

OIL CONSERVATION DIVISION

Jerry Sexton
Supervisor, District I

ed

Attachment

OCD COMPLAINT FORM

UIC ____
OTHER ____

COMPLAINT TAKEN BY: JERRY SEXTON DATE: 4-7-83 TIME: _____

PERSON COMPLAINING: IN PERSON: ____ PHONE: X

Name: Red Regan, Jal City Manager ~~Ralph Bowington~~

Address: Box 95, Jal, NM

Phone: _____

Complaint: water well east of Jal had gone bad -- (salty)

## INVESTIGATION

INVESTIGATOR: Eddie Seay DATE: 4-12-83 TIME: 8 am

DESCRIBE INVESTIGATION AND FINDINGS: Met with Mr. Regan to get details about water problem of Mr. Bowington. Met with Mr. Bowington and obtained water sample from his well and another well in the area. Will collect more samples later.

Bowington well 7100 ppm cl // 9/17/84: 5,975 ; 11/2[illegible]: 1190

Sonny Dakan well 39,760 ppm cl. [illegible] 43,762

ACTION TAKEN: DATE: 4-15-83 TIME: _____

Sent copy of analysis and letter to Ralph Bowington and Sonny Dakan. Plan to run bradenhead survey in the immediate area.

USE ADDITIONAL SHEET IF NECESSARY

# The Use of Ionic Mixing Curves in Differentiating Oil Field Brine from Natural Brine in a Fresh Water Aquifer

by Vernon A. Mast

## Introduction

The encroachment of salt water brine into fresh water aquifers is receiving increasing attention as water use by industries, muncipalities and irrigation increases. Where natural subsurface salt deposits exist in the vicinity of a producing oil field, the question of the source of the brine becomes important, especially when the activities of man are blamed for the presence of salinity in an aquifer.

The presence of ground water pollution in the south Wichita, Kansas, vicinity has received considerable attention over the past few years from both the news media and the Kansas State Department of Health and Environment. The pollution threatens municipal water supplies, residential water wells and irrigation usage. The pollution has been attributed to past and present oil field brine disposal practices and to the dissolution of underlying natural halite and gypsum evaporite beds. For litigation purposes, it became important to determine the percentage contribution of each of these sources to the total pollution.

A series of test wells was drilled, both into the fresh water aquifer and into the underlying evaporite beds. Static water levels were measured and water samples were taken on a weekly basis for about 12 months. The water samples were chemically analyzed for primary ions, ionic concentration ratios were calculated using varying combinations of ions, and computer plots were generated to analyze the results.

Chemical fingerprinting techniques to identify brine sources are in their infancy. Several investigators (Whittamore and Pollock 1978; Gogel 1981) used ionic ratios to identify salt water brines. The most widely used technique is the sodium-to-chloride ratio. Whittamore and Pollock have shown that the oil field brines in Kansas have a sodium-to-chloride ratio equal to 0.5 ± 0.1 and natural saline formation waters have a sodium-to-chloride ratio equal to 0.65 ± 0.03.

This article describes the study and the analytical technique used to determine the relative contribution of each pollution source to the increased salinity of the fresh water aquifer in the south Wichita, Kansas, area.

## Site Geology and Drilling Program

This study was conducted on a fresh water aquifer in a producing oil field located in Section 29-T28S-R1E, Sedgwick County, Kansas. The site is located within the Arkansas River floodplain. Unconsolidated Pleistocene sand and gravel deposits, about 50 feet thick, comprise the floodplain. The underlying Wellington Formation is Permian shale with alternating thin layers of gypsum to a depth of about 85 feet, where a thick layer of gypsum is encountered. Halite beds are common in the formation but are not identified in drillers' logs. The water table in the fresh water aquifer is approximately 15 feet below the ground surface. Thus the fresh water aquifer has a thickness of about 35 feet. Highly mineralized water was encountered within the gypsum layers in the bedrock.

Irrigation well water used in the area reportedly caused leaf kill in an orchard operation because of high concentrations of certain ionic species. A drilling program was developed to study this problem. It was determined that the chemical differences exist with depth within the formation from which the water used for irrigation was pumped. Four clusters of monitoring wells surrounded a centrally located irrigation well. The clusters were positioned at distances from the irrigation well equal to increments of one-half the fresh water aquifer thickness. Each cluster contained three wells: one at 30 foot depth near the center of the aquifer, one at 50 foot depth at the bottom of the aquifer, and one at 100 foot depth cemented into the Wellington Formation and sealed from the fresh water aquifer. The site geology, along with the general configuration of the well clusters, is shown in Figure 1.

Water samples were taken and static water levels were measured weekly for about nine months. The water levels of those wells within the fresh water aquifer remained relatively constant at about 15 feet beneath the ground surface. The wells drilled into bedrock showed water levels at nine feet from the

ground surface. This six feet of potentiometric head difference may be sufficient to force highly mineralized water upward through cracks and fissures in the bedrock and be partially responsible for the pollution problem.

## Chemical Analysis

The water sampling was performed using a Wildco 250ml Model 1280-A10 sampler. Approximately 350 water samples, along with locally produced oil field brine samples, were analyzed for the primary ions sodium, calcium, magnesium, sulfate, chloride and for total dissolved soilds. Sodium, calcium and magnesium determinations employed the Perkin-Elmer 5000 atomic absorption spectrophotometric system. Sulfate levels were determined using a Hach DR/3 spectrophotometer. The total dissolved solids content was determined by drying a sample at 90 C. The chloride ion was tested using mercuric nitrate titrant and diphenylcarbazone reagent.

Background chemical levels were determined for the three major types of water, which upon mixing, constituted the ground water at the study site. Fresh water samples from local water wells, oil field production salt water brine samples from local tank batteries and samples of natural brine from the underlying halite and gypsum beds were obtained and analyzed. Additional chemical data were obtained from the Kansas State Geological Survey and the Kansas State Department of Health and Environment.

All of the data generated in the study were examined using the Gauss Error Function. The data with small probability were rejected according to Chauvenet's Criteria as described by Young (1962). The baseline data by which the fresh water aquifer was characterized, along with the analytical results are given in Table 1. The sodium-to-chloride ratio of 0.53 for the aquifer at the 50-foot level is close to that given for produced water, indicating an oil field brine source. It is also noted that the sodium-to-chloride ratio of 0.57 at the 30-foot level is between that found for an oil field brine and the naturally mineralized water at 100 feet. It is readily apparent from the data that the pollution concentration increased with aquifer depth, but the contribution of each pollution source to the overall problem is not readily apparent.

Table 1
Medn Values for Chemical Analyses (mg/L)

| Ion | Fresh water | Oil field brine | Natural brine | Aquifer (30 ft) | Aquifer (50 ft) |
|---|---|---|---|---|---|
| $Ca^{++}$ | 110 | 8,990 | 2,550 | 550 | 4,550 |
| $Mg^{++}$ | 21 | 2,480 | 1,690 | 270 | 1,100 |
| $Na^{+}$ | 148 | 49,000 | 5,170 | 770 | 8,280 |
| $Cl^{-}$ | 100 | 95,500 | 7,600 | 1,340 | 15,640 |
| $SO_4^{--}$ | 60 | 500 | 7,110 | 510 | 220 |
| TDS | 575 | 157,000 | 24,200 | 6,390 | 29,900 |
| $Na^{+}/Cl^{-}$ | 1.48 | 0.51 | 0.68 | 0.57 | 0.53 |

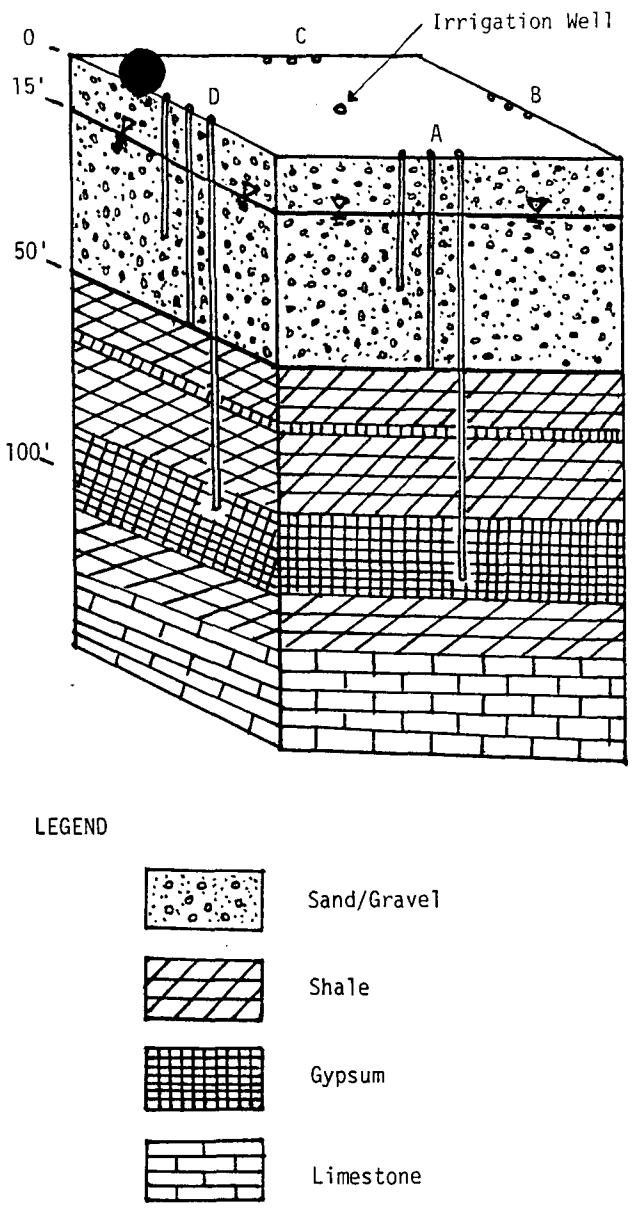


Figure 1. Site geology and position of well clusters A, B, C and D within the fresh water aquifer and the Wellington Formation bedrock

## Computer Analysis

In the computer data analysis, factor pairs of calcium, magnesium, chloride and total dissolved solids vs. sulfate were used. The sulfate was chosen to represent the distinct characteristics of the natural brine in the underlying Wellington Formation. Likewise, the chloride ion was used as the main factor representing the influence from oil field brine. Furthermore, the total dissolved solids factor was used to provide an overall view of pollutants in the brine. Finally, the calcium and magnesium were used for comparison in the analysis.

After the factor pairs were chosen, the percent volume of those three sources of water were calculated from the three simultaneous linear equations as shown below.

$$C_{lf} \cdot P_f + C_{lo} \cdot P_o + C_{lw} \cdot P_w = C_{la} \quad (1\text{-a})$$

$$C_{2f} \cdot P_f + C_{2o} \cdot P_o + C_{2w} \cdot P_w = C_{2a} \quad (1\text{-b})$$

$$P_f + P_o + P_w = 1 \quad (1\text{-c})$$

higher than for the middle of the aquifer. This fact coincides with the characteristics of a chemically unsaturated static water system. Since the mass density of the pollutant ions make them heavier, the pollution is expected to accumulate at the bottom of the system.

**Table 2**
**Mean Volumetric Contribution Percentages from the Computer Analysis**

| Ion | Middle of aquifer | | | Bottom of aquifer | | |
|---|---|---|---|---|---|---|
| | F | O | W | F | O | W |
| $Ca^{++}$ | 95.4 | 1.3 | 3.3 | 79.3 | 14.9 | 5.8 |
| $Mg^{++}$ | 95.5 | 1.2 | 3.3 | 83.3 | 6.5 | 10.2 |
| $Cl^{-}$ | 96.0 | 0.6 | 3.4 | 84.7 | 8.5 | 6.8 |
| TDS | 95.9 | 0.7 | 3.4 | 85.2 | 7.9 | 6.9 |

F = fresh water aquifer water; O = oil field brine; W = Wellington Formation water

## Summary and Conclusions

A statistical analysis model has been presented and has proven to be a valuable tool in determining the percentage contribution of pollution from sources of contaminants in a fresh water aquifer. For the most reliable factors, chloride and total dissolved solids, the volumetric percentage contribution of oil field brine and Wellington Formation natural brine at the bottom of the aquifer ranged from 6.5 percent to 8.5 percent and 6.8 percent to 7.1 percent, respectively. The results were used in expert testimony and relied upon in the final decision.

For the analytical model itself, two drawbacks are pointed out. First, the water system in the model is highly simplified. For a system with more than two potential pollutant sources, this analysis will not serve a proper function. Second, the choice of factor pairs is site-dependent. With different geological environments, as well as different pollutant types, the factor pairs used must be chosen accordingly.

With respect to these two drawbacks, three suggestions are made for future analysis in multisource pollution systems:

1. For an unsteady-state system, a time factor should be included in the analysis
2. For a system of N number of pollutant sources, factor groups of N items should be used for analysis
3. Every item in the factor group selected should represent the characteristics of the respective pollutant sources.

## References


Gogel, Tony. 1901. Discharge of Saltwater from Permian Rocks to Major Stream-Aquifer Systems in Central Kansas. Chemical Quality Series 9. Kansas Geological Survey, The University of Kansas, Lawrence, Kansas.

Whittemore, Donald O. and Livia M. Pollock. 1978. Determination of Salinity Sources in Water Resources of Kansas by Minor Alkali Metal and Halide Chemistry. Contribution No. 208. Kansas Water Resources Research Institute, Manhattan, Kansas.

Whittemore, Donald O., C.L. Basel, O.K. Galle and T.C. Waugh. 1981. Geochemical Identification of Saltwater Sources in the Smoky Hill River Valley, McPherson, Saline, and Dickinson Counties, Kansas. Kansas Geological Survey, The University of Kansas, Lawrence, Kansas.

Young, Hugh D. 1962. Statistical Treatment of Experimental Data. McGraw-Hill Book Company Inc., New York, New York.


## Biographical Sketch


*Vernon A. Mast is associate professor of civil engineering at Oklahoma State University. His responsibilities include teaching undergraduate and graduate courses, and supervising graduate research. His primary research interest is ion migration and attenuation through soils. He has served as a consultant in more than 100 cases involving contamination of ground water by oilfield operations. Dr. Mast received his graduate degrees from the University of Pennsylvania and The Ohio State University. He is a registered professional engineer.*

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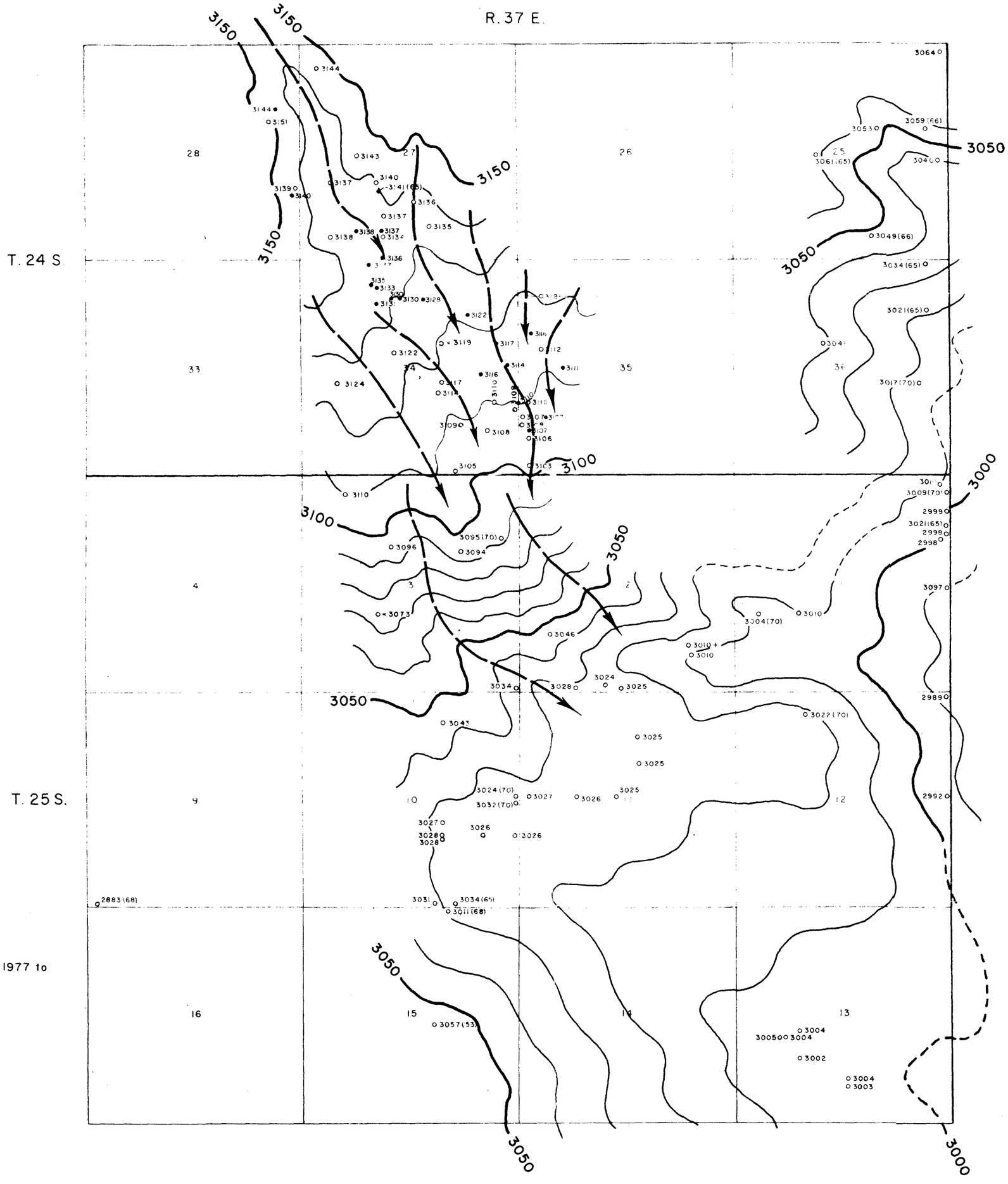


● = Added and corrected Nov. 1977 to Oct. 19, 1979

# ALTITUDE AND CONFIGURATION OF WATER TABLE IN PART OF TOWNSHIPS 24S AND 25S RANGE 37E N.M.P.M. - 1979

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Revised: Oct. 19, 1979

S.E. Galloway, New Mexico State Engineer Office, November - 1977

WT-47-D

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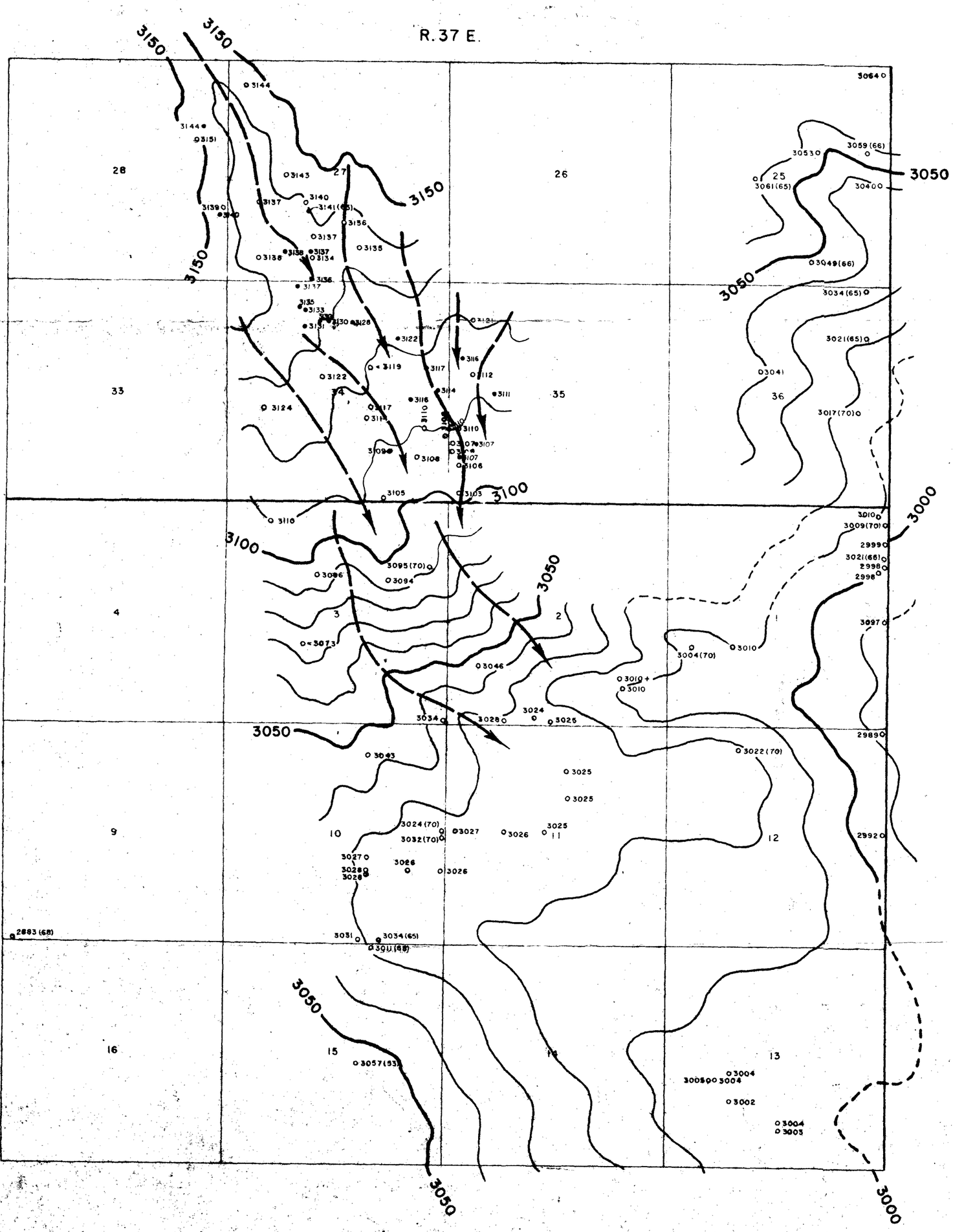


● = Added and corrected, Nov. 1977 to Oct. 19, 1979

# ALTITUDE AND CONFIGURATION OF WATER TABLE IN PART OF TOWNSHIPS 24S AND 25S RANGE 37E N.M.P.M. - 1979

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Revised Oct. 19, 1979

N.E. Gallegos, New Mexico State Engineer Office

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R. 37 E.

R. 38 E.

T. 25 S.

T. 26 S.

Updated in 1972 on the basis of the Shallow aquifer

601 W. ILLINOIS
HOBBS, NEW MEXICO 88240
(505) 392-2236
FAX (505) 392-6949

# EDDIE SEAY CONSULTING

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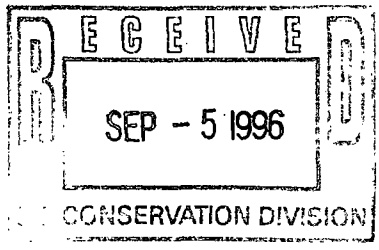



September 3, 1996

New Mexico Oil Conservation Division
Environmental Bureau
ATTN: Mark Ashley
2040 South Pacheco
Santa Fe, NM 87505

RE: Jal Brine Station BW-007

Mr. Ashley:

Pursuant to your letter dated August 16 concerning the testing of Mr. Prather's brine wells. The Eunice well BW-002 will be and is ready to test at time designated.

The Jal brine BW-007 well is not in operation and not equipped to be tested. a permit for disposal was filed for this well several months earlier and the State is still studying the permit and/or process. If the permit is denied, the well will be P & A according to OCD rules and regulations. If it is approved, then testing will be required again.

It is our wish to wait until some decision has been made on the application to dispose into this well before additional expense is incurred in testing.

Please call at your convenience to discuss our options.

Your attention in this matter is greatly appreciated.

Sincerely,

Eddie W. Seay, Agent

cc: Dink Prather

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

August 16, 1996

Certified Mail
Return Receipt No. P-288-258-827

Mr. Paul Prather
P&S Brine Sales
P.O. Box 7169
Eunice, New Mexico 88231

**RE: Mechanical Integrity Testing of Brine Supply Wells**

**Annual Test**
**Jal Brine Station BW-007**
**Lea County, New Mexico**

**Annual Test**
**Eunice Brine Station BW-002**
**Lea County, New Mexico**

Dear Mr. Prather:

The Underground Injection Control Program of the Federal Safe Drinking Water Act requires that operators demonstrate mechanical integrity of all injection wells by ensuring that there are no leaks in the tubing, casing, or packer, and that the injected fluid is confined within the injection zone through proper cementing.

All brine wells that operate without a packer will be required to have an annual open hole pressure test equal to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for four hours with a maximum of 10 percent bleed-off allowed. Every five years or at the time of discharge plan renewals they will be required to have an open hole pressure test equal to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for four hours with zero bleed-off.

All brine wells that operate with a packer will be required to have an annual casing/tubing annulus pressure test equal to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for four hours.

Operators will be responsible for providing equipment and shall bear all costs incurred. The date and time of all tests will be scheduled and witnessed by the New Mexico Oil Conservation Division.

Please have the Eunice Brine Station ready for testing on September 19, 1996 at 8:00 AM, and the Jal Brine Station ready for testing on September 19, 1996 at 9:00 AM as outlined below.

For brine wells operating without a packer:

1) The cavern must be pressured up and stabilized for a period of at least 24 hours prior to testing.

2) The system shall be tested to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for a period of four hours. A maximum of 10 percent bleed-off will be allowed for annual tests. Testing conducted every five years or at the time of discharge plan renewal will have zero bleed-off.

3) A continuous recording pressure chart with an 8 hour clock shall be installed on both the casing/tubing annulus and tubing. The pressure range shall not be greater than 1,000 psig.

4) Have well head prepared for test. All valves should be in good working order. All casing/tubing annulus and tubing valves shall be open.

5) All gauges shall be in good working order.

6) Have manpower and equipment available for pressure test.

For brine wells operating with a packer:

1) Have the casing/tubing annulus and tubing loaded with inert fluid prior to testing.

2) The casing/tubing annulus shall be tested to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for four hours.

3) A continuous recording pressure chart with an 8 hour clock shall be installed on the casing/tubing annulus. The pressure range shall not be greater than 1,000 psig.

4) Have well head prepared for test. All valves should be in good working order.

5) All gauges shall be in good working order.

6) Have manpower and equipment available for pressure test.

If you have any questions regarding this matter, please feel free to contact me at (505) 827-7155.

Sincerely,

Mark Ashley
Geologist

$\frac{Na}{Cl}$ : 0.51 for Permian Brine's Brine - however, analysis suspect

EM meter at Fremont.

Brunton Pole:

made adjustment and adjustment battery ok

coil separation check:

Receiver placed approx 3 m. toward transmitter to deflect needle fully.

First point 90 feet south of Moseley water well. Line A set due north/south at 50 ft intervals.

| Distance From point O on line A | Coil Sep. | Vertical/ Horiz. | Sens. Range | READING | NOTES |
|---|---|---|---|---|---|
| | | | | | coil sep. needle wobbles |
| 0 | 20m | V | 30 | 2.56 ✓ | |
| | " | H | 100 | 2.5 ✓ | |
| 50 ft | " | V | 30 | 2.45 ✓ | |
| 100 | " | V | 100 | 2.1 ✓ | |
| 150 | " | V | 100 | 2.2 ✓ | |
| Line jogs east 50 ft to avoid pipeline | | | | | |
| 150 | 20m | V | 30 | 2.4 ✓ | |
| Line jogs another 50 ft east - total 100 ft east. | | | | | |
| 150 | 20m | V | 30 | 2.35 ✓ | |
| 200 | " | V | 30 | 2.3 | |
| 250 | " | V | 30 | 2.1 | |
| 300 | " | V | 30 | 2.3 | |
| 350 | " | V | 30 | 2.2 | |
| 400 | " | V | 30 | 2.1 | |
| 450 | " | V | 30 | 2.1 | |
| 500 | " | V | 30 | 2.1 | |
| 550 | " | V | 30 | 2.2 | |

| Dist | Coil Sep | V/H | Sens. | Peak | Notes |
|---|---|---|---|---|---|
| 600 | 20m | V | 30 | 2.1 | |
| 650 | " | " | 30 | 2.19 | |
| 700 | " | " | 30 | 2.1 | |
| 750 | " | " | 30 | 2.12 | |
| 800 | " | " | 100 | 0.95 | |
| 850 | " | " | 100 | 0.85 | |
| 900 | " | " | 30 | 2.1 | |
| | | | (100 | 0.6) | |
| 950 | " | " | 30 | 2.15 | |
| 1000 | " | " | 30 | 2.32 | |
| 1050 | " | " | 30 | 2.4 | |
| 1100 | " | " | 30 | 2.73 | |
| 1150 | " | " | 100 | 1.15 | receiver coil 50' from transmitter pipeline |
| 1200 | " | " | 100 | 0.75 | |
| 1250 | " | " | 100 | 1.2 | transmitter at edge of old drilling pit on pipeline |
| 1300 | " | " | 30 | 2.7 | |
| 1350 | " | " | 30 | 2.26 | |
| 1400 | " | " | 30 | 2.23 | |
| 1400 | | H | 100 | 0.95 | coil on ground |
| 1350 | | H | 100 | 1.0 | |

| | | | | |
|---|---|---|---|---|
| 1300 | 20m | H | 100 | 1.35 |
| 1250 | " | H | 100 | 0.9 |
| 1000 | 20 | H | 100 | 1.0 |
| 750 | " | H | 100 | 1.65 |

East - west line B crossing A 750' spot X next up well cross drilling pit of Bachman; Nuff Ranch No. 2-Y Unit 14 Sec 21 T25S R37E - Robert Smith (Mountain Bird Salvage) requested copy of schlumberger resistivity from data collected today)

| | | | | |
|---|---|---|---|---|
| B.0 | 20m | V | 30 | 2.1 |
| | | H | 100 | 0.90 |
| B.50'w | | V | 30 | 2.2 |
| | | H | 100 | 0.9 |
| 100'w | | V | 30 | 2.22 |
| | | H | 100 | 1.18 |
| 150'w | | V | 30 | 2.22 |
| | | H | 30 | 1.5 |

| DIST | COIL SEP | V/H | Sens. | READ | NOTES |
|---|---|---|---|---|---|
| 200'w | 20 m | V | 30 | 2.25 | |
| | | H | 100 | 1.75 | |
| 250'w | | V | 50 | 2.2 | |
| | | H | 30 | 2.15 | |
| 300w | | V | 30 | 2.2 | |
| | | H | 100 | 1.1 | |
| 350w | | V | 30 | 2.2 | 'n of center of abandoned BH pit |
| | | H | 100 | 1.0 | |
| 400 | | V | 30 | 2.31 | |
| | | H | 100 | 1.05 | |
| 450 | | V | 30 | 2.28 | |
| | | H | 100 | 1.1 | |
| 500 | | V | 30 | 2.23 | reading on edge of pipeline |
| | | H | no reading - 2x. | | tried |
| 550 | | V | 30 | 2.31 | |
| | | H | 30 | 1.0 | |
| 600 | | V | 30 | 2.35 | |
| | | H | 100 | 1.03 | |
| 650 | | V | 30 | 2.12 | |
| | | H | 100 | 1.0 | |

| East of 250N's Line | | | | | |
|---|---|---|---|---|---|
| DIST | COIL SEP | V/H | Sens. | READ | NOTES |
| 0 | | V | 30 | 1.8 | |
| | | H | no reading | | |
| 50e | | V | 30 | 1.7 | |
| | | H | 100 | 0.95 | |
| 100e | | V | 30 | 2.1 | |
| | | H | 100 | 1 | |
| 150e | | V | 30 | 2.1 | |
| | | H | 100 | .8 | |
| 200 | | V | 30 | 1.98 | |
| | | H | 100 | 0.85 | |
| 250 | | V | 30 | 2.0 | |
| | | H | 100 | .75 | |
| 300e | | V | 30 | 1.9 | |
| | | H | 100 | .8 | |
| 350 | | V | 30 | 1.9 | |
| | | H | 100 | .8 | |
| 400 | | V | 30 | 1.9 | |
| | | H | 100 | .75 | |
| 450 | | V | 30 | 2 | |
| | | H | 100 | .7 | |

Taking ℄ readings from 100' east of point 0 on A line:

| DIST | COIL SEP | V/H | SENS | READ | NOTES |
|---|---|---|---|---|---|
| 0 | 20m | V | 30 | 2.64 | |
| | \| | H | 100 | 1.55 | |
| 50 | \| | V | 30 | 2.4 | |
| | \| | " | no reading. | | |
| 100 | \| | V | 100 | 95 | |
| | V | H | 100 | 2.7 | |
| 150 | | V | 100 | 1.5 | |
| | | H | 100 | 1.7 | |
| 200 | | V | 100 | 98 | |
| | | H | 100 | 1.25 | |
| 250 | | V | 100 | 1.1 | |
| | | H | 100 | 1.25 | |
| 300 | | V | 100 | 1.08 | |
| | | H | 100 | 1.42 | |
| 350 | | V | 100 | 0.9 | power line (2-wires) between 350 & 400 |
| | | H | 100 | 0.75 | |
| 400 | | V | 100 | 1.4 | |
| | | H | 100 | 1.45 | |
| 450 | 20m | V | 100 | 1.52 | |
| | ↓ | H | 100 | 1.4 | |
| 500 | ↓ | V | 100 | 1.7 | |
| | ↓ | H | 100 | 1.3 | |
| 550 | ↓ | V | 100 | 1.8 | |
| | ↓ | H | 100 | 1.25 | |
| 600 | | V | 100 | 1.95 | |
| | | H | 100 | 1.08 | |
| 650 | | V | 100 | 1.78 | |
| | | H | 100 | 1.1 | |
| 700 | | V | 100 | 1.6 | |
| | | H | 100 | 1.09 | |
| 750 | | V | 100 | 1.5 | |
| | | H | " | 1.3 | |
| 800 | | V | " | 1.18 | |
| | | H | " | 1.1 | |

~~Est~~ Took e-w line across pt 100 on the south ℄.

within 15' para- llel to a-w line

receiver mounted on fence post

transmit on underground wire with this line

| DIST | COIL SEP | V/H | SENS | READING | NOTE |
|---|---|---|---|---|---|
| 0 | 20m | V | 30 | 2.5 | |
| | | H | 100 | 1.35 | |
| 50 | 20m | V | 30 | 2.75 | |
| | | H | 100 | 1.08 | |
| 100 | | V | 100 | 0.9 | |
| | | H | 100 | 1.1 | |
| 150 | | V | 30 | 2.95 | |
| | | H | 100 | 1.23 | |
| 200 | | V | 30 | 2.9 | |
| | | H | 100 | 1.33 | |
| 250 | | V | 30 | 2.95 | |
| | | H | 100 | 1.3 | |
| 300 | | V | 30 | 2.95 | |
| | | H | 100 | 1.31 | |
| 350 | | V | 100 | 0.9 | |
| | | H | 100 | 1.31 | |
| 400 | | V | 100 | 0.95 | |
| | | H | 100 | 1.15 | |
| 450 | | V | 100 | 0.95 | |
| | | H | " | 1.1 | |

| | | | | | |
|---|---|---|---|---|---|
| 500 | 20m | V | 30 | 2.8 | |
| | | H | 100 | 1.1 | |
| Going east on same line | | | | | |
| 50 | 20m | V | 30 | 2.5 | |
| | | H | 100 | 1.35 | |
| 100 | | V | 30 | 1.5? | Great variability trans. at bank wireface |
| | | H | no reading | | |
| 150 | | V | no reading | | |
| 50ft south of point 200 (line deflected to avoid pipeline) | | | | | |
| 200 | | V | 30 | 2.4 | |
| | | H | 100 | 1.1 | |
| 250 | | V | 30 | 2.4 | |
| | | H | 100 | .92 | |
| 300 | | V | 30 | 2.3 | |
| | | H | 100 | 0.95 | |
| 350 | | V | 30 | 2.2 | |
| | | H | 100 | 1.2 | |
| 400 | | V | 30 | 1.45 | |
| | | H | 100 | 1.1 | |

| No. of Samples | Ion |
|---|---|
| | Na |
| | K |
| | Ca |
| | Mg |
| | Cl |
| | HCO3 |
| | CO3 |
| | SO4 |
| | TDS |
| | |
| | NO3+ NO2 |
| | NH3 |
| | Kjeld N |
| | |
| | As |
| | Ba |
| | Cd |
| | CN |
| | Cr |
| | F |
| | Pb |
| | Hg |
| | Se |
| | Ag |
| | U |
| | 226 |
| | Ra 228 |
| | |
| | Cu |
| | Fe |
| | Mn |
| | Phenols |
| | Zn |
| | |
| | Al |
| | B |
| | Co |
| | Mo |
| | Ni |
| | |
| | pH |
| | Conduct. |

NONE

# FIELD TRIP REPORT
## GROUND WATER SECTION

SLD USER CODES
Ground Water: 59300
$NO_3$, HC, & Toxics: 59600
UIC: 59500

County Lea

FACILITY VISITED
Name of Facility: Permian Brine Sales, Jal Station
Location: ≈ 1 mi. east of Jal

Discharge Plan Number: DP- 324
Type of Operation: brine extraction and sales

ENVIRONMENTAL IMPROVEMENT DIVISION FIELD VISIT
EID Inspector(s): Patsy Morgan, Steve Sanes, Tom Bunt, Rolf Rubffner (for part of time)
Date of Inspection or Visit: 11/28/84
Discharger's Representative Present During EID Visit:
Name: Mac McCutchan - Robert Smith - Ken Moseley
Title or Position: consultant for Permian - Permian geologist - water well owner
Purpose of Visit:
a. Evaluation of Proposed Discharge Plan _____
b. Compliance Inspection of Discharge with Approved Plan _____
c. Other (specify) investigation of gross brine contamination of water wells
Inspection Activities During Field Visit:
a. Inspection of Facilities or Construction (specify) near Permian Brine facility

b. Sampling of Effluents (give sampling locations)

c. Sampling of Ground Water (give names or locations of wells)

d. Evaluation of geology, soils, water levels or other physical characteristics of the location (specify)

e. Other (specify) Carried out 7-hour electromagnetic terrain conductivity survey in attempt to define contaminant plume affecting 2 water wells.

Observations and Information Obtained during the Visit:

inconclusive

ACTION REQUIRED

need more EM survey work at site.

UIC CLASS V INVENTORY

Thirty five additional Class V injection wells have been located to date bringing the total of Class V wells to 158. Staff are finalizing the assessment of groundwater quality impacts from subsidence control (backfill) wells. Staff are also creating a priority list of cities within the state to focus the search for industrial disposal wells.

Climax Chemical

The states first Hazardous Waste injection well has been completed to a depth of 5000'. The well is currently undergoing development to increase its injection capacity. Climax is on schedule with their assurance and Injection operations should begin by October 1.

| | | |
|---|---|---|
| (200) | 15 m | 29.5 |
| | 30 m | 43 |
| (300) | 15 | 29.5 |
| | 30 | 44 |
| (200) | 15 | 9 |
| | 30 | 44 |
| (400) | 15 | 9.5 |
| | 30 | 38 |
| (450) | 15 | 9.5 |
| | 30 | 36 |
| (500) | 15 | 28 |
| | 30 | 36 |

only in Edmonton:

| | | |
|---|---|---|
| (50) | 15 | 25 |
| | 30 | 45 |
| (100) | 15 | 50 **** |
| (200) | 15 | 24 |
| | 30 | 36 |
| (250) | 15 | 24 |
| | 30 | 15 |
| (300) | 15 | 32 |
| | 30 | 32 |
| (350) | 15 | 22 |
| | 30 | 40 |
| (400) | 15 | 14.5 |
| | 30 | 30 |

11. If there is a leak, spill or other unanticipated discharge of a significant amount of water contaminants on the surface or underground at your facility, will you commit to notifying the EID Ground Water Section within 48 hours **(1-203.A.1., 5-208.B.1)**?

B. Post-operational commitments required prior to plan approval

1. Plugging and abandonment

a. Plug and cap wells. Procedure must conform to that specified in 5-209, and be approved in advance.

b. Demonstrate financial ability **(5-210.B.17)** to:

i. plug well and prepare for proper abandonment;

ii. restore protected ground water if contaminated by your ~~brine extraction~~ activities; ~~and~~

iii. undertake measures necessary to prevent contamination of groundwater having 10,000 mg/l or less TDS, after cessation of operations.

2. Pond closure

a. Remove liner, if any, from pit **(3-107.A)**

b. ~~Remove salt crust from unlined pit and surrounding area (3-107.A.4, 11)~~

c. Restore area to original contours or take other appropriate measures to prevent post-operational contamination (3-107.A.11).

V. SIGN-OFF REQUIREMENT

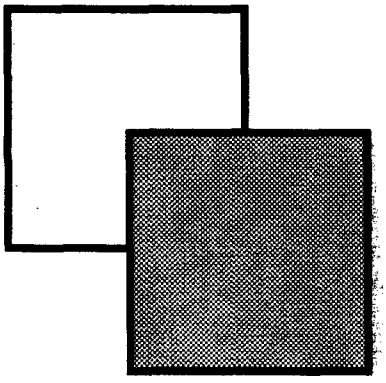
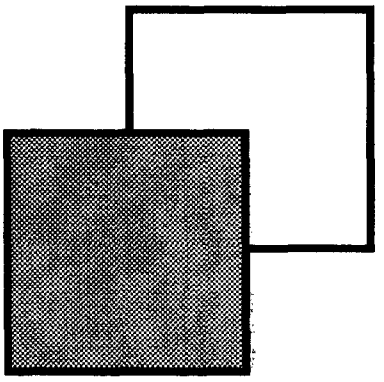
Responsible official must certify as follows:

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment **(5-101.H.2)**.

| | | |
|---|---|---|
| (450) | 15m | 51 * |
| | 30 m | 47 |
| (500) | 15 m | 57 |
| | 30 | 43 |
| (550) | 15 | 60 |
| | 30 | 42 |
| (600) | 15 | 32 * |
| | 30 | 36 * |
| (650) | 15 | 60 |
| | 30 | 37 |
| (700) | 15 | 53 |
| | 30 | 36 |
| (750) | 15 | 50 |
| | 30 | 43 |
| (800) | 15 | 39 |
| | 30 | 37 |

E-W line across north ℄:

| | | |
|---|---|---|
| (0) | 15m | 25 |
| | 30 m | 45 |
| (50) | 15m | 27.5 |
| | 30 | 36 |
| (100) | 15 | 9 |
| | 30 | 36 |
| (150) | 15 | 29.5 |
| | 30 | 41 |
| (200) | 15 | 29 |
| | 30 | 46 |

Xerox Print Service 7.0.1 on EID Laser

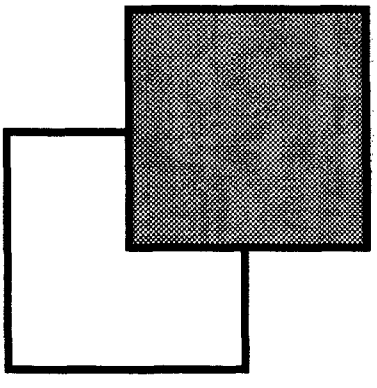
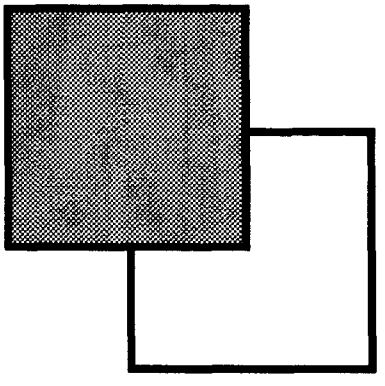
Document Paige Morgan

Created 27-May-85 5:12:27

Printed 27-May-85 5:12:55

For Patsy Sandoval:Santa Fe:NM HED

1 Sheets, 1 Copy.

| | | |
|---|---|---|
| (350e) | 15 m | 19 |
| | 30 | 27 |
| (400) | 15 m | 19 |
| | 30 | 25 |
| (450)e | 15m | 20 |
| | 30 | 22 |

℄ north:

| | | |
|---|---|---|
| (0) | 15m | 26.4 |
| | 30 m | 59 |
| (50) | 15 | 24 |
| (100) | 15 | 9.5 |
| | 30 | 89 |

| | | |
|---|---|---|
| (150) | 15 m | 35 |
| | 30 m | 57 |
| (200) | 15m | 33 |
| | 30 m | 42 |
| (250) | 15 m | 37 |
| | 30 m | 42 |
| (300) | 15 m | 36 |
| | 30 m | 48 |
| (350) | 15 | 30 * |
| | 30 | 26 |
| (400) | 15 | 47 |
| | 30 | 48 |

4. Under "Concept Paper for Reporting Requirements", page 2, Para. 1: "The Agency is moving toward quarterly reporting of detailed data for all facilities."-- This is absurd. I read some very pithy remarks by a congressman recently (unfortunately can't lay hands on the articles now) who pointed out that the gargantuan paper chase of RCRA, with manifests of hazardous wastes from cradle to grave, has not resulted in a single identification of violation - instead, violations have been pointed out by disgruntled employees, observant inspectors and such resources. It is the height of futility to send UIC the same route.

| | | |
|---|---|---|
| (300)w | 15 m | 22 |
| | 30 m | 35 |
| (350)w | 15 m | 22* |
| | 30 m | 33 |
| (400)w | 15 m | 23.2 |
| | 30 | 35 |
| (450)w | 15 | 22.8 |
| | 30 | 37 |
| (500) | 15 | 22.3 |
| (550) | 15 | 23.1 |
| | 30 | 33 |
| (600) | 15 | 23.5 |
| | 30 | 34 |
| (650)w | 15 | 24.2 |
| | 30 | 33 |

| | | |
|---|---|---|
| (B.O.e) | 15 | 18 |
| (50e) | 15 | 17 |
| | 30 | 32 |
| (100) | 15 | 21 |
| | 30 | 33 |
| (150)e | 15 | 21 |
| | 30 | 27 |
| (200) | 15 | 19.8 |
| | 30 | 29 |
| (250) | 15 | 20 |
| | 30 | 25 |
| (300)e | 15 | 19 |
| | 30 | 27 |

TO: Richard Stamets, Director
Oil Conservation Division

FROM: Paige Morgan, WRS III
EID Ground Water Section

DATE: May 24, 1985

RE: Proposed Additional Reporting Requirements
For UIC Programs

~~I'm sure~~ we can count on you to fight of additional reporting requirements to the extent humanly possible. ~~That's~~ my general reaction to The Concept Paper on the above-referenced topic. I think that the paper in large part states the obvious, ~~as far as~~ responses to violations ~~goes~~, of course, those are the responses we would have to the stated violations. To have to count such responses is another story. The big ones are easy - you can do those from memory on a quarterly basis; but to have to count every discharge plan required letter you send out, every phone call in which you point out that a certain discharge is illegal - would be a terrible time-waster. ~~And speaking of wasting time, everyone's heard this before but it's nonetheless perfectly true that~~ time spent counting beans is time stolen from doing compliance inspections and otherwise tracking down what's really going on ~~in the big wide world.~~

Some Specific Comments:

1. This whole business would be A Lot less painful if it were up to the Program Managers to compile these statistics during their oversight trips. We have to allocate some time to do a little show-and-tell for them every time they show up, anyway- why not make it a little cooperative project to have the PM put together our quarterly reports by interviewing us and letting us point them to appropriate files?

2. Page 5: Inspections. ~~This~~ wouldn't be too overous ~~to you guys at OCD~~, because of your well-established inspection program. But it's virtually impossible for us at EID with ~~are~~ little two-man ~~circus~~. Our priorities are redefined for us just about daily - we rarely know 2 weeks in advance that we will be making an inspection trip, let alone 3 months in advance.

3. Although realistically speaking, I think we should define "major" facilities as those which pose a substantial threat to ground water quality, and not just as Class I and IV facilities as "majors" just because it cuts down our reporting requirements.

| | | |
|---|---|---|
| (1000) | 15 m | 23.2 |
| (1050) | " | 24 |
| (1100) | " | 27.3 |
| (1150) | 15m | 36 * |
| | 30m | 55 |
| (1200) | 15m | 26 * |
| | 30m | 33.5 |
| (1250) | 15m | 40 * |
| | 30m | 30 |
| (1300) | 15m | 27 |
| | 30m | 45 |
| (1350) | 15m | 22.8 |
| | 30m | 33.5 |
| (1400) | 15m | 22.3 |
| | 30m | 33 |

E-W line B:

| | | |
|---|---|---|
| (B.0) | 15m | 21 |
| | 30m | 31 |
| (50)W. | 15m | 22 |
| | 30m | 30 |
| (100) | 15m | 22.2 |
| | 30m | 39 |
| (150)W | 15m | 22.2 |
| | 30m | 50 |
| (200) | 15m | 20.5 |
| | 30 | 58 |
| (250)W | 15m | 22 |
| | 30 | 21.5 |

TONEY ANAYA
GOVERNOR

DENISE D. FORT
DIRECTOR

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020

May 15, 1985

Dan Becker
Environmental Action
1346 Connecticut Ave., NW - Suite 731
Washington, D.C. 20036

Dear Mr. Becker:

Enclosed is a personal check for $25.00 to cover the cost of copying and mailing to me one copy of your Deep Well Injection Fact Packet. Also, if possible, I would appreciate receiving a receipt so that I can be reimbursed.

Thank you.

Sincerely,

Paige Grant Morgan

Paige Grant
Water Resource Specialist
Ground Water Section.

PG/ps

| Station | Depth (coil sep. × .75 if V, 1.5 if H) | Corrected reading (mmhos?) | |
|---|---|---|---|
| N-S line (0) | 15 m | ~~7.68~~ | 25.6 |
| | 30 m | ~~25~~ | 83 |
| (50) | 15 m | ~~7.35~~ | 24.5 |
| (100) | 15 m | ~~21~~ | 70 |
| (150) | 15 m | ~~22~~ | 73 |
| (150 E) | 15 m | ~~7.2~~ | 24 |
| (150 EE) | 15 m | ~~7.05~~ | 23.5 |
| (200) | " | ~~6.9~~ | 23 |
| (250) | " | 21 | |
| (300) | " | 23 | |
| (350) | " | 22 | |
| (400) | 15 m | 22 | |
| (450) | " | 21 | |
| (500) | " | 21 | |
| (550) | " | 22 | |
| (600) | " | 21 | |
| (650) | " | 21.9 | |
| (700) | " | 21 | |
| (750) | " | 21.2 | |
| (800) | " | 32 | |
| (850) | " | 29 | |
| (900) | " | 21 | |
| (950) | " | 21.5 | |

ODUCTION OF
THE
LLOWING
UMENT (S)
T BE IMPROVED
DUE TO
CONDITION OF
E ORIGINAL

4-wire pipeline

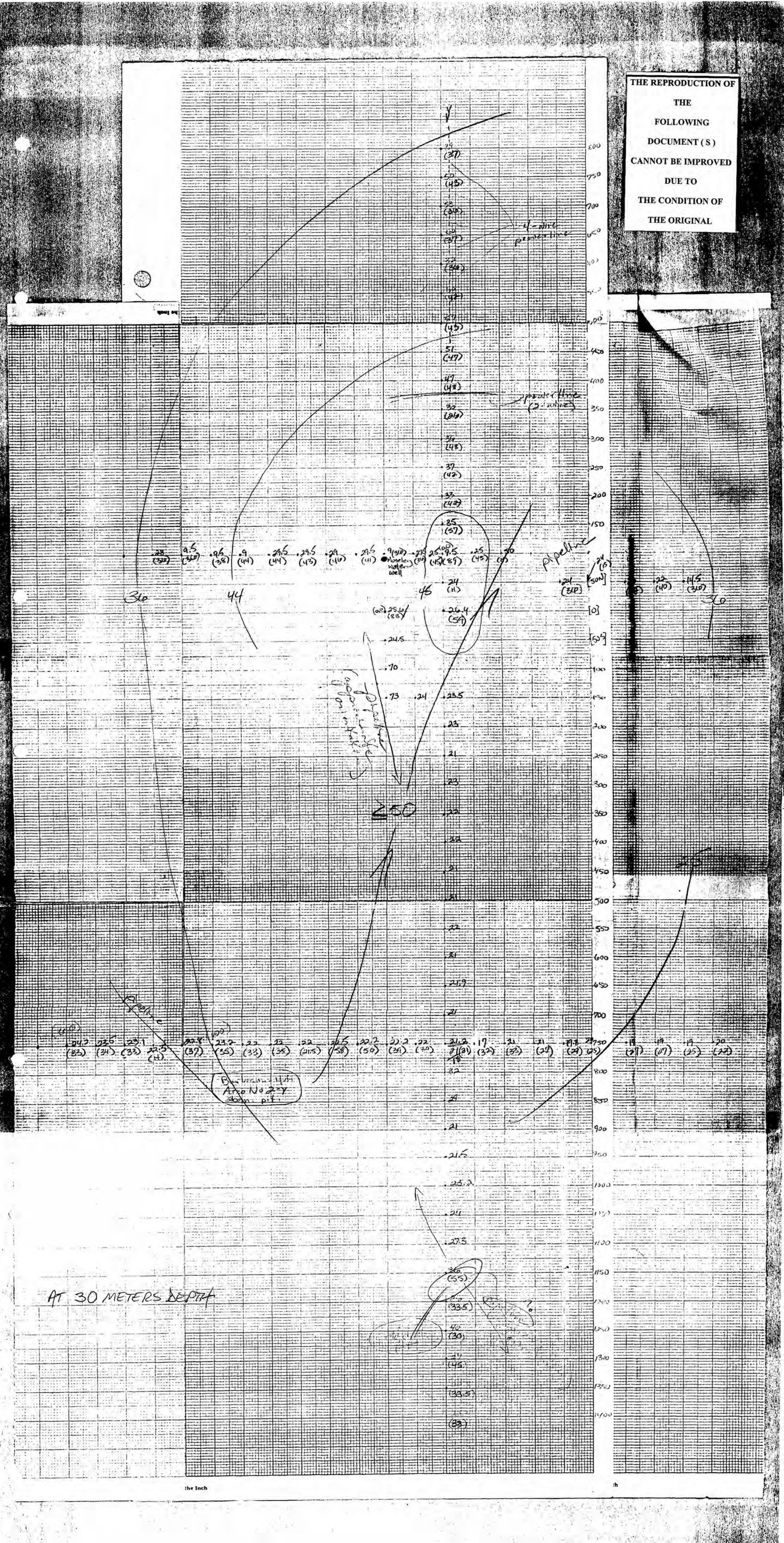
Pipeline

Burlington-Hunt
Arco No 2-Y

Top number at 15 m depth
(lower number at 30 m depth)

BASE MAP

THE REPRODUCTION OF THE FOLLOWING DOCUMENT (S) CANNOT BE IMPROVED DUE TO THE CONDITION OF THE ORIGINAL



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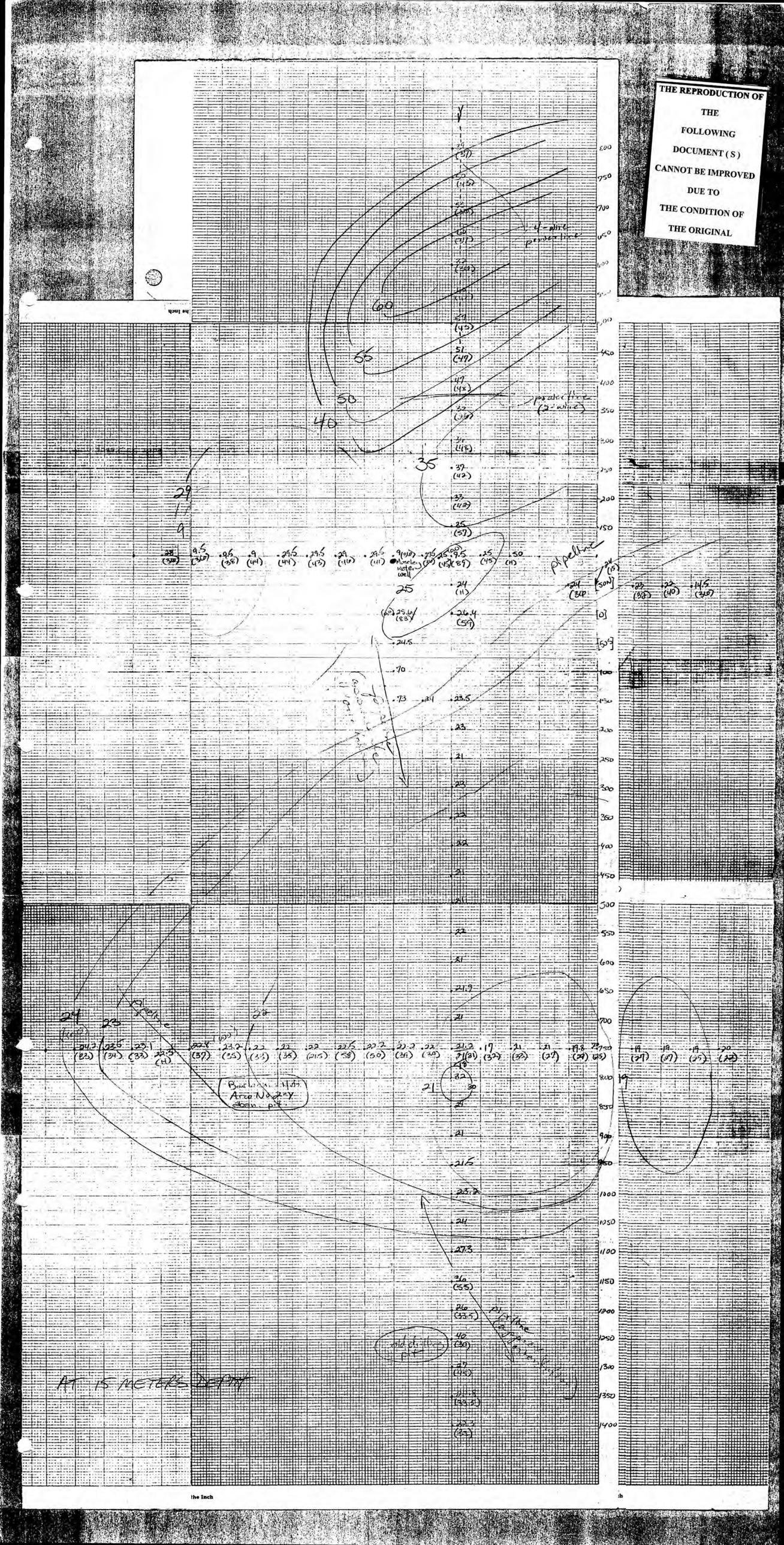


REPORT TO: Morgan/Sares
Ground Water & Hazardous Waste Bureau
Environmental Improvement Division
Health & Environment Department
P.O. Box 968 - Crown Building
Santa Fe, NM 87504-0968

LAB NUMBER WC 5654
DATE RECEIVED 11/30/84
DATE REPORTED 12/29/85 (Initials)
SLD USER CODE NUMBER 59500

Well Location Address ~~B~~ Permian Brine Sales Inc, Jal NM

Point of Collection ~~In~~ Brine Pond

Well Owner/User Permian Brine

Number of People Drinking Water from Well 0

Collected 11/28/84 (Date) 1130 (Time) By Morgan/Sares (Name) EID (Agency)

Well Depth —

Water Level —

pH 7.12

Conductivity (Uncorrected) _____ umho/cm

Taste? Odor? Color? Collectors Remarks

Brine Sample

Temperature 10°C °C

Conductivity at 25°C _____ umho/cm

PROJECT:

Ca 51.4

From ____, A-$H_2SO_4$ Sample:

- ☐ Nitrate-$N^+$ Nitrite-N _____ mg/l _____
- ☐ Ammonia-N _____ mg/l _____
- ☐ Chemical oxygen demand _____ mg/l _____
- ☐ _____ _____ _____

From ____, A-$HNO_3$ Sample:

- ☐ ICAP Scan
- ☐ Metals by AA (Specify)

From F, NA Sample:

| | | | Date Analyzed |
|---|---|---|---|
| ☑ Calcium | 1027 | mg/l | 1/16 |
| ☑ Potassium | 663 | mg/l | 12/17 |
| ☑ Magnesium | 582 | mg/l | 1/21 |
| ☑ Sodium | 96370 | mg/l | 12/17 |
| ☑ Bicarbonate | 91.2 | mg/l | 1/29 |
| ☑ Chloride | 189647 | mg/l | 1/17 |
| ☑ Sulfate | 4380 | mg/l | 1/4 |
| ☑ Total Solids | 253080 | mg/l | 1/2 |
| ☐ _____ | _____ | _____ | _____ |

RECEIVED
FEB 06 1985
GROUND WATER/HAZARDOUS WASTE BUREAU

charge balance off by -11.0%

This form accompanies 1 sample(s) marked as follows to indicate field treatment:

NF: Whole sample (no filtration).
F: Filtered in field with 0.45u membrane filter
A-$H_2SO_4$: Acidified with 2 ml conc $H_2SO_4$/l
A-$HNO_3$: Acidified with 5ml conc $HNO_3$/l
NA: No acid added

8411281138

REPORT TO: Morgan/Sares
Ground Water & Hazardous Waste Bureau
Environmental Improvement Division
Health & Environment Department
P.O. Box 968 - Crown Building
Santa Fe, NM 87504-0968

LAB NUMBER HM 1540
DATE RECEIVED 11/30/84
DATE REPORTED 1/9/85 mf
Initials
SLD USER CODE NUMBER 59500

RECEIVED
JAN 14 1985
GROUND WATER/HAZARDOUS WASTE BUREAU

Well Location Address Permian Brine Sales Inc, Jal NM

Point of Collection ~~Jal, NM~~ Brine Pit Pond

Well Owner/User Permian Brine

Number of People Drinking Water from Well 0

Collected 11/28/84 (Date) 1137 (Time) By Morgan/Sares (Name) EID (Agency)

Well Depth —

Water Level —

Taste? Odor? Color? Collectors Remarks

Brine Sample

pH 7.12

Conductivity (Uncorrected) _____ umho/cm

Temperature 10°C °C

Conductivity at 25°C _____ umho/cm

PROJECT:

From ____, A-$H_2SO_4$ Sample:

- ☐ Nitrate-N+ Nitrite-N _____ mg/l _____
- ☐ Ammonia-N _____ mg/l _____
- ☐ Chemical oxygen demand _____ mg/l _____
- ☐ _____ _____ _____

From F, A-$HNO_3$ Sample:

- ☑ ICAP Scan
- ☐ Metals by AA (Specify)

From ____, NA Sample: Date Analyzed

- ☐ Calcium _____ mg/l _____
- ☐ Potassium _____ mg/l _____
- ☐ Magnesium _____ mg/l _____
- ☐ Sodium _____ mg/l _____
- ☐ Bicarbonate _____ mg/l _____
- ☐ Chloride _____ mg/l _____
- ☐ Sulfate _____ mg/l _____
- ☐ Total Solids _____ mg/l _____
- ☐ _____ _____

This form accompanies 1 sample(s) marked as follows to indicate field treatment:

NF: Whole sample (no filtration).
F: Filtered in field with 0.45u membrane filter 841128 1137
A-$H_2SO_4$: Acidified with 2 ml conc $H_2SO_4$/l
A-$HNO_3$: Acidified with 5ml conc $HNO_3$/l
NA: No acid added

ICAP -SCREEN

Jal, N.M

Lab Number: HM # 1540

Sample Code: Permian Brine Sales Inc.

Date Submitted: 11/30/84

Date Reported: 1/9/85

By: Morgan / Sares

By:

| Determination | Concentration (µg/ml) |
|---|---|
| Aluminum | <0.10 |
| Barium | <0.10 |
| Beryllium | <0.10 |
| Boron | 8.7 |
| Cadmium | <0.10 |
| Calcium | 950. |
| Chromium | <0.10 |
| Cobalt | <0.10 |
| Copper | <0.10 |
| Iron | <0.10 |
| Lead | <0.10 |
| Magnesium | 640. |
| Manganese | 0.25 |
| Molybdenum | <0.10 |
| Nickel | <0.10 |
| Silicon | 0.93 |
| Silver | <0.10 |
| Strontium | 15. |
| Tin | <0.10 |
| Vanadium | <0.10 |
| Yttrium | <0.10 |
| Zinc | <0.10 |

# ATOMIC ABSORPTION ANALYSES

Arsenic _____µg/ml

Selenium _____µg/ml

Mercury _____µg/ml

84-1071 -C

R[illegible]ronmental Improvement Division
[illegible]alth & Environment Department
P.O. Box 968 - Crown Building
Santa Fe, New Mexico 87504-0968
ATTENTION: PAIGE MORGAN
BUREAU: Ground Water/Haz Waste

LABORATORY 11/30/84
LAB NUMBER OR 1071 A,B.
SLD Users Code No. 59500

ALL CONTAINERS WHICH THIS FORM ACCOMPANIES ARE COLLECTIVELY REFERRED TO AS "SAMPLE".

CERTIFICATE OF FIELD PERSONNEL

Sample Type: Water ☒ Soil ☐ Other _____

Water Supply and/or Code No. _____

City & County near Jal, Lea County

Collected (date & time) 11/28/84 10:44 a.m. By (name) Paige Grant Morgan

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____

Dissolved Oxygen=_____mg/l; Alkalinity=_____; Flow Rate=_____

Sampling Location, Methods & Remarks (i.e. odors etc.)

bailed from near SWL at ≈ 50 feet below surface.
Well casing rusty. PVC bailer used.

I certify that the statements in this block accurately reflect the results of my field analyses, observations and activities. Signed Paige Grant Morgan

I certify that I witnessed these field analyses, observations and activities and concur with the statements in this block. Signed _____

Method of Shipment to Laboratory Hand-carried.

THIS FORM ACCOMPANIES 2 septum vials with teflon-lined discs identified as:
specimen 841128104 4; duplicate _____; triplicate _____; blank(s) _____,
and _____ amber glass jug(s) with teflon-lined cap(s) identified as _____,
and _____ other container(s) (describe) _____ identified as _____.

Containers are marked as follows to indicate preservation (circle):

NP: No preservation; sample stored at ~~room~~ temperature ~~(~20°C)~~ ambient air < 50°F.
P-ICE: Sample stored in an ice bath.
P-$Na_2O_3S_2$: Sample preserved with 3 mg $Na_2O_3S_2$/40 ml and stored at room temperature.

CERTIFICATE(S) OF SAMPLE RECEIPT

I (we) certify that this sample was transferred from _____ to _____ at (location) _____ on (date & time) _____ and that the statements in this block are correct.

Disposition of Sample _____. Seal(s) Intact: Yes ☐ No ☐ .

Signature(s) _____ _____

---

I (we) certify that this sample was transferred from _____ to _____ at (location) _____ on (date & time) _____ and that the statements in this block are correct.

Disposition of Sample _____. Seal(s) Intact: Yes ☐ No ☐ .

Signature(s) _____ _____

RECEIVED
JAN 02 1985
GROUND WATER HAZARDOUS WASTE BUREAU

ANALYSES REQUESTED LAB. NO. 1071

PLEASE CHECK THE APPROPRIATE BOXES BELOW TO INDICATE THE TYPE OF ANALYTICAL SCREENS REQUIRED. WHENEVER POSSIBLE LIST SPECIFIC COMPOUNDS SUSPECTED OR REQUIRED.

| QUALITATIVE | QUANTATIVE | PURGEABLE SCREEN |
|---|---|---|
| X | | ALIPHATIC HYDROCARBON SCREEN * |
| | X | AROMATIC HYDROCARBON SCREEN |
| | | HALOGENATED HYDROCARBON SCREEN |
| | | GAS CHROMATOGRAPH/MASS SPECTROMETER |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | SPECIFIC COMPOUNDS |
| | | search for contamination by oil/natural gas ✓ |
| | | |
| | | |

| QUALITATIVE | QUANTATIVE | EXTRACTABLES SCREEN |
|---|---|---|
| | | ALIPHATIC HYDROCARBONS |
| | | CHLORINATED HYDROCARBON PESTICIDES |
| | | CHLOROPHENOXY ACID HERBICIDES |
| | | HYDROCARBON FUEL SCREEN |
| | | ORGANOPHOSPHATE PESTICIDES |
| | | POLYCHLORINATED BIPHENYLS (PCB's) |
| | | POLYNUCLEAR AROMATIC HYDROCARBONS |
| | | |
| | | |
| | | |
| | | SPECIFIC COMPOUNDS |
| | | |
| | | |
| | | |
| | | |

REMARKS:

## ANALYTICAL RESULTS

| COMPOUND | CONC-ENTRATION | COMPOUND | CONC-ENTRATION |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | * DETECTION LIMIT | 1 ug/l |

REMARKS: No GC/MS purgeables detected other than a few aliphatics at low concentration (<5 ug/l).

CETRIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes No . Seal(s) Broken by _____ date _____.

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements in this block and the analytical data on this page accurately reflect the analytical results for this sample.

Date(s) of analysis 12/3/84. Analysts signature J. Ashby

Icertify that I have reviewed and concur with the analytical results for this sample and with the statements in this block. Reviewers Signature: R Meyerhein

REPORT TO: Morgan/Saves
Ground Water & Hazardous Waste Bureau
Environmental Improvement Division
Health & Environment Department
P.O. Box 968 - Crown Building
Santa Fe, NM 87504-0968

LAB NUMBER GC 5644
DATE RECEIVED 11/30/84
DATE REPORTED CJ 1/22/85
Initials
SLD USER CODE NUMBER 59500

Well Location Address Box 223, Jal, NM 88525
Point of Collection Moseley Well
Well Owner/User Ken Moseley
Number of People Drinking Water from Well 0
Collected 11/28/84 Date 1043 Time
By Morgan/Saves Name EID Agency
Well Depth —
Water Level ~50'
Taste? Odor? Color? Collectors Remarks

pH —
Conductivity (Uncorrected) — umho/cm
Temperature — °C
Conductivity at 25°C — umho/cm

PROJECT: Ca 21.5

From ____, A-$H_2SO_4$ Sample:

- ☐ Nitrate-$N^+$ Nitrite-N ____ mg/l ____
- ☐ Ammonia-N ____ mg/l ____
- ☐ Chemical oxygen demand ____ mg/l ____
- ☐ ____ ____ ____

From ____, A-$HNO_3$ Sample:

- ☐ ICAP Scan
- ☐ Metals by AA (Specify)

From F, NA Sample:

| | | | Date Analyzed |
|---|---|---|---|
| ☑ Calcium | 430.0 | mg/l | 1/16 |
| ☑ Potassium | 8.58 | mg/l | 12/17 |
| ☑ Magnesium | 174 | mg/l | 1/21 |
| ☑ Sodium | 352 | mg/l | 12/17 |
| ☑ Bicarbonate | 189.6 | mg/l | 1/14 |
| ☑ Chloride | 1190 | mg/l | 1/17 |
| ☑ Sulfate | 629.9 | mg/l | 1/4 |
| ☑ Total Solids | 3594 | mg/l | 1/2 |
| ☐ ____ | | | |

charge balance checks out

This form accompanies 1 sample(s) marked as follows to indicate field treatment:

- NF: Whole sample (no filtration)
- F: Filtered in field with 0.45u membrane filter
- A-$H_2SO_4$: Acidified with 2 ml conc $H_2SO_4$/l
- A-$HNO_3$: Acidified with 5ml conc $HNO_3$/l
- NA: No acid added

84/11/28/1043

RECEIVED
JAN 24 1985
GROUND WATER/HAZARDOUS WASTE BUREAU

REPORT TO: Morgan/Saves
Ground Water & Hazardous Waste Bureau
Environmental Improvement Division
Health & Environment Department
P.O. Box 968 - Crown Building
Santa Fe, NM 87504-0968

LAB NUMBER HM-1522
DATE RECEIVED 11/30/84
DATE REPORTED 1/8/85 MJ
Initials
SLD USER CODE NUMBER 59506

Well Location Address Ken Moseley Well, Box 223, Jal, NM 88525

RECEIVED
JAN 14 1985
GROUND WATER/HAZARDOUS WASTE BUREAU

Point of Collection Moseley Well

Well Owner/User Ken Moseley

Number of People Drinking Water from Well 0

Collected 11/28/84 (Date) 1042 (Time)

By Morgan/Saves (Name) EID (Agency)

Well Depth —

Water Level ~50'

Taste? Odor? Color? Collectors Remarks

pH —

Conductivity (Uncorrected) — umho/cm

Temperature — °C

Conductivity at 25°C — umho/cm

PROJECT:

From ____, A-$H_2SO_4$ Sample:

- ☐ Nitrate-$N^+$ Nitrite-N ____ mg/l ____
- ☐ Ammonia-N ____ mg/l ____
- ☐ Chemical oxygen demand ____ mg/l ____
- ☐ ____ ____ ____

From F, A-$HNO_3$ Sample:

- ☑ ICAP Scan
- ☐ Metals by AA (Specify)

From ____, NA Sample:

Date Analyzed

- ☐ Calcium ____ mg/l ____
- ☐ Potassium ____ mg/l ____
- ☐ Magnesium ____ mg/l ____
- ☐ Sodium ____ mg/l ____
- ☐ Bicarbonate ____ mg/l ____
- ☐ Chloride ____ mg/l ____
- ☐ Sulfate ____ mg/l ____
- ☐ Total Solids ____ mg/l ____
- ☐ ____ ____

*This form accompanies 1 sample(s) marked as follows to indicate field treatment:*

- NF: Whole sample (no filtration).
- F: Filtered in field with 0.45u membrane filter
- A-$H_2SO_4$: Acidified with 2 ml conc $H_2SO_4$/l
- A-$HNO_3$: Acidified with 5ml conc $HNO_3$/l
- NA: No acid added

8411281042

ICAP -SCREEN

Lab Number: HM # 1532

Sample Code: Ken Moseley Well, Jal

Date Submitted: 11/30/84

Date Reported: 1/8/85 mJ

By: Morgan/Sares

By:

| Determination | Concentration (µg/ml) |
|---|---|
| Aluminum | <0.10 |
| Barium | <0.10 |
| Beryllium | <0.10 |
| Boron | 0.82 |
| Cadmium | <0.10 |
| Calcium | 370. |
| Chromium | <0.10 |
| Cobalt | <0.10 |
| Copper | <0.10 |
| Iron | 0.49 |
| Lead | <0.10 |
| Magnesium | 130. |
| Manganese | 0.47 |
| Molybdenum | <0.10 |
| Nickel | <0.10 |
| Silicon | 22. |
| Silver | <0.10 |
| Strontium | 7.1 |
| Tin | <0.10 |
| Vanadium | <0.10 |
| Yttrium | <0.10 |
| Zinc | <0.10 |

# ATOMIC ABSORPTION ANALYSES

Arsenic _____ µg/ml

Selenium _____ µg/ml

Mercury _____ µg/ml

REPORT TO: Morgan/Saves
Ground Water & Hazardous Waste Bureau
Environmental Improvement Division
Health & Environment Department
P.O. Box 968 - Crown Building
Santa Fe, NM 87504-0968

LAB NUMBER WC 5651
DATE RECEIVED 11/30/84
DATE REPORTED CW 12/28/85
Initials
SLD USER CODE NUMBER 59560

Well Location Address Cramer Well PO Box 49, Jal, NM 88252

Point of Collection Cramer well

Well Owner/User Billy Wayne Cramer

Number of People Drinking Water from Well 0

Collected 11/28/84 Date 1006 Time

By Morgan/Saves Name EID Agency

Well Depth —

Water Level — ~50'

Taste? Odor? Color? Collectors Remarks

pH —

Conductivity (Uncorrected) — umho/cm

Temperature — °C

Conductivity at 25°C — umho/cm

PROJECT: Ca 158.2

From ____, A-$H_2SO_4$ Sample:

- ☐ Nitrate-$N^+$ Nitrite-N ____ mg/l ____
- ☐ Ammonia-N ____ mg/l ____
- ☐ Chemical oxygen demand ____ mg/l ____
- ☐ ____ ____ ____

From ____, A-$HNO_3$ Sample:

- ☐ ICAP Scan
- ☐ Metals by AA (Specify)

From F, NA Sample:

| | | | Date Analyzed |
|---|---|---|---|
| ☑ Calcium | 3164 | mg/l | 1/16 |
| ☑ Potassium | 78.0 | mg/l | 12/17 |
| ☑ Magnesium | 1025 | mg/l | 1/21 |
| ☑ Sodium | 23862 | mg/l | 12/17 |
| ☑ Bicarbonate | 130.2 | mg/l | 1/28 |
| ☑ Chloride | 43762 | mg/l | 1/17 |
| ☑ Sulfate | 2483 | mg/l | 1/4 |
| ☑ Total Solids | 74,714 | mg/l | |
| ☑ ____ | | | |

RECEIVED
FEB 06 1985
GROUND WATER/HAZARDOUS WASTE BUREAU

*This form accompanies* 1 *sample(s) marked as follows to indicate field treatment:*

- NF: Whole sample (no filtration).
- F: Filtered in field with 0.45u membrane filter 841128 1006
- A-$H_2SO_4$: Acidified with 2 ml conc $H_2SO_4$/l
- A-$HNO_3$: Acidified with 5ml conc $HNO_3$/l
- NA: No acid added

REPORT TO: Morgan/Saves

Ground Water & Hazardous Waste Bureau
Environmental Improvement Division
Health & Environment Department
P.O. Box 968 - Crown Building
Santa Fe, NM 87504-0968

LAB NUMBER HM 1538
DATE RECEIVED 11/30/84
DATE REPORTED 1/9/85 mS
Initials
SLD USER CODE NUMBER 59500

Well Location Address Cramer Well, P.O Box 49, Jal, NM 88252 RECEIVED

Point of Collection Cramer residence well JAN 14 1985

Well Owner/User Billy Wayne Cramer

GROUND WATER/HAZARDOUS WASTE BUREAU

Number of People Drinking Water from Well 0

Collected 11/28/84 (Date) 1005 (Time)

By Morgan/Saves (Name) EID (Agency)

Well Depth —

Water Level —

pH —

Conductivity (Uncorrected) — umho/cm

Taste? Odor? Color? Collectors Remarks

Sample from Abandon well

Temperature — °C

Conductivity at 25°C — umho/cm

PROJECT:

From ____, A-$H_2SO_4$ Sample:

- ☐ Nitrate-N+ Nitrite-N ____ mg/l ____
- ☐ Ammonia-N ____ mg/l ____
- ☐ Chemical oxygen demand ____ mg/l ____
- ☐ ____ ____ ____

From F, A-$HNO_3$ Sample:

- ☒ ICAP Scan
- ☐ Metals by AA (Specify)

From ____, NA Sample: (Date Analyzed)

- ☐ Calcium ____ mg/l ____
- ☐ Potassium ____ mg/l ____
- ☐ Magnesium ____ mg/l ____
- ☐ Sodium ____ mg/l ____
- ☐ Bicarbonate ____ mg/l ____
- ☐ Chloride ____ mg/l ____
- ☐ Sulfate ____ mg/l ____
- ☐ Total Solids ____ mg/l ____
- ☐ ____ ____

This form accompanies 1 sample(s) marked as follows to indicate field treatment:

NF: Whole sample (no filtration).
F: Filtered in field with 0.45u membrane filter 841128 1005
A-$H_2SO_4$: Acidified with 2 ml conc $H_2SO_4$/l
A-$HNO_3$: Acidified with 5ml conc $HNO_3$/l
NA: No acid added

ICAP -SCREEN

Lab Number: NM 1538

Sample Code: Cramer Well, Jal NM

Date Submitted: 11-30-84

Date Reported: 1/9/85

By: Morgan / Saren

By: MF

| Determination | Concentration (µg/ml) |
|---|---|
| Aluminum | <0.10 |
| Barium | <0.10 |
| Beryllium | <0.10 |
| Boron | 1.3 |
| Cadmium | <0.10 |
| Calcium | 2900. |
| Chromium | <0.10 |
| Cobalt | <0.10 |
| Copper | <0.10 |
| Iron | 0.10 |
| Lead | <0.10 |
| Magnesium | 1100. |
| Manganese | 0.30 |
| Molybdenum | <0.10 |
| Nickel | <0.10 |
| Silicon | 11. |
| Silver | <0.10 |
| Strontium | 58. |
| Tin | <0.10 |
| Vanadium | <0.10 |
| Yttrium | <0.10 |
| Zinc | 2.3 |

84-1068 -C

REP... ...onmental Improvement Division
Health & Environment Department
P.O. Box 968 - Crown Building
Santa Fe, New Mexico 87504-0968
ATTENTION: PAIGE MORGAN
BUREAU: Ground Water / Haz Waste

LABORATORY 11/30/84

LAB NUMBER OR 1068 A, B.

SLD Users Code No. 59300

ALL CONTAINERS WHICH THIS FORM ACCOMPANIES ARE COLLECTIVELY REFERRED TO AS "SAMPLE".

CERTIFICATE OF FIELD PERSONNEL

Sample Type: Water ☒ Soil ☐ Other _____

Water Supply and/or Code No. _____

City & County near Jal, Lea County

Collected (date & time) 11/28/84 - 10:07 a.m. By (name) Paige Grant Morgan

pH=_____; Conductivity=_____umho/cm at_____°C; Chlorine Residual=_____

Dissolved Oxygen=_____mg/l; Alkalinity=_____; Flow Rate=_____

Sampling Location, Methods & Remarks (i.e. odors etc.)

pumped for ≈ 2 minutes before collecting sample

I certify that the statements in this block accurately reflect the results of my field analyses, observations and activities. Signed Paige Grant Morgan

I certify that I witnessed these field analyses, observations and activities and concur with the statements in this block. Signed _____

Method of Shipment to Laboratory hand-carried.

THIS FORM ACCOMPANIES 2 septum vials with teflon-lined discs identified as:
specimen 84/11/28/007; duplicate_____; triplicate_____; blank(s)_____,
and_____ amber glass jug(s) with teflon-lined cap(s) identified as_____,
and_____ other container(s) (describe)_____ identified as_____.

Containers are marked as follows to indicate preservation (circle):

(NP): No preservation; sample stored ~~at room temperature (~20°C)~~. in vehicle - air temp < 50° F

P-ICE: Sample stored in an ice bath.

P-$Na_2O_3S_2$: Sample preserved with 3 mg $Na_2O_3S_2$/40 ml and stored at room temperature.

CERTIFICATE(S) OF SAMPLE RECEIPT

I (we) certify that this sample was transferred from _____ to _____ at (location)_____ on (date & time)_____ and that the statements in this block are correct.

Disposition of Sample_____. Seal(s) Intact: Yes ☐ No ☐ .

Signature(s)_____ _____

---

I (we) certify that this sample was transferred from _____ to _____ at (location)_____ on (date & time)_____ and that the statements in this block are correct.

Disposition of Sample_____. Seal(s) Intact: Yes ☐ No ☐ .

Signature(s)_____ _____

RECEIVED
JAN 02 1985
GROUND WATER/HAZARDOUS WASTE BUREAU

## ANALYSES REQUESTED LAB. NO. 1068

PLEASE CHECK THE APPROPRIATE BOXES BELOW TO INDICATE THE TYPE OF ANALYTICAL SCREENS REQUIRED. WHENEVER POSSIBLE LIST SPECIFIC COMPOUNDS SUSPECTED OR REQUIRED.

| QUALITATIVE | QUANTATIVE | PURGEABLE SCREEN | QUALITATIVE | QUANTATIVE | EXTRACTABLES SCREEN |
|---|---|---|---|---|---|
| X | | ALIPHATIC HYDROCARBON SCREEN * | | | ALIPHATIC HYDROCARBONS |
| | X | AROMATIC HYDROCARBON SCREEN | | | CHLORINATED HYDROCARBON PESTICIDES |
| | | HALOGENATED HYDROCARBON SCREEN | | | CHLOROPHENOXY ACID HERBICIDES |
| | | GAS CHROMATOGRAPH/MASS SPECTROMETER | | | HYDROCARBON FUEL SCREEN |
| | | | | | ORGANOPHOSPHATE PESTICIDES |
| | | | | | POLYCHLORINATED BIPHENYLS (PCB's) |
| | | | | | POLYNUCLEAR AROMATIC HYDROCARBONS |
| | | | | | |
| | | | | | |
| | | | | | |
| | | SPECIFIC COMPOUNDS | | | SPECIFIC COMPOUNDS |
| | | *search for natural gas constituents (oil) | | | |
| | | | | | |
| | | | | | |

REMARKS:

## ANALYTICAL RESULTS

| COMPOUND | CONC-ENTRATION | COMPOUND | CONC-ENTRATION |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | * DETECTION LIMIT | 1 µg/l |

REMARKS: No GC/MS purgeables detected.

CETRIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes No . Seal(s) Broken by _____ date _____ .

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements in this block and the analytical data on this page accurately reflect the analytical results for this sample.

Date(s) of analysis 12/4/84. Analysts signature J. Ashley

Icertify that I have reviewed and concur with the analytical results for this sample and with the statements in this block. Reviewers Signature: L Meyerhen

TONEY ANAYA
GOVERNOR

DENISE D. FORT
DIRECTOR

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020

October 10, 1985

Robert Smith
Permian Brine
Route 3 Box 3033
Odessa, TX 79763

Dear Mr. Smith:

Enclosed, per your request by telephone on October 7th, is a list of the brine wells in New Mexico with, on one page, their location by township, range and section, and on the other page, their county of location and "well status". This latter category is one used by EPA on their computerized injection well inventory, and so we incorporated it into our own nascent computer inventory system. The codes under "well status" are translated as follows:

| | |
|---|---|
| PA | Permanently abandoned. |
| AC | Active. |
| TA | Temporarily abandoned. |
| UC | Under construction. This category is broadly interpreted and may also mean that a well is permitted but has not commenced construction. |
| AN | Abandoned without approval. |

I hope that this is of use to you.

Sincerely,

Paige Grant Morgan
Water Resource Specialist

PG:pgm

PERMIAN BRINE SALES, INC.
ROUTE 3, BOX 3033
ODESSA, TEXAS 79763

MIDLAND, TX 797
PM
8 JAN
1985

RECEIVED
JAN 14 1985
GROUND WATER/HAZARDOUS WASTE
BUREAU

New Mex. EID
Box 968
Santa Fe, NM 87508

Attn: Paige Morgan

JAL - 6.601

ENTERED

v/n 3025

State of New Mexico
Commission of Public Lands
P.O. Box 1148
Santa Fe, New Mexico 87501
#M-14474

8030 bbls x $.35 ÷ 10 = 281.05

$ 281.05
CK# 23335

ALWAYS type on check stub:

BBL AMT. 8030
SALE VALUE 2810.50 (bbls x $.35)
ROYALTY DUE 281.05

ENTERED

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO

ENVIRONMENTAL IMPROVEMENT DIVISION

P.O. Box 968, Santa Fe, New Mexico 87504-0968

(505) 984-0020

TONEY ANAYA
GOVERNOR

DENISE D. FORT
DIRECTOR

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

P 612 423 469

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

(See Reverse)

| | |
|---|---|
| Sent to R.C. McCutchan | |
| Street and No. Rt. 3, Box 3033 | |
| P.O. State and ZIP Code Odessa, TX 79763 | |
| Postage | $ |

U.S.G.P.O. 1983-403-517

January 2, 1985

R.C. McCutchan, Geologist
Permian Brine Sales, Inc.
Rt. 3, Box 3033
Odessa, TX 79763

RE: Discharge plan DP-324 for Permian Brine Sales' Jal brine facility, SE¼ SE¼ SE¼ Section 16, T25S, R37E.

Dear Mr. McCutchan:

Thank you for making the trip to meet us for the pressure test at Permian Brine's Jal facility on November 28th, and for sending me the chart from the test recorder on November 30. We appreciate the efforts of Permian Brine to bring this facility into compliance with New Mexico state regulations governing ground water quality. I hope that this letter and your reply will constitute the final phase of developing an approvable discharge plan.

The numbered paragraphs below correspond to those used in our previous correspondence.

2.b. I am waiting for results of the analyses of samples we collected from your brine pit and the two adjacent water wells whose owners have complained of chloride contamination. Until I have received those reports, I cannot arrive at a conclusion regarding the source of chloride contamination in the area.

Whether or not activities at Permian Brine's Jal station are judged responsible for the contamination of the above-mentioned wells, I find no plugging records for the Arnott-Ramsay No. 2 and No. 3 wells previously used for brine production at your site. Pursuant to Section 5-203 of the Water Quality Control Commission regulations, these wells must be plugged in accordance with the plugging plan submitted as part of your discharge plan. Please let me know when you make arrangements for these wells to be plugged, so that we can have a representative on site to witness the plugging job.

3.a. As we discussed during our meeting at your Jal facility, I do not share your view that the potential for corrosion of the casing in your brine well is low. Consequently, I place considerable importance on the aspect

of your discharge plan discussed in Section 5-210.B.15 of the WQCC regulations, related to contingency plans in the event of a well failure to ensure that ground water containing less than 10,000 mg/l TDS will not be contaminated by leaking brine. Further, please note the requirement under Section 1-203.A.2 to "take appropriate and necessary steps to contain and remove or mitigate the damage caused by the discharge". Please discuss the approach you would take to mitigate any damage to ground water caused by brine leaking from a damaged casing or moving through channels in the cement around your casing.

4.a. It seems questionable that brine spilled during truck loading will spill directly into a six-inch wide drain. I recommend that you slope the entire loading area toward the spill collection pit and pave the ramps with asphalt or caliche. The Aqua-flex liner you plan to use for the pit itself appears adequate.

I agree that oil well drilling activities pose a considerable threat of brine contamination of aquifers. The Oil Conservation Division recently established an environmental unit in an attempt to address this and other ground water contamination problems related to oil and gas production. Meanwhile, the EID intends to enforce the ground water quality protection regulations for those facilities for which we have author[illegible] If you have evidence of discrepancies in the amount of protection afforded to ground water by the regulatory actions of EID compared with OCD you are invited to bring such evidence to the attention of the Water Quality Control Commission through its chairman, Ms. Denise Fort.

4.b. The Soil Conservation Service mapped the soil at your site as the Simona-Upton association (Soil Survey, Lea County, New Mexico, USDA Soil Conservation Service in cooperation with New Mexico Agricultural Experiment Station. January 1974). There is caliche, both indurated and as gravel, in the soil profile, but the soil is not equated with caliche. This information with the rest of the information you have provided on the leak detection system beneath the brine storage pit, indicates to me that the leak detection system could have been better designed for the purpose. Any leak at the storage pit will be considered significant and you have already committed in your letter to me of October 31, 1984, to notify this Bureau in the event of a significant leak and to proceed to mitigate any damage that may have been caused by the leak. Please outline briefly what those mitigation procedures would be.

5.b. Noted.

6.a Since you so often find your guages to be faulty and you indicated during our conversation in Jal that you would not expect an operator to keep records of annular pressure with any accuracy, I can see only two ways that we could get a reading on the mechanical integrity of this well between EID-witnessed pressure tests:

(1) install a monitor well at close proximity to your brine well, perforated in the relatively shallow formation tapped by the Bowington well (static water level roughly 50 feet below ground surface) and in the deeper formation (probably Santa Rosa or Chinle) tapped by your supply well, with a plug to separate the two and sufficient access to the deeper formation to permit a sample to be bailed periodically. Two separate monitor wells, one to each water-bearing formation, would also be acceptable. An analysis of each formation fluid for major cations and anions would subsequently be required, and each formation would then be monitored for chlorides on a quarterly basis. or

(2) Conduct a pressure test in the brine well on a quarterly basis, and submit the chart from the recorder used to record the test with your quarterly report. This test may be conducted at normal operating pressure, so that you need not import a pump to the site. It occurs to me that you might combine the periodic pressure test requirement with your regular reversal of flow in the well (3.b.), and let the recorder run overnight. A pressure test at normal operating pressure should be run for at least six hours, to pick up any slight, steady decline in pressure that may not be detected in a shorter test.

It is acceptable, as you proposed, that your quarterly chemistry reports consist only of chlorides from your injected water and produced brine, and from your monitor well(s), if you choose that option for monitoring mechanical integrity. You indicated that you would send me copies of the brine production reports that go to the State Lands Commission. If you choose to conduct a quarterly pressure test rather then putting in monitor wells, the chart from a pressure test should also be submitted on a quarterly basis.

When the following points are satisfactorily addressed, I plan to recommend that the EID Director approve this discharge plan:

a) if results of the analyses of samples from the Cramer and Bowington wells confirm that Permian Brine's operation is not the cause of contamination in those wells; and

b) when Arnott-Ramsay No. 2 and No. 3 wells are satisfactorily plugged; and

c) when a contingency plan is prepared for response in the event of a significant leak or spill of brine on the surface or from the brine well; and

d) on receipt of an approvable plan for monitoring mechnical integrity in the brine well.

Thank you for preparing this discharge plan for Permian Brine's Jal facility.

Sincerely,

Paige Grant Morgan

Paige Grant Morgan
Water Resource Specialist
Ground Water Section

PGM:jba

cc: John Guinn, EID District IV, Roswell
Rolf Ruffner, EID Field Office, Hobbs

MSB

# PERMIAN BRINE SALES, INC.

**24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN**

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531



RECEIVED
DEC 05 1984
GROUND WATER/HAZARDOUS WASTE BUREAU


November 30, 1984

Environmental Improvement Division
P.O. Box 968
Santa Fe, New Mexico 87504- 0968

Re: Mechanical Integrety Test

Dear Ms. Morgan:

A mechanical integrety test has been run on the brine well at the Jal Brine Station. The test proved that the well has mechanical integrety. Enclosed is the pressure chart from the well test.

If you have any questions, feel free to contact me.

Sincerely,
PERMIAN BRINE SALES, INC.

Robert C. Smith

ROBERT C. SMITH
PETROLEUM GEOLOGIST

RCS/law
Enc.

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

P. O. BOX 1591

ODESSA, TEXAS
79760

PHONE 332-0531



RECEIVED
DEC 05 1984
GROUND WATER/HAZARDOUS WASTE BUREAU


## MECHANICAL INTEGRITY TEST REPORT

Station Jal — Date 11-28-84

Station Number _____ — Witness Paige Morgan

Run By Robert C. Smith — Witness _____

Normal Operating Pressure 175 psi

Depth of Well 1591'

Pressure attained in Test 325 psi

Rate of Injection (approximate) 60 gpm

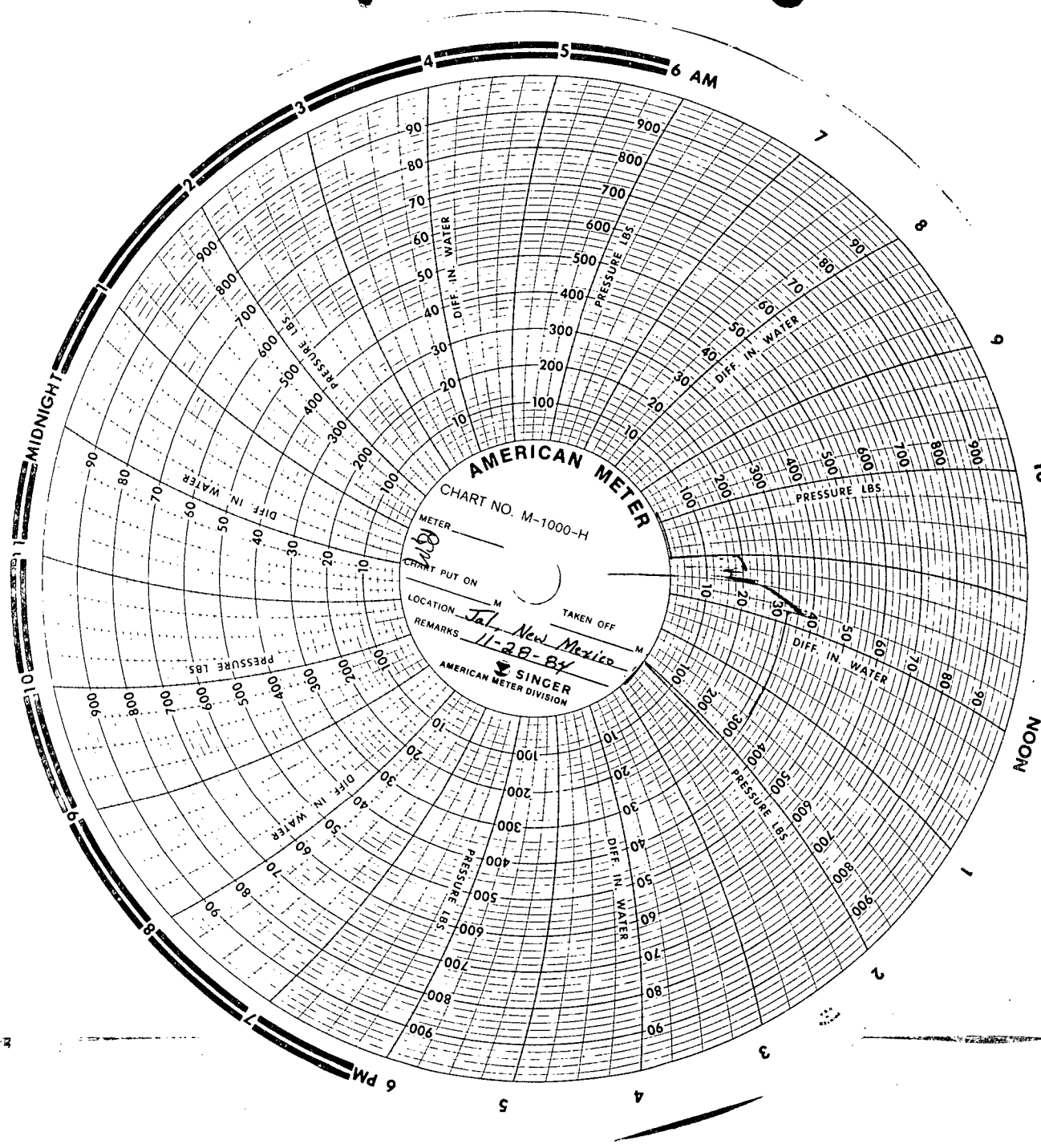
Pressuring up time 45 min

Static test time 2 Hrs

Pounds of decline 5 psi

Percentage of decline 1.5%

REMARKS _____


AMERICAN METER
CHART NO. M-1000-H
METER
CHART PUT ON
M
TAKEN OFF
M
LOCATION Jal, New Mexico
REMARKS 11-28-84
SINGER
AMERICAN METER DIVISION
MIDNIGHT
6 AM
NOON
6 PM
PRESSURE LBS.
DIFF. IN. WATER
DIFF IN WATER
PRESSURE LBS

| moles | Ion |
|---|---|
| 3✓ | Na |
| 3✓ | K |
| 3✓ | Ca |
| 3✓ | Mg |
| 3✓ | Cl |
| 3✓ | HCO3 |
| | CO3 |
| 3✓ | SO4 |
| 3✓ | TDS |
| | NO3+ NO2 |
| | NH3 |
| | kield N |
| | As |
| (N) | Ba |
| | Cd |
| | CN |
| | Cr |
| | F |
| | Pb |
| | Hg |
| | Se |
| | Ag |
| | U |
| | V |
| | Ra 226 |
| | Ra 228 |
| | Cu |
| | Fe |
| | Mn |
| | Phenols |
| | Zn |
| | Al |
| | B |
| | Co |
| | Mo |
| | Ni |
| 3✓ | pH |
| 3✓ | Conduct. |

# FIELD TRIP REPORT
## GROUND WATER SECTION

SLD USER CODES
Ground Water: 59300
$NO_3$, HC, & Toxics: 59600
UIC; (59500)

County Lea

FACILITY VISITED
Name of Facility: Permian Brine
Location: Jal

Discharge Plan Number: DP-324
Type of Operation: Brine extraction well

ENVIRONMENTAL IMPROVEMENT DIVISION FIELD VISIT
EID Inspector(s): Paige Morgan + Steve Sanco
Date of Inspection or Visit: 11/28/84
Discharger's Representative Present During EID Visit:
Name: Russ Hickerson - Mac McCutcheon - Robert Smith
Title or Position: Vice-pres - Geologist - Geologist
Purpose of Visit:
a. Evaluation of Proposed Discharge Plan ✓
b. Compliance Inspection of Discharge with Approved Plan
c. Other (specify) investigate complaints of chloride contamination in adjacent water wells.
Inspection Activities During Field Visit:
a. Inspection of Facilities or Construction (specify)
Brine pond + water storage tanks

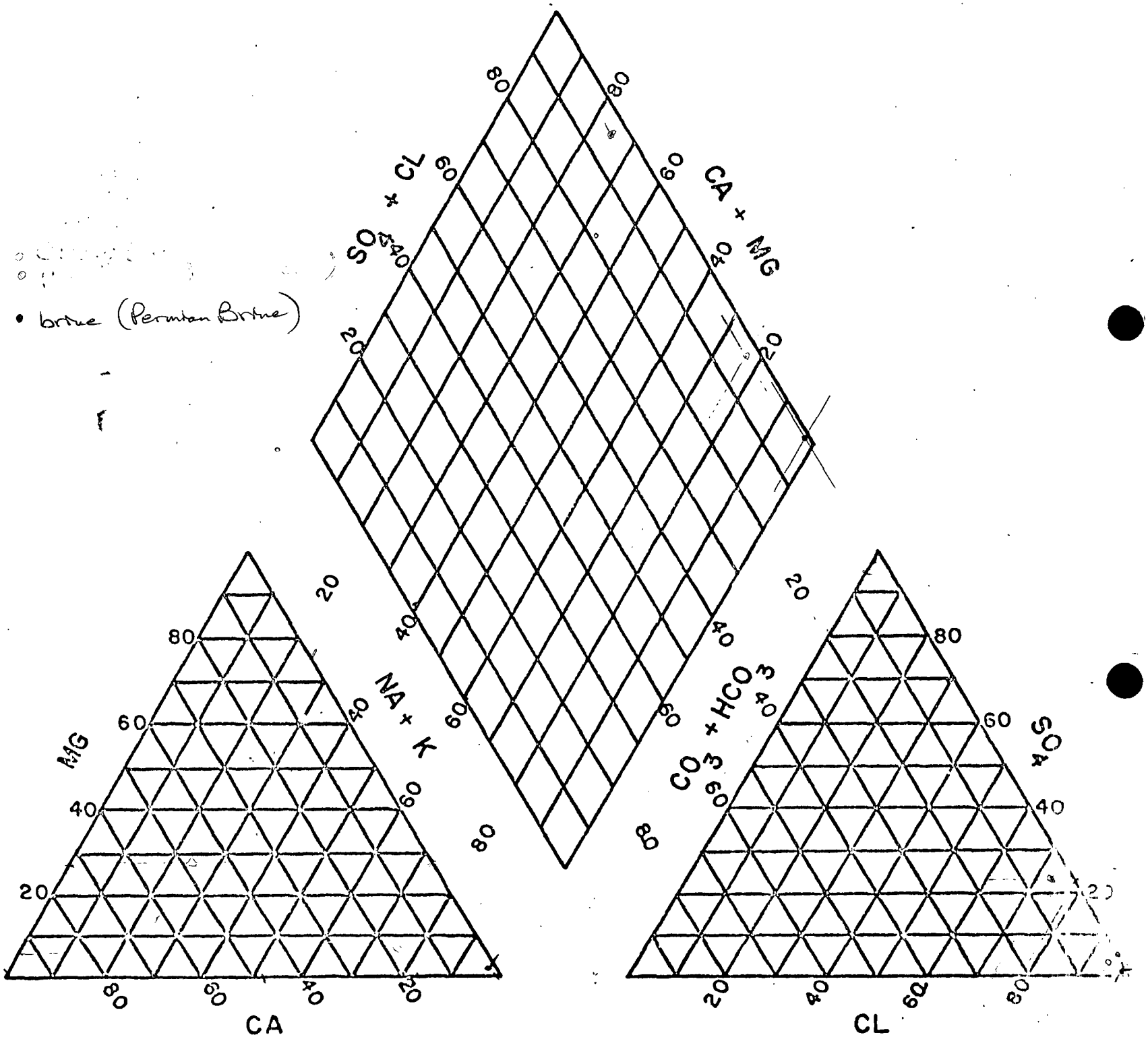
b. Sampling of Effluents (give sampling locations)
Brine pond 8411281137-38

c. Sampling of Ground Water (give names or locations of wells)
Cramer well ≈ 1000 ft south of brine well 8411281005-06-07
Boultinghouse/Moseley well ≈ 1200 ft south of " " 8411281042-43-44

d. Evaluation of geology, soils, water levels or other physical characteristics of the location (specify)
Moseley well SWL ≈ 50 ft. Three oil wells, active and abandoned, w/ accompanying "reclaimed" mud/brine pits, located within 1200 ft of contaminated water wells, to south.
e. Other (specify) Signs at these sites: Arco 2-H S21 T25 R37 7-13-83 Lewis B. Burleson Inc; Burleson & Huff Arco No. 2-Y Unit H T25S R37E Sec 21; Burleson & Huff Arco No. 1 Unit A Sec 21 T25 R37.
Observations and Information Obtained during the Visit:
The first two pits listed above were devoid of vegetation, indicating probable severe chloride concentrations. The third better.

organics (2) → Pressure test at Permian brine well conducted at 30-35 psi - chart from recorder will be forwarded to us. DAT indicated no substantial drop in pressure.

ACTION REQUIRED




• brine (Permian Brine)

# PERMIAN BRINE SALES, INC.

**24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN**

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531



RECEIVED
NOV 19 1984
GROUND WATER/HAZARDOUS WASTE BUREAU


November 6, 1984

Paige Grant
Water Resource Specialist
Environmental Improvement Division
P.O. Box 968
Santa Fe, New Mexico 87504-0968

Re: Chloride contamination of shallow aquifer in the vicinity of Permian Brine's Jal Brine Station

Dear Miss Grant:

This will acknowledge your letter of August 29, 1984, regarding the subject water well contamination.

At your suggestion, we obtained samples of the Bowington and Cramer water wells analyses attached. An analysis of the Permian Brine water well is also attached. The analyses obtained September 17, 1984, indicates the Cramer well is indeed severely contaminated with chlorides. However, the Bowington well (the resident with the orchard) does not exhibit unusually high chlorides.

The statement in your letter that the brine station could "possible cause...this chloride contamination due to its close proximity UPGRADIENT of the wells...". Please refer to Drawing J-1 Rev. of the plotted hydraulic gradient, in the shallow 100-150' aquifer in this area. Although this sketch was prepared from 1953 data, it is possible this gradient still prevails due to the substantial withdrawals to the north from water wells of El Paso Natural Gas Company plants. Consequently, even if there had been significant surface brine spillage or underground migration of brine, it would move in a northerly direction from Permian Brine's site.

An on the ground search for a possible source of this contamination indicated a "reclaimed" surface drilling reserve pit at the Burleson Huff-ARCO 2Y well. This well was completed December 30, 1975. As exhibited in the pictures of this pit area. The total lack of vegetation, indicates this pit was a collection of drilling mud and saturated brine. As shown on Drawing J-2 REV. the contaminated wells are 1030 and 1160 feet from this site, and down-gradient. The

five years intervening between this well completion and the observed contamination in 1980 would provide ample time for the movement of the contaminants, even in this semi-arid area.

The loss of circulation in the two earlier brine wells was caused by fracturing into the Rustler zone overlying the salt. The workover records of the previous operator detail exactly what happened. The brine well had plugged up - probably by failure to backflush the well at monthly intervals - so the well operator hired a pump truck to remove the plug. The operator thus mistakenly exceeded the salt fracture pressure, fracture occurred and pressure was lost immediately.

We do not deny the fracturing of the salt section can lead to contamination of near-surface aquifers. The vertical migration of the brine solution usually occurs in or near well bores close to the fractured areas. In the case of this area, the close proximity of Permian Brine's water well - 30' - to the No. 2 abandoned brine well, and bottomed at 450' it would seem reasonable that any contamination as a result of this fracturing would be observed in this water well. As indicated from the water analyses of this water well the chlorides concentration barely exceeds the standards for public water supplies and the sulfates are below the standard requirements.

We hope this report answers most of the questions in your letter. From our experiences in this area, the occurance, productivity and movement of underground water must be classified as an art rather than a science. There are no consistent data or hydraulic equations that will predict and/or satisfy the actual field conditions we have encountered in the drilling and operation of water wells.

If you require further information or have additional questions, please let up hear from you.

Very truly yours,
PERMIAN BRINE SALES, INC.

R.C. MC CUTCHAN
ENGINEER

RCM/law

exas Department of Water Resources – Underground Injection Control Section

it No. _____

## GROUND WATER ANALYSIS REPORT- IN SITU MINING

Well No. _____ Sample No. _____

Submitted By A. L. Hickerson Date Collected: 9-17-84 ; By _____

Company Permian Brine Sales, Inc. Mine Billy W. Carmer

**FIELD MEASUREMENTS:**

Spec. Conductance at Well: _____
Sample Temperature: _____
pH: _____

**WELL DATA:**

Normal Water Level: _____ msl
Pump: Set at _____ feet; _____ gpm.
Bottom of: Casing _____ feet; Completion Interval _____ feet
Land Surface Datum: _____ msl

SAMPLE METHODS: Calibrate Electrical Conductance Meter (1) Page 71; Pump Well Until Electrical Conductance is Approx. Constant.
CONTAINER: 1 Liter Plastic
ANALYSIS: Lab Name Martin Water Labs., Inc. Date Received 9-17-84 Date Reported 9-24-84
Martin Water Labs., Inc. #984246

**MAJOR AND SECONDARY CONSTITUENTS**

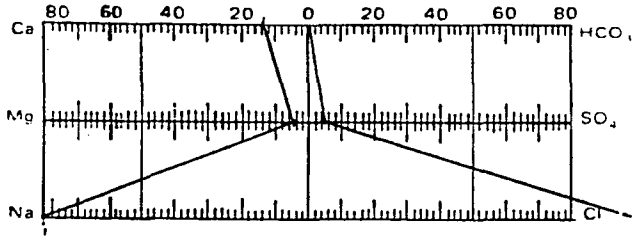
| | ITEM | STORET | mg/l (a) | F (b) | | epm (c) | Ecf (d) | | (c) x (d) | % epm |
|---|---|---|---|---|---|---|---|---|---|---|
| A. | Calcium (Ca) | 00915 | 3,840 | = 20.04 x | | 191.62 | x 52.0 = | | 3.7 | 14.4 |
| B. | Magnesium (Mg) | 00925 | 923 | = 12.16 x | | 75.90 | x 46.6 = | | 1.6 | 5.7 |
| C. | Sodium (Na) | 00929 | 17,400 | = 22.99 x | | 756.85 | x 48.9 = | | 37,009.9 | 79.9 |
| D. | | | Total Cation | .... | | 1,024.37 | | | | |
| E. | Carbonate ($CO_3$) | 00445 | 0 | = 30.00 x | | 0.00 | x 84.6 = | | 0.0 | 0.0 |
| F. | Bicarbonate ($HCO_3$) | 00440 | 142 | = 61.02 x | | 2,32 | x 43.6 = | | 101.2 | 0.2 |
| G. | Sulfate ($SO_4$) | 00945 | 3,183 | = 48.03 x | | 66.27 | x 73.9 = | | 4,897.4 | 5.0 |
| H. | Chloride (Cl) | 00940 | 44,742 | = 35.45 x | | 1,262.11 | x 75.9 = | | 95,794.1 | 94.8 |
| I. | Nitrate ($NO_3$-N) | 71851 | 3.4 | | | | Total | | 137,807.9 | = T. (1) page 31 |
| J. | | | Total Anion | ... | | 1,330.70 | | | | |
| K. | Total Ion | | 70,230 | | | | | | | |
| L. | TDS (180 °C) | 70300 | 74,384 | | | | | | | |
| M. | TDS = K - (.5F) | | = 70,159 | | | | | | | |
| N. | Ec (25 °C) | 00095 | 82.5 x $10^3$ | µmhos | | | | | | |
| P. | Ec (Dilute) = 118 x 1,666 | | = 196,588 | µmhos | | | | | | |
| Q. | Alk. as $CaCO_3$ | 00410 | 116 | | | | | | | |
| R. | pH | 00403 | 7.30 | | | | | | | |

Accuracy Check

| | | Range |
|---|---|---|
| Ion (D/J) | 0.77 | .96 to 1.04 |
| TDS (L/M) | 1.06 | .90 to 1.10 |
| Ec (P/T) | 1.43 | .95 to 1.05 |

Average bal. Doesn't check

DIAGRAM % CATION % ANION




(1) See STD Methods - 15th Edition

Analyst
Remarks _____ Checked By _____

RECEIVED
NOV 13 1984
GROUND WATER/HAZARDOUS WASTE BUREAU

TDWR-0361

Texas Department of Water Resources – Underground Injection Control Section

Permit No. _____

## GROUND WATER ANALYSIS REPORT- IN SITU MINING

Well No. _____ Sample No. _____

Submitted By A. L. Hickerson Date Collected: 9-17-84 ; By _____

Company Permian Brine Sales, Inc. Mine Ralph Bowington's water well

**FIELD MEASUREMENTS:**

Spec. Conductance at Well: _____

Sample Temperature: _____

pH: _____

**WELL DATA:**

Normal Water Level: _____ msl

Pump: Set at _____ feet; _____ gpm.

Bottom of: Casing _____ feet; Completion Interval _____ feet

Land Surface Datum: _____ msl

SAMPLE METHODS: Calibrate Electrical Conductance Meter (1) Page 71; Pump Well Until Electrical Conductance is Approx. Constant.

CONTAINER: 1 Liter Plastic

ANALYSIS: Lab Name Martin Water Labs., Inc. Date Received 9-17-84 Date Reported 9-24-84

Martin Water Labs., Inc. #984245

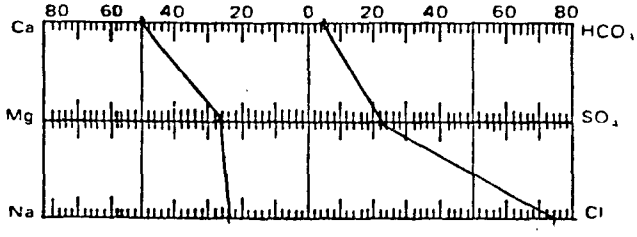
**MAJOR AND SECONDARY CONSTITUENTS**

| | ITEM | STORET | mg/l (a) | F (b) | epm (c) | Ecf (d) | (c) x (d) | % epm |
|---|---|---|---|---|---|---|---|---|
| A. | Calcium (Ca) | 00915 | 660 | = 20.04 x | 32.93 | x 52.0 = | 1,712.4 | 48.9 |
| B. | Magnesium (Mg) | 00925 | 219 | = 12.16 x | 18.00 | x 46.6 = | 838.8 | 26.8 |
| C. | Sodium (Na) | 00929 | 375 | = 22.99 x | 16.31 | x 48.9 = | 797.6 | 24.3 |
| D. | | | Total Cation | .... | ~~67.24~~ | | | |
| E. | Carbonate ($CO_3$) | 00445 | 0 | = 30.00 x | 0.00 | x 84.6 = | 0.0 | 0.0 |
| F. | Bicarbonate ($HCO_3$) | 00440 | 205 | = 61.02 x | 3.36 | x 43.6 = | 146.5 | 4.9 |
| G. | Sulfate ($SO_4$) | 00945 | 707 | = 48.03 x | 14.72 | x 73.9 = | 1,087.9 | 21.6 |
| H. | Chloride (Cl) | 00940 | 1,775 | = 35.45 x | 50.07 | x 75.9 = | 3,800.3 | 73.5 |
| I. | Nitrate ($NO_3$-N) | 71851 | 3.4 | | | Total | 8,383.5 | = T. (1) page 31 |
| J. | | | Total Anion | ... | 68.15 | | | |
| K. | Total Ion | | 3,942 | | | | | |
| L. | TDS (180 °C) | 70300 | 4,906 | | | | | |
| M. | TDS = K - (.5F) | | = 3,839 | | | | | |
| N. | Ec (25 °C) | 00095 | $5.78 \times 10^3$ | µmhos | | | | |
| P. | Ec (Dilute) = 114 x 83 | | = 9,462 | µmhos | | | | |
| Q. | Alk. as $CaCO_3$ | 00410 | 168 | | | | | |
| R. | pH | 00403 | 7.10 | | | | | |

Accuracy Check

| | | Range |
|---|---|---|
| Ion (D/J) | 0.99 | .96 to 1.04 |
| TDS (L/M) | 1.28 | .90 to 1.10 |
| Ec (P/T) | 1.13 | .95 to 1.05 |

DIAGRAM % CATION % ANION




Charge bal. checks

(1) See STD Methods - 15th Edition

Analyst Remarks _____ Checked By _____

RECEIVED
NOV 13 1984
GROUND WATER/HAZARDOUS WASTE BUREAU

ent No. 3319000

Permit No. _____

GROUND WATER ANALYSIS REPORT-IN SITU MINING

Well No. 1 Sample No. 1

Production Area No. _____

Submitted By Permian Brine Sales Date Collected: 7-25-84 ; By R.C. McCutchan

Company Jal Brine Station Mine Jal, New Mexico Sta. Fresh Water

SAMPLE METHODS: Calibrate Ec Meter (1)Page 71; Pump Well Until Ec is Approx. Constant.

| Sample | Date | Temp (C) | pH | Spec. Cond. (umhos) |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |

| | | | |
|---|---|---|---|
| Spec. Cond. at Well: | 2000 | | µmhos |
| Normal Water Level: | 2835 | | msl |
| Pump: Set at | 2667 msl | 45 | gpm. |
| Bottom of: Casing | n.a. msl; screen | d.a. | msl |
| Land Surface Datum: | 3085 msl | | |

CONTAINER: 1 Gal. Plastic for *Items; 1 Gal. Plastic for all other items.; One quart plastic (full) for Specific Conductivity

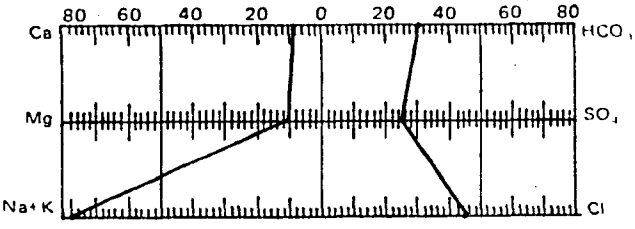
PRESERVATION METHODS: Acidify * Item to <2 pH ($HNO_3$); Cool all other items to 4 °C.

ANALYSIS: Lab Name Southwestern Laboratories Date Received 8-2-84 Date Reported 8-6-84

MAJOR AND SECONDARY CONSTITUENTS (Group No. 1)

| | ITEM | STORET | mg/l (a) | F (b) | epm (c) | Ecf (d) | (c) x (d) | % epm |
|---|---|---|---|---|---|---|---|---|
| A. | Calcium (Ca) | 00915 | 33 | = 20.04 x | 1.65 | x 52.0 = | 86 | 8.4 |
| B. | Magnesium (Mg) | 00925 | 27 | = 12.16 x | 2.22 | x 46.6 = | 103 | 11.3 |
| C. | Sodium (Na) | 00929 | 357 | = 22.99 x | 15.53 | x 48.9 = | 759 | 79.3 |
| D. | Potassium (K) | 00937 | 8 | = 39.10 x | 0.20 | x 72.0 = | 14 | 1.0 |
| E. | | | Total Cation | .... | 19.60 | | | |
| F. | Carbonate ($CO_3$) | 00445 | None | = 30.00 x | --- | x 84.6 = | --- | --- |
| G. | Bicarbonate ($HCO_3$) | 00440 | 376 | = 61.02 x | 6.16 | x 43.6 = | 269 | 30.9 |
| H. | Sulfate ($SO_4$) | 00945 | 239 | = 48.03 x | 4.98 | x 73.9 = | 368 | 25.0 |
| I. | Chloride (Cl) | 00940 | 312 | = 35.45 x | 8.80 | x 75.9 = | 668 | 44.1 |
| J. | Nitrate ($NO_3$-N) | 71851 | | | | Total | 2267 | = T (1) page 35 |
| K. | Fluoride (F) | 00951 | | | | | | |
| L. | Silica ($SiO_2$) | 00955 | | | | | Accuracy Check | |
| M. | | | Total Anion | ... | 19.94 | | | Range |
| N. | Total Ion | .... | | | | Ion (E:M) | 0.98 | .96 to 1.04 |
| P. | TDS (180 °C) | 70300 | 1184 | | | TDS (P:Q) | 1.01 | .90 to 1.10 |
| Q. | TDS = N - .5G | | = 1168 | | | Ec (S:T) | 1.01 | .95 to 1.05 |
| R. | Ec (25 °C) | 00095 | 2100 | | | | | |
| S. | Ec (Dilute) = 115 x 20 | | = 2300 µmhos | | | | | |
| U. | Alk. as $CaCO_3$ | 00410 | 308 | | | | | |
| V. | pH | 00403 | 7.49 | | | | | |

DIAGRAM % CATION % ANION




(1) See STD Methods - 14th Edition

MINOR AND TRACE CONSTITUENTS (Group No. 2)

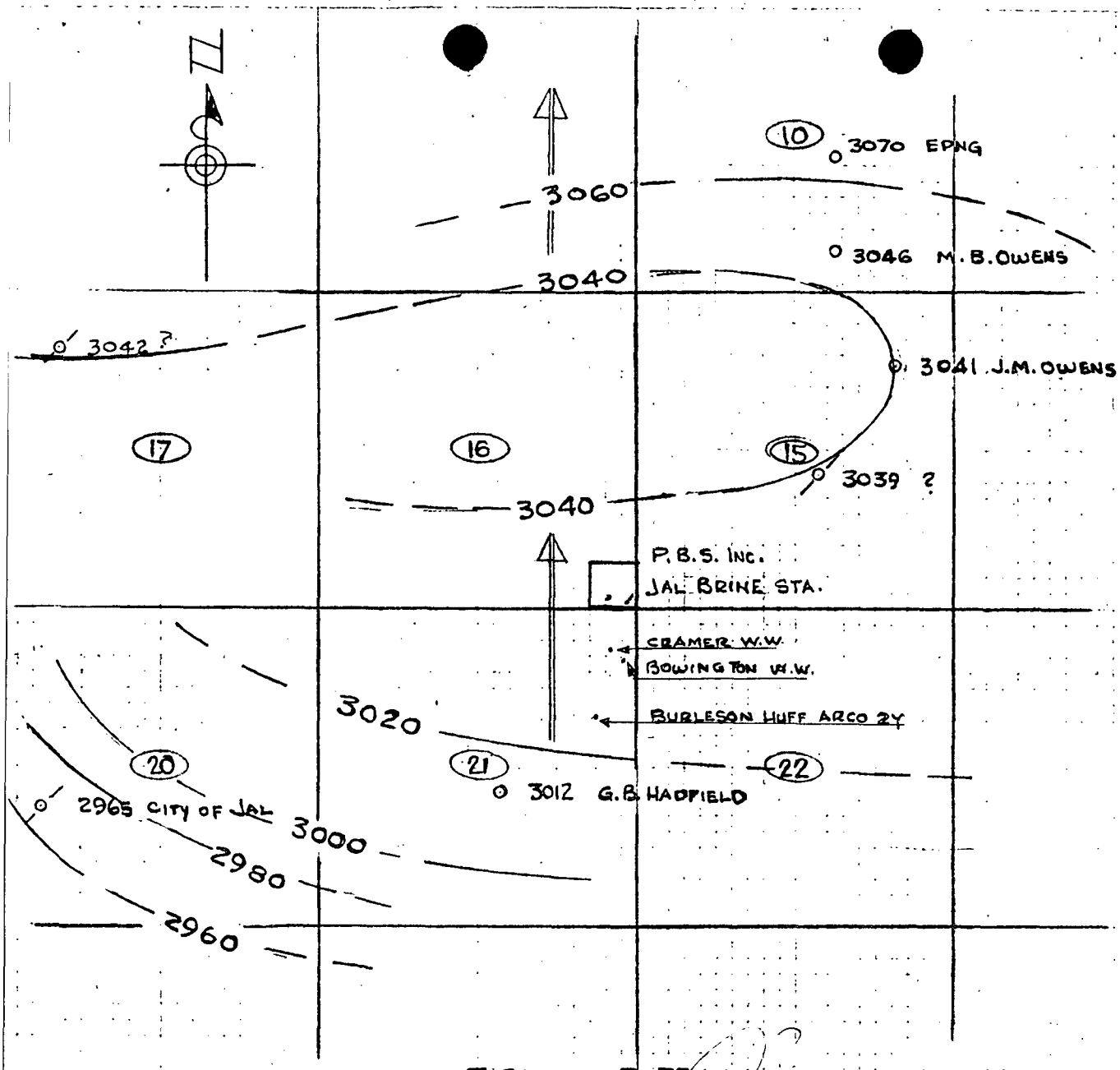
| ITEM | mg/l | ITEM | mg/l | ITEM | mg/l |
|---|---|---|---|---|---|
| * Arsenic (As) | | * Manganese (Mn) | | * Uranium (U) | |
| * Cadmium (Cd) | | * Mercury (Hg) | | Ammonia-N | |
| * Iron (Fe) | | * Moly. (Mo) | | Radium 226 | (pci/1) |
| * Lead (Pb) | | * Selenium (Se) | | | |

Analyst Remarks Report No. 35697

Checked By Gary M. Burtel

received 8-7-84

RECEIVED NOV 13 1984 GROUND WATER/HAZARDOUS WASTE BUREAU




T 25 S - R 37 W

SCALE 1" = 2640'

AQUIFERS

- o OGALLALA
- o/ QUATERNARY

HYDRAULIC GRADIENT

? UNKNOWN OWNER

DATA FROM: TABLE 6 RECORDS OF WELLS IN SOUTHERN LEA CO. N. MEX. P. 85.

"GEOLOGY AND GROUND-WATER CONDITIONS IN SOUTHERN LEA COUNTY, NEW MEXICO"

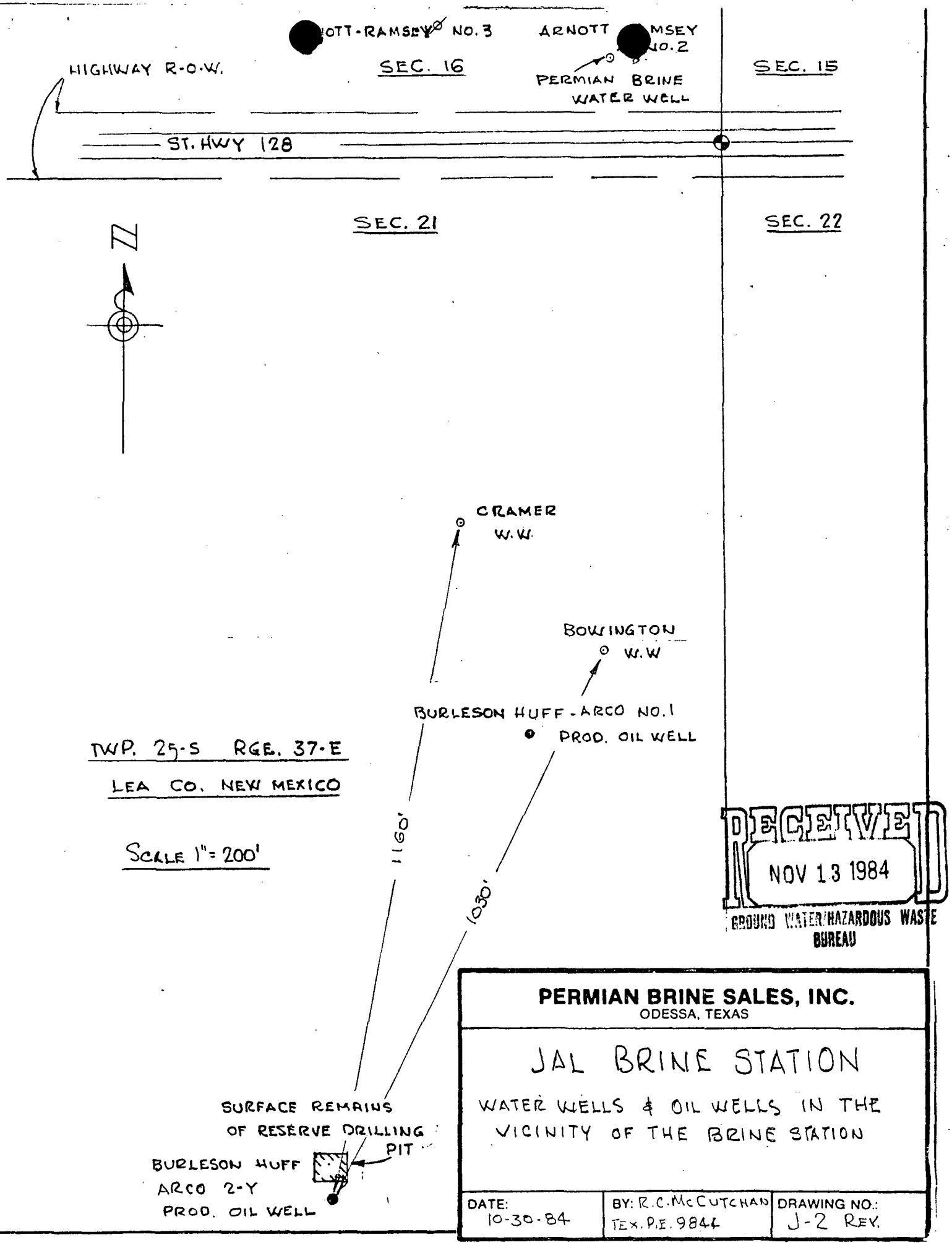
NICHOLSON & CLEBSCH

RECEIVED
NOV 13 1984
GROUND WATER/HAZARDOUS WASTE BUREAU

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

# HYDRAULIC GRADIENT
## SOUTHERN LEA COUNTY
## NEW MEXICO

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 9-17-84 | R.C. MCCUTCHAN Tex P.E. 9844 | J-1 Rev |




RECEIVED
NOV 13 1984
GROUND WATER/HAZARDOUS WASTE BUREAU

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

# JAL BRINE STATION

WATER WELLS & OIL WELLS IN THE VICINITY OF THE BRINE STATION

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 10-30-84 | R.C. McCUTCHAN TEX. P.E. 9844 | J-2 REV. |

RESERVE MUD PIT AT
BURLESON HUFF ARCO 24

CRAMER WELL

RESERVE PIT & OIL WELL IN FOREGROUND

BOWINGTON WELL

| Permian Brine Mixture 11/28/84 | | | | |
|---|---|---|---|---|
| K | 663 mg/l | 16.95 meq/l | | .5% |
| Ca | 1027 " | 51.25 " | | 1.5% |
| Mg | 582 | 47.88 | | 1% |
| Na | 96370 | 4192.10 | 97% | 4308.18 total |
| $SO_4$ | 4380 | 91.24 | | 1.7 |
| Cl | 189647 | 5349.94 | | 98 |
| $HCO_3$ | 191.2 | 3.13 | | ~.3 |
| [TDS (calc.) | 292860] | | | 5444.31 total |

Mosely 11/28/84

| | | | |
|---|---|---|---|
| K | 8.58 mg/l | 0.219 meq/l | |
| Ca | 430 | 21.457 | |
| Mg | 174 | 14.313 | |
| Na | 352 | 15.312 | ~~0.2~~ |
| $SO_4$ | 629.9 | 13.121 | $\frac{Na}{Cl}$: 0.30 |
| Cl | 1190 | 33.570 | |
| $HCO_3$ | 189.6 | 3.108 | |

Cramer 11/28/84

| | | | |
|---|---|---|---|
| K | 78 | 1.994 | |
| Ca | 3164 | 157.885 | |
| Mg | 1025 | 84.317 | |
| Na | 23862 | 1037.997 | $\frac{Na}{Cl}$: 0.54 |
| $SO_4$ | 2483 | 51.721 | |
| Cl | 43762 | 1234.526 | |
| $HCO_3$ | 130.2 | 2.134 | |

Mosely 9/17/84

| | | | |
|---|---|---|---|
| K | — | — | |
| Ca | 660 | 32.934 | |
| Mg | 219 | 18.015 | |
| Na | 375 | 16.313 | |
| $SO_4$ | 707 | 14.727 | $\frac{Na}{Cl}$: 0.21 |
| Cl | 1775 | 50.073 | |
| $HCO_3$ | 205 | 3.360 | |

Permian water

| | | | |
|---|---|---|---|
| K | 8 mg/L | 0.205 meq/L | |
| Ca | 33 " | 1.648 | |
| Mg | 27 | 2.221 | |
| Na | 357 | 15.530 | $\frac{Na}{Cl}$ : 1.14 |
| $SO_4$ | 239 | 4.978 | |
| Cl | 312 | 8.802 | |
| $HCO_3$ | 376 | 6.163 | |

"#1 Monitor"

| | | | |
|---|---|---|---|
| K | - | - | |
| Ca | 4 | 0.200 | |
| Mg | 12.2 | 1.004 | |
| Na | 483 | 21.011 | |
| $SO_4$ | 212.5 | 4.426 | $\frac{Na}{Cl}$ : 1.21 |
| Cl | 400 | 11.284 | |
| $HCO_3$ | 396.5 | 6.499 | |

Conoco: $\frac{Na}{Cl}$ : 0.62 T20S R38E Sec. 2.

P&S: $\frac{Na}{Cl}$ : 0.62 T21S R37E Sec. 34

Salado: $\frac{Na}{Cl}$ : 0.65 T25S R37E Sec. 14

Sims-McC: $\frac{Na}{Cl}$ : 0.64 T21S R37E Sec. 32

Unichem-Eunice: $\frac{Na}{Cl}$ : 0.54 T21S R37E Sec. 34.

529 Brine: $\frac{Na}{Cl}$ : 0.36 T17S R32E Sec 30

KTS: 0.47 T9S R35E Sec 27

Marathon Rd: 0.64 T19S ~~R35E~~ R34E

Permian Corp: 0.63 T18S R37E Sec 36

Quality: 0.31 T12S R36E Sec. 20

Salty Dog, Inc: 0.65 T19S R36E Sec 5

Tracy: 0.52 T22S R7E Sec 3

Inichem Carlsbad: 0.64 T22S R26E Sec. 36

Wasserbund: 0.63 T16S R35E Sec 31

Inichem Truckers #1: 0.64 T19S R35E Sec 1

Inichem Truckers #2: 0.64 T18S R38E Sec 33

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531



RECEIVED
NOV 05 1984
WATER/HAZARDOUS WASTE BUREAU


October 31, 1984

Paige Grant
Water Resource Specialist
Environmental Improvement Division
Box 968
Santa Fe, New Mexico 87504-0968

Dear Miss Grant:

To continue our correspondence and in reply to your letter of August 31, 1984, the attached report is submitted for your information. We have attempted to answer your queries based on our experiences, technical data and a sincere desire to comply with all regulations of EID.

With regard to the pressure test, we have, on this date, contacted Mr. Rolf Rufner in the Hobbs office of EID to set a date for the test. He advised that he would call back to set a firm date later.

To better facilitate the approval of this permit application, we would like to suggest a meeting, in Santa Fe, with you and your staff at a date convenient for your participation. There are several specific regulatory proposals that we would like to discuss that, in our opinion, cannot adequantely be resolved by correspondence. Normally, we shall be able to arrange our schedule for the meeting on the briefest notice. Please call us at (915) 332-0531 regarding this proposal.

Very truly yours,
PERMIAN BRINE SALES, INC.

R.C. MC CUTCHAN
ENGINEER

RCM/law

1.b. Noted

2.b. Two samples of water wells at the residences south of the brine station were obtained September 12, 1984. The analyses are attached.

Drawing No. J-2, attached, shows the location of the two water wells south of the brine station in relation to the plugged and abandoned Arnott-Ramsey No. 2 and 3. Also, Permian Brine's water well.

The close proximity of Permian's water well, 30' to the abandoned brine well should be noted. The comparatively low chlorides concentration and TDS of this water well as compared to the Bowington and Cramer wells, 800 to 1000 feet south, would indicate the chloride contamination of these latter wells is coming from some other source. See tabulation below:

| SAMPLE DATE | 9/12/84 | 9/12/84 | 7/25/84 |
|---|---|---|---|
| DISTANCE FROM ABANDONED BRINE WELL | 1000' | 800' | 30' |
| | Bowington | Cramer | Permian Brine |
| CL | 1,775 | 44,742 | 312 |
| TDS | 4,906 | 74,384 | 1,184 |
| COND | 5,780 | 82,500 | 2,100 |

Additionally, we believe the brine station is down-hydraulic gradient from the wells to the south. See Drawing J-1. Although this gradient sketch was prepared from 1953 data, we believe it is still in a northerly direction. The substantial water well withdrawals to the north, primarily by El Paso Natural Gas Plants over the past forty years, would account for this subsurface flow.

3.a. When water dissolves the rock salt in a brine well, all air is displaced from the water. This released air is trapped under the sloping anhydrite and shale ledges along the side of the cavern as well as above the casing shoe. This causes the brine well to have a "cushion" in it, so that when the circulating pump on a brine well is shut down the well continues to flow until the pressure in the "cushion" declines sufficiently to offset the decline in pressure by removal of tubing and casing annulus pressure drop.

The brine is thus oxygen free and corrosion is minimized.

The loss of circulation in the two earlier brine wells was caused by fracturing into the Rustler zone overlying the salt. The workover records of the previous operator detail exactly what happened. The brine well had plugged

up - probably by failure to backflush the well at monthly intervals - so the well operator hired a pump truck to remove the plug. The operator thus mistakenly exceeded the salt fracture pressure, fracture occurred and pressure was lost immediately.

3.b. We reverse the well each month long enough to fill the casing annulus with fresh water and then let it set overnight before resuming normal direct circulation.

3.c. Cavern size calculation -

Our assumption is that cavern development is cylindrical in shape rather than spherical. We believe this to be a more reasonable and perhaps, a more accurate configuration based on our method of INSITU mining; i.e. the injection of fresh water at the base of the cavern through the tubing and circulating the brine out the top through the tubing - casing annulus.

Our condensed formula is expanded here;

We work with diameters rather than radii in calculating areas and volumes of circular shapes, such as pipe, drilled holes, tanks, etc. Therefore, the formula we use is an follows:

a. area of a circle = $\pi d^2/4$

(derived from - area = $\pi r^2$
$r = d/2$ $r^2 = d^2/4$)

b. To obtain total cubic feet from bbls of brine:

cu.ft. = bbls brine x 5.61 cu.ft./bbl

= 30,600 x 5.61

= 171,666 cu.ft.

c. To obtain the area of cylinder of the above volume, divide by the vertical dimension, thickness of the salt section = 324 feet

d. Area of cylinder circle = 171,666/324

= 529.8 sq.ft.

e. To solve for the diameter of the cylinder from the known area, substitute in the formula, in "a" above:

$529.8 = \pi d^2/4$

$d = [4 \times 529.8/\pi]^{1/2}$

= 25.97 feet

Q.E.D.

4.a. Drawing J-3 is a sketch of the proposed spill catch basin; attached are specifications for the "aquaflex" liner material.

There is no such thing as an "average load". Loads vary from 5 barrels to 130 barrels, depending on what they want the brine for, distance and terrain to be hauled, etc. In the winter time, water trucks may load only a few barrels to prevent their pump mainfolds from freezing. On a "kill" job, an operator may specify a brine weighing 9.2#/gallon in order to properly balance the bottomhole pressure of the well being worked on. Thus the truck driver would load 62 barrels of brine and 58 barrels of fresh water to make 120 barrels of 9.2# brine. See attached chart used by all truckers on "kill" jobs.

The amount of spills at the station is insignificant. We do not spill as much brine in a year as the brine left in the pits of one oil well after drilling with fresh water through the rock salt layer underlying this country.

4.b. Native "soil" at this station site is caliche. It is very porous compacted or otherwise.

b.c. Noted

4.d. Noted

4.e. Noted

5.b. Cost estimate and supporting bids for plugging the brine well is attached.

6.a. The pumping conditions are observed daily, consequently any pressure variations are noted and reported. The calibration of pressure gauges are rarely performed as it is more efficient to replace a faulty instrument with a new one. However, we do dead weight test gauges occasionally only to find most of them are worn out.

6.b. Noted

Texas Department of Water Resources – Underground Injection Control Section

Permit No. _____

## GROUND WATER ANALYSIS REPORT- IN SITU MINING

Well No. _____ Sample No. _____

Submitted By A. L. Hickerson Date Collected: 9-17-84 ; By _____

Company Permian Brine Sales, Inc . Mine Ralph Bowington's water well

**FIELD MEASUREMENTS:**

Spec. Conductance at Well: _____

Sample Temperature: _____

pH: _____

**WELL DATA:**

Normal Water Level: _____ msl

Pump: Set at _____ feet; _____ gpm.

Bottom of: Casing _____ feet; Completion Interval _____ feet

Land Surface Datum: _____ msl

SAMPLE METHODS: Calibrate Electrical Conductance Meter (1) Page 71; Pump Well Until Electrical Conductance is Approx. Constant.

CONTAINER: 1 Liter Plastic

ANALYSIS: Lab Name Martin Water Labs., Inc. Date Received 9-17-84 Date Reported 9-24-84

Martin Water Labs., Inc. #984245

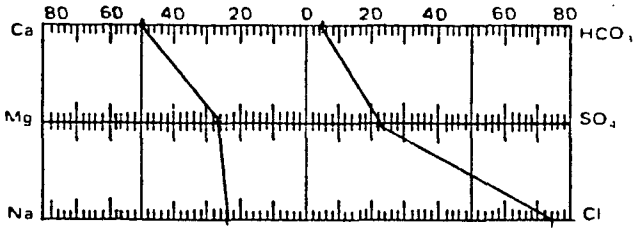
**MAJOR AND SECONDARY CONSTITUENTS**

| | ITEM | STORET | mg/l (a) | F (b) | | epm (c) | Ecf (d) | | (c) x (d) | % epm |
|---|---|---|---|---|---|---|---|---|---|---|
| A. | Calcium (Ca) | 00915 | 660 | = 20.04 x | | 32.93 | x 52.0 = | | 1,712.4 | 48.9 |
| B. | Magnesium (Mg) | 00925 | 219 | = 12.16 x | | 18.00 | x 46.6 = | | 838.8 | 26.8 |
| C. | Sodium (Na) | 00929 | 375 | = 22.99 x | | 16.31 | x 48.9 = | | 797.6 | 24.3 |
| D. | | | Total Cation | .... | | ~~67.24~~ | | | | |
| E. | Carbonate ($CO_3$) | 00445 | 0 | = 30.00 x | | 0.00 | x 84.6 = | | 0.0 | 0.0 |
| F. | Bicarbonate ($HCO_3$) | 00440 | 205 | = 61.02 x | | 3.36 | x 43.6 = | | 146.5 | 4.9 |
| G. | Sulfate ($SO_4$) | 00945 | 707 | = 48.03 x | | 14.72 | x 73.9 = | | 1,087.9 | 21.6 |
| H. | Chloride (Cl) | 00940 | 1,775 | = 35.45 x | | 50.07 | x 75.9 = | | 3,800.3 | 73.5 |
| I. | Nitrate ($NO_3$-N) | 71851 | 3.4 | | | | Total | | 8,383.5 | = T. (1) page 31 |
| J. | | | Total Anion | .... | | 68.15 | | | | |
| K. | Total Ion | | 3,942 | | | | | | | |
| L. | TDS (180 °C) | 70300 | 4,906 | | | | | | | |
| M. | TDS = K - (.5F) | | = 3,839 | | | | | | | |
| N. | Ec (25 °C) | 00095 | $5.78 \times 10^3$ | μmhos | | | | | | |
| P. | Ec (Dilute) = 114 x 83 | | = 9,462 | μmhos | | | | | | |
| Q. | Alk. as $CaCO_3$ | 00410 | 168 | | | | | | | |
| R. | pH | 00403 | 7.10 | | | | | | | |

Accuracy Check

| | | Range |
|---|---|---|
| Ion (D/J) | 0.99 | .96 to 1.04 |
| TDS (L/M) | 1.28 | .90 to 1.10 |
| Ec (P/T) | 1.13 | .95 to 1.05 |

DIAGRAM % CATION % ANION




(1) See STD Methods - 15th Edition

Analyst

Remarks _____ Checked By _____

Client No. 3319000

Permit No. _____

# GROUND WATER ANALYSIS REPORT-IN SITU MINING

Well No. 1 Sample No. 1

Production Area No. _____

Submitted By Permian Brine Sales Date Collected: 7-25-84 ; By R.C. McCutchan

Company Jal Brine Station Mine Jal, New Mexico Sta. Fresh Water

SAMPLE METHODS: Calibrate Ec Meter (1)Page 71; Pump Well Until Ec is Approx. Constant.

| Sample | Date | Temp (C) | pH | Spec. Cond. (umhos) |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |

| | | | | |
|---|---|---|---|---|
| Spec. Cond. at Well: | 2000 | | | μmhos |
| Normal Water Level: | 2835 | | | msl |
| Pump: Set at | 2667 | msl | 45 | gpm. |
| Bottom of: Casing | n.a. | msl; screen | d.a. | msl |
| Land Surface Datum: | 3085 | msl | | |

CONTAINER: 1 Gal. Plastic for *Items; 1 Gal. Plastic for all other items.; One quart plastic (full) for Specific Conductivity

PRESERVATION METHODS: Acidify * Item to <2 pH ($HNO_3$); Cool all other items to 4 °C.

ANALYSIS: Lab Name Southwestern Laboratories Date Received 8-2-84 Date Reported 8-6-84

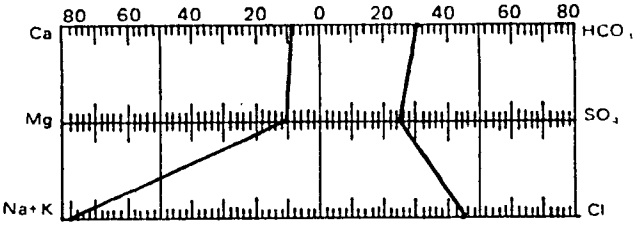
MAJOR AND SECONDARY CONSTITUENTS (Group No. 1)

| | ITEM | STORET | mg/l (a) | F (b) | epm (c) | Ecf (d) | (c) x (d) | % epm |
|---|---|---|---|---|---|---|---|---|
| A. | Calcium (Ca) | 00915 | 33 | = 20.04 x | 1.65 | x 52.0 = | 86 | 8.4 |
| B. | Magnesium (Mg) | 00925 | 27 | = 12.16 x | 2.22 | x 46.6 = | 103 | 11.3 |
| C. | Sodium (Na) | 00929 | 357 | = 22.99 x | 15.53 | x 48.9 = | 759 | 79.3 |
| D. | Potassium (K) | 00937 | 8 | = 39.10 x | 0.20 | x 72.0 = | 14 | 1.0 |
| E. | | | Total Cation | .... | 19.60 | | | |
| F. | Carbonate ($CO_3$) | 00445 | None | = 30.00 x | --- | x 84.6 = | --- | --- |
| G. | Bicarbonate ($HCO_3$) | 00440 | 376 | = 61.02 x | 6.16 | x 43.6 = | 269 | 30.9 |
| H. | Sulfate ($SO_4$) | 00945 | 239 | = 48.03 x | 4.98 | x 73.9 = | 368 | 25.0 |
| I. | Chloride (Cl) | 00940 | 312 | = 35.45 x | 8.80 | x 75.9 = | 668 | 44.1 |
| J. | Nitrate ($NO_3$-N) | 71851 | | | | Total | 2267 | = T (1) page 35 |
| K. | Fluoride (F) | 00951 | | | | | | |
| L. | Silica ($SiO_2$) | 00955 | | | | | | |
| M. | | | Total Anion | ... | 19.94 | | | |
| N. | Total Ion | .... | | | | | | |
| P. | TDS (180 °C) | 70300 | 1184 | | | | | |
| Q. | TDS = N - .5G | = | 1168 | | | | | |
| R. | Ec (25 °C) | 00095 | 2100 | | | | | |
| S. | Ec (Dilute) = 115 x 20 | = | 2300 | μmhos | | | | |
| U. | Alk. as $CaCO_3$ | 00410 | 308 | | | | | |
| V. | pH | 00403 | 7.49 | | | | | |

Accuracy Check

| | | Range |
|---|---|---|
| Ion (E:M) | 0.98 | .96 to 1.04 |
| TDS (P:Q) | 1.01 | .90 to 1.10 |
| Ec (S:T) | 1.01 | .95 to 1.05 |

DIAGRAM % CATION % ANION



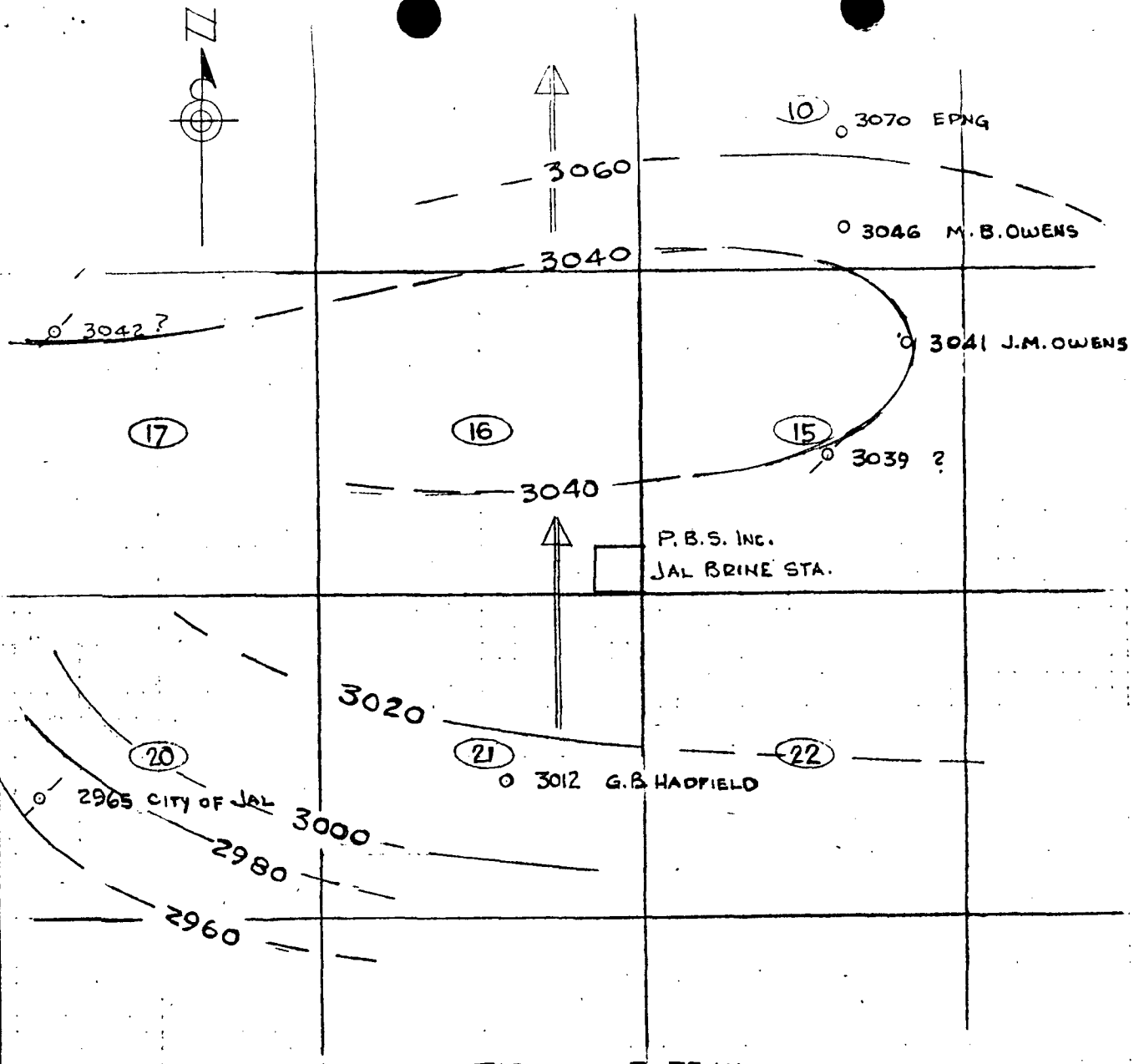

(1) See STD Methods - 14th Edition

MINOR AND TRACE CONSTITUENTS (Group No. 2)

| ITEM | mg/l | ITEM | mg/l | ITEM | mg/l |
|---|---|---|---|---|---|
| * Arsenic (As) | | * Manganese (Mn) | | * Uranium (U) | |
| * Cadmium (Cd) | | * Mercury (Hg) | | Ammonia-N | |
| * Iron (Fe) | | * Moly. (Mo) | | Radium 226 | (pci/1) |
| * Lead (Pb) | | * Selenium (Se) | | | |

Analyst Remarks Report No. 35697 Checked By Gary M. Bunch

received 8-7-84




T. 25 S - R. 37 W

SCALE 1" = 2640'

AQUIFERS

o OGALLALA

o' QUATERNARY

HYDRAULIC GRADIENT

? UNKNOWN OWNER

DATA FROM: TABLE 6 RECORDS OF WELLS IN SOUTHERN LEA CO. N. MEX. P. 85. "GEOLOGY AND GROUND-WATER CONDITIONS IN SOUTHERN LEA COUNTY, NEW MEXICO" NICHOLSON & CLEBSCH

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

HYDRAULIC GRADIENT
SOUTHERN LEA COUNTY
NEW MEXICO

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| SEPT. 17, 1984 | R.C. McCUTCHAN TEX. P.E. 9844 | J-1 |

DIETZGEN 1000 R.C. Tracing Vellum

ARNOTT-RAMSEY NO. 2

ARNOTT RAMSEY NO. 2

HIGHWAY R-O-W.

SEC. 16

PERMIAN BRINE WATER WELL

SEC. 15

ST. HWY 128

SEC. 21

SEC. 22

N

CRAMER W.W.

BOWINGTON W.W

BURLESON HUFF - ARCO NO. 1 PROD. OIL WELL

TWP. 25-S RGE. 37-E

LEA CO. NEW MEXICO

SCALE 1" = 200'

SURFACE REMAINS OF RESERVE DRILLING PIT

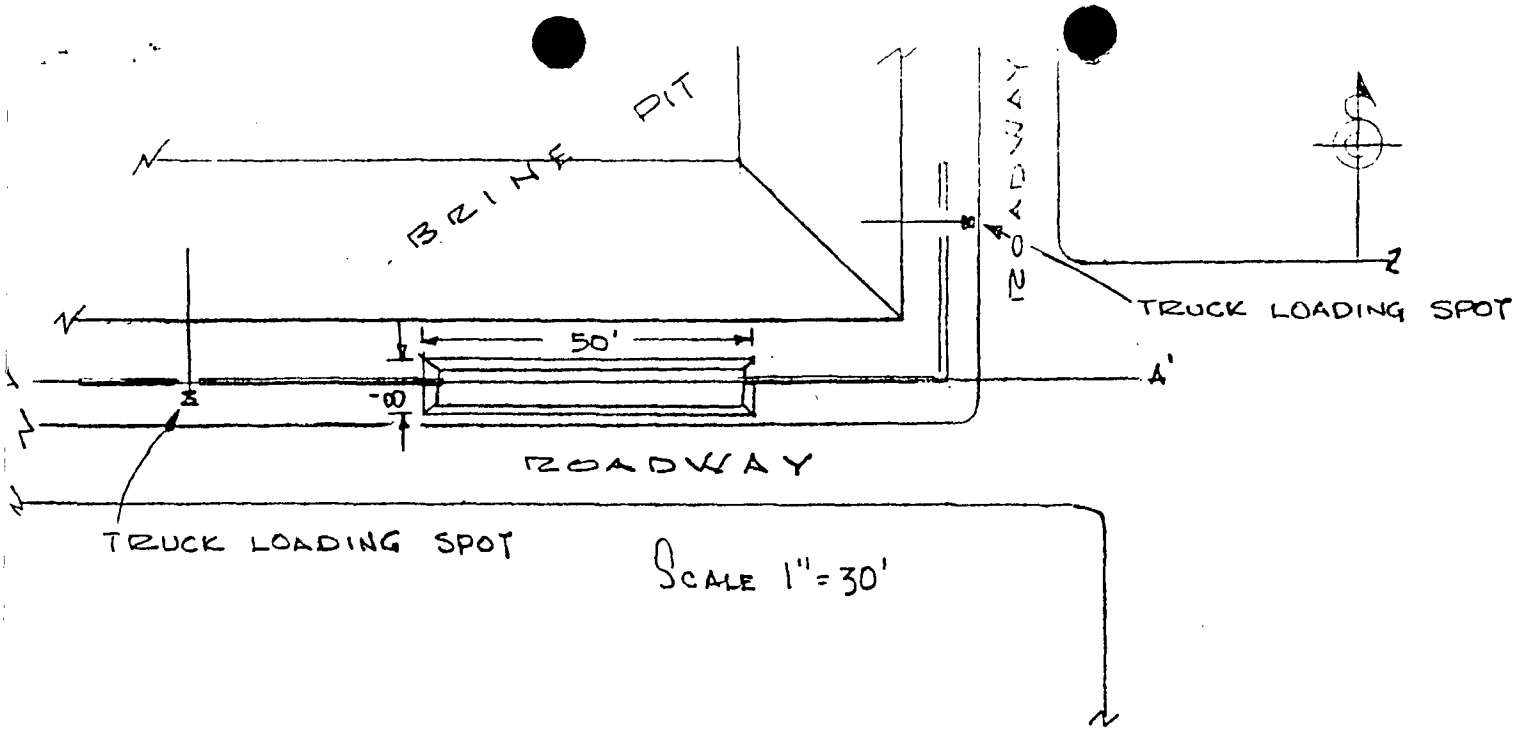
BURLESON HUFF ARCO 2-Y PROD. OIL WELL

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

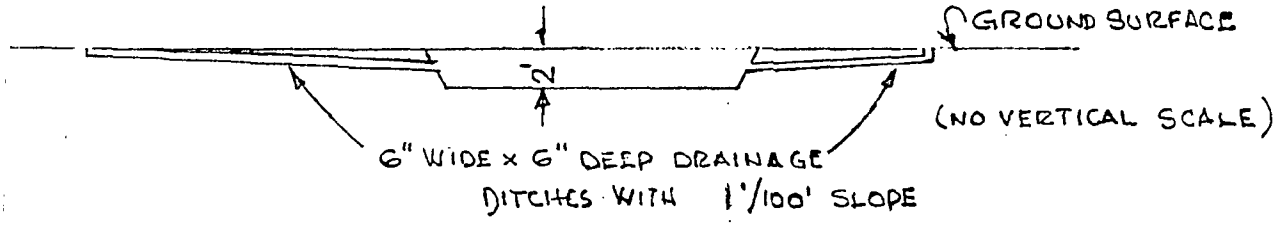
# JAL BRINE STATION

WATER WELLS & OIL WELLS IN THE VICINITY OF THE BRINE STATION

| DATE: 10-30-84 | BY: R.C. McCOTCHAN TEX. P.E. 9844 | DRAWING NO.: J-2 |
|---|---|---|




A-A' CROSS-SECTION



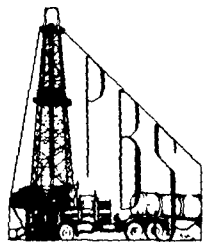

PIT & DITCHES LINED WITH 20 MIL 'AQUAFLEX'

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

PROPOSED BRINE SPILL
CATCH BASIN
JAL BRINE STATION

| DATE: | BY: R.C. McCUTCHAN | DRAWING NO.: |
|---|---|---|
| 9-18-84 | TEX. P.E. 9844 | J-3 |

# USE 10 LB. BRINE



- Drill A Gauge Hole
- Prevent Key Seats
- Eliminate Hydration of Shales
- Increase Drilling Rate
- Reduce Cost of Cementing
- Control High Pressures
- Jel Easily for Frac Jobs
- Prevent Crystallized Drill Pipe

**To Reduce Your Hauling Costs**
**Brine Stations Located At:**

| | | |
|---|---|---|
| Amarillo | Ft. Stockton | Odessa |
| Andrews | Grandfalls | Orla |
| Artesia | Imperial | Ozona |
| Barstow | Jal | N. Pecos |
| Big Spring | Kermit | Pyote |
| Carlsbad | West Kermit | Sayre, Okla. |
| Coyanosa | Mobeetie | Sandhills |
| South Crane - S.W.D. | East Mentone | Snyder |
| West Crockett | North Mentone | |

## PERMIAN BRINE SALES, INC.

BRINE — FRESHWATER — DISPOSAL

TEXAS — NEW MEXICO — OKLAHOMA

**ODESSA, TEXAS**
**79763**

**Rt. 3, Box 3033** **PHONE (915) 332-0531**

**5711 W. 10th.**

**A. L. Hickerson** **Russell Hickerson**

| Final Desired Weight Pounds Per Gallon | Hydrostatic Pressure PSI Per 100 Feet | Degrees Salometer | FOR WEIGHTING UP FRESH WATER WITH 10# BRINE<br>SIZE OF TRANSPORT LOAD | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 100 | | 110 | | 120 | | 130 | | 135 | | 140 | |
| | | | BARRELS | | BARRELS | | BARRELS | | BARRELS | | BARRELS | | BARRELS | |
| | | | BRINE | WATER | BRINE | WATER | BRINE | WATER | BRINE | WATER | BRINE | WATER | BRINE | WATER |
| 8.33 | 43.3 | 0 | 0 | 100 | 0 | 110 | 0 | 120 | 0 | 130 | 0 | 135 | 0 | 140 |
| 8.5 | 44.2 | 11 | 10 | 90 | 11 | 99 | 12 | 108 | 13 | 117 | 14 | 121 | 14 | 126 |
| 8.6 | 44.7 | 18 | 16 | 84 | 18 | 92 | 19 | 101 | 21 | 109 | 22 | 113 | 22 | 118 |
| 8.7 | 45.3 | 24 | 22 | 78 | 24 | 86 | 26 | 94 | 29 | 101 | 30 | 105 | 31 | 109 |
| 8.8 | 45.8 | 30 | 28 | 72 | 31 | 79 | 34 | 86 | 36 | 94 | 38 | 97 | 39 | 101 |
| 8.9 | 46.3 | 36 | 34 | 66 | 37 | 73 | 41 | 79 | 44 | 86 | 46 | 89 | 48 | 92 |
| 9.0 | 46.8 | 42 | 40 | 60 | 44 | 66 | 48 | 72 | 52 | 78 | 54 | 81 | 56 | 84 |
| 9.1 | 47.4 | 48 | 46 | 54 | 51 | 59 | 55 | 65 | 60 | 70 | 62 | 73 | 64 | 76 |
| 9.2 | 47.9 | 54 | 52 | 48 | 57 | 53 | 62 | 58 | 68 | 62 | 70 | 65 | 73 | 67 |
| 9.3 | 48.4 | 60 | 58 | 42 | 64 | 46 | 70 | 50 | 75 | 55 | 78 | 57 | 81 | 59 |
| 9.4 | 48.9 | 66 | 64 | 36 | 70 | 40 | 77 | 43 | 83 | 47 | 86 | 49 | 90 | 50 |
| 9.5 | 49.4 | 71 | 70 | 30 | 77 | 33 | 84 | 36 | 91 | 39 | 95 | 40 | 98 | 42 |
| 9.6 | 49.9 | 77 | 76 | 24 | 84 | 26 | 91 | 29 | 99 | 31 | 103 | 32 | 106 | 34 |
| 9.7 | 50.5 | 83 | 82 | 18 | 90 | 20 | 98 | 22 | 107 | 23 | 111 | 24 | 115 | 25 |
| 9.8 | 51.0 | 88 | 88 | 12 | 97 | 13 | 106 | 14 | 114 | 16 | 119 | 16 | 123 | 17 |
| 9.9 | 51.5 | 94 | 94 | 6 | 103 | 7 | 113 | 7 | 122 | 8 | 127 | 8 | 132 | 8 |
| 10.0 | 52.0 | 99 | 100 | 0 | 110 | 0 | 120 | 0 | 130 | 0 | 135 | 0 | 140 | 0 |

**Permian Brine Sales, Inc.**

915 - 332-0531 ODESSA, TEXAS

4.a.

# AQUAFLEX®

## 20 GAUGE PVC MEMBRANE LINER

AQUAFLEX ® 20 gauge vinyl membrane is available in widths up to 92 inches. It is specifically formulated as a barrier membrane to satisfy the containment requirements of individual pond, canal, landfill, reservoir, tank, and pit liner applications.

AQUAFLEX membranes are available in thicknesses up to 45 gauge. Liners fabricated from AQUAFLEX have a long history of successful performance. They offer good chemical resistance, sealability, and serviceability in unexposed installations.

All AQUAFLEX membranes are manufactured from virgin domestic resins.

---

**CHEMICAL RESISTANCE:**

| | |
|---|---|
| ACIDS: | good to excellent |
| BASES: | fair to good |
| METALLIC SALTS: | excellent |
| OILS: | fair to poor |
| SOLVENTS: | poor |
| GLYCOLS: | good |
| WATER: | excellent |

**MILDEW AND FUNGUS RESISTANCE:**

Excellent

**BONDABILITY:**

Heat, solvent and dielectric sealable

Consult with Pantasote for specific applications.

---

### TYPICAL PHYSICAL PROPERTIES

| Property | Value | Test Method |
|---|---|---|
| Thickness, mils | 20 ± 5% | ASTM D 1593 |
| Tensile Strength, min. (psi) | (2600) | ASTM D 882 |
| lbs./in. width, min. | 52 | Method A |
| Modulus @ 100% Elongation | | |
| min. (psi) | (1000) | Method A |
| lbs./in. width, min. | 20 | Method A |
| Ultimate Elongation, % min. | 300 | Method A |
| Oven Aging, wt. loss, % max. | 0.5 | 2" x 4" sample 16 hrs. in a circulating forced air oven @ 212°F |
| Tear Resistance | | |
| A) Elmendorf, grams, min. | 4000 | ASTM D 1922 |
| (gms/mil, min.) | (200) | |
| B) Graves Tear, lbs. min. | 6 | ASTM D 1004 |
| (lbs/in., min.) | (300) | |
| Low Temperature Impact, ° F. | – 20 | ASTM D 1790 |
| Volatility (Activated Carbon Method) % loss, max. | 1.0 | ASTM D 1203 Method A |
| Water Extraction, % loss max. | 0.3 | ASTM D 1239 104° F., 24 hrs. |
| Specific Gravity, min. | 1.20 | ASTM D 792 Method A |
| Dimensional Stability | | ASTM D 1204 |
| % change, max. | 5 | 212° F, 15 mins. |
| Resistance to Soil Burial | | ASTM D 3083 |
| Tensile Strength Loss, % max. | 5.0 | 120 day |
| Elongation Loss, % max. | 20.0 | Soil Burial |
| * Bonded Seam Strength | | ASTM D 3083 |
| % of orig. Tensile Strength, min. | 80 | Para. 9.3 1 inch width |
| Color | As Required | |

* Attainable by fabricator and/or contractor.

---

8/80

Pantasote

PANTASOTE INC FILM/COMPOUND DIVISION
26 JEFFERSON STREET, PASSAIC, NEW JERSEY 07055
AREA CODE 201 – 777-8500 • TWX 710-989-7108

PLUG JAL

| | |
|---|---|
| CAST IRON BRIDGE PLUG | $ 985.00 |
| CEMENTING | 1,830.48 |
| WELL SERVICE UNIT<br>6 hrs @ $100 | 600.00 |
| WELDER<br>3 hrs @ $30 | 90.00 |
| DIRT WORK (DOZER)<br>3 hrs @ $60 | 180.00 |
| | 3,685.48 |
| CONTINGENCY 10% | 368.55 |
| | $4,054.03 |

P. O. Box 12125 • Odessa, TX 79768 • 915/561-8128

# ACE PERFORATORS, INC.

September 17, 1984

Permian Brine Sales
Rt. 3 Box 3033
Odessa, TX 79763

ATTN: Russ Hickerson

Dear Russ,

As per our conversation on Monday, 9-17-84, Ace Perforators submits the price quote of $ 985.00. The quote is to set a Baker Cast Iron Bridge Plug in 5 1/2" casing on your Jal, NM brine well.

Sincerely,

Weldon L Watkins

Weldon Watkins
Ace Perforators, Inc.

WW/slm

HALLIBURTON SERVICES
DRAWER 3746, ODESSA, TEXAS 79760

September 18, 1984

PROCEDURE ANALYSIS
CEMENTING

FOR: Russ Hickerson
Permian Brine Sales
Rt. 3, Box 3033
Odessa, TX 79763

RE: Plugging Brine Wells (5-1/2" casing) - JAL

PURPOSE: To determine the equipment and materials necessary to plug the above referenced wells from 0 to 1,200 feet.

All materials and equipment will be coordinated through our Odessa, Texas District Office. Mr. Dennis E. Page is the District Manager, phone area code (915) 381-2040.

We are pleased to have this opportunity to present this proposal for your consideration. If you accept our proposal, all materials and equipment furnished and services performed will be under our General Terms and Conditions and pursuant to our Applicable Work Order Contract (whether or not executed by you). Copies of the General Terms and Conditions and Applicable Work Order Contract will be furnished on request.

Respectfully prepared by,

Eddy Martch (HT)
Eddy Martch,
Field Engineer

EM/ht

cc: Mr. D.E. Page
Mr. D.A. Daugherty
Mr. J.N. Culbertson
Field Supervisors
File

COST ESTIMATE

| | |
|---|---|
| 130 sacks Class "C" Neat | $ 790.40 |
| Drayage 40 Miles | 171.08 |
| Pump Service (1,200 ft. plus 40 miles) | 869.00 |
| | $ 1,830.48 |

The prices in this report are estimates only, are based on current published prices, do not include applicable taxes, and are subject to change due to field operations.

STATE OF NEW MEXICO
HEALTH ENVIRONMENT

Date 9/7/84

To Paige

Building/Room

- ☐ For Your Attention
- ☐ For Your Information
- ☐ Please Comment
- ☐ Please See Me
- ☐ Please Handle
- ☐ Approved
- ☐ For Your Recommendation
- ☐ For Your Approval
- ☒ Please Return
- ☐ Please File
- ☐ Please Mail
- ☐ As Requested

☐ **Telephone Call:** Number _____ Time Called _____

MESSAGE

Gary McCaslin

393-2333

From EID - Hobbs

Building/Room Ref- letter to Al Hickerson dated 8/29/84

**ADM 030** Issued 5/78

September 6
9:41

Paige

Garrison McCaslin from Hobbs Field office wants talk Permian mine subs.

393-2533

Ident

9/10: Wanted to know if he should follow up letter to Permian and contact them about doing a pressure test – I said to hold off until we hear back from them.

At ≈400 ft depth, ~~Odessa~~ just south of Eunice near Texas line – well-drillers report encountering caverns when drilling for water

3-6" wide
under first caliche, find fissures – concern in loose sand – SS

with regard to problem of septic systems. Gave to Walking to Steve Anderson (CSSB) about trying to write regs to recognize potential problems of direct effect of leach field on ground water through fissures.

TONEY ANAYA
GOVERNOR

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
DENISE FORT, DIRECTOR

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

P 612 423 338

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

| | |
|---|---|
| Sent to R. C. McCutchan | |
| Street and No. Rt. 3 Box 3033 | |
| P.O. State and ZIP Code Odessa, Tx 79763 | |
| Postage | $ |
| Certified Fee | |

U.S.G.P.O. 1983-403-517

August 31, 1984

R.C. McCutchan, Geologist
Permian Brine Sales, Inc.
Rt. 3, Box 3033
Odessa, TX 79763

Dear Mr. McCutchan:

Thank you for your letter of August 20, 1984, responding to a number of questions I raised with regard to the discharge plan you submitted on May 10, 1984, for the Permian Brine Sales brine extraction well and associated surface facilities, located about 2 miles east of Jal, New Mexico. My comments follow, in the same format as was used in my July 9th letter and your August 20th response.

1.a. Noted.

1.b. The lack of a surface casing remains a source of concern. I recognize that it cannot be corrected without an extensive workover of the well. This will not be required unless some evidence in the future indicates that the well is causing ground water contamination.

2.a. Noted.

2.b. Perhaps you could try leaving letters at these residences. However, this may be a moot point: we have received complaints from two well-owners at this location (across the road to the south of the subject brine station) of severe chloride contamination, and EID is investigating the situation. Please see the attached letter to A.L. Hickerson, president of Permian Brine Sales, on this subject.

2.c. Noted.

2.d. Noted.

2.e. Noted. This information is of interest and will be provided to EID scientists investigating aquifer contamination in the southeast of the state.

3.a. I cannot agree with you that production of saturated brine in down-hole piping does not result in corrosion. Corrosion does indeed take place in the presence of oxygen; a brine well is not an anaerobic environment, as you suggest. In a report entitled "UIC Evaluation of Salt Extraction Wells in New Mexico" (Lee Wilson and Associates, Inc., June 1982, prepared for the Oil Conservation Division), Dr. Wilson

writes: "Withdrawal of the brine through the annulus greatly increases the risk of casing corrosion and leakage." He goes on to acknowledge that this pattern of withdrawal does lessen the threat of formation collapse, as you pointed out in your recent letter. Later in the report, he suggests that if the well is cased to allow 40 to 50 feet of salt to remain undissolved in the roof of the cavity, the threat of subsidence is much reduced. In short, it is possible to protect against both corrosion and formation collapse. If you plan to continue the pattern of injecting water down the tubing and withdrawing brine through the annulus, we will assume that the potential for corrosion is greater than if the injection pattern were the reverse, and we will schedule more frequent pressure tests of the well than will be required of facilities that inject down the annulus.

With regard to your comment that Permian Brine has never experienced tubing or casing corrosion in 25 years of operating brine extraction wells: has the company ever mounted an effort to check for corrosion? Is it not possible that corroded casing may have played a role in the loss of circulation at two earlier brine wells at your Jal location?

3.b. How high do allow the pressure to climb before reversing flow in the well to dissolve encrustation?

3.c. I still don't follow your calculation: I don't recognize the function of $4/\pi$, nor do I see why you take the square root of the whole expression. I propose the follow means of calculating cavity size: Each barrel of fresh water dissolves 122.6 pounds of salt, creating a cavity of 0.9157 cubic feet (less if the brine contains less than 350,000 mg/l TDS). Hence your cavity could be as much as 37.68 feet in diameter (average, assuming a sphercial shape):

(30,600 bbl brine produced) x (0.9157 $ft^3$) = 28020.42 $ft^3$

Volume of sphere = $(4/3)\pi r^3$

$$\frac{(3/4)\,28020.42}{\pi} = \frac{(3/4)\,(4/3)\pi r^3}{\pi}$$

$$6689.38^{1/3} = (r^3)^{1/3}$$

$$r = 18.84$$

$$d = 18.84 \times 2 = 37.68$$

The diameter of the cavity calculated by this method still presents no source of concern. (For your reference, I have attached a portion of the above-mentioned report by Lee Wilson and Associates which discusses the calculation of cavity size for a brine extraction well.)

4.a. Please provide a sketch to demonstrate that spills from trucks would all flow to the collection pit. How would the fluid in the pit be disposed of? Please provide manufacturer's specifications for the Aquaflex liner - will it tolerate exposure to sunlight while the emergency pit is empty (which is presumably most of the time)?

As a means of stopping spills at their source, have you explored the alternative of installing an automatic shutoff switch so that the pump delivering brine to the trucks would deliver no more than an average truckload, requiring manual reactivation to top off the larger-capacity trucks?

4.b. ". . . Compacted with soil, caliche. . .": do you mean soil and caliche or are you saying that the soil is caliche? Since you subsequently refer to the soil being highly permeable (4.d.), please clarify this point. This soils information will help to determine whether a small, persistent leak occurring in the 24-foot interval between drains is likely to be detected.

4.c. A small point: the name of the Bureau has been changed to "Ground Water/Hazardous Waste Bureau". I agree: the sooner the cleanup, the better, so long as this bureau is kept informed so that we have some idea of the proportions of the leak/spill.

4.d. Noted. However, please note that desert rainfall is frequently characterized by short-duration, high intensity storm events accompanied by rapid runoff.

4.e. Noted. Perhaps the flushing liquid could be injected into the well, since the cavity shall be left full of brine.

5.a. Noted.

5.b. The purpose of a plugging bond is to provide the State with sufficient funds to properly plug the well and close out the facility in the event that a well-owner decamps without taking these precautions against ground water contamination. Your plugging plan looks like a good one: please demonstrate that $5000 would be sufficient to execute it.

6.a. The pump pressure monitoring approach is acceptable if you commit to keeping records of your daily pressure readings and submit proof that your gauge has been calibrated (lab invoice, other?) on an annual basis.

6.b. Noted. Please contact Mr. Garrison McCaslin at the EID Hobbs field office (393-2333 or 397-1291) to arrange for him to witness a pressure test of your brine well using a pressure of at least 350 psi and a chart with a large enough scale to show results clearly.

Please respond to the above remarks at your earliest convenience. At the same time, please propose a schedule for making quarterly reports to this bureau of the following information: TDS, chloride and specific conductance of your well which supplies injection fluid, and of your produced brine; maximum and average injection pressure; monthly totals of brine sales for the quarter; and, annually, an invoice from a calibration lab, or other proof of the accuracy of the gauge used to monitor the pressure of the brine discharge line.

will not to
will tell me
how to get that
reports from
State Land Commission
Office

It would be mutually advantageous for Permian Brine Sales and the EID to agree on a discharge plan for your present brine facility at the Jal site, so that we can turn our attention to investigation of the chloride contamination at that locale. Again, I appreciate your voluntary submittal of a Part 5 discharge plan for this facility.

Sincerely,

Paige Grant

Paige Grant
Water Resource Specialist
Ground Water Section

PG:jba

cc: John Guinn, EID District IV, Roswell
Gary McCaslin, EID Field Office, Hobbs
Dennis McQuillan, EID Surveillance Section, Santa Fe
Richard Perkins, EID Surveillance Section, Santa Fe

TONEY ANAYA
GOVERNOR

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
DENISE FORT, DIRECTOR

P 612 423 328

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

*(See Reverse)*

| | |
|---|---|
| Sent to A.L. Hickerson | |
| Street and No. Rt. 39, Box 3033 | |
| P.O., State and ZIP Code Odessa, TX 79763 | |
| Postage | $ |

U.S.G.P.O. 1983-403-517

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

August 29, 1984

A.L. Hickerson, President
Permian Brine Sales, Inc.
Route 39, Box 3033
Odessa, TX 79763

RE: Chloride contamination of a shallow aquifer in the vicinity of Permian Brine Sales brine in situ extraction well and associated surface facilities in the SE¼ SE¼ of Section 16, T25S, R27E, approximately two miles east of Jal, New Mexico.

Dear Mr. Hickerson:

The Surveillance Section, Ground Water/Hazardous Waste Bureau, EID, has recently received complaints from two well-owners immediately south of your Jal brine facility, who report that there has been a deterioration of their well water quality due to chloride contamination, beginning no later than 1980. One of these wells was tested in 1982, and was reported at that time to have a total dissolved solids (TDS) content of 14,312 milligrams per liter (mg/l) and chlorides of 8,800 mg/l. The chloride content of this well, which is used to irrigate an orchard, has resulted in the death of a number of fruit trees. This well had produced water of good quality since the early 1960s.

Your brine facility cannot be eliminated as a possible cause of this chloride contamination due to its close proximity upgradient of the wells that have shown such a sharp rise in chlorides. The EID field office in Hobbs will soon begin collecting samples in the area in order to document the extent of the problem and to determine the source(s). You may wish to have the same analyses performed for your injection water and brine and as are being performed by EID, in order to assure yourself of the validity of our results. At least the following parameters will be analyzed:

Specific Conductance (on-site measurement)

Calcium
Potassium
Magnesium
Sodium
Bicarbonate
Chloride
Sulfate
Nitrate as N
Total Dissolved Solids

EQUAL OPPORTUNITY EMPLOYER

Purgeable aromatic hydrocarbons

| | |
|---|---|
| Strontium | as well as the other heavy metals |
| Boron | and trace elements that are detected |
| Silicon | by means of an ICAP scan. |

In addition, please research and submit information about any operation that may have occupied your facility site in the past, and any spills, leaks, brine storage or disposal practices that Permian Brine Sales or your precursor at the site may have used/experienced, that could have resulted in the chloride contamination problem that appears to be surfacing. In particular, please discuss the loss of circulation in two earlier brine extraction wells at the site (Arnott-Ramsay State #2 and #3). There is a brief mention in a 1982 report on brine wells (Lee Wilson and Associates, June 1982: "UIC Evaluation of Salt Extraction Wells in New Mexico", prepared for the Oil Conservation Division), that in the case of one of these wells, ". . . the lost water caused fracturing of the Rustler Formation." (page 12). Please discuss this point thoroughly.

We hope to achieve your voluntary compliance in obtaining the information necessary to investigate the problem discussed above. If you have any questions regarding the contents of this letter, please contact me at the above address and telephone number, extension 285.

Sincerely,

Paige Grant

Paige Grant
Water Resource Specialist
Ground Water Section

PG:jba

cc: John Guinn, EID District IV, Roswell
Gary McCaslin, EID Field Office, Hobbs
Dennis McQuillan, EID Surveillance Section, Santa Fe
through: Richard Perkins, Program Manager, EID Surveillance Section

STATE OF NEW MEXICO
HEALTH & ENVIRONMENT department

# MEMORANDUM

DATE: 8/28/84

TO: file

FROM: Patsy Grant

SUBJECT: Report from Dennis McQuillan (Surveillance Section) of complaints of chloride contamination near Permian Brine Sales' Jal brine facility — 8/23/84.

Ken Mosley - grandson? / caretaker of property owned by Lovington just south across the road from brine station. Their well started going bad around 1980, had it tested in 1982: TDS 14,312 mg/l, Cl 8800 mg/l. Killed his orchard. Neighbor's well also gone bad: former owner Deacon, now Cramer.

I wrote letter requesting quick response to my critique of their d.p. and addressing them of complaints. Dennis reviewed ltr. While that letter was still in draft, rec'd Permian Brine's response to my earlier letter. Responded with one letter to geologist to critique d.p., another to president to point out contamination.

# PERMIAN BRINE SALES, INC.

**24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN**

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531


August 20, 1984


RECEIVED
AUG 24 1984
GROUND WATER HAZARDOUS WASTE BUREAU


Environmental Improvement Division
P.O Box 968
Santa Fe, New Mexico 87504-0968

Attn: Miss Paige Grant

Re: Permian Brine Sales, Inc.
Jal Brine Station

Dear Miss Grant:

This will acknowledge your letter of July 9, 1984, requesting additional information and data on the subject discharge plan.

Enclosed is the report we have prepared in response to your questions and remarks. We have listed them with the same outline headings as used in your letter.

If you need any additional clarification, please advise us at your convenience.

Very truly yours,
PERMIAN BRINE SALES, INC.

R.C. MC CUTCHAN
GEOLOGIST

RCM/law
Enc.

PERMIAN BRINE SALES, INC. JAL, NEW MEXICO
BRINE STATION - DISCHARGE PLAN
SUPPLEMENTAL INFORMATION REQUESTED BY EID, JULY 1984

1. a. The 5½" casing string is J-55, 17#/ft.

   b. At the time this well was drilled there were no regulations specifing the installation of surface casing for brine wells. Consequently, the cementing circulated to within 60' of the surface was supplemented by circulating cement from the surface to the 60' depth to protect the shallow aquifers.

   The Ogallala Aquifer has been extensively eroded away throughout this area. It is possible, this will account for the absence of the formation and lack of identification in the driller's log.

2. a. Attached is an analysis of a water sample, recently obtained from Permian Brine's water well.

   b. The statement in our original discharge plan that there are five residential water wells, across the road - south from the brine station is erroneous. An on-the-ground inspection and in conversation with Permian Brine's local station operator, indicates there are only three residences at this location. All of occupants work and are not at home during the daytime hours. We know two of the residences are connected to the Jal city 10" water line, from the city well in NW/4, SE/4, Sec 13, TWP 25 S, RGE 37 E. The line is approximately 50' North and parallels state highway 128.

   We are reasonably sure the third residence is connected and that they might also have a water well that may or may not be in use. In the absence of the residents and after three weeks trying to catch them at home, we are reluctant to enter their property to locate a water well and obtain samples. The property is labelled with "no trespassing" signs and an unfriendly watchdog occupies the entrance. However, we shall, in the future continue to attempt to make contact with this resident to obtain a water well sample if available, and forward the analysis to you.

   c. See attached Map No. 1, Rev.

   d. The New Mexico State Engineers office in Roswell was contacted. Mr. Nelson, in that office after referring to his card files, located only two water wells within the vicinity of Permian Brine's property. The records show these wells to be the property of J.M. Owen, and one located in Sec. 21 and one in

Sec. 22. I called Mr. Owen and discussed these sites. He advised that he had a well in Sec. 21, that had been abandoned several years. He did not have a well in Sec. 22 and, to his knowledge, there are no water wells in that section.

e. The two water wells indicated on Figure 2 were searched for on the ground from the location description in Figure 6, "Records of wells in Southern Lea County". The well in Sec. 21, in my opinion and from my on-the-ground inspection and Mr. Owen's description, is the well shown in Figure 2. It was produced with an oilfield type pump jack according to Mr. Owen. I found the pump jack in place, the polished rod still connected and inserted in the well casing packing gland. However, the pump jack had been knocked over, the polished rod bent 90° from the vertical and the entire installation pretty well destroyed. Mr. Owen said he abandoned the well several years ago due to the water contamination from natural gas. He assumed the gas was coming from nearby abandoned oil wells with casing leaks.

The other site, shown in Figure 2, in Sec. 15, was thoroughly searched by on-the-ground inspection. There was no current surface evidence of a water well at this site and the State Engineer's office had no record of it. I would speculate a well was drilled here in the early 1950's to provide water for the drilling of oil wells at that time and the water well abandoned after the drilling activities ceased.

3. a. The production of saturated brine in down-hole piping does not result in corrosion. Corrosion of steel occurs only when the brine and steel are present in ambient air (oxygen) association. In twenty-five years of operation of brine installations Permian Brine has never experienced any tubing or casing corrosion.

The circulation of fresh water through the annulus creates a hazardous conditions in the down-hole (cavern) operations. The constant solution of the salt, at the top of the cavern tends to enlarge the roof area and ultimately results in cave-ins of the overlying shale stringers. These cave-ins usually result in the loss of the brine well and allows the percolation of the brine upward and outward to the shallower formations.

b. The average injection pressure is 175 PSI.

c. Brine production at the Jal Station totalled 30,600 barrels. (At the time of my original calculations.)

$$\text{Average Dia} = [(30{,}600 \times 5.61 \text{ CF/bbl} / 324' \text{ salt section}) \times (4/\pi)]^{\frac{1}{2}}$$
$$= 26.97'$$

I used the term"maximum" diameter and it should have been "average" diameter. The diameter at the bottom, tubing outlet, will be larger than at the casing seat. This provides a tear drop shape and, as stated in 3-a, maintains a minimum diameter at the roof of the cavern to protect it from cave-ins.

4. a. With approval of EID, Permain Brine will provide spill containment facilities, as described below. This type of spill collection has been installed at most of Permian's brine stations, and has proven an effective and safe method of handling this problem.

A ditch is trenched adjacent to the truck-loading spots and is graded to drain to an isolated 100 barrel capacity pit. The ditch and collection pit is lined with 20 mil "Aquaflex" liner.

b. The inside portion of the brine pit is constructed of compacted native soil, caliche at the Jal station. The gravel pack is installed only around the sub-surface leak detection piping. The piping is sloped to the leak detection sump. For operational purposes, the pit bottoms are constructed level. The leak detection sump is checked several times each month by both the station operator and the maintenance crews when they are at the station for repair or maintenance services. The cover of the sump is kept locked to prevent vandalism and the pumping of fluids.

c. Permian Brine's contingency plan shall comply with EID's directions by calling the Chief, Water Pollution Control Bureau. However, in the event of a significant leak, it is Permian's policy to dispatch maintenance crews immediately to contain and repair the damage. It has not been satisfactory to wait for inspections and directions from the state control agencies before starting clean-up procedures.

d. Map No. 2, showing the surface contours in the Jal station area, is a reporudction of two USGS 7½' Quads since the site is approximately 500' from the north limits of the Jal and the south limits or the Jal NW quads. The contour interval on the Jal quad is 5' and 10' on the Jal NW qaud. There is no well defined drainage in the immediate station area. The only indicated drainage, is approximately 2000' east, about 10' lower than the station site. The US Weather Bureau indicated an annual average rainfall in this area between 9 and 10 inches. In this desert environment, an unusually heavy rainfall is practically unheard of and what rain that does occur is usually absorbed into the dune soil and a runoff of any magnitude is highly unlikely.

e. The normal procedure for the closure of brine pits is the flushing of the lined pit with fresh water. This is done to dissolve all salt that might have precipated, due to evaporation. This flushing liquid is transported to a legally established disposal well. The Hypalon liner is then salvaged, for future use, and the pit berms are graded to fill the pit and return the surface to its original configuration.

5. a. The plugging of an abandoned brine well will always leave the solution cavern filled with saturated brine. The wording of the original plugging plans was unfortunately vague regarding the cementing procedure. The cement slurry is always pumped down the tubing and circulated to the surface upon well abandonment.

b. Attached is a copy of the one well plugging bond submitted to the Oil Conservation Division in August 1980. Also, subsequent correspondence regarding the legal well location.

6. a. The circulating system operates with a 70 GPM, constant speed, electric motor driven pump. This volume of fresh water produced is metered and reported weekly. The quantity of saturated brine returned to the pit is visually observed, there is no meter on this return line. However, the most accurate method of determining leaks is variations in the pump discharge pressures. Under normal operating conditions the discharge pressure remains constant. Daily monitoring of this pressure provides a quantative method of evaluating both down hole and surface conditions of the circulating system. e.g. A drop in the normal operating pressure (and a visual sighting of the brine return rate from the return line at the pit) would indicate a leak. An increase in normal operating pressure will indicate, usually, down hole problems: tubing or annulus plugging, cave-ins, etc.

b. We regret the quality of the re-produced pressure chart submitted. The original of this chart was claimed by the Oil Conservation Commission, the governing authority at the time of the test. In the future, we will provide the original chart to you or a more readable copy. The original chart recorded a constant pressure line at 210 PSI. The note on the chart that was interepted as "injection began at 4:56 PM" is acutally the pump injection rate "45 GPM". It is agreeable that a test pressure of 1½ times normal operating pressure should be the test condition on future tests.

Client No. 3319000

Permit No. _____

GROUND WATER ANALYSIS REPORT-IN SITU MINING

Well No. 1 Sample No. 1

Production Area No. _____

Submitted By Permian Brine Sales Date Collected: 7-25-84 ; By R.C. Mc Cutchan

Company Jal Brine Station Mine Jal, New Mexico Sta. Fresh Water

SAMPLE METHODS: Calibrate Ec Meter (1)Page 71; Pump Well Until Ec is Approx. Constant.

| Sample | Date | Temp (C) | pH | Spec. Cond. (umhos) |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |

| | | | |
|---|---|---|---|
| Spec. Cond. at Well: | 2000 | | µmhos |
| Normal Water Level: | 2835 | | msl |
| Pump: Set at | 2667 msl | 45 | gpm. |
| Bottom of: Casing | N.A. msl; screen | D.A. | msl |
| Land Surface Datum: | 3085 msl | | |

CONTAINER: 1 Gal. Plastic for *Items; 1 Gal. Plastic for all other items.; One quart plastic (full) for Specific Conductivity

PRESERVATION METHODS: Acidify * Item to <2 pH ($HNO_3$); Cool all other items to 4 °C.

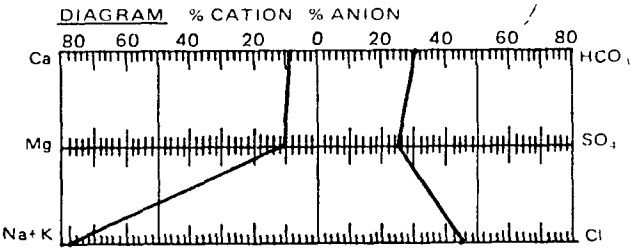
ANALYSIS: Lab Name Southwestern Laboratories Date Received 8-2-84 Date Reported 8-6-84

MAJOR AND SECONDARY CONSTITUENTS (Group No. 1)

| | ITEM | STORET | mg/l (a) | F (b) | epm (c) | Ecf (d) | (c) x (d) | % epm |
|---|---|---|---|---|---|---|---|---|
| A. | Calcium (Ca) | 00915 | 33 | = 20.04 x | 1.65 | x 52.0 = | 86 | 8.4 |
| B. | Magnesium (Mg) | 00925 | 27 | = 12.16 x | 2.22 | x 46.6 = | 103 | 11.3 |
| C. | Sodium (Na) | 00929 | 357 | = 22.99 x | 15.53 | x 48.9 = | 759 | 79.3 |
| D. | Potassium (K) | 00937 | 8 | = 39.10 x | 0.20 | x 72.0 = | 14 | 1.0 |
| E. | | | Total Cation | .... | 19.60 | | | |
| F. | Carbonate ($CO_3$) | 00445 | None | = 30.00 x | --- | x 84.6 = | --- | --- |
| G. | Bicarbonate ($HCO_3$) | 00440 | 376 | = 61.02 x | 6.16 | x 43.6 = | 269 | 30.9 |
| H. | Sulfate ($SO_4$) | 00945 | 239 | = 48.03 x | 4.98 | x 73.9 = | 368 | 25.0 |
| I. | Chloride (Cl) | 00940 | 312 | = 35.45 x | 8.80 | x 75.9 = | 668 | 44.1 |
| J. | Nitrate ($NO_3$-N) | 71851 | | | | Total | 2267 | = T (1) page 35 |
| K. | Fluoride (F) | 00951 | | | | | | |
| L. | Silica ($SiO_2$) | 00955 | | | | | | |
| M. | | | Total Anion | ... | 19.94 | | | |
| N. | Total Ion | .... | | | | | | |
| P. | TDS (180 °C) | 70300 | 1184 | | | | | |
| Q. | TDS = N · .5G | | = 1168 | | | | | |
| R. | Ec (25 °C) | 00095 | 2100 | | | | | |
| S. | Ec (Dilute) = 115 x 20 | | = 2300 µmhos | | | | | |
| U. | Alk. as $CaCO_3$ | 00410 | 308 | | | | | |
| V. | pH | 00403 | 7.49 | | | | | |

Accuracy Check

| | | Range |
|---|---|---|
| Ion (E:M) | 0.98 | .96 to 1.04 |
| TDS (P:Q) | 1.01 | .90 to 1.10 |
| Ec (S:T) | 1.01 | .95 to 1.05 |




(1) See STD Methods - 14th Edition

MINOR AND TRACE CONSTITUENTS (Group No. 2)

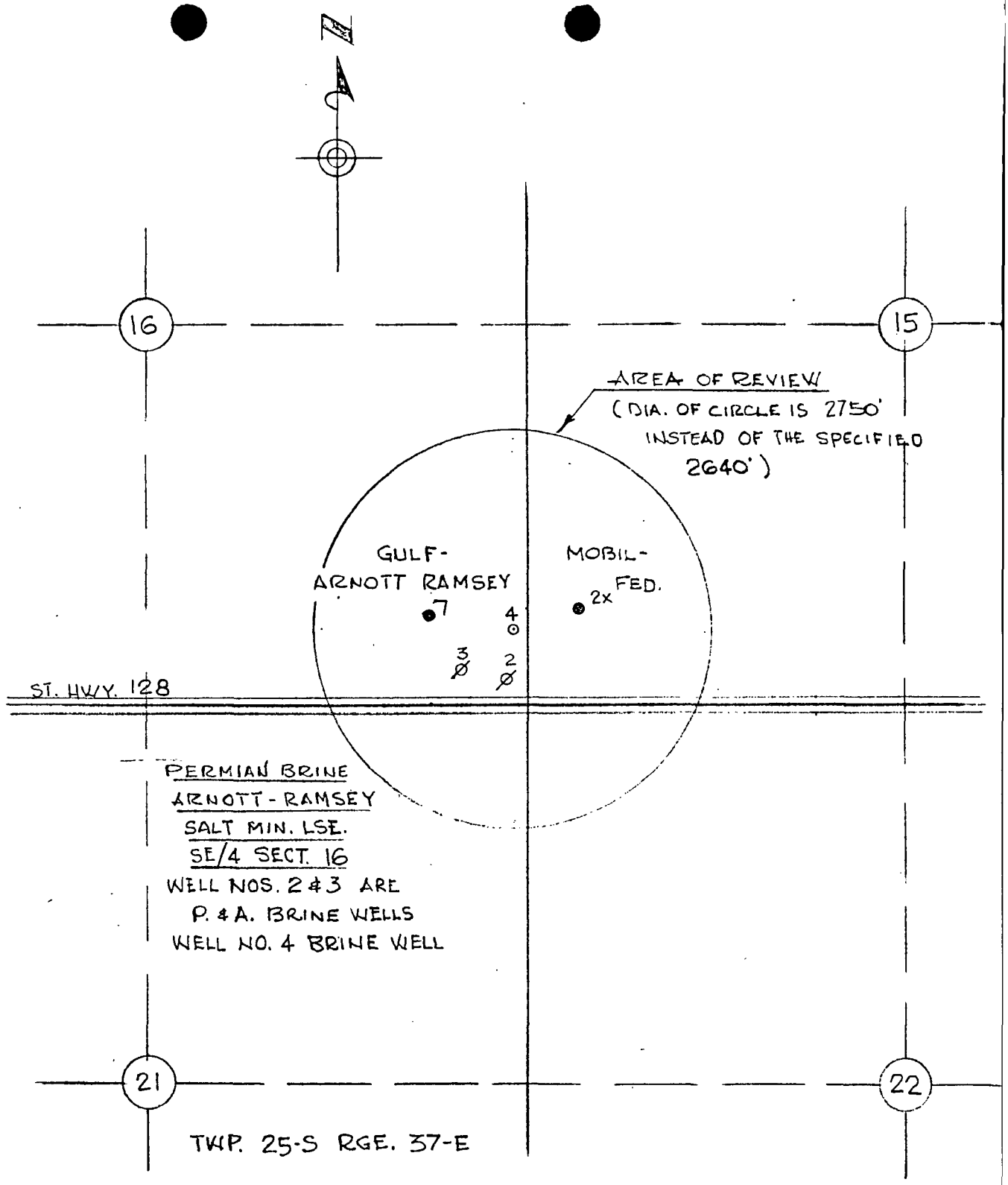
| ITEM | mg/l | ITEM | mg/l | ITEM | mg/l |
|---|---|---|---|---|---|
| * Arsenic (As) | | * Manganese (Mn) | | * Uranium (U) | |
| * Cadmium (Cd) | | * Mercury (Hg) | | Ammonia-N | |
| * Iron (Fe) | | * Moly. (Mo) | | Radium 226 | (pci/1) |
| * Lead (Pb) | | * Selenium (Se) | | | |

Analyst Remarks Report No. 35697

Checked By Gary M. Bunch

received 8-7-84

2-a.




SCALE 1" = 1000'

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

JAL BRINE STATION
LEA CO. NEW MEXICO

| DATE: | BY: | ~~DRAWING NO.~~: |
|---|---|---|
| 7-23-84 | R.C. McCUTCHAN TEX. P.E. 9844 | MAP NO. 1-REV. |

5-6.

Form O & G B-1
Adopted 6-17-77

# STATE OF NEW MEXICO

## ONE-WELL PLUGGING BOND

### FOR CHAVES, EDDY, LEA, McKINLEY, RIO ARRIBA, ROOSEVELT, SANDOVAL, AND SAN JUAN COUNTIES ONLY

BOND NO. 610 057411 2
(For Use of Surety Company)

AMOUNT OF BOND 5,000.00

COUNTY Lea

NOTE: For wells less than 5,000 feet deep, the minimum bond is $5,000.00*
For wells 5,000 feet to 10,000 feet deep, the minimum bond is $7,500.00*
For wells more than 10,000 feet deep, the minimum bond is $10,000.00

* Under certain conditions, a well being drilled under a $5,000.00 or $7,500.00 bond may be permitted to be drilled as much as 500 feet deeper than the normal maximum depth; i.e., a well being drilled under a $5,000.00 bond may be permitted to go to 5,499 feet, and a well being drilled under a $7,500.00 bond may be permitted to go to 10,500 feet. (See Rule 101)

File with Oil Conservation Commission, P. O. Box 2088, Santa Fe 87501

KNOW ALL MEN BY THESE PRESENTS:

That Permian Brine Sales & Service, Inc., (~~An individual~~)(~~a partnership~~)(a corporation organized in the State of Texas, with its principal office in the city of Odessa, State of Texas, and authorized to do business in the State of New Mexico), as PRINCIPAL, and United States Fire Insurance Company, a corporation organized and existing under the laws of the State of New York, and authorized to do business in the State of New Mexico, as SURETY, are held firmly bound unto the State of New Mexico, for the use and benefit of the Oil Conservation Commission of New Mexico pursuant to Section 65-3-11, New Mexico Statutes Annotated, 1953 Compilation, as amended, in the sum of Five Thousand & No/100---------- Dollars lawful money of the United States, for the payment of which, well and truly to be made, said PRINCIPAL and SURETY hereby bind themselves, their successors and assigns, jointly and severally, firmly by these presents.

The conditions of this obligation are such that:

WHEREAS, The above principal has heretofore or may hereafter enter into oil and gas leases, or carbon dioxide ($CO_2$) gas leases, or helium gas leases with the State of New Mexico; and

WHEREAS, The above principal has heretofore or may hereafter enter into oil and gas leases, or carbon dioxide ($CO_2$) gas leases, or helium gas leases on lands patented by the United States of America to private individuals, and on lands otherwise owned by private individuals; and

WHEREAS, The above principal, individually, or in association with one or more other parties, has commenced or may commence the drilling of one well not to exceed a depth of 5,000 feet, to prospect for and produce oil or gas, or carbon dioxide ($CO_2$) gas or helium gas, or does own or may acquire, own or operate such well, or such well started by others on land embraced in said State oil and gas leases, or carbon dioxide ($CO_2$) leases, or helium gas leases, and on land patented by the United States of America to private individuals, and on land otherwise owned by private individuals, the identification and location of said well being the South quarter of the Southeast quarter
(Here state exact legal subdivision by 40-acre tract or lot)
of Section 16, Township 25 ~~North~~ (South), Range 37 (East)(~~West~~), N.M.P.M.
Lea County, New Mexico.

NOW, THEREFORE, If the above bounden principal and surety or either of them or their successors or assigns, or any of them, shall plug said well when dry or when abandoned in accordance with the rules, regulations, and orders of the Oil Conservation Commission of New Mexico in such way as to confine the oil, gas, and water in the strata in which they are found, and to prevent them from escaping into other strata;

THEN, THEREFORE, This obligation shall be null and void; otherwise and in default of complete compliance with any and all of said obligations, the same shall remain in full force and effect.

PERMIAN BRINE SALES & SERVICE, INC.
PRINCIPAL

P. O. Box 1591, Odessa, Texas 79760
Address

By _____
Signature

President
Title

(Note: Principal, if corporation, affix corporate seal here.)

UNITED STATES FIRE INSURANCE COMPANY
SURETY

P. O. Box 2639, Dallas, Texas 75221
Address

By _____
Attorney-in Fact
Wilford H. Elmore

(Note: Corporate surety affix corporate seal here.)

---

ACKNOWLEDGEMENT FORM FOR NATURAL PERSONS

STATE OF _____)
COUNTY OF _____) ss.

On this _____ day of _____, 19____, before me personally appeared _____, to me known to be the person (persons) described in and who executed the foregoing instrument and acknowledged that he (they) executed the same as his (their) free act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and seal on the day and year in this certificate first above written.

_____
Notary Public

_____
My Commission expires

---

ACKNOWLEDGEMENT FORM FOR CORPORATION

STATE OF Texas)
COUNTY OF Ector) ss.

On this 15th day of August, 19 80, before me personally appeared A. L. Hickerson, to me personally known who, being by me duly sworn, did say that he is President of Permian Brine Sales & Service, Inc. and that the foregoing instrument was signed and sealed on behalf of said corporation by authority of its board of directors, and acknowledged said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and seal on the day and year in this certificate first above written.

Norma Fernandez
Notary Public

9/30/80
My Commission expires

---

ACKNOWLEDGEMENT FORM FOR CORPORATE SURETY

STATE OF Texas)
COUNTY OF Ector) ss.

On this 15th day of August, 19 80, before me appeared Wilford H. Elmore, to me personally known, who, being by me duly sworn, did say that he is attorney-in-fact of United States Fire Insurance Company and that the foregoing instrument was signed and sealed on behalf of said corporation by authority of its board of directors, and acknowledged said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and seal on the day and year in this certificate first above written.

Norma Fernandez
Notary Public

9/30/80
My Commission expires
(Note: Corporate surety attach power of attorney.)

---

APPROVED BY:

OIL CONSERVATION COMMISSION OF NEW MEXICO

By _____

Date _____

STATE OF NEW MEXICO
# ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

November 6, 1980

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

Jalt well File
NMOCC File
PLUGGING BOND

Permian Brine Sales &
Service, Inc.
P. O. Box 1591
Odessa, Texas 79760

Re: $5,000 One-Well Plugging Bond
Permian Brine Sales & Service, Inc., Principal, United States Fire Insurance Company, Surety
SE/4 SE/4 of Sec. 16, T-25-S, R-37-E, Lea County
Depth: 5,000 feet
Bond No. 610 057411 2

Gentlemen:

The Oil Conservation Division acknowledges receipt of and approves the rider giving the exact well description as follows:

515 feet from the South line and 100 feet from the East line of Section 16.

Sincerely,

JOE D. RAMEY,
Director

dr/

cc: Oil Conservation Division
Hobbs, New Mexico

United States Fire Insurance Co.
P. O. Box 2639
Dallas, Texas 75221

STATE OF NEW MEXICO
# ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

P.O. Box 2088

August 20, 1980

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

mailed copy to Maddox & Blanch

Permian Brine Sales &
Service, Inc.
P. O. Box 1591
Odessa, Texas 79760

Re: $5,000 One-Well Plugging Bond
Permian Brine Sales & Service, Inc., Principal, United States Fire Insurance Company, Surety
SE/4 SE/4 of Sec. 16, T-25-S, R-37-E, Lea County. Depth: 5,000 ft.
Bond No. 610 057411 2

Gentlemen:

The Oil Conservation Division hereby approves the above-captioned plugging bond effective August 19, 1980.

Because of the great amount of infill drilling in the State, the Division now requires all bonds give the exact location of the well by the footage description; example: 660 feet from the South line and 660 feet from the East line. Therefore, please have your insurance company send us a rider for the above-described bond with the exact well description.

Sincerely,

JOE D. RAMEY
Director

JDR/dr

cc: Oil Conservation Division
Hobbs, New Mexico

United States Fire Insurance Co.
P. O. Box 2639
Dallas, Texas 75221

515' FSL & 100' FEL
Sec 16 T-25-S
R-37-E

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

Joseph Goldberg
SECRETARY

Ted Guambana
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

July 9, 1984

R.C. McCutchan, Geologist
Permian Brine Sales, Inc.
Route 3, Box 3033
Odessa, TX 79763

Dear Mr. McCutchan:

Thank you for submitting a discharge plan for Permian Brine Sales' brine in situ extraction well and associated surface facilities in the SE¼SE¼ of Section 16, T25S, R37E, approximately two miles east of Jal, New Mexico. We appreciate your preparing a discharge plan addressing Part 5 as well as Part 3 of the Water Quality Control Commission (WQCC) Regulations before the period of approval for your present discharge plan expires.

The following comments on your submittal need to be satisfactorily addressed by you before your proposed discharge plan can be approved. Although the comments appear numerous and critical, I feel that you did an excellent job of interpreting the WQCC Regulations as to what information is required in a discharge plan for a brine extraction well.

1. Well Specs

   (a) What series is your 5½" casing (J or N)?

   (b) I note that there is no surface casing in the well. This inclines me to scrutinize the facility more carefully than I would if there were that added protection for nearer-surface formations, particularly since your brine well probably intercepts the Ogalalla (reference Figure 1 of your discharge plan), although the driller's log makes no direct mention of it.

2. Background Data

   (a) There are problems with the water quality analysis; the sum of reported anions and cations is greater than the reported TDS, and the specific conductance reported is inconsistent with the TDS. (I assume the conductance is 11,000 mmhos as indicated in the text, and not 11.000 mmhos as reported on the analysis form.) 11,000 mmhos indicates a very high concentration of dissolved solids, and if it

is correct, it needs to be followed up with additional studies to explain the reason for the apparent contamination of ground water in the area.

Please recheck the conductance of the well water. If your reading of ± 11,000 mmhos is repeated, please propose a monitoring program for specific conductance in water wells within a quarter-mile radius of your brine facility, to indicate background water quality conditions in the area. Also, please submit another analysis for the major anions and cations from your water well; and please provide me with any past water quality analyses that have been carried out for this well.

If a recheck of the water quality of this well shows no present contamination, please submit a plan for reporting analyses for chloride, TDS and specific conductance in this well to EID on a quarterly basis.

(b) With reference to the five residential water wells immediately south of the brine station: please submit information on the depth of completion, depth to water and aquifer(s) encountered and/or a driller's log for these wells. This information should be available from the State Engineer's Office. If the well-owners will grant access to their wells, please sample for chlorides, TDS and specific conductance in each and provide the results of the analyses to EID.

(c) The scale of Map No. 1 is too small to be useful. Please enlarge the four-section area containing the area of review, without sacrificing legibility.

(d) None of the wells listed in Table 6 from Nicholson and Clebsch are in or adjacent to the area of review of Permian Brine's Arnott Ramsey State No. 4 brine well. You are likely to find more pertinent information in the files of the State Engineer and the Oil Conservation Division.

(e) It would be useful to search for futher information on the two closest wells to the area of review indicated on Figure 2.

3. Brine Production Procedures

(a) Given the potential for corrosion of the casing by saturated brine, we prefer that you inject water down the annulus and bring the brine back up the tubing, except for an occasional reversal to flush any encrusted salt out of the tubing. When the EID injection well inspection program gets underway, those brine well operators found to be injecting down the tubing more often than down the casing will be required to carry out a pressure test more frequently than other brine facilities.

(b) Please give a maximum as well as an average injection pressure. At what pressure do you reverse the flow to flush out encrustation?

(c) Please submit the records and calculations by which you arrived at the figure of 26 feet maximum diameter of the solution cavern from which you have been extracting brine.

4. Surface Facilities

(a) Please discuss your spill prevention and containment procedures with regard to truck loading.

(b) Leak detection system: what material underlies the Hypalon liner? Is there a gravel pack under the entire pond or just around the individual drains? Is the entire pond bottom sloped toward the collection drain, or just the individual drains? How often is the leak detection sump checked?

(c) Please prepare a contingency plan for response should any significant leak or spill be detected. Include a reference to the reporting requirements under Section 1-203.

(d) Please discuss the flooding potential of the site. A statement that the site is not located in a swale such that it would receive occasional storm runoff, and a brief discussion of the generally flat topography of the area, will suffice.

(e) Please propose a method for closure of the pond after cessation of activities at the site.

5. Plugging and Abandoment

(a) Your plugging plan is generally adequate. However, prior to plugging the wellbore itself, it is recommended that the cavity be filled with saturated brine. After placement of the plug just above the casing shoe, tubing should be run and cement circulated from the bottom of the casing rather than pumped down from the top.

(b) Do you have a plugging bond for your brine well? If so, please provide us with a copy. If not, please propose an amount for a plugging bond, or submit some other acceptable proof of financial responsibility. Please bear in mind that the bond must be for an amount sufficient to prepare both the well and surface facilities for proper abandonment.

6. Monitoring

(a) With regard to your pressure test proposal (letter from R.D. Hickerson to Jerry Sexton, July 7, 1983, incorporated into your proposed discharge plan): How would you recognize a loss of brine return? Do you monitor flow into and out of the well? How do you check the gauges for accuracy?

(b) In the future, please submit a clearer chart as a record of your pressure test, and be sure the information on it is internally consistent. The handful of points on the chart you submitted is not as indicative as a continuous line would be. The note on the chart says that injection began at 4:56 p.m., but the recorder pen recorded the test occurring between 11:00 a.m. and 2:00 p.m.

The test would also be more conclusive of mechanical integrity if it were conducted at higher pressure. If your pump is incapable of generating approximately 350 psi (roughly 1½ times normal operating pressure), you will be required to use a tank truck capable of generating such a pressure for purposes of demonstrating mechanical integrity for an EID inspection.

You have no time constraint on responding to the above comments, except that you must have an approved discharge plan under Part 5 plus Part 3 of the regulations by the time your present discharge plan approval expires. The period of approval of your Part 5 discharge plan will be for five years from the date of its approval; if your Part 5 discharge plan is approved a year in advance of the expiration date of your present approved discharge plan, the final year of approval of your Part 3 discharge plan will not apply.

Again, I appreciate your voluntary submittal of a Part 5 discharge plan for this facility. Please let me know if I can clarify any of the above remarks or any other point of the regulations.

Sincerely,

Paige Grant

Paige Grant
Water Resource Specialist
Ground Water Section

PG:egr

cc: John Guinn, EID District IV, Manager

mcb

DRAFT

**SUGGESTED OUTLINE FOR DISCHARGE PLAN SUBMITTAL:**

Brine Extraction Facilities

I. GENERAL DESCRIPTION

A. Name of facility **and name and address of responsible party**

B. Location: county, township, range **and ¼¼¼ Section or latitude/longitude coordinates (3-106.C.2)**
-indicate on USGS topo map, 7½' or 15' quad

C. Schematic of facility
-include ~~short verbal description~~ of process, including transportation elements (e.g., loading trucks) ?

D. **Operational** history of **injection and production at** facility **(5-203.C.4)**
**-include dates of well construction and beginning of injection**

II. DESCRIPTION OF FACILITY

A. Surface Facilities

1. Dimension of pond(s)/tank(s)
**-include side slope angle for ponds**

2. Length and type of pipe(s) carrying brine **from well to pond(s)/tank(s)**

3. Average daily discharge and withdrawal from pond/tank **(3-106.C.1)**

4. Type of pond liner, if any
-include manufacturer's specs, technique used to seal seams

B. Underground Facilities

1. Depth, diameter, **production and protection** casing and tubing specs of well(s)
-include schematic drawings **(5-210.B.13; 5-205.A.3.d.)**

2. Construction procedures, including cementing and casing program, logging procedures, deviation checks **(5-205.A.4.a)**, and a drilling, testing and coring program **(5-210.B.14; 5-204.B.2.b; 5-205.A.3.d,e)**. Include logs and results of tests for all new and worked-over wells **(5-205.A.4)**.

lacking (don't need)

3. Stimulation program **(5-210.B.11)**. Note: 5-206 limitations.

lacking (don't need?)

4. Maximum and average injection pressures, injection volume, and other injection procedures **(5-210.B.12; 5-203.B.1; 5-205.A.3.b,f)**.

point out our concerns w/ this

If one well is to be used for injection and extraction, is brine to be pumped up annulus or central tubing? Give rationale for method used (5-210.B.12).

NA 5. Notification prior to drilling, casing etc. (5-205.A.5).

III. SITE CHARACTERISTICS

NA A. Soils (This section need only be submitted if unlined surface impoundments are proposed or in use. Additional ground water monitoring may be required for facilities using unlined surface impoundments. If impoundments do not adequately protect ground water, they will not be approved for use.)

1. Texture class

2. Soil Conservation Service (SCS) assessment of capability/limitations

3. Percolation test

B. Geology (5-203.C.3)

1. Stratigraphic section (drilling log) of well(s) on the site, indicating depth, thickness and chemical characteristics of water-bearing strata and lithology 3-106.C.3,6; 5-205.A.3.j), and stressing permeability of the strata immediately above and below the salt beds. Also give the lithology, stratigraphy, and fracture pressure of salt beds and confining zones (5-205.A.3.i).

such low pressure of injection - do we need?

2. Maps and cross-sections detailing the geology and geologic structures of the local area, including faults (known or suspected) (5-210.B.6 & 7). Are the faults known conduits or barriers to ground water flow?

marginal

C. Hydrology (5-203.C.3)

1. Maps and cross-sections indicating the general vertical and lateral limits of all ground water having 10,000 mg/l or less TDS within one mile of the site, the position of such ground water within this area relative to the injection formation, and the direction of water movement, where known, in each zone of ground water which may be affected by the proposed injection operation (5-210.B.5).

neither map shows info that follows on Penn's well data

2. A map showing the brine well(s) which are to be constructed and the number, name, and location of all producing wells, injection wells, abandoned wells, dry holes, surface bodies of water, springs, mines, quarries, residences and roads, and any other pertinent surface features that are within a quarter-mile radius

need larger scale

of the brine well or well field (5-202.B.3; 5-210.B.2.)

3. Flooding potential of the site (3-106.C.4).

4. Depth to and quality of ground water most likely to be affected by spills/leaks (3-106.C.3). Analysis should include **sodium ($Na^+$), potassium ($K^+$), calcium ($Ca^{++}$), magnesium ($Mg^{++}$), bicarbonate ($HCO_3^-$), carbonate ($CO_3^=$), chloride ($Cl^-$), sulfate ($SO_4^=$), and nitrate ($NO_3^-$).**

5. Analysis **or description** of water used for injection (if different from III.C.4, above) (3-106.C.1; 5-203.C.1). Include density, corrosiveness and temperature (5-205.A.3.g), as well as above constituents. Analyses to be submitted at least quarterly (5-207.C.1), **unless the source is such that a change in makeup is very unlikely (e.g. a city water system).**

6. Chemical analysis of brine (if facility is presently in operation) (3-106.C.1,3). Analysis should include those constituents indicated in III.C.4. Once in operation, reports to be submitted quarterly (5-207.C.1), **unless there is no change in the analysis.**

IV. PROCEDURES TO PROTECT GROUND WATER QUALITY

A. During Operation

1. Identify those abandoned wells/shafts or other conduits in the area of review which penetrate the injection zone and which, through being improperly sealed, completed or abandoned, provide a pathway for migration of contaminants. Detail what corrective action (e.g. plugging open holes) will be taken to prevent any movement of contaminants into ground water of less than/equal to 10,000 mg/l TDS through such conduits due to the proposed injection activity (5-203.A, B.1). Include completion and plugging records of **such wells/shafts** (5-203.C.5.).

2. In the event that operations have begun before information comes to light regarding such a conduit that will require plugging, injection pressure will be **required to be** limited to avoid movement of contaminants through such a conduit into protected ground water (5-203.B.2).

3. Mechanical integrity testing, such as:

   a. pressure test prior to start of operation (5-204.B.1.a);

   b. monitoring of annulus pressure (5-204.B.1.b; 5-204.C.)

4. Means and locations for measuring inflow to and outflow from the pond/tank (locations may be indicated on the schematic required under I.C) **(3-106.C.2, 5).**

5. Compare volumes of fresh water injected to volume of brine extracted to detect underground losses **(3-107.A.1).** May be done by recording injection pressure and either flow rate or volume every two weeks, or by metering and daily recording of fluid volumes **(5-207.C.2).**

6. Location and design of site(s) and method(s) for sampling for quality of fresh water and brine at facility **(3-106.C.5).**

7. Leak detection system under pond: drains, lysimeters, other? **(3-107.A.1,3,9).**

8. Monitoring **to detect any** deterioration of ground water quality in area-do you have access to water well(s) within _____ (distance) down-gradient from the facility, in order to do quality analyses? If not, may need to put in observation wells **(3-107.A.2,9; 5-205.C);** and make periodic quality reports **(5-207.C.2.b,c). Also, identify wells in the area for which the potential contamination from your brine operation is very low, which can serve to indicate "background" levels of water quality parameters in the area.**

9. How will spillage/leakage be prevented during truck loading or at transfer points within the facility?

10. Contingency plans in the event of:

    a. leak/spill from surface facilities;

    b. loss of mechanical integrity of injection well. How will ground water be protected from contamination or treated if contamination has occurred?

B. Post-operational **commitments required prior to plan approval**

**1. Plugging and abandonment**

a. Plug and cap wells. Procedure must conform to that specified in 5-209, **and be approved in advance.**

b. Demonstrate financial ability **(5-210.B.17)** to:

i. plug well and prepare for proper abandonment;

ii. restore protected ground water if contaminated by your brine extraction activities.

2. **Pond closure**

   a. Remove liner, if any, from pit **(3-107.A)**

   b. Remove salt crust from unlined pit and surrounding area **(3-107.A.4, 11)**

   c. **Restore area to original contours** or otherwise - - -

V. SIGN-OFF REQUIREMENT

Responsible official must certify as follows:

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibilitv of fine and imprisonment. (5-101.H.2).

PG:egr

STATE OF NEW MEXICO
# ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

TONEY ANAYA
GOVERNOR

June 14, 1984

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88240
(505) 393-6161

RECEIVED

JUN 15 1984

GROUND WATER/HAZARDOUS WASTE
BUREAU

Paige Grant
Water Resource Specialist
Ground Water Section
Environmental Improvement Division
P.O. Box 968
Santa Fe, NM 87504

Dear Paige:

In response to your inquiry concerning the Permian Brine discharge plan, the only thing we might add to the proposed plugging procedure for the Arnott Ramsay State #4 well in SE/4 SE/4 of Sec. 16, T25S, R37E, is that tubing be run and cement be circulated from the bottom. This will prevent cement going out any possible holes in casing and leaving voids inside the pipe.

Your question concerning information on casing, you might want to know whether the casing is N-80 or J-55 as well as weight/ft. The casing in this well is probably J-55 and the main difference in the two is chemical analysis. The pipe used for wellbore casing is threaded and coupled, they only weld on pull nipples, etc.

We see no need for more stringent mechanical integrity tests unless you plan to allow them to produce out the casing, then you might want to require a casing inspection log be run yearly.

We do still have a plugging bond on file covering this well but on all new brine wells this process will need to be handled by EID.

Under separate cover we are forwarding you a copy of the Halliburton Cementing Tables.

If this does not cover all your questions, please let us hear from you.

Very truly truly yours,

OIL CONSERVATION DIVISION

Jerry Sexton
Supervisor, District I

ED

P.S. you might want to investigate getting the plugging bond transferred over to EID since we are out of the brine well program. Also, the outline for preparation of discharge plan looks OK to us.

Marie:

Apparently the problem was with loading a comma after each "SE¼". The description

SE¼ SE¼ SE¼ Section 16, T25S R37E

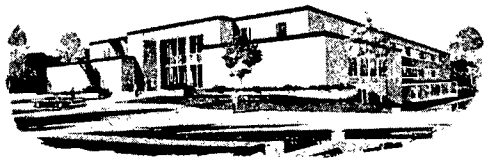
is correct.

Do you think that's a critical enough error to reissue the notice?

(answer: no.)

Sabre

# State of New Mexico



## Commissioner of Public Lands

JIM BACA
COMMISSIONER

P.O. BOX 1148
SANTA FE, NEW MEXICO 87504-1148

June 11, 1984

Director,
N.M. Environmental Improvement Division
P.O. Box 968, Crown Building
Santa Fe, New Mexico 87504-0968

Dear Sir:

We have received your public notice concerning (DP-324) Permian Brine Sales, Inc., A. L. Hickerson, President for a discharge plan.

Please clarify the legal description of this land, which presently reads:

SE¼, SE¼, SE¼, Section 16, T25S, R37E

Since there is an obvious typegraphical error, we would appreciate a description. The State Land Office does have concern in the SE¼ of Section 16 and is concerned for proper discharge in this area.

Thank you for your help.

Sincerely,

Evelyn D. Jeys
Commercial Leasing

cc: Pleas Glenn
Date File

RECEIVED

JUN 13 1984

GROUND WATER/HAZARDOUS WASTE
BUREAU

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

Joseph Goldberg
SECRETARY

Ted Guambana
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

June 9, 1984

Evelyn Downs
Oil Conservation Division
District Office No. 1
P.O. Box 1980
Hobbs, NM 88240

Dear Evelyn:

Let me know if it is an imposition to ask your and Jerry's opinions on the following questions:

I enlcose the plugging plan from Permian Brine's discharge plan for their brine well near Jal, SE¼SE¼ Section 16, T25S, R37E (Arnott Ramsey State No. 4). I also enclose the completion report for this well. On the basis of this information and your background knowledge of the hydrology and well construction practices in the Jal area, do you think this plugging is satisfactory?

The only specifications given for the production casing in this well were diameter, length and "17#/ft". Would this be sufficient information for you to judge the corrosivity of the casing? Would it not also be useful to know if the casing was welded or threaded-and-coupled? Also, note: there is no surface casing on this well. What is your reaction to that? Should they be required to make more stringent tests of mechanical integrity than we might otherwise require? Finally: do you have a plugging bond for this well? Are you going to continue to require plugging bonds for new brine wells, or is that something EID is going to have to take over?

Please give me a call with your answers, to save yourself the trouble of a written response. Also, could we have a copy of the pamphlet you mentioned which has such useful conversions as sacks to cubic feet and barrels to gallons?

Thank you in advance for your help - I'll try to keep this sort of thing to a minimum.

Sincerely,

Paige Grant

Paige Grant
Water Resource Specialist
Ground Water Section

PG:egr

EQUAL OPPORTUNITY EMPLOYER

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

Joseph Goldberg
SECRETARY

Ted Guambana
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

P 612 423 202

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

(See Reverse)

| | |
|---|---|
| Sent to | A.L. Hickerson President |
| Street and No. | Rt. 3, Box 3033 |
| P.O., State and ZIP Code | Odessa, Texas 79763 |
| Postage | $ |

U.S.G.P.O. 1983-403-517

May 29, 1984

A.L. Hickerson, President
PERMIAN BRINE SALES, Inc.
Rt. 3, Box 3033
Odessa, TX 79763

Dear Mr. Hickerson:

Enclosed is a copy of the public notice pertaining to your proposed discharge which was issued by this division pursuant to New Mexico Water Quality Control Commission Regulations, Section 3-108.

If you have any questions, please do not hesitate to contact me at the above address and telephone number (ext. 279).

Sincerely,

Maxine S. Goad

Maxine S. Goad
Program Manager
Ground Water Section

MSG:jba

Enclosure

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

Joseph Goldberg
SECRETARY

Ted Guambana
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

P 612 423 200

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

*(See Reverse)*

U.S.G.P.O. 1983-403-517

| | |
|---|---|
| Sent to Morris Whitmore, Mayor | |
| Street and No. Drawer 340 | |
| P.O., State and ZIP Code Jal, N.M. 88252 | |
| Postage | $ |

May 29, 1984

The Honorable Morris Whitworth
MAYOR, CITY OF JAL
Drawer 340
Jal, New Mexico 88252

Dear Mayor Whitworth:

Enclosed is a public notice which includes notice of a proposed discharge plan(s) for one or more operations in or near your city.

If you have any questions, please do not hesitate to contact me at the above address and telephone number (ext. 279).

Sincerely,

Maxine S. Goad

Maxine S. Goad
Program Manager
Ground Water Section

MSG:jba

Enclosure

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

Joseph Goldberg
SECRETARY

Ted Guambana
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

P 612 423 207

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

(See Reverse)

U.S.G.P.O. 1983-403-517

Sent to Lea Cnty Comm.
Street and No. Lea Cnty Courthouse
P.O., State and ZIP Code Lovington, NM 88260
Postage $

May 29, 1984

Lea County Commissioners
Lea County Courthouse
Lovington, New Mexico 88260

Board of County Commissioners:

Enclosed is a public notice which includes notice of proposed discharge plan(s) for one or more operations located in your county.

If you have any questions, please do not hesitate to contact me at the address and telephone number given above.

Sincerely,

Maxine S. Goad

MAXINE S. GOAD
Program Manager
Ground Water Section

MSG:jba

Enclosure

May 29, 1984
TO BE PUBLISHED ON OR BEFORE JUNE 6, 1984

**PUBLIC NOTICE**
NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION
HEALTH AND ENVIRONMENT DEPARTMENT

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission Regulations, the following proposed discharge plans have been submitted for approval to the Director of the New Mexico Environmental Improvement Division, P.O. Box 968, Crown Bldg., Santa Fe, New Mexico 87504-0968; telephone (505) 984-0020.

(DP-42) BJZ AND BERT ZWAAGSTRA DAIRIES, P.O. Drawer E, Mesquite, New Mexico 88048 has submitted a revised renewal application for the disposal of milking center wastewater from two dairies with 1800 cows located in Section 8, T25S, R3E, Dona Ana County. An estimated 72,000 gallons per day of effluent will be discharged to 196 acres of cropland. The water most likely to be affected is at a depth of 15 to 90 feet with a total dissolved solid content of approximately 2500 to 4000 mg/1.

(DP-344) LOS VILLEGAS BROTHER'S CHILE PROCESSING PLANT, Roger Villegas, President, P.O. Box 99, Hatch, New Mexico 87937 proposes to discharge approximately 8000 gallons per day of effluent from the chile processing plant located in Section 14, T19S, R3W in Dona Ana County, New Mexico. The plant will wash, roast, peel and package both red and green chile, and the effluent will be discharged into a holding pond and subsequently used to irrigate 19 acres. The ground water most likely to be affected is at a depth of 5 to 12 ft. below land surface with a total dissolved solids content of approximately 1000 mg/1.

(DP-324) PERMIAN BRINE SALES, INC., A.L. Hickerson, President, Rt. 3 Box 3033, Odessa, Texas 79763 has submitted a discharge plan addressing both Part 3 and Part 5 of the New Mexico Water Quality Control Commission regulations for an existing brine in situ extraction well and associated surface facilities located in the SE¼, SE¼, SE¼, Section 16, T25S, R37E near the town of Jal, Lea County, New Mexico. This facility is presently covered by an approved discharge plan addressing Part 3 of the regulations alone. The brine is produced by injecting fresh water (total dissolved solids (TDS) concentration approximately 1025 mg/1) into dry salt beds at a depth of about 1550 feet, dissolving the salt and bringing it to the surface in solution. Production of brine (mean density greater than 10 lbs/gal) averaged 8800 barrels per month in 1983. The brine is stored in a lined pit, from which it is pumped to tank trucks on demand. The ground water most likely to be affected by the operation is at a depth of 400 feet with a TDS concentration of 1025 mg/1. However, pockets of ground water may exist in the area at depths as shallow as 50 feet, with higher or lower concentrations of TDS.

(DP-327) VALLEY VIEW SUBDIVISION, Roger Simmons, Owner, 213 12th St., Alamogordo, New Mexico 88310 proposes to reamend the original discharge plan DP-327 by installing a septic tank to replace the aeroebic treatment plant and

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

Joseph Goldberg
SECRETARY

Ted Guambana
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

P 456 371 354
RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL
(See Reverse)

| | |
|---|---|
| Sent to A.L. Hickerson | |
| Street and No. Rt 3 Box 3033 | |
| P.O. State and ZIP Code Odessa, TX | |
| Postage | $ |

May 26, 1984

A.L. Hickerson, President
Permian Brine Sales, Inc.
Rt. 3, Box 3033
Odessa, TX 79763

Dear Mr. Hickerson:

On May 10, 1984, the Environmental Improvement Division received from your geologist, Mr. R.C. McCutchan, a discharge plan (DP-324) for your brine in situ extraction well located in the SE¼SE¼SE¼, Section 16, T25S, R37E near the town of Jal in Lea County, New Mexico. A discharge plan for this facility is required pursuant to Sections 3-104, 3-106, and 5-101.B. of the Water Quality Control Commission regulations. If additional information is needed to complete review of the discharge plan you have submitted, you will be notified.

Public notice of receipt of the plan has been issued by EID as required by Section 3-108 of the regulations.

If you have any questions about the regulations or about the handling of your discharge plan, please do not hesitate to contact Paige Grant of the EID staff at the address and telephone number listed above (ext. 285).

Sincerely,

for Steven Asher
DIRECTOR

SA:PG:egr

cc: John Guinn, EID District IV, Manager
EID Field Office, Hobbs

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

Joseph Goldberg
SECRETARY

Ted Guambana
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

May 26, 1984

Drafted by Paige Grant Paige Grant 5/23/84
CONCURRENCES
Goad
Drypolcher MSS2 5/24/84
Holland HQ 5/25/84

A.L. Hickerson, President
Permian Brine Sales, Inc.
Rt. 3, Box 3033
Odessa, TX 79763

Dear Mr. Hickerson:

On May 10, 1984, the Environmental Improvement Division received from your geologist, Mr. R.C. McCutchan, a discharge plan (DP-324) for your brine in situ extraction well located in the SE¼SE¼SE¼, Section 16, T25S, R37E near the town of Jal in Lea County, New Mexico. A discharge plan for this facility is required pursuant to Sections 3-104, 3-106, and 5-101.B. of the Water Quality Control Commission regulations. If additional information is needed to complete review of the discharge plan you have submitted, you will be notified.

Public notice of receipt of the plan has been issued by EID as required by Section 3-108 of the regulations.

If you have any questions about the regulations or about the handling of your discharge plan, please do not hesitate to contact Paige Grant of the EID staff at the address and telephone number listed above (ext. 285).

Sincerely,

HQ

Steven Asher
DIRECTOR

SA:PG:egr

cc: John Guinn, EID District
EID Field Office, Hobbs

Permian Brine Sales 5/24/84

The discharge plan was already submitted and this letter confirms that it was needed. This letter falls into Category III.C. of the Asher delegation memo & so can be signed by the Bureau Chief.

MSS

EQUAL OPPORTUNITY EMPLOYER

5/21/84: spoke with State Engineer Office at Roswell to ascertain where water would have been struck in the Santa Rosa/Chinle Fms. if SWL rose to ≈250 ft. The spokesman said water was encountered at ≈ 400 feet. Went on to say well was drilled in 1967 by O.R. Musselwhite to TD 500 ft. Said there is shallow (± 50 ft. deep) ground water in Jal area, but in pockets - locating it is hit or miss. Wrote public notice accordingly.

Paige Grant

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531


RECEIVED

MAY 10 1984

GROUND WATER/HAZARDOUS WASTE BUREAU

May 7, 1984

Environmental Improvement Division
Box 968
Santa Fe, New Mexico 87504-0968

Attn: Paige Grant

Dear Ms. Grant:

DP-324

Enclosed is Permian Brine's discharge plan for the Jal Brine Station, in compliance with the recent changes as outlined in Section 5 of the New Mexico Water Quality Control Commission.

This report was completed prior to the reception of your letter and outline of April 17, 1984. (Incidentally, your letter, postmarked in Santa Fe, April 18, 1984 was received at our offices on May 1, 1984.) In reviewing the outline, I believe this report covers all of the pertinent data required in Section 5. However, if additional information is required please cll or write at your convenience.

Very truly yours,
PERMIAN BRINE SALES, INC.

R.C. MC CUTCHAN
GEOLOGIST

RCM/law
enc.

RECEIVED

MAY 10 1984

GROUND WATER/HAZARDOUS WASTE
BUREAU

# JAL BRINE STATION

A.L. HICKERSON, PRESIDENT
PERMIAN BRINE SALES, INC.
RT. 3 BOX 3033
ODESSA, TEXAS 79763
915/332-0531

JAL BRINE STATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

A.L. HICKERSON, PRESIDENT
PERMIAN BRINE SALES, INC.

## INTRODUCTION

Permian Brine Sales, Inc. operates an insitu brine mining well in southeastern Lea County, approximately two miles east of Jal on state highway no. 128. The legal description of this site is: SE/4 SE/4, Section 16, Range 37-E, Township 25-S, (see map No. 1). The well is designated as Permian Brine Sales, Inc. - Arnott Ramsey State No. 4. The well was completed in 1981 and has been in continuous operation since that date.

The produced brine is used primarily in oil field operations as a drilling fluid and as a "kill" fluid. (To neutralize well bore pressures in producing wells for workover maintenance.) Smaller amounts of brine are sold to industry for the regeneration of zeolite water softeners. Fresh water is also sold at this site for industrial purposes. Drawing No. 1, is a sketch of the operations area.

## DEVELOPMENT OF THE BRINE WELL

The brine well was completed in March 1981. It was drilled to 1269' with a 7-7/8" bit. 5½" = 17#/ft casing was set at 1258' in an anhydrite stringer in the Salado salt section. The casing was cemented with 400 sacks of Class H cement with 2% $CACL_2$. The cement was circulated to 60' and was cemented from the surface to this depth through 1" pipe. The cement plug was drilled out at 1271' and the casing string tested to 500 PSI.

The well was drilled to a T.D. of 1591' with a 4-3/4" bit. 2-7/8" tubing was run to 1582' in the open hole. See New Mexico Oil Conservation Division, well reports form C-103, well completion report and log, form C-105 and drawing No. 2, attached.

A mechanical integrity test on this brine well was performed on July 6, 1983 and reported to the Oil Conservation Commission. A copy of this test is attached.

## WATER WELL

The water well located on the site, furnishes fresh water for the solution mining of the brine. See Drawing No. 1. This well was drilled several years ago by the pervious owner and no records are available

of the original drilling. However, Permian Brine has established the depth as 459'. A 5 hp 45 GPM submersible pump is landed at 418'. The static water level stands at 250'.

This water well is used for monitoring purposes. A recent analysis of the water is attached. At this depth, it would indicate the well producing water from either the Santa Rosa or Chinle formations of the Triassic. Conductance tests of the well water are periodically observed to check for any contamination. The most recent April 24, 1984 indicated 11,000 M MHOS.

## BRINE PRODUCTION PROCEDURES

The fresh water from the water well is produced into the 1,000 bbl fresh water storage tank. A 10hp submersible pump with capacity of 60 GPM is submerged in the fresh water storage tank and discharges at 200 PSI to either the tubing or casing of the brine well through approximately 400' of 2-3/8" O.D. fiberglass line pipe (rated at 450 PSI). This flow pattern indicates the flow is reversible in the well. The produced brine discharges from the well to the brine storage pit through approximately 300' of 2-3/8" O.D. PVC, Sch. 40 line pipe. Truck loading is accomodated at both the brine pit for brine and at the 1,000 bbl storage tank for fresh water. From the volume of brine produced and sold since initial operations began, a calculated maximum diameter of the cavern is 26'. Brine production for 1983 averaged 8800 bbl/month.

## BRINE WELL PLUGGING AND ABANDONMENT

Plugging will be accomplished by using one Baker Model S cast iron bridge plug. This plug is set by lowering it down the casing on an electric wire line to the predetermined depth, just above the casing shoe. This plug is made with two sets of slips, one above and one below the plug body, and a solid steel guide shoe at the base of the plug. The plug is disengaged from the wire line setting tool and the slips actuated by firing a power charge within the setting tool. This plug then provides a pressure seal. After the plug has been set the casing will be evacuated of mud and/or other fluids by air displacement. Then a calculated volume of Class C cement slurry will be pumped down the casing until it is completely filled. The exposed casing, at the surface, will be sealed by welding a steel plate over the open end of the casing.

The salt formations in West Texas and New Mexico are always overlain with a relatively thick section (20' to 50') of anhydrite. This impervious and insoluable formation material provides an excellent casing seat and after cementing a perfect seal that prevents the circulation of fluids from the salt cavern to the upper formations behind the casing. Consequently, setting the bridge plug at this point in the casing (opposite an anhydrite lens) and filling with cement protects the overlying formations from contamination should a casing failure occur at some future time.

AREA OF REVIEW

Applying the critera, as stated in the Water Control Commission Regulations, Section 5-202-B-2; the regulations state "...where the well field production at all times exceeds injection to produce a net withdrawal;" then a one-quarter mile area of review shall prevail. Since the production of saturated brine by fresh water solution mining results in a 7.14% increase in produced fluid over injection fluid these conditions provide compliance with the above regulations.

Below is a listing of all wells within the area of review.

1. Permian Brine - Arnott Ramsey No. 2 P & A Brine Well
2. Permian Brine - Arnott Ramsey No. 3 P & A Brine Well

The plugging and abandonment reports of these wells, as reported to the oil conservation division are attached. Also, please refer to the recent letter dated March 30, 1984 from Permian Brine Sales, Inc. by Mr. R.D. Hickerson to Paige Grant.

3. Gulf - Arnott Ramsey No. 7; 610' FSL, 660' FEL, Sec 16 8-5/8" csg @ 376' - 230 sx cement; producing oil well. 4½" csg @ 3700' - 1580 sx cement
4. Mobil - Federal No. 2X; 660' FSL, 330 FWL, Sec 15 8-5/8" csg @ 1060' - 500 sx cement; 5½" csg @ 3700' - 1,000 sx cement; producing oil well.

There are five residences, across state highway No. 128 to the south of the brine station, in the NE/4 of Sec 21, see Map 2; all have water wells.

A trailer house has been recently located immediately east of the brine station in the SE/4 of Sec 15. However, this residence obtains water from the city of Jal's water line, parallelling the state highway on the north, producing water from the city well in the SW/4 of Sec 13, R-37-E, TWP 25 S.

NOTE

The following descriptions, figures and maps have been liberally abstracted and reproduced from "Ground Water Report 6 - Geology and Ground Water Conditions or Southern Lea County, New Mexico", by Alexander Nicholson, Jr. and Alfred Clebsch, Jr.

## GEOLOGY AND HYDROLOGY

Southern Lea County overlies a large subsurface structural feature known as the Permian Basin. Oil exploration have revealed highly complex subsurface geology involving rocks ranging from the Precambrian and Early Paleozoic to the Permian Age. However, the early Paleozoic has little significance relating to potable and industrially usable ground waters in this area. The oldest formations exposed in this area are Triassic in age; the only other rocks to be seen at the surface are Tertiary and Quaternary in age. Only the Mesozic and younger formations yield potable water. See Table No. 3.

Figure No. 1 shows the distribution of geologic units exposed in the Jal area. The contacts between the Ogallala and Quaternary Alluvium formations are generalized because of poor exposures, due to the large areas covered by drift sand.

### STRATIGRAPHY

The southwestern part of the county overlies the Delaware Basin and the eastern part overlies the Central Basin platform. Between these two areas is the back-reef or shelf area. See Table No. 3. These general areas are defined on the basis of sedimentary depositional environments that existed during Permian time. The boundary between the basin and shelf areas is fairly sharp being marked by a complex of reef deposits; the boundary between the shelf area and the platform is transitional.

Since the earlier Palezoic formations are not revelant to this report, the description of these older formations will be omitted and this outline shall begin with the upper Permian.

The salt section, being mined at the Jal site, is the Salado formation and is assigned to the middle section of the Ochoa series of the upper Permian. This series is chiefly evaporite deposits. The lower most formation of this series is the Castile formation, which is chiefly

anhydrite with some halite beds. Overlying the Castile is the Salado formation, which extends across both the Deleware and Midland Basins and across the Central Basin platform; it ranges in thickness from zero to 2,000 feet. The formation is mainly halite containing some anhydrite stringers. The Rustler formation overlies the Salado and usually has a massive anhydrite bed at its base but also includes red beds and salt.

A sequence of red beds overlie the Rustler, consisting of micaeous red silt stone, shale and sandstone and are commonly cemented with gypsum. The age of these beds have been assigned to both the Permian and Triassic by various geologists based on localities of study. The lower section is called the Dewey Lake and is differeniated from the upper section by a zone of coarse, frosted quartz grains in the lower ten feet. The upper section is referred to as the Tecovas formation.

The hydrologic significance of these red beds is not completely understood, however, it is doubtful that any wells in Lea County produce water from them.

The Mesozic is represented in the area only by the Upper Triassic rocks of the Dockum group. This group is divisible into the Santa Rosa sandstone and the Chinle formation. The Santa Rosa is the principal aquifer in the western part of the county. The Chinle also provides an underground source of water both of these formations are at depths of 400+ feet and are highly mineralized.

The Cenozoic period is represented by the Ogallala formation of the Tertiary of Plicoene age. It underlies most of the county and ranges in thickness from a few inches to 300 feet. It is chiefly a calcareous, unconsolidated sand but contains clay, silt and gravel. The Ogallala is one of the major aquifers in this area.

The Quaternary age sediments are present in southern Lea County in the form of alluvial deposits, probably of both Pleistocene and recent age and dune sands of recent age. The alluvium was deposited in topographically low areas where the Ogallala formation had been stripped away. The dune sands mantle the older alluvium and the Ogallala over most of the area. These Quaternary alluvial deposits vary in thickness from 15 to 30 feet and are an important source of ground water in the eastern part of the county, especially along the major drainages.

Figure No. 2 shows the water table elevations in Tertiary and Quaternary formations and the areal boundaries of these aquifers. The figure also indicates the Piezometric countours and areal extent of the Triassic formations.

Figure No. ~~18~~ 13 shows a typical cross-section of an area immediately north of the Jal brine station site. These type of depressions, an erosional feature, are found throughout this area. These features are formed both by subsidence and sub-surface collapse resulting from solution of the evaporites.

DRAINAGE

There is no integrated drainage in southern Lea County, hence there is no through-going drainage to the Pecos River to the west and south. All stream courses are ephemeral and only one, Monument Draw has significant length; it traverses the eastern part of the county from north to south for approximately 35 miles and extends into Texas. See Figure No. 3.

# PERMIAN BRINE SALES, INC.

JAL BRINE STATION

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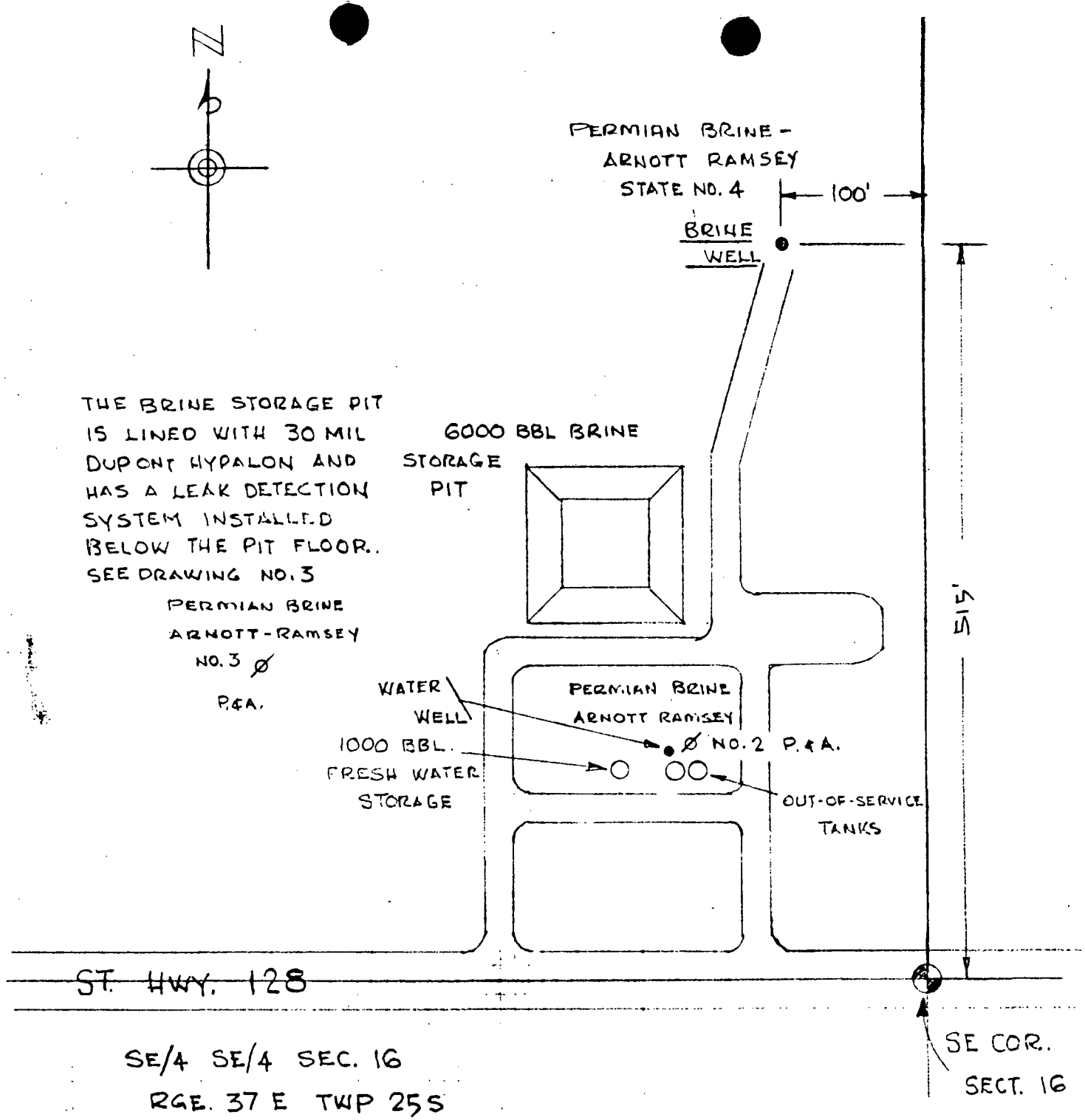
## DRAWINGS




SE/4 SE/4 SEC. 16
RGE. 37 E TWP 25S
LEA CO. NEW MEXICO

SCALE 1" = 100'

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

LAYOUT OF OPERATING FACILITIES

___SAL BRINE STATION

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
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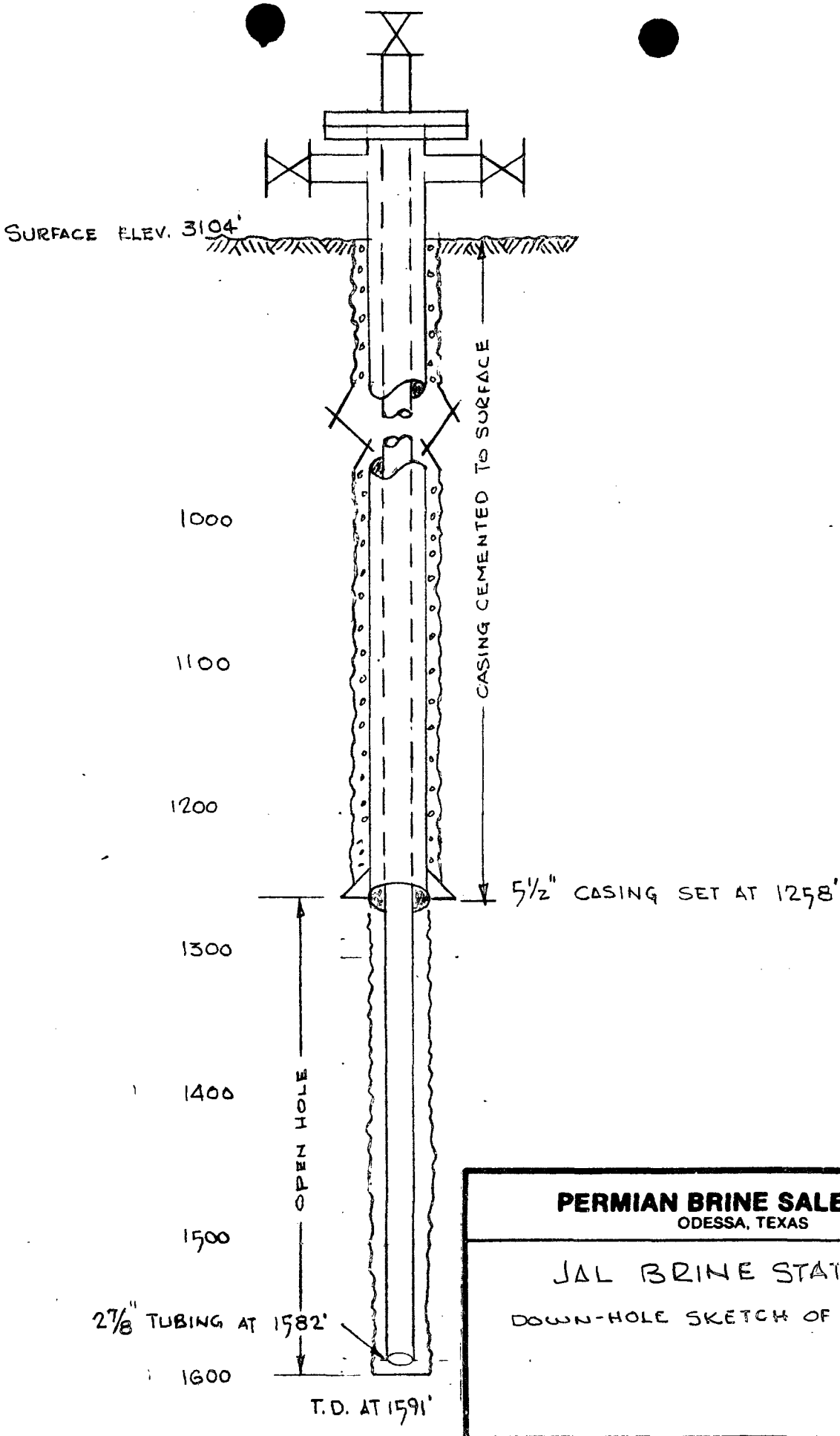


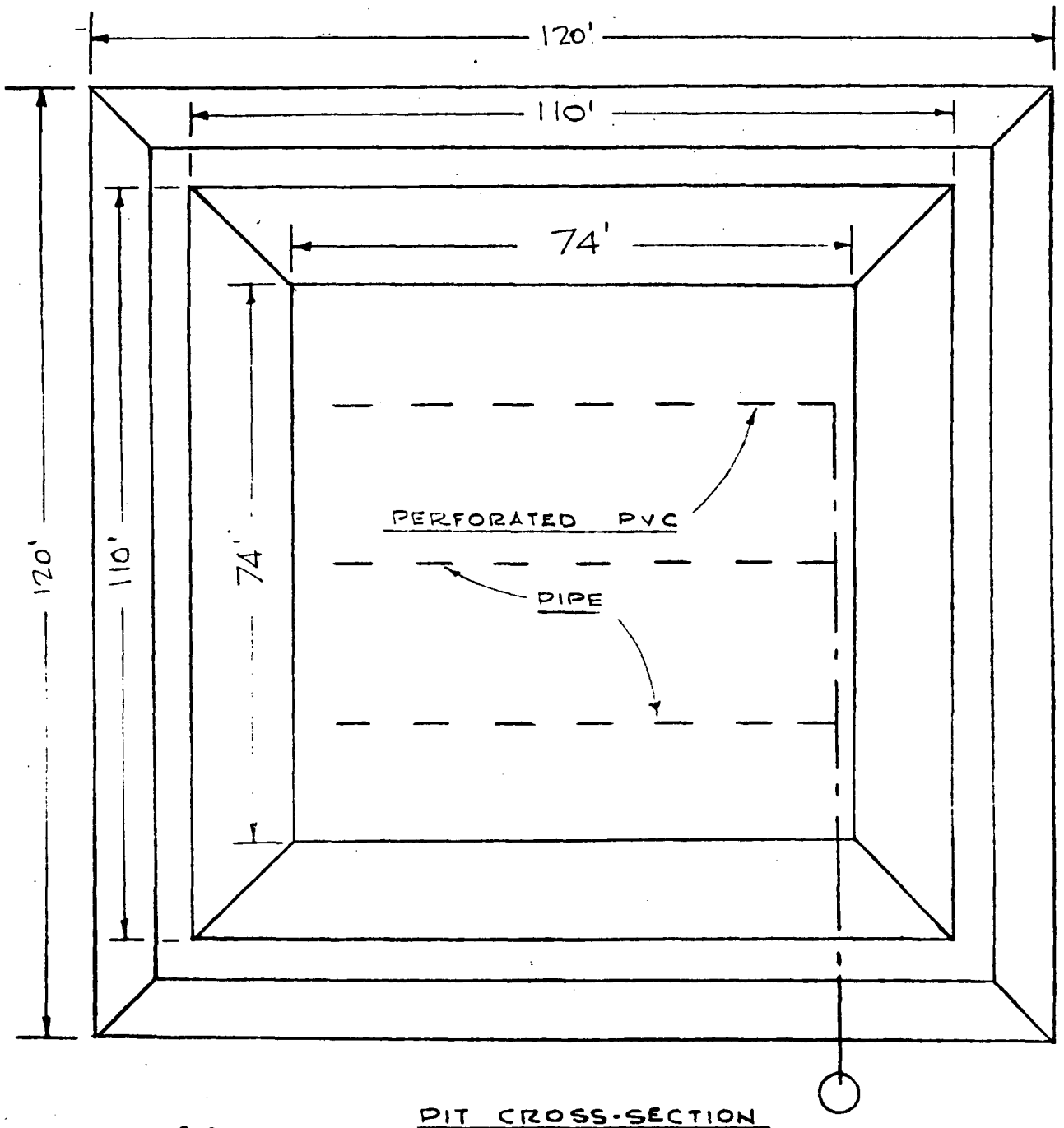

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

# JAL BRINE STATION

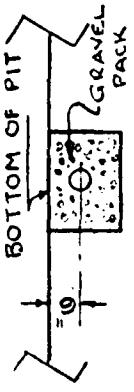
DOWN-HOLE SKETCH OF BRINE WELL

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 4-18-84 | R.C. McCUTCHAN TEX. P.E. 9844 | 2 |

# BRINE STORAGE PIT




CROSS-SECTION OF LEAK DETECTION PIPING

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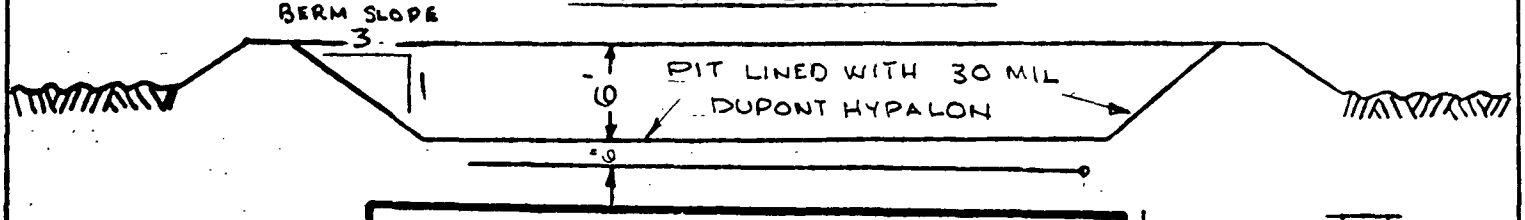


NO SCALE

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

DETAILS OF BRINE STORAGE PIT
JAL BRINE STATION

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|---|---|---|
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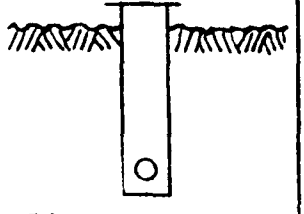

LEAK DETECTION SUMP

Form 205 5-57—88017-D

PERMIAN BRINE SALES, INC.

JAL BRINE STATION

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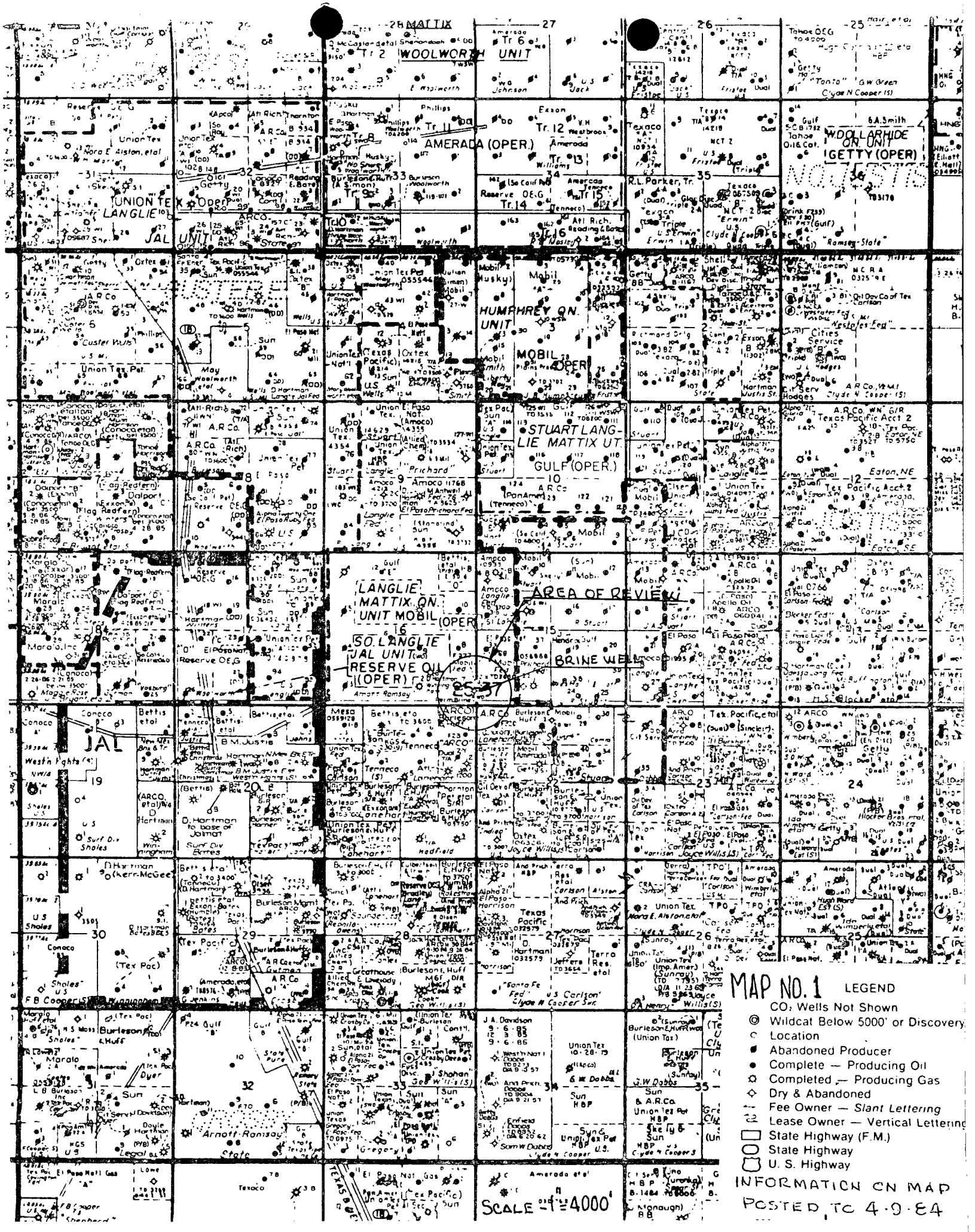
MAPS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GETTY (OPER)
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MOBIL (OPER)
STUART LANG-LIE MATTIX UT.
GULF (OPER.)
LANGLIE MATTIX QN. UNIT MOBIL (OPER)
SO. LANGLIE JAL UNIT RESERVE OIL (OPER)
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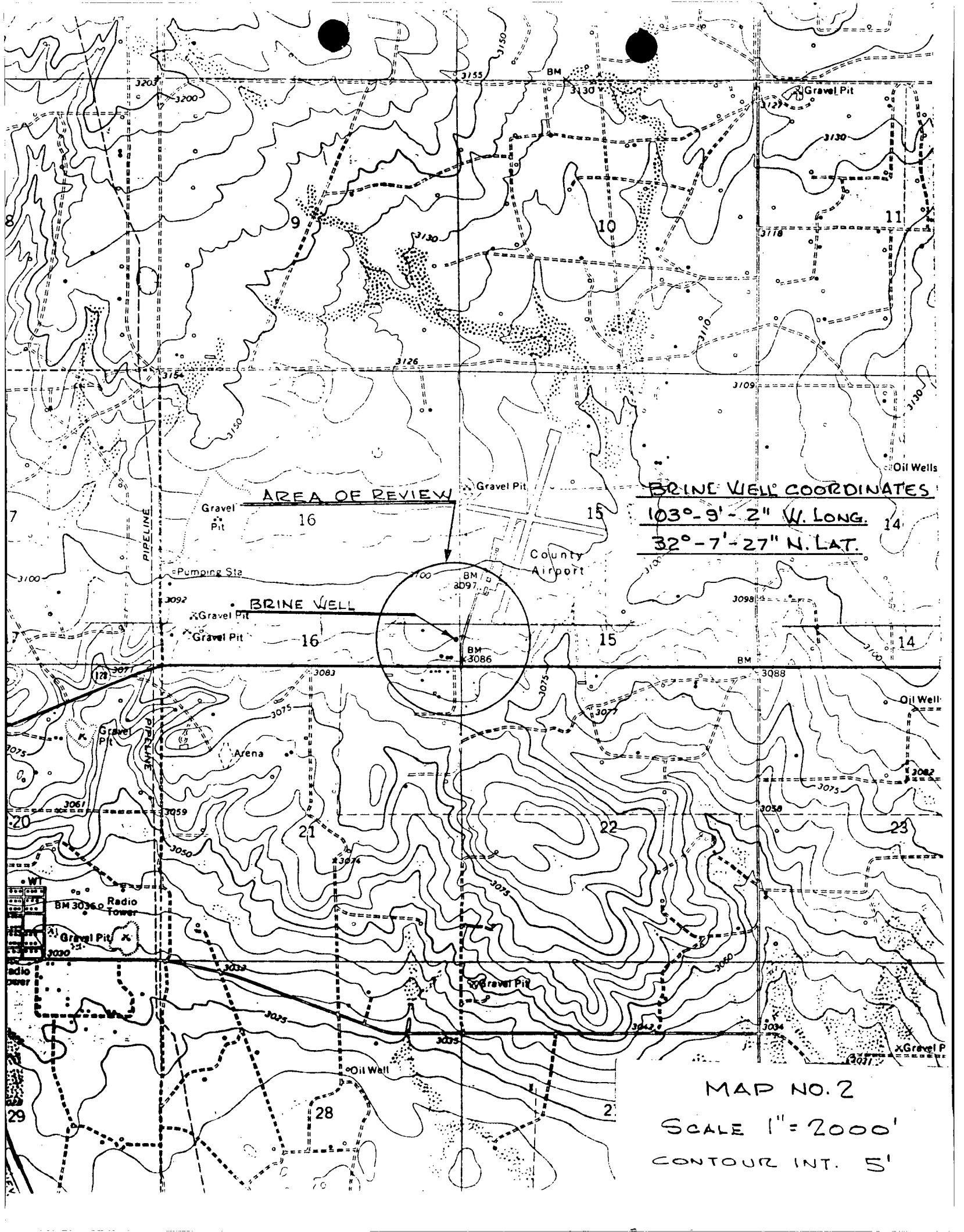
MAP NO. 1
LEGEND
CO₂ Wells Not Shown
Wildcat Below 5000' or Discovery
Location
Abandoned Producer
Complete — Producing Oil
Completed — Producing Gas
Dry & Abandoned
Fee Owner — Slant Lettering
Lease Owner — Vertical Lettering
State Highway (F.M.)
State Highway
U. S. Highway
INFORMATION ON MAP POSTED TO 4-9-84
SCALE 1" = 4000'


AREA OF REVIEW
BRINE WELL
BRINE WELL COORDINATES
103°-9'-2" W. LONG.
32°-7'-27" N. LAT.
MAP NO. 2
SCALE 1" = 2000'
CONTOUR INT. 5'
PIPELINE
Gravel Pit
Pumping Sta
County Airport
Oil Wells
Oil Well
Arena
Radio Tower
BM 3036
BM 3086
BM 3097
BM 3088
16
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PERMIAN BRINE SALES, INC.

JAL BRINE STATION

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WELL COMPLETION AND CEMENTING
REPORTS

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

| NO. OF COPIES RECEIVED | | |
|---|---|---|
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| SANTA FE | | |
| FILE | | |
| U.S.G.S. | | |
| LAND OFFICE | | |
| OPERATOR | | |

# OIL CONSERVATION DIVISION

P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Jal #4

Form C-103
Revised 10-1-78

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: M14474

## 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. OIL WELL [ ] GAS WELL [ ] OTHER- Brine Well

7. Unit Agreement Name:

2. Name of Operator: Permian Brine Sales & Service, Inc.

8. Farm or Lease Name: Arnott Ramsey State

3. Address of Operator: P.O. Box 1591 Odessa, Texas 79760

9. Well No.: 4

4. Location of Well: UNIT LETTER P, 515 FEET FROM THE South LINE AND 100 FEET FROM THE East LINE, SECTION 16 TOWNSHIP 25S RANGE 37E NMPM.

10. Field and Pool, or Wildcat: Wildcat

15. Elevation (Show whether DF, RT, GR, etc.)

12. County

16. 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 [ ] | | COMMENCE DRILLING OPNS. [ ] | PLUG AND ABANDONMENT [ ] |
| PULL OR ALTER CASING [ ] | CHANGE PLANS [ ] | CASING TEST AND CEMENT JOB [X] | |
| OTHER [ ] | | OTHER [ ] | |

17. 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.

Open Hole Drilled to 1269'
17# - 5½" casing cemented with 400 sacks
Class H with 2% $CaCl_2$
Circulated to 60' - cemented
0-60' through 1" pipe - waited 48 hours.
Drilled out cement plug to 1271' - tested casing and cement.
Held 500# for 30 minutes.
Drilled ahead to 1591 feet, and hung 2 7/8 tubing in open hole @ 1582 ft.

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

SIGNED A.L. Hickerson TITLE President DATE 3-18-81

A.L. Hickerson

APPROVED BY _____ TITLE _____ DATE _____ 1981

CONDITIONS OF APPROVAL, IF ANY:

RECEIVED
MAR 20 1981
OIL CONSERVATION DIV.

| NO. COPIES RECEIVED | | |
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| DISTRIBUTION | | |
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| OPERATOR | | |

Form C-105
Revised 1-1-65

# NEW MEXICO OIL CONSERVATION COMMISSION
# WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: M14474

1a. TYPE OF WELL — OIL WELL [ ] GAS WELL [ ] DRY [ ] OTHER

b. TYPE OF COMPLETION — NEW WELL [ ] WORK OVER [ ] DEEPEN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] OTHER

7. Unit Agreement Name:

8. Farm or Lease Name: Arnott Ramsey State

2. Name of Operator: Permian Brine Sales & Service, Inc.

9. Well No.: 4

3. Address of Operator: P.O. Box 1591, Odessa, Texas 79760

10. Field and Pool, or Wildcat: Wildcat

4. Location of Well

UNIT LETTER P LOCATED 515 FEET FROM THE South LINE AND 100 FEET FROM THE East LINE OF SEC. 16 TWP. 25S RGE. 37E NMPM

12. County: Lea

| 15. Date Spudded | 16. Date T.D. Reached | 17. Date Compl. (Ready to Prod.) | 18. Elevations (DF, RKB, RT, GR, etc.) | 19. Elev. Cashinghead |
|---|---|---|---|---|
| 10-8-80 | 3-10-81 | 3-10-81 | 3104 G.L. | 3106 |

| 20. Total Depth | 21. Plug Back T.D. | 22. If Multiple Compl., How Many | 23. Intervals Drilled By | Rotary Tools | Cable Tools |
|---|---|---|---|---|---|
| 1591' | 1582 | - | → | 120-1591 | 0-120 |

24. Producing Interval(s), of this completion — Top, Bottom, Name: Salt Section Open Hole 1258-1591

25. Was Directional Survey Made: NO

26. Type Electric and Other Logs Run: NONE

27. Was Well Cored: NO

28. CASING RECORD (Report all strings set in well)

| CASING SIZE | WEIGHT LB./FT. | DEPTH SET | HOLE SIZE | CEMENTING RECORD | AMOUNT PULLED |
|---|---|---|---|---|---|
| 5 1/2" | 17# | 1258' | 7 7/8 | 400 SX | NONE |
| | | | | | |
| | | | | | |
| | | | | | |

29. LINER RECORD

| SIZE | TOP | BOTTOM | SACKS CEMENT | SCREEN |
|---|---|---|---|---|
| | | | | |
| | | | | |

30. TUBING RECORD

| SIZE | DEPTH SET | PACKER SET |
|---|---|---|
| | | |
| | | |

31. Perforation Record (Interval, size and number): Open Hole 1258-1591

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

| DEPTH INTERVAL | AMOUNT AND KIND MATERIAL USED |
|---|---|
| | |
| | |
| | |

33. PRODUCTION

| Date First Production | Production Method (Flowing, gas lift, pumping — Size and type pump) | Well Status (Prod. or Shut-in) |
|---|---|---|
| | | |

| Date of Test | Hours Tested | Choke Size | Prod'n. For Test Period → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Gas — Oil Ratio |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| Flow Tubing Press. | Casing Pressure | Calculated 24-Hour Rate → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Oil Gravity — API (Corr.) |
|---|---|---|---|---|---|---|
| | | | | | | |

34. Disposition of Gas (Sold, used for fuel, vented, etc.)

Test Witnessed By

35. List of Attachments

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED A.L. Hickerson TITLE President DATE 3-11-81

A.L. Hickerson

This form is to be filed with the appropriate District Office of the Commission not later than [redacted] days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radioactivity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

## INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

| Southeastern New Mexico | | | | Northwestern New Mexico | | | |
|---|---|---|---|---|---|---|---|
| T. Anhy | 1035 | T. Canyon | | T. Ojo Alamo | | T. Penn. "B" | |
| T. Salt | 1155 | T. Strawn | | T. Kirtland-Fruitland | | T. Penn. "C" | |
| B. Salt | | T. Atoka | | T. Pictured Cliffs | | T. Penn. "D" | |
| T. Yates | | T. Miss | | T. Cliff House | | T. Leadville | |
| T. 7 Rivers | | T. Devonian | | T. Menefee | | T. Madison | |
| T. Queen | | T. Silurian | | T. Point Lookout | | T. Elbert | |
| T. Grayburg | | T. Montoya | | T. Mancos | | T. McCracken | |
| T. San Andres | | T. Simpson | | T. Gallup | | T. Ignacio Qtzte | |
| T. Glorieta | | T. McKee | | Base Greenhorn | | T. Granite | |
| T. Paddock | | T. Ellenburger | | T. Dakota | | T. | |
| T. Blinebry | | T. Gr. Wash | | T. Morrison | | T. | |
| T. Tubb | | T. Granite | | T. Todilto | | T. | |
| T. Drinkard | | T. Delaware Sand | | T. Entrada | | T. | |
| T. Abo | | T. Bone Springs | | T. Wingate | | T. | |
| T. Wolfcamp | | T. | | T. Chinle | | T. | |
| T. Penn. | | T. | | T. Permian | | T. | |
| T Cisco (Bough C) | | T. | | T. Penn. "A" | | T. | |

## OIL OR GAS SANDS OR ZONES

No. 1, from ..... to ..... No. 4, from ..... to .....

No. 2, from ..... to ..... No. 5, from ..... to .....

No. 3, from ..... to ..... No. 6, from ..... to .....

## IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from 450 To 475' to 260 feet. .....

No. 2, from ..... to ..... feet. .....

No. 3, from ..... to ..... feet. .....

No. 4, from ..... to ..... feet. .....

## FORMATION RECORD (Attach additional sheets if necessary)

| From | To | Thickness in Feet | Formation | From | To | Thickness in Feet | Formation |
|---|---|---|---|---|---|---|---|
| 0 | 10 | 10 | Caliche | | | | |
| 10 | 60 | 50 | Sand | | | | |
| 60 | 1035 | 975 | Red Beds | | | | |
| 1035 | 1155 | 120 | Rustler Anhydrite | | | | |
| 1155 | 1591 | 436 | Salt With Shale And Anhydrite Stringers | | | | |

EXHIBIT 1

PERMIAN BRINE SALES, INC.

JAL BRINE STATION

---

MECHANICAL INTEGRITY TEST

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531


July 7, 1983

Jerry Sexton
New Mexico Oil Conservation Commission
P.O. Box 1980
Hobbs, New Mexico 88240

RE: Mechanical Integrity Test on
Arnott-Ramsey #4

Dear Mr. Sexton:

Find enclosed our test chart, test report, and an explanation thereof.

We feel that the minute pressure decline is due to salt going into solution and thus making the cavern larger. Other wells have declined as much as 4% and still been determined to be tight.

To protect the fresh water of New Mexico we propose to:

1. Run a pressure test annually,
2. Report any loss of injection pressure within forty-eight (48) hours,
3. Report any loss of brine return within forty-eight (48) hours.

Please let me know if this will meet your New Mexico Oil Coservation Commission rules.

If you have any questions, please do not hesitate to call me at (915) 332-0531.

Sincerely yours,

PERMIAN BRINE SALES, INC.

Russell D. Hickerson
Vice President

RDH/smc
Enclosures

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

P. O. BOX 1591 ODESSA, TEXAS 79760 PHONE 332-0531


Jerry Sexton
New Mexico Oil Conservation Commission
P.O. Box 1980
Hobbs, New Mexioc 88240

## MECHANICAL INTEGRITY TEST REPORT

Station JAL (ARNOTT-RAMSEY #4) Date 7-6-83

Station Number 5 Witness TONY PLATTSMIER

Run By RUSS HICKERSON Witness DAVE PACCIARELLI

Normal Operating Pressure 210# PSI.

Depth of Well 1591' T.D.

Pressure attained in Test 218# PSI.

Rate of Injection (approximate) 45 gpm

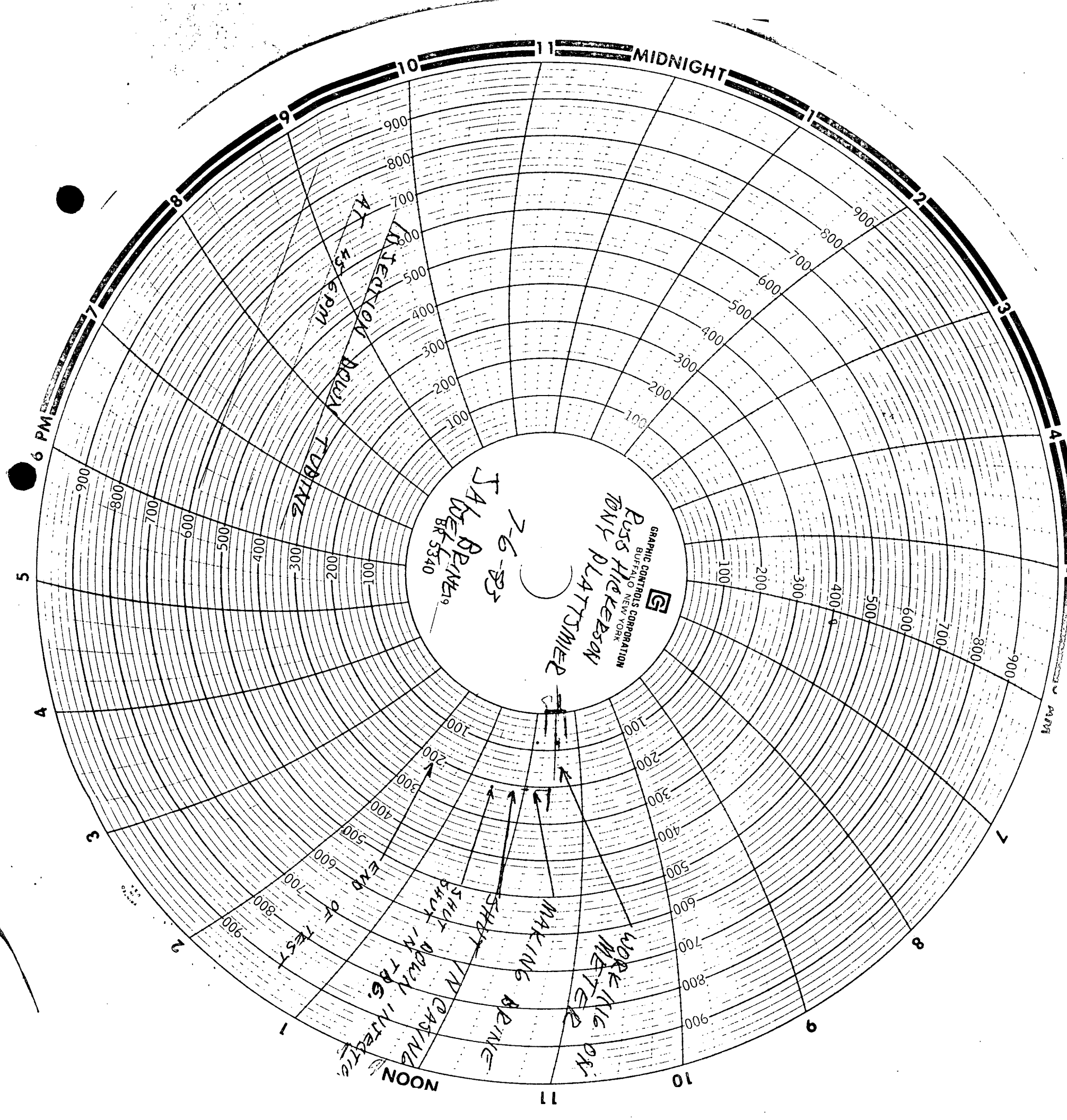
Pressuring up time 20 MINUTES

Static test time 1 HR. 10 MINUTES

Pounds of decline 3# PSI. (218# TO 215#)

Percentage of decline 1.3 %

REMARKS INJECTION PUMP WOULD NOT GO PAST 218#. SMALL PER CENTAGE OF DECLINE INDICATES CASING, CEMENT JOB AND CAVERN IS TIGHT.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NOON
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600
700
800
900
GRAPHIC CONTROLS CORPORATION
BUFFALO NEW YORK
7-6-82
JAMES RIVER
BRK 5340
RUSS HIGHER
TONE PLATTSMEAR
DOWN TIME
AT 3:45PM
DIVISION
END OF TEST
SHUT DOWN IN TAG.
SHUT DOWN
MAKING PRINT
MEETING ON
WORKING

12. The test for mechanical integrity of the underground casing and cavern is accomplished by pressuring the well to 1 ½ times the normal operating pressure. This is done by pumping fresh water into the well, through the tubing while the casing outlet is closed. A record of the volume of fresh water pumped and the time required to reach the test pressure is recorded. The well is then shut-in and is left in this condition for at least four hours. The pressures are monitored on a pressure recorder at the well site.

Small reductions in the test pressure, during the test period, are the result of salt entering solution. This process is influenced by the downhole conditions in the salt strata. If the well has a large cavern capacity and has not been circulated at high volume rates in the recent past, the fluid in the underground system is fully saturated. Therefore, the volume of fresh water required to pressure the cavern will be comparatively less than under the opposite conditions. The shut-in pressure will also indicate minimum change, over the test period, due to the fact that the comparatively small amount of fresh water entering solution will not materially effect the huge volume of saturated brine in the cavern. Conversely, if brine has been produced at a high rate immediately preceeding the test then, not only is the water used for pressuring entering solution, but some of the previously pumped fresh water for brine production is also dissolving salt, and thus enlarging the cavern during the pressure test.

PERMIAN BRINE SALES, INC.

JAL BRINE STATION

---

GEOLOGIC & HYDROLOGIC TABLES

TABLE 3. STRATIGRAPHIC UNITS IN SOUTHERN LEA COUNTY, N. MEX.

| Geologic age | | Geologic unit | Thickness (ft) | General character | Water-bearing properties |
|---|---|---|---|---|---|
| Cenozoic Quaternary | Recent and Pleistocene | Sand | 0–30± | Dune sand, unconsolidated stabilized to drifting, semiconsolidated at depth; fine- to medium-grained. | Above the zone of saturation, hence, does not yield water to wells. Aids recharge to underlying formations by permitting rapid infiltration of rainwater. |
| | | Alluvium | 0–400± | Channel and lake deposits; alternating thickbedded calcareous silt, fine sand, and clay; thickest in San Simon Swale; less than 100 feet thick in most places. | Saturated and highly permeable in places in east end of Laguna Valley. Forms continuous aquifer with Ogallala formation. Wells usually yield less than 30 gpm. Locally above the water table. |
| Cenozoic Tertiary | Pliocene | Ogallala | 0–300± | Semiconsolidated fine-grained calcareous sand capped with thick layer of caliche; contains some clay, silt, and gravel. | Major water-bearing formation of the area. Unsaturated in many localities, such as north side of Grama Ridge, west side of Eunice Plain, Antelope Ridge area, and Rattlesnake Ridge. Greatest saturated thickness along east side of Eunice Plain, west of Monument Draw, where wells yield up to 30 gpm. Highest yields, up to 700 gpm, obtained from wells along south edge of Eunice Plain, east of Jal. |
| Mesozoic Cretaceous | | Undifferentiated | 35± | Small isolated and buried residual blocks of limestone, about 3 miles east of Eunice. | Possibly small isolated bodies of water locally. |
| Mesozoic Triassic | Dockum group | Chinle formation | 0–1,270± | Claystone, red and green; minor fine-grained sandstones and siltstones; underlies all of eastern part of southern Lea County area; thins westward; absent in extreme west. | Yields small quantities of water from sandstone beds. Yields are rarely over 10 gpm. Water has high sulfate content. |
| | | Santa Rosa sandstone | 140–300± | Sandstone, chiefly red but locally white, gray, or greenish-gray; fine- to coarse-grained; exposed in extreme west; underlies Cenozoic rocks in western part of area, and is present at depth in eastern part. | Yields small quantities of water over most of the area. Some wells are reported to yield as much as 100 gpm. Water has high sulfate content. |
| Paleozoic | Permian or Triassic | Undifferentiated | 90–400+ | Siltstone, red, shale, and sandstone; present at depth under all of southern Lea County. | No wells are known to be bottomed in the red beds. Probably can yield very small quantities of high-sulfate water. |
| Paleozoic | Ordovician through Permian | | 6,500–17,000± | Thick basin deposits ranging in character from evaporites to coarse clastics; thinnest on the east side of the area over the Central basin platform, thickest toward the southwest. | No presently usable water supply available from these rocks. Source of highly mineralized oil-field waters. |
| Precambrian | | | | Granite, granodioritic and other igneous and metamorphic rocks; complex structure. | Not hydrologically significant. |

## TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX.

LOCATION NUMBER: Explanation in section on well-numbering system.

OWNERS: EPNG, El Paso Natural Gas Co.; MCRA, Maljamar Co-operative Repressuring Agreement.

AQUIFER: Tr, Triassic rocks; To, Ogallala formation; Qal, Quaternary alluvium.

DEPTH OF WELL: M, measured; all other depths are reported.

ALTITUDE: Altitudes interpolated from topographic maps. Probable error less than 10 feet.

WATER LEVEL: Measured depths are given to nearest tenth of a foot; reported depths are given to nearest foot. All are non-pumping water levels except as noted otherwise in remarks column.

SURFACE DIAMETER OF WELLS: Expressed in inches unless otherwise indicated. Diameters of cased, drilled wells are given in inches. Diameters and rectangular dimensions of dug wells are given in feet.

METHOD OF LIFT: Lw, lift pump, windmill powered; Li, lift pump, internal-combustion-engine powered; Le, lift pump electrically driven; Te, turbine pump, electrically driven; Ti, turbine pump, internal-combustion-engine powered; Je, jet pump, electrically driven; N, unequipped or partly equipped.

USE OF WATER: D, domestic; L, domestic use other than drinking, such as watering lawns and gardens; P, public supply; I, irrigation; In, industrial; S, stock; N, none; O, observation.

REMARKS: EY, reported estimated yield; gpm, gallons per minute; gpd, gallons per day; MWP, measured while pumping; PR pumped recently; WBZ, water-bearing zone.

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16.32.27.441 | Buffalo Oil Co. | To | 265 | 4,300 | 200(?) | — | — | 8⅝ | — | In | Perforations 194-254 feet. |
| 35.400 | Drew Taylor | To | 246M | 4,265 | 160(?) | — | — | 8¼ | Te | In,D | Taylor well 2. Northwest well of 3. EY 60-80 gpm. |
| 17.32.2.433 | MCRA | To | 200 | 4,240 | 60 | 1948 | — | 7 | Te | In,D | Well 6. EY 50 gpm. |
| 2.434 | MCRA | To | 192 | 4,240 | 60 | 6- 1-50 | 1948 | 7 | Te | In,D | Well 5. EY 50 gpm. |
| 2.443 | MCRA | To | 190 | — | — | — | — | 7 | Te | In,D | Well 7. EY 50 gpm. |
| 3.140 | Buffalo Oil Co. | To | — | — | — | — | — | — | — | In | Buffalo-Taylor well 3. Chemical analysis in table 8. |
| 3.320a | do. | To | — | 4,250 | 175.6 | 7-21-54 | — | 6 | N | N | Buffalo-Taylor well 2. Nearby well pumping. |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 17.32.4.442 | W. Taylor | Qal | — | 4,180 | 82.9 | 6- 3-54 | — | 6 | N | N | — |
| 11.231 | MCRA | To | 139 | 4,180 | — | — | 1947 | 7 | Te | In,D | Well 4. |
| 17.32.11.233 | MCRA | To(?) | 140 | 4,200 | 70 | 9-20-47 | — | 8 | Li | In,D | Well 2. EY 9 gpm. |
| 11.411 | MCRA | To(?) | 200 | 4,170 | 70 | 6-15-46 | — | 8 | Te | In,D | Well 1. EY 90 gpm. |
| 11.411a | MCRA | To(?) | 130 | — | 70 | 9-23-47 | — | 8 | Li | In,D | Well 3. EY 50 gpm. |
| 17.33.13.341 | Potash Co. of America | To | 252M | 4,124 | 149.7 | 11-20-53 | 1952 | 6 | N | O | — |
| 18.322 | Kewanee Oil Co. | To | 220 | 4,230 | — | — | — | 10¾ | Te | In,D | Two wells. Chemical analysis in table 8. |
| 26.422 | Phillips Oil Co. | To | — | 4,125 | 161.2 | 11-20-53 | 1950 | 8 | N | In,O | — |
| 28.110 | — | To | 241M | 4,185 | 198.0 | 5-11-54 | — | 7 | N | N | — |
| 30.124 | Walter Williams | Qal | — | 4,045 | 70.0 | 7-29-54 | — | 7 | Lw | S | PR |
| 18.33.14.111 | — | Qal | 40M | 3,965 | 35.8 | 6- 3-54 | — | 5 | N | N | — |
| 19.142 | — | Tr(?) | — | 3,820 | >140 | 12- 9-58 | — | 4 | Lw | S | — |
| 34.133 | — | Tr | 200M | 3,760 | 177.4 | 12- 9-58 | — | 8½ | N | N | — |
| 19.32.8.200 | — | Tr | — | 3,650 | 365.3 | 12- 9-58 | — | 7½ | Lw | S | Chemical analysis in table 8. |
| 36.100 | W. M. Snyder | Tr | 485 | 3,565 | — | — | — | — | Li | D,S | — |
| 19.33.5.213 | — | Tr | — | 3,710 | >299 | 12- 9-58 | — | — | Lw | S | — |
| 26.244 | Mark Smith | Qal | 101 | 3,600 | 92.9 | 7- 1-54 | — | — | Lw | D,S | MWP |
| 19.34.9.114 | Scharbauer Cattle Co. | Tr(?) | 33 | 3,790 | 28.6 | 6- 3-54 | — | 6 | Lw | S | Chemical analysis in table 8. |
| 31.131 | Clark Scharbauer | Qal | — | 3,625 | 65.8 | 7- 1-54 | — | 6 | Lw | S | MWP |
| 19.35.5.121 | Gene Dalmont | To | 88 | 3,890 | 50 | 7-28-54 | — | 8 | Ti | I | — |
| 5.234 | Jules Smith | To | 90 | 3,860 | 35 | — | — | — | Lw | D,S | — |
| 10.113 | N. T. Roberts | To | 36 | 3,860 | 19.9 | 7-28-54 | — | 6 | Lw | S | EY 5 gpm. |
| 12.444 | — | Qal | — | 3,740 | 34.2 | 7-28-54 | — | 3 ft. | Lw | S | — |
| 19.35.17.122 | J. D. Roberts | Qal | 50 | 3,835 | 29.9 | 7-28-54 | — | 3×3 ft. | Lw | D,S | Dug 0-30 feet; drilled 30-50 feet. |
| 22.334 | — | Qal | — | 3,740 | 23.5 | 7-28-54 | — | 8 | Lw | N | — |
| 24.121 | — | Qal | — | 3,735 | 28.6 | 11-16-53 | — | 6 ft. | N | N | — |
| 25.424 | — | Qal | — | 3,675 | 22.6 | 11-16-53 | — | — | N | N | Uncased shothole. |
| 25.434 | — | Qal | — | 3,660 | 22.8 | 11-16-53 | — | 6 | Lw | S | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 19.36.5.233 | Tom Green | To | 60 | 3,815 | 52.3 | 7-28-54 | — | — | Lw | D,S | — |
| 19.313 | — | Qal | 44.6M | 3,685 | 18.6 | 11-16-53 | — | — | N | N | Uncased shothole. |
| 20.111 | Tom Green | Qal | — | 3,695 | 25.7 | 7-28-54 | — | — | Lw | S | EY 10 gpm. PR |
| 25.123 | — | To | 43M | 3,680 | 16.0 | 3-18-54 | — | 6 | N | N | Northwest well of six. Chemical analysis in table 8. |
| 19.36.26.224 | J. E. Weir | Qal | 12.7M | 3,650 | 6.7 | 5- 7-54 | — | 4×5 ft. | N | N | At Monument Spring. |
| 28.422 | Mrs. Abi Hall | To | 52M | 3,720 | 36.6 | 3-18-54 | — | 7 | N | N | — |
| 28.441 | do. | To | 27M | 3,680 | 22.7 | 3-18-54 | — | 6 | N | N | — |
| 32.110 | S. P. Jordan | Qal | 32 | 3,645 | 19 | 11-20-29 | — | — | — | — | Chemical analysis in table 8. |
| 32.324 | — | Qal | 30 | 3,630 | 27.2 | 7-28-54 | — | 4×4 ft. | Lw | N | — |
| 19.37.4.110 | V. Linam | To | 29 | 3,680 | 21 | 9-19-29 | — | — | — | — | Chemical analysis in table 8. |
| 18.111 | Amerada Oil Co. | To | 134 | 3,705 | 35 | 9- -47 | 1947 | 10¾ | Ti | D | Monument District Camp. WBZ 67-108 feet, 112-125 feet. EY 385 gpm. |
| 18.331 | EPNG | To | — | 3,710 | 51.9 | 3-18-54 | — | 10 | N | N | — |
| 20.242 | Humble Oil Co. | — | 80 | 3,660 | Dry | — | 1937 | — | N | N | Plugged and abandoned. |
| 21.132 | do. | To | 67 | 3,635 | — | — | 1937 | — | — | — | State "D" well 2. EY 30 gpm. |
| 19.37.25.422 | — | To | — | 3,600 | 40 | 4- 6-54 | — | — | Lw | S | — |
| 29.333 | — | Qal | — | 3,595 | 13.3 | 7-28-54 | — | 7 | Lw | D | MWP |
| 29.344 | Hobbs School district | Qal | 30± | — | 21.5 | 3-23-60 | — | 8 | Te | P | — |
| 29.344a | do. | Qal | 30± | — | — | — | — | 6 | Te | P | Chemical analysis in table 8. |
| 30.113 | Continental Oil Co. | Qal | 60 | 3,660 | — | — | — | — | Te | D | Pumps dry in summer. |
| 20.32.1.322 | W. M. Snyder | Qal | 30 | 3,510 | 21.8 | 7- 1-54 | — | 6 | Li | S | Water not potable. |
| 18.233 | Freeport Sulfur Co. | Tr | 400 | 3,450 | 89.2 | 3-24-54 | 1954 | 8 | Li | In | WBZ 215-243 feet. |
| 27.144 | Joel Frey | Qal | 25 | 3,545 | 12.3 | 6-11-54 | — | — | Lw | N | — |
| 30.142 | — | Qal | — | 3,530 | 9.9 | 6-11-54 | — | 8⅝ | N | N | Located in sink. |
| 36.214 | Mrs. Bingham | Qal | 60 | 3,588 | 46.6 | 6- 6-55 | 1950 | 7¼ | Lw | D | West well of three. |
| 20.33.15.221 | — | Tr | — | 3,570 | 336.1 | 4-20-55 | — | 4 | Li | N | — |
| 24.122 | D. C. Berry | Tr | 700± | 3,630 | 300± | — | — | 10 | Lw | S | — |
| 20.34.17.334 | Mark Smith | Tr | 200 | 3,635 | 140 | 7- 1-54 | 1940 | 10 | Lw | S | MWP |
| 22.223 | D. C. Berry | Tr | 235 | 3,655 | — | — | — | 10 | Lw | S | — |
| 20.35.1.221 | J. L. Wood | Qal | 35 | 3,655 | 24.5 | 11-16-53 | — | 4×4 ft. | N | O | — |
| 31.113 | Leo Sims | To | 85 | 3,740 | 68.4 | 6-25-54 | — | 6 | Lw | S | PR |
| 33.433 | do. | To | 135 | 3,700 | 94.1 | 6-25-54 | — | 7 | Lw | S | MWP |
| 35.333 | do. | To | 105 | 3,690 | 88.9 | 4-15-54 | — | — | Lw | D,S | MWP Southeast well of two. |
| 20.36.1.412 | Amerada Oil Co. | Qal | 72M | 3,565 | 33.1 | 3-30-54 | — | 7 | N | N | — |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20.36.5.321 | — | Qal | — | 3,635 | 28.3 | 11-16-53 | — | 6 | Lw | S | — |
| 12.141 | — | Qal | 40±M | 3,550 | 29.5 | 3-25-54 | — | — | Lw | S | — |
| 12.222 | Sunray Oil Co. | Qal | 56 | 3,560 | 29.0 | 3-30-54 | — | 7 | Lw | L | Water not potable. |
| 20.36.15.222 | Continental Oil Co. | Tr | 700 | 3,575 | — | — | — | — | Li | D | — |
| 15.421 | H. S. Record | Qal | 50 | 3,575 | 35.7 | 3-30-54 | 1938 | 8½ | Lw | S | Water not potable. MWP. Chemical analysis in table 8. |
| 24.423 | — | Qal | 50±M | 3,540 | 36.4 | 3-25-54 | — | 7 | Lw | In | Water used to soak wooden tanks. |
| 25.312 | Stanolind Oil and Gas Co. | Tr | 225 | 3,550 | 117.3 | 3-25-54 | — | 6 | Lw | D | — |
| 26.244 | Amerada Oil Co. | Tr | 265 | 3,555 | — | — | — | 7½ | Li | In | Water used for oil well drilling. |
| 32.112 | Leo Sims | Tr | 612 | 3,640 | 300 | 4-15-54 | — | — | Lw | S | — |
| 35.244 | Humble Oil Co. | Tr | 230 | 3,550 | — | — | 1938 | — | — | In | Federal Fopeano well 2. EY 18 gpm. |
| 20.27.3.341 | — | Qal | — | 3,560 | 19.5 | 4- 1-54 | — | 7½ | Lw | S | Water not potable. |
| 20.37.4.111 | Jim Cooper | Qal | 40 | 3,560 | — | — | — | — | Je | L | Chemical analysis in table 8. |
| 4.221 | Nolan and Lane | Qal | 45 | 3,555 | 31.4 | 4- 2-54 | 1940 | 6 | Lw | D | Chemical analysis in table 8. |
| 4.314 | — | Qal | 48M | 3,550 | 32.8 | 4- 2-54 | — | 8 | N | N | — |
| 4.341 | Humble Oil Co. | Qal | 106 | 3,550 | — | — | 1935 | — | — | — | Plugged and abandoned. |
| 4.444 | — | Qal | 30±M | 3,560 | 23.5 | 4- 1-54 | — | 8 | N | N | — |
| 5.333 | Amerada Oil Co. | Qal | 75 | 3,555 | — | — | 1954 | 7 | Ti | In | WBZ 35-65 feet. |
| 7.133 | — | Qal | — | 3,555 | 27.1 | 3-29-54 | — | 8½ | N | N | — |
| 7.241 | — | Qal | 28.5M | 3,550 | 26.4 | 3-29-54 | — | 8½ | N | N | About 70 feet northwest of windmill. MWP |
| 7.434 | — | Qal | — | 3,540 | 25.2 | 3-30-54 | — | 8½ | Lw | S | |
| 8.321 | Amerada Oil Co. | Qal | 86 | 3,550 | 30 | 1-23-54 | 1954 | 7 | Ti | In | Reportedly had no measurable drawdown at 50 gpm. |
| 20.37.8.424 | Tidewater Oil Co. | Qal | 62 | 3,545 | 25.9 | 3-22-54 | — | — | Li | D | EY less than 1 gpm. |
| 9.110 | W. H. Laughlin | Qal | 55 | 3,558 | 34.0 | 11-16-53 | — | 4×6 ft. | N | O | — |
| 9.351 | Skelly Oil Co. | Qal | — | 3,545 | 18.0 | 3-22-54 | — | 7 | N | N | — |
| 13.321 | Earl Kornegay | Qal(?) | 78M | 3,545 | 75.7 | 4- 2-54 | — | — | Lw | S | — |
| 16.144 | — | Qal | 36M | 3,525 | 13.2 | 2- 8-53 | — | 6 | N | N | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 17.131 | — | Qal | — | 3,540 | 24.8 | 4- 1-54 | — | 7½ | Lw | N | — |
| 20.431 | — | Qal | 40 | 3,510 | 24.1 | 3-26-54 | — | 12 | Lw | S | PR |
| 21.400 | — | Qal | — | 3,500 | 43.0 | 3-26-54 | — | 7 | N | N | — |
| 28.122 | Gulf Oil Corp. | Qal | 60 | 3,500 | 29.3 | 3-26-54 | — | 7 | N | N | — |
| 28.244 | — | Qal | 42±M | 3,490 | 37.4 | 3-26-54 | — | 6 | Lw | S | PR |
| 29.111 | Mid-Continent Petroleum Co. | Qal | — | 3,520 | 43.8 | 3-25-54 | — | 7 | N | N | — |
| 31.144 | Humble Oil Co. | Qal | 144 | 3,600 | — | — | — | — | — | — | WBZ gray sand, 60-98 feet. |
| 20.37.31.211 | Humble Oil Co. | Qal | 125 | 3,540 | Dry | — | — | — | — | — | Penetrated red beds at 40 feet. |
| 35.441 | Continental Oil Co. | Qal | 63M | 3,480 | 53.4 | 3-23-54 | — | 12 | N | N | — |
| 36.330 | do. | Qal | 120 | — | — | — | — | — | Te | In,D | One of two wells supplying pump station for lease houses. |
| 20.38.6.143 | — | To | — | 3,575 | 45.9 | 4- 6-54 | — | — | Lw | S | PR |
| 7.222 | William Walker | To(?) | 112 | — | — | — | — | 24 | Ti | I | — |
| 7.411 | A. E. Galloway | To(?) | 125 | — | — | — | — | — | Ti | I | — |
| 8.231 | City of Eunice | Qal | — | 3,570 | — | — | — | — | Te | P | West well of two. EY 600 gpm. |
| 8.232 | do. | Qal | — | 3,570 | — | — | — | — | Te | P | East well of two. |
| 8.311 | A. E. Galloway | Qal | 125 | 3,570 | 64.1 | 4- 2-54 | — | — | Ti | I | — |
| 9.124 | — | Qal | 40±M | 3,570 | 35.2 | 4- 2-54 | — | — | Lw | S | — |
| 11.414 | — | To | 93M | 3,565 | 30.7 | 12- 9-53 | — | 3½ ft. | N | N | — |
| 20.38.12.244 | — | To | — | 3,565 | 43.7 | 12- 7-53 | — | 6½ | N | N | — |
| 16.133 | Earl Kornegay | Qal | — | 3,560 | 50 | 3-22-54 | — | — | Lw | S | — |
| 17.113 | Amerada Oil Co. | Qal | 120 | 3,565 | — | — | 1951 | 7 | Ti | In | EY 40 gpm. |
| 17.141 | Earl Kornegay | Qal | 105±M | 3,555 | 59.3 | 3-22-54 | — | 7 | N | N | — |
| 17.142 | do. | Qal | 96M | 3,555 | 57.2 | 3-22-54 | — | — | N | N | — |
| 17.333 | Amerada Oil Co. | Qal | 116 | — | — | — | — | 7 | Ti | In | EY 35 gpm. |
| 17.334 | do. | Qal | 168 | 3,550 | 72.8 | 3-22-54 | — | — | N | N | — |
| 18.242 | do. | Qal | 124 | 3,565 | 50 | 3- -52 | — | 7 | Je | D | EY 17 gpm. |
| 19.320 | Continental Oil Co. | Qal | 115 | 3,545 | 78.8 | 4- 2-54 | — | 8 | Le | D | Chemical analysis in table 8. |
| 31.341 | — | Qal | 70±M | 3,490 | 66.7 | 3-23-54 | — | 6 | N | N | — |
| 20.39.7.133 | — | To | — | 3,565 | 43.6 | 12- 7-53 | — | 7½ | N | N | — |
| 18.344 | Earl Kornegay | To | 60±M | 3,540 | 46.2 | 12- 9-53 | — | — | N | N | Located northwest of windmill. |
| 21.33.2.231 | The Texas Co. | Tr | 1,150 | 3,810 | — | — | — | — | Li | D | Chemical analysis in table 8. |
| 21.33.2.422 | D. C. Berry | To | 120 | 3,805 | 107.2 | 6-28-54 | — | — | Lw | D | Chemical analysis in table 8. |
| 2.442 | do. | To | — | 3,800 | 72.9 | 6-28-54 | — | 10 | Lw | S | Located on west side of sink and west of earthen tank. |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21.33.2.442a | do. | To | — | — | — | — | — | — | Lw | D,S | Located on east side of earthen tank. Chemical analysis in table 8. |
| 18.112 | do. | To | — | 3,900 | 143.0 | 6-21-54 | — | — | Lw | S | — |
| 28.124 | San Simon Ranch | Tr | 224 | 3,690 | 179.5 | 6-30-54 | — | 7½ | N | N | "Standard" well. |
| 21.34.8.422 | do. | To | 120 | 3,705 | 105.8 | 6-30-54 | — | — | Lw | S | — |
| 13.324 | Wilson Oil Co. | Tr | 335 | 3,655 | 200 | 1943 | 1943 | — | Li | D | — |
| 23.223 | do. | To | 220 | 3,660 | 150 | 1954 | — | — | Li | In,D | — |
| 21.34.24.222 | Mid-Continent Oil Co. | Tr(?) | 125 | 3,655 | — | — | — | — | Li | D | — |
| 33.233 | San Simon Ranch | To | 80M | 3,665 | 67.0 | 6- 6-55 | — | 7¼ | N | N | "Christmas" well. |
| 21.35.1.122 | Amerada Oil Co. | Tr | 312 | 3,550 | 175 | 6- 7-54 | 1954 | 7 | Li | In | EY 9 gpm. |
| 7.211 | Wilson Oil Co. | Tr | 430 | 3,700 | 340 | 1940(?) | 1940 | — | Li | D | One of two water wells at Wilson Camp. |
| 14.111 | San Simon Ranch | Tr | 250 | 3,580 | 147.3 | 6- 7-55 | — | 6 | Lw | S | "Scharbauer" well. |
| 24.223 | do. | Tr | — | 3,620 | 205.7 | 4-14-54 | — | — | Lw | S | — |
| 27.321 | — | To | — | 3,615 | 21.8 | 12- 8-58 | — | — | N | N | — |
| 27.321a | — | To | — | 3,620 | — | — | — | — | Lw | S | Chemical analysis in table 8. |
| 21.35.30.411 | San Simon Ranch | To | 58M | 3,630 | 35.6 | 11-25-53 | — | 7½ | Lw | S | — |
| 21.36.9.222 | W. L. Van Noy | Tr | 447 | 3,605 | <350 | — | — | 8 | Li | P | EY 6 gpm. Public supply for Oil Center. Chemical analysis in table 8. |
| 10.112 | Humble Oil Co. | Tr | 495 | — | — | — | — | — | N | N | WBZ sand, 385-395 feet. |
| 19.222 | Pacific-Western Oil Co. | To(?) | 230M | 3,630 | 216.0 | 1- 7-54 | — | 8 | N | N | — |
| 23.233 | Frontier Country Club | To | 200 | 3,555 | 139.0 | 4-22-55 | 1955 | 8⅝ | — | — | Unfinished well. Recently bailed. |
| 28.243 | — | To | 197M | 3,585 | 174.5 | 1-15-54 | — | 6¾ | N | N | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21.36.29.144 | Humble Oil Co. | To(?) | 305 | 3,630 | — | — | 1935 | — | N | N | WBZ sand, 225-305 feet. |
| 33.223 | — | To | 215 ± M | 3,590 | 205.5 | 11-12-53 | — | 6½ | N | N | — |
| 36.242 | W. M. Snyder | To | — | 3,505 | 113.3 | 1-15-54 | — | 6 | Lw | S | MWP |
| 21.37.6.244 | — | To | — | 3,495 | 70.3 | 3-23-54 | — | 8 | Li | — | — |
| 10.211 | Continental Carbon Black Co. | Qal | 76 | 3,440 | 26 | 1953 | 1945 | 8 | Te | In,D | — |
| 11.311 | — | Qal | 77M | 3,426 | 39.1 | 12- 8-53 | — | 7½ | N | N | — |
| 12.341 | Terry and McNeil | Qal | 100 | 3,450 | 76.3 | 10- 2-53 | — | 7 | Ti | In | — |
| 13.111 | Western Oil Field Corp. | Qal | 185 | 3,425 | 60 | 10- 2-53 | 1953 | — | — | — | Drilled for oil. |
| 14.123 | — | Qal | — | 3,420 | 25.4 | 12- 8-53 | — | 6 | Lw | S | — |
| 18.442 | T. Davis | To | 125 | 3,510 | 99.7 | 1-10-54 | — | 7 | Ti | D,S | — |
| 21.111 | — | To | — | 3,460 | 73.1 | 1-10-54 | — | 7¾ | N | N | — |
| 21.37.22.211 | — | To | 49M | 3,420 | 37.7 | 4-21-55 | — | — | N | N | — |
| 22.413 | — | To | — | 3,410 | 75.0 | 10- 1-53 | — | 7 | N | N | — |
| 23.211 | Skelly Oil Co. | To(?) | 81 | 3,420 | 42.5 | 10- 1-53 | 1948 | — | N | N | Skelly Eunice Plant 2, well 1. Initial yield, 55 gpm. |
| 23.213 | do. | To(?) | 83 | 3,410 | 45.8 | 10- 1-53 | 1948 | — | N | N | Skelly Eunice Plant 2, well 2. |
| 23.231 | do. | To(?) | 84 | 3,410 | 43.0 | 10- 1-53 | 1948 | — | N | N | Skelly Eunice Plant, 2, well 3. Initial yield, 100 gpm. |
| 23.233 | do. | To(?) | 81 | 3,405 | 44.1 | 10- 1-53 | 1948 | — | N | N | Skelly Eunice Plant 2, well 4. Initial yield, 60 gpm. |
| 23.300 | Gulf Oil Corp. | To | 100 | 3,390 | 59 | 5-31-50 | 1948 | 10¾ | Te | In,D | Gulf Eunice Gasoline Plant, well 22. |
| 21.37.23.331 | — | To | — | 3,385 | 72.9 | 10- 1-53 | — | 8½ | N | N | — |
| 23.331a | Gulf Oil Corp. | To | 96 | 3,390 | 64 | 5-31-50 | — | 7 | Te | In,D | Gulf Eunice Plant, well 23. |
| 26.323 | do. | To | 101 | 3,365 | 64 | 12- 3-48 | — | — | Te | In,D | Gulf Eunice Plant, Cone well 1. |
| 26.400 | do. | Qal | 160 | 3,365 | 53 | 7-23-51 | — | 5⅞ | N | N | Gulf Eunice Plant, well 5. |
| 27.232 | do. | To | 99 | 3,400 | 62 | 1948 | 1948 | 7 | Te | In,D | Gulf Eunice Plant, well 14. Initial yield, 55 gpm. |
| 27.241 | do. | To | 180 | 3,385 | 60 | 1948 | — | 7 | N | N | Gulf Eunice Plant, well 4. |
| 30.414 | — | To | — | 3,480 | 101.6 | 1-11-54 | — | — | Lw | In | — |
| 32.121 | Skelly Oil Co. | To | 92M | 3,460 | 90.7 | 1-15-54 | — | 6½ | N | N | — |
| 33.110 | City of Eunice | To | 130 | 3,450 | — | — | — | 6 | N | N | Old public-supply well. WBZ 90-130 feet. Chemical analysis in table 8. |
| 21.37.33.111 | Magnolia Oil Co. | To | 110(?) | 3,450 | 103.8 | 12-10-53 | — | 6 | Ti | In,D | Water used for oil well flooding. Chemical analysis in table 8. |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21.37.33.210 | City of Eunice | Tr | 350 | 3,430 | — | 1944 | — | 6 | N | N | Old public-supply well. WBZ 320-350 feet. Chemical analysis in table 8. EY 10 gpm. |
| 33.211 | — | To | 103M | 3,430 | 99.6 | 11-12-53 | — | 10¾ | N | N | — |
| 33.233 | City of Eunice | To | 135 | 3,435 | 100 | 1944 | — | 8 | Te | P | City well 1. Perforated 100-130 feet. Chemical analysis in table 8. |
| 35.423 | Gulf Oil Corp. | Qal | 110 | 3,375 | 61 | 5-17-50 | — | 10¾ | Te | In,D | Gulf Eunice Plant, well 21. |
| 35.442 | do. | Qal | 87 | 3,360 | 59 | 11-14-51 | — | 7 | Te | In,D | Gulf Eunice Plant, well 17. WBZ sand and gravel, 65-74 feet. |
| 21.37.36.144 | P. Wallach | Qal | 66±M | 3,370 | 47.8 | 10- 9-53 | — | 6 | Lw | S | — |
| 36.344 | do. | Qal | — | 3,360 | 49.8 | 10- 9-53 | — | 8⅝ | Lw | S | — |
| 21.38.6.133 | Ray McNeil | Qal | 90+ | 3,550 | 79.4 | 12- 7-53 | — | 7 | N | N | — |
| 6.133a | do. | To | 90? | — | — | — | — | — | Lw | — | Chemical analysis in table 8. |
| 6.133b | do. | To | 108 | — | — | — | — | — | N | N | do. |
| 8.144 | Humble Oil Co. | — | 133 | 3,565 | Dry | — | — | — | — | — | Plugged and abandoned. |
| 22.33.13.200 | San Simon Ranch | Tr | 508 | 3,510 | — | — | — | — | Lw | S | WBZ 420-470 feet. |
| 22.34.12.111 | do. | Qal | 62 | 3,530 | 48 | — | 1951 | — | Lw | D,S | — |
| 12.114 | do. | Qal | 16M | 3,515 | 12.6 | 3-17-54 | — | — | Lw | S | Is an infiltration tunnel about 70 feet long and 5 feet in diameter feeding 2 windmills, 1 centrifugal pump and 1 siphon. |
| 22.36.1.333 | Gulf Oil Co. | To | 150 | 3,490 | 111.2 | 11-12-53 | — | — | Li | L | Chemical analysis in table 8. |
| 2.444 | — | — | — | — | — | — | — | — | Lw | S | Chemical analysis in table 8. |
| 8.443 | United Carbon Co. | Tr | 1,000± | 3,580 | 700 | — | — | 8 | Le | In,D | Three wells. EY 30 gpm each. Chemical analysis in table 8. |
| 11.224 | Texas-Pacific Coal and Oil Co. | To | 120+ | 3,500 | 113.8 | 11-12-53 | — | 8 | Lw | D | Chemical analysis in table 8. |
| 13.222 | Ohio Oil Co. | Tr(?) | — | 3,455 | Flowing | — | — | 7 | N | N | Capped and flowing. |
| 25.434 | R. L. Robinson | To | — | 3,430 | 118.5 | 11-23-53 | — | — | Li | S | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 22.36.35.314 | do. | To | 197 | 3,490 | 187.4 | 11-23-53 | — | — | Lw | S | — |
| 1.132 | G. Sims | Qal | — | 3,350 | 47.6 | 10-14-53 | — | — | N | N | Open, uncased hole. |
| 1.440 | do. | Qal | — | — | — | — | — | — | Lw | S | Chemical analysis in table 8. |
| 2.442 | Humble Oil Co. | Qal | 86M | 3,360 | 53.3 | 10- 9-53 | — | 7 | N | N | Initial yield, 68 gpm. |
| 3.133 | Sinclair Oil and Gas Co. | To | 120 | 3,425 | 90 | — | 1946 | — | Je | D | — |
| 3.134 | do. | — | 52M | 3,420 | Dry | 9-28-53 | — | — | N | N | — |
| 3.440 | Cities Service Oil Co. | To | — | 3,390 | 75.8 | 9-29-53 | — | 7½ | N | N | — |
| 4.211 | City of Eunice | To | 155 | 3,445 | 110 | 1953 | 1953 | 10 | Te | P | Well 12. Initial yield, 100 gpm; yield in 1953, 60 gpm. |
| 4.213 | do. | To | 155 | 3,440 | 114.8 | 3- 6-54 | 1952 | 10 | Te | P | Well 11. EY 60 gym. |
| 4.214a | Eunice Cemetery Assoc. | To | 115±M | 3,435 | 108.2 | 9-29-53 | — | 6½ | N | N | — |
| 22.37.4.233 | City of Eunice | To | 155 | 3,435 | 110 | 1951 | 1951 | 8 | Te | P | Well 9. |
| 4.421 | Sinclair Oil and Gas Co. | To | 114±M | 3,430 | 90.1 | 9-28-53 | — | 7⅝ | N | N | — |
| 4.424 | Skelly Oil Co. | To | 164 | — | <139 | — | 1950 | 8⅝ | Ti | In,D | Skelly Eunice Plant 1, well 13. Initial yield, 150 gpm; dropped to 20 gpm. |
| 8.441 | Shell Oil Co. | To | 168 | 3,400 | 60 | 1953 | 1936 | 6⅝ | Lw | D | — |
| 9.313a | Humble Oil Co. | To | 166M | 3,400 | 72.7 | 9-29-53 | 1944 | 9½ | N | N | Humble—J. L. Greenwood well 2. |
| 9.331 | do. | To | 160 | — | — | — | 1945 | 7⅝ | Te | D | Humble—J. L. Greenwood well 4. |
| 9.333 | do. | To | 172 | — | — | — | 1946 | 4 | Te | In | Humble—J. L. Greenwood well 5. Water used for oil well flooding. |
| 22.37.9.441 | Humble Oil Co. | To | 104±M | 3,410 | 85.5 | 9-29-53 | 1940 | 6⅝ | N | N | Humble—J. L. Greenwood well 1. |
| 10.213 | Gulf Oil Corp. | To | 220 | 3,400 | 100 | 1950 | — | — | Lw | D | Gulf-Brunson lease well. |
| 10.320 | Skelly Oil Co. | To | — | 3,395 | 81.0 | 9-29-53 | — | 11½ | N | N | — |
| 11.324 | — | Qal | 100M | 3,350 | 45.3 | 10-16-53 | 1952 | 5 | N | N | — |
| 11.444 | Leo Sims | Qal | — | 3,345 | 58.7 | 10-16-53 | — | 8⅝ | Lw | S | — |
| 12.114 | G. Sims | Qal | 84M | 3,340 | 53.9 | 10-14-53 | — | 7 | N | N | — |
| 12.443 | do. | Qal | 59M | 3,335 | 53.9 | 10-14-53 | — | 15 | N | N | — |
| 12.443a | do. | Qal | 59M | 3,335 | 53.3 | 10-14-53 | — | — | N | N | Uncased and open. |
| 15.333 | H. O. Sims | To | — | 3,380 | 81.0 | 9- -53 | — | 4¼ | Lw | D,S | — |
| 16.432 | Skelly Oil Co. | To | 135 | — | — | — | — | 7 | Ti | In,D | Skelly Eunice Plant 1, well 11. EY 40 gpm. |
| 16.443 | do. | To | 136 | 3,385 | 80.9 | 9-28-53 | 1947 | 8⅝ | Ti | In,D | Skelly Eunice Plant 1, well 10. |
| 22.37.21.221 | — | To(?) | — | 3,380 | 76.5 | 9- -53 | — | 6⅝ | N | N | — |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 22.37.21.421 | — | To(?) | — | 3,360 | 62.0 | 9- -53 | — | 4½ | N | N | — |
| 22.331 | Skelly Oil Co. | To(?) | 115± | 3,350 | 69.0 | 9-29-53 | 1949 | — | Ti | In,D | Skelly Eunice Plant 1, well 12. EY 40 gpm. |
| 23.233 | Leo Sims | Qal | 77M | 3,345 | 55.0 | 10-14-53 | — | 14 | N | N | Open and uncased. |
| 23.441 | O. I. Boyd | Qal | 70± | 3,335 | 55.3 | 10-12-53 | — | — | Lw | S | Dug. |
| 23.441a | do. | Qal | 70± | 3,335 | 55.2 | 10-12-53 | — | 7½ | N | N | — |
| 24.133a | G. Sims | Qal | 127M | 3,322 | 59.3 | 4-21-55 | — | 10 | Li | N | — |
| 24.133b | do. | Qal | 80 | — | — | — | — | — | Lw | N | Chemical analysis in table 8. |
| 25.313 | Marshal Drinkard | Qal | 69M | 3,300 | 50.1 | 10-14-53 | 1945 | 13½ | N | N | — |
| 27.334b | Skelly Oil Co. | Qal | 127M | 3,335 | 54.4 | 9- -53 | — | 8½ | N | N | Skelly Eunice Plant 1, well 9. |
| 27.410 | do. | To? | 182 | — | — | — | — | 7 | Te | In,D | EY 25 gpm. Perforations 150-170 feet. |
| 22.37.28.323 | Clower Drilling Co. | Qal | — | 3,353 | 66.1 | 9- -53 | — | 9¼ | N | N | — |
| 34.221 | Humble Oil Co. | Qal and Tr | 229 | 3,520 | — | — | 1938 | — | — | In | WBZ 58-61 feet, 138-146 feet, 185-192 feet. EY 22 gpm. |
| 36.141a | Tom Linebury | Qal | 40 | 3,300 | 32.2 | 10-12-54 | — | — | Lw | S | — |
| 36.141b | do. | Qal | 46 | 3,300 | 31.1 | 6- 3-55 | — | 6 | N | N | — |
| 22.38.18.234 | The Texas Co. | Tr | 386M | 3,360 | 180 | 10- -53 | 1953 | — | Li | In | WBZ gray sand, 325-380 feet. EY 20 gpm. |
| 19.222 | do. | Tr | — | 3,365 | 146.0 | 10-14-53 | — | 7 | N | N | — |
| 23.32.4.222 | C. H. and W. O. James | Tr | 550 | 3,630 | — | — | 1931 | 8 | Lw | S | EY 10 gpm. |
| 21.222 | Frank and Charles James | Tr | 550 | 3,700 | 500 | — | — | 8 | Li | S | — |
| 23.33.12.322 | San Simon Ranch | Tr | 400 | 3,685 | — | — | 1953 | — | Lw | S | WBZ 370-400 feet. |
| 23.33.28.334 | Brinninstool | Tr | 575 | 3,675 | 500 | — | — | — | Lw | D,S | EY 2.5 gpm. |
| 23.34.1.444 | San Simon Ranch | Qal | 144±M | 3,360 | 137.3 | 11-25-53 | — | 6 | N | N | — |
| 31.340 | Continental Oil Co. | Tr | 678 | 3,620 | — | — | 1953 | 8 | Li | In | EY 47 gpm. Chemical analysis in table 8. |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 23.35.27.444 | — | To | — | 3,480 | 117.2 | 3- -53 | — | 7 | N | N | — |
| 23.36.15.414 | J. E. Matkins | To(?) | 230 | 3,390 | 148.4 | 12- 4-53 | — | 6 | Lw | D,S | — |
| 16.343 | do. | Tr | 1,100 | 3,465 | 150 | 1952 | — | — | Lw | S | — |
| 22.434 | Texas Pacific Coal and Oil Co. | To | 210±M | 3,395 | 188.6 | 12- 1-53 | — | 8½ | N | N | — |
| 23.111 | do. | To | — | 3,370 | 143.6 | 12- 4-53 | — | 8 | Li | In | — |
| 31.233 | J. Combass | To | — | — | — | — | — | — | Lw | S | Chemical analysis in table 8. |
| 23.36.35.211 | J. Combass | To | 170 | 3,330 | 123.0 | 3- -53 | — | 6½ | N | N | — |
| 36.341 | EPNG | To | 250 | 3,330 | 124 | — | — | 10¾ | Ti | In,D | Jal Plant 4, well 8. |
| 36.342 | EPNG | To | 261 | 3,330 | 120 | — | 1952 | — | Ti | In,D | Jal Plant 4, well 7. |
| 23.37.2.133 | — | To | — | 3,304 | 62.8 | 10-16-53 | — | — | N | N | — |
| 2.422 | — | Qal | — | 3,295 | 64.1 | 6- 3-55 | — | 6 | Lw | S | — |
| 3.421 | H. O. Sims | To | 80 | 3,295 | 64.1 | 10-16-53 | — | — | Lw | D,S | — |
| 4.114 | — | To | 84—M | 3,341 | 81.8 | 12- 3-53 | — | 5½ | N | N | — |
| 4.211 | Skelly Oil Co. | Tr(?) | 226 | 3,340 | — | — | 1947 | 10¾ | Le | D | H. O. Sims Camp well 1. EY 10 gpm. |
| 6.144 | — | To | — | 3,375 | 102.9 | 12- 3-53 | — | 6½ | Lw | S | — |
| 20.333 | Bert Steeler | Qal(?) | 177 | 3,300 | 117 | — | 1939 | — | Lw | D,S | — |
| 25.132 | M. L. Goins | To(?) | — | 3,215 | 28.3 | 10-15-53 | — | 7 | Lw | S | — |
| 27.441 | — | Qal | — | 3,270 | 78.3 | 3- 4-53 | — | 5½ | Lw | S | — |
| 23.37.31.442 | EPNG | To(?) | 173 | 3,300 | 118 | 1952 | 1952 | 12½ | Te | In,D | Jal Plant 4, well 4. |
| 32.122 | — | To(?) | — | 3,300 | 99.0 | 7-23-54 | — | 6 | Lw | S | — |
| 32.331 | EPNG | To(?) | 173 | 3,310 | — | — | — | 20 | Te | In,D | Jal Plant 4, well 1. WBZ 115-171 feet. EY 40 gpm. |
| 33.122 | — | To(?) | 120M | 3,310 | 91.2 | 3- 4-53 | — | 9 | N | N | — |
| 23.38.5.233 | Humble Oil Co. | Tr | 400M | 3,385 | 189.8 | 10-15-53 | 1943 | 7½ | N | N | W. F. Scarbrough well 1. EY 14 gpm. |
| 8.214 | Tom Linebury | Tr | — | 3,372 | 198.3 | 10-15-53 | — | 6½ | Lw | D,S | — |
| 24.32.3.322 | Frank James | Tr | 550 | 3,650 | — | — | — | 10 | Lw | D,S | — |
| 10.344 | do. | Qal | 60 | 3,588 | 31.1 | 6- 3-55 | 1910 | 6 | Lw | S | Located in sink. |
| 33.422 | Richard Ritz | Tr | 367M | 3,510 | 313.4 | 2-18-58 | — | 12 | Lw | S | EY 0.25 gpm. |
| 24.33.10.113 | Carl Johnson | Qal | 36±M | 3,595 | 24.6 | 11-27-53 | — | 6½ | Lw | S | — |
| 24.33.23.311 | — | Tr | 232M | 3,565 | 208.6 | 11-27-53 | — | 9½ | N | N | — |
| 24.444 | — | Qal | — | 3,530 | 16.9 | 11-27-53 | — | 5½ | Lw | S | — |
| 33.231 | Carl Johnson | Qal | — | 3,460 | 93.2 | 3-17-54 | — | 6 | Lw | D,S | — |
| 24.34.4.111 | — | To | — | 3,570 | 51.3 | 6- 3-55 | — | — | Lw | S | — |
| 5.444 | — | To | 78(?) | 3,590 | 66.6 | 4-21-55 | — | — | Lw | N | — |
| 10.112 | Madera Ranch | To | 83M | 3,525 | 71.8 | 4-27-53 | — | 6 | N | N | — |
| 10.422 | do. | To | 94M | 3,315 | 63.2 | 4-27-53 | — | 7½ | N | N | — |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 24.34.35.122 | do. | Tr | 258M | 3,410 | 223.9 | 3-29-53 | — | 6 | Lw | S | — |
| 24.35.30.341 | do. | Tr | 150±M | 3,320 | 139.6 | 11-27-53 | — | 6 | Lw | S | — |
| 24.36.3.111 | — | To | — | 3,400 | 181.1 | 3-12-53 | — | 7½ | N | N | — |
| 3.333 | Charles Whitten | To(?) | 190±M | 3,390 | 181.1 | 3-12-53 | — | 11½ | N | N | — |
| 9.133 | do. | To | 230 | 3,395 | 195.0 | 3- 6-53 | 1948 | 7 | N | N | — |
| 13.314 | Humble Oil Co. | To | 160 | — | — | — | 1941 | — | — | — | WBZ sand, 138-158 feet. EY 10 gpm. |
| 24.36.15.222 | Canmex Oil Co. | To | 200 | 3,370 | 181.3 | 3-12-53 | 1937 | 7 | Lw | D | — |
| 22.220 | Continental Oil Co. | Tr | 692 | 3,340 | — | — | — | 8¼ | Li | D | A. H. Meyers "A" well 1. Intake set at about 475 feet. Maximum yield 6 gpm. |
| 23.222 | — | To | — | 3,345 | 147.9 | 3- 6-53 | — | 6¼ | Lw | I | Measurement made inside pipe column. |
| 27.221 | J. R. Wilson | To | — | 3,320 | 122.9 | 3- 6-53 | — | 10 | N | N | — |
| 24.37.5.111 | EPNG | To | 173 | 3,275 | 111 | 9- 8-52 | 1952 | 10¾ | Te | In,D | Jal Plant 4, well 6. |
| 7.431 | Fowler Hair | To | 132M | 3,300 | 119.9 | 3- 6-53 | — | 6¼ | N | N | — |
| 10.123 | Trinity Production Co. | Tr | 747 | 3,260 | 120 | 2- -53 | 1953 | — | Li | In | EY 42 gpm. Chemical analysis in table 8. |
| 14.211 | Fowler Hair | To(?) | 72M | 3,205 | 64.5 | 3- 3-53 | — | 5 | N | N | — |
| 24.37.16.342 | — | To | 106M | 3,235 | 67.7 | 3-11-53 | — | 9 | N | N | — |
| 16.423 | Humble Oil Co. | To | 150 | 3,240 | — | — | 1951 | 6⅝ | Te | D | Fowler-Ellenburger Camp well 1. WBZ 90-150 feet. |
| 17.422 | Fowler Hair | To | 92M | 3,260 | 86.5 | 3- 4-53 | — | 7½ | N | N | — |
| 19.234 | — | To | 124M | 3,290 | 117.4 | 3- 5-53 | — | 10 | Lw | S | — |
| 21.444 | Dollarhide Water Co. | To | 74M | 3,210 | 69.6 | 3- 2-53 | — | 7½ | N | N | — |
| 25.322 | Fowler Hair | To | — | 3,136 | 76.1 | 3- 3-53 | — | 6½ | Lw | D,S | — |
| 34.320 | Plains Production Co. | To | 75±M | 3,160 | 56.8 | 3- 2-53 | — | 12 | N | N | — |
| 25.33.20.443 | — | Tr | — | 3,395 | 200-250 | 8-18-58 | — | 6 | Lw | D,S | — |
| 31.244 | Nick Ritz | Tr | 320 | 3,400 | 257.5 | 7-26-54 | — | 8 | Lw | S | — |
| 25.34.1.132 | Madera Ranch | Tr | 300+ | 3,385 | 231.0 | 4-15-53 | — | 6 | N | N | — |

PERMIAN BRINE SALES, INC.

JAL BRINE STATION

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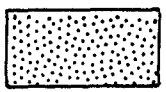
# GEOLOGIC & HYDROLOGIC FIGURES

## EXPLANATION



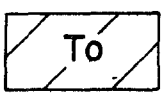
Sand

*Thin cover of drift sand in most places; locally dunes 20-40 feet high*

Qal

Alluvium

*Sand and gravel along dry washes; silt and sand in lake beds; includes some wind-deposited sand around depressions*




Ogallala formation

*Chiefly sand, poorly to well-cemented with calcium carbonate; contains some clay, silt, and gravel; capped in most places by caliche*

Pleistocene and Recent

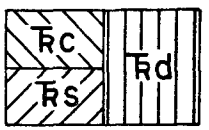
Pliocene

QUATERNARY

TERTIARY

Cretaceous rocks, undifferentiated

*Slumped blocks of buff, tan, or white fossiliferous limestone*




Dockum group

TRc-*Chinle formation, red and green claystone, minor siltstone, and fine-grained sandstone;* TRs-*Santa Rosa sandstone, red to white poorly sorted, coarse-grained, crossbedded sandstone;* TRd-*rocks of the Dockum group, undifferentiated*

Upper Triassic

—— 3500 ——

Contours on the red-bed surface

*Dashed where approximate or inferred. Contour interval 50 feet. Datum mean sea level*

CRETACEOUS

TRIASSIC

FIG. 1 EXPLA.

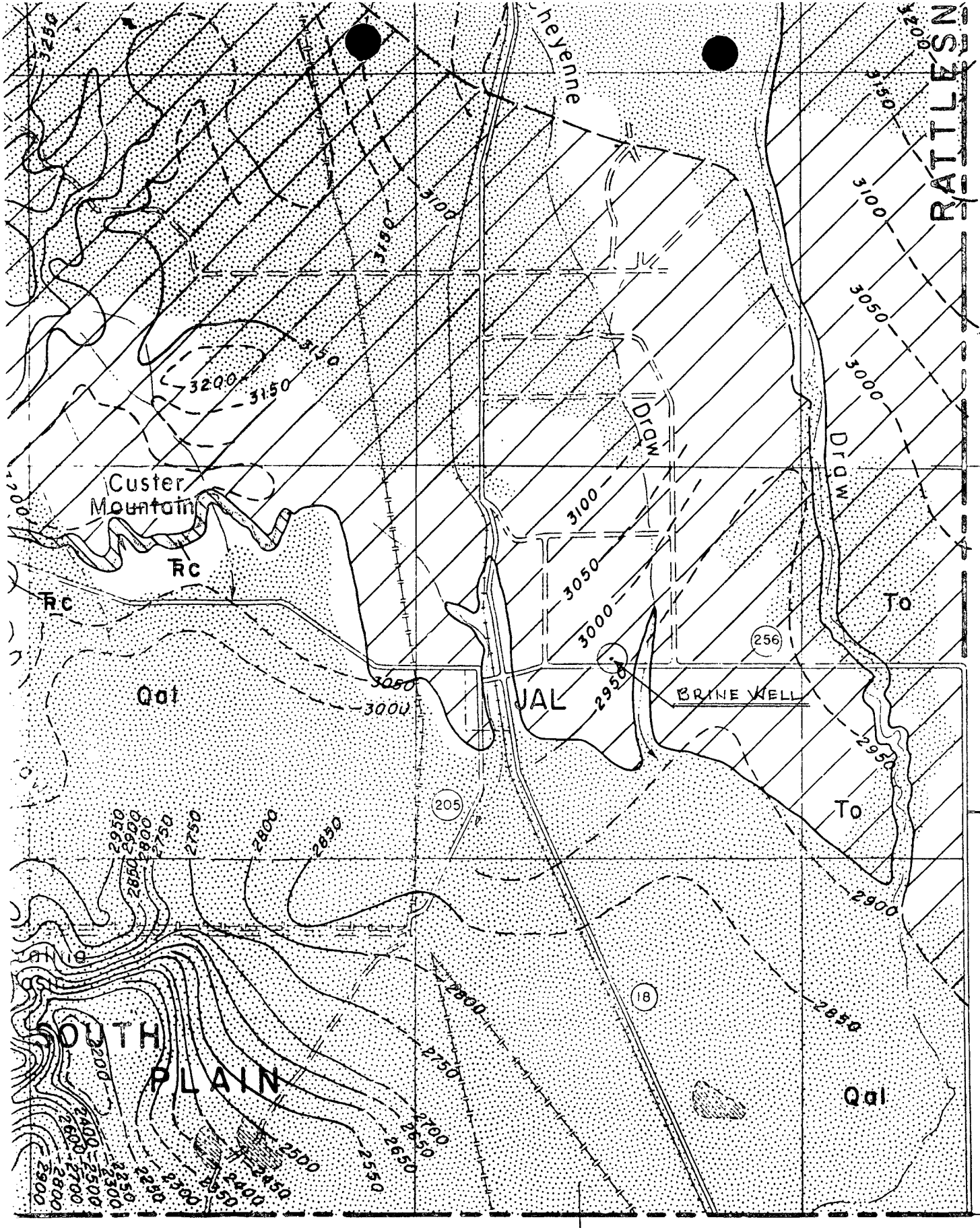



FIG. 1

WINKLER COUNTY

SCALE 1" = 2 MILES

Geology by Alexander Nicholson, Jr., 1953
Contours on buried red-bed surface
compiled by Alexander Nicholson, Jr.,
Alfred Clebsch, Jr., and S. R. Ash from

# EXPLANATION

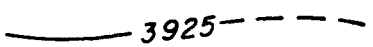
$\frac{150}{252}$ ○

Water well

*Upper figure is depth to water; lower figure is depth of well. Open circles are wells finished in Tertiary or Quaternary rocks; solid circles are wells finished in Triassic rocks*

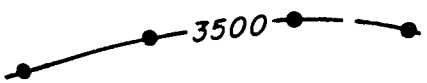
F = Flowing
R = Reported
P = Water level measured while pumping
D = Dry
? = Uncertainty as to aquifer
> = More than
< = Less than

(See tables 6 and 7 for detailed well data.)



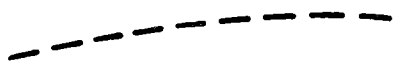

Water-table contour in Tertiary or Quaternary rocks

*Dashed where inferred or uncertain. Contour interval 25 feet. Datum mean sea level*




Water-table or piezometric contour on water body in Triassic aquifers

*Dashed where inferred or uncertain. Contour interval 100 feet. Datum mean sea level*



Approximate position of boundary between Triassic rocks and saturated Tertiary and Quaternary rocks

FIG. 2
EXPLA.

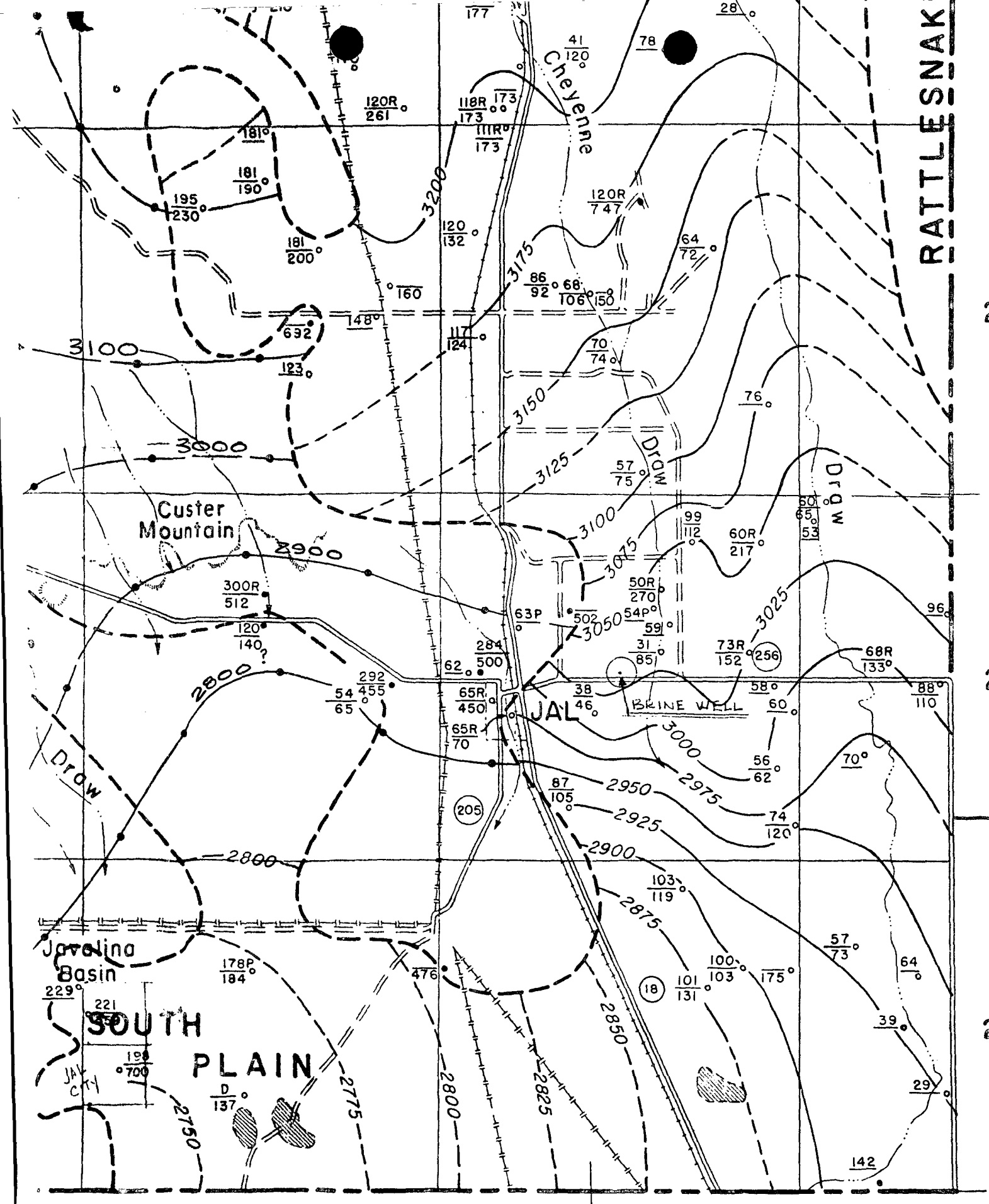

RATTLESNAK
Cheyenne
Custer Mountain
Draw
Draw
Draw
JAL
BRINE WELL
Javelina Basin
SOUTH PLAIN
JAL CITY
3200
3175
3150
3125
3100
3075
3050
3025
3000
2975
2950
2925
2900
2875
2850
2825
2800
2775
2750
T. 24 S.
T. 25 S.
T. 26 S.
R. 36 E.
R. 37 E.
R. 38 E.
SCALE 1" = 2 MILES
103°10'
WINKLER COUNTY

FIG. 2

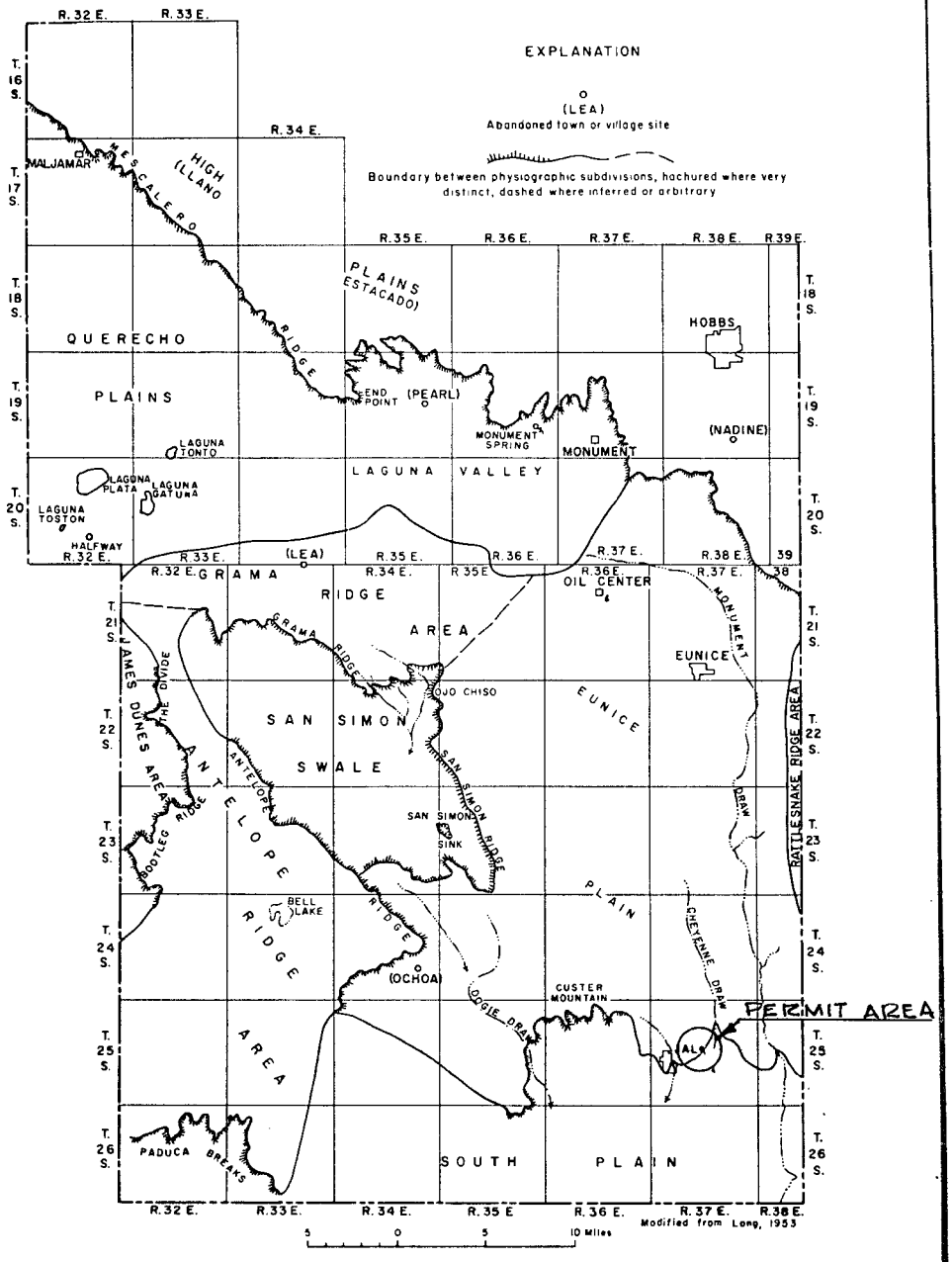



Figure 3

PHYSIOGRAPHIC SUBDIVISIONS OF SOUTHERN LEA COUNTY, N. MEX.

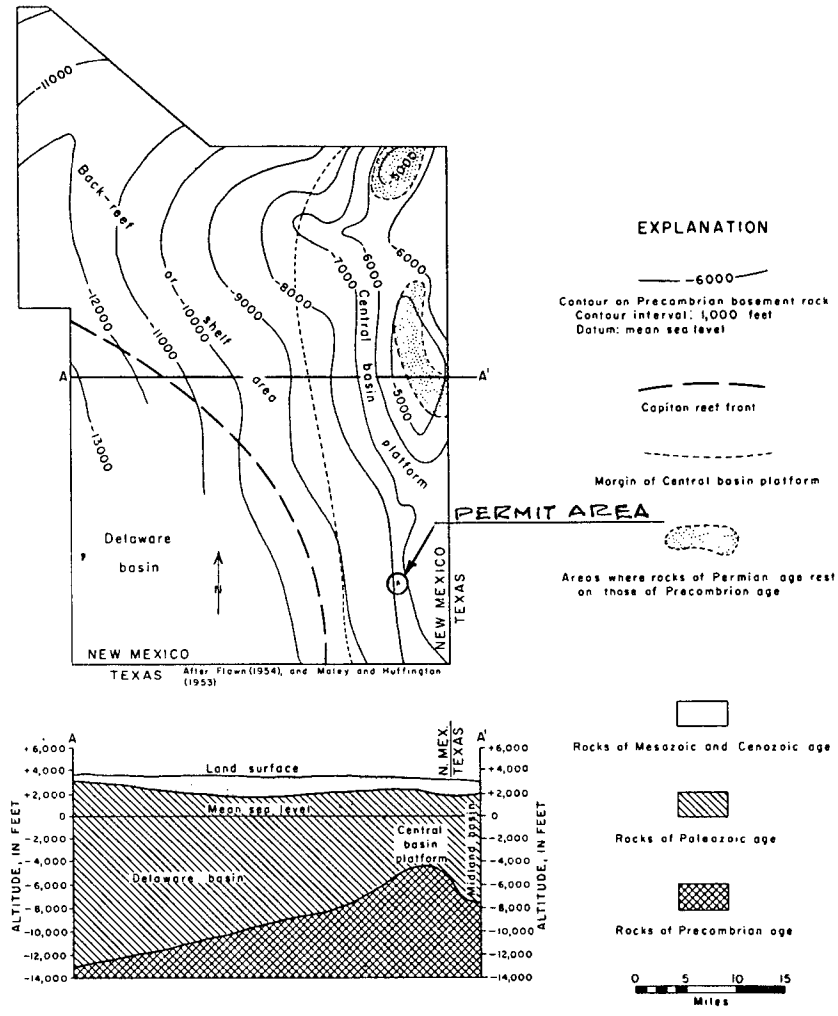



Figure 13

STRUCTURE MAP AND CROSS SECTION OF THE DELAWARE BASIN AND CENTRAL BASIN PLATFORM, LEA COUNTY, N. MEX.

PERMIAN BRINE SALES, INC.

JAL BRINE STATION

---

WELL PLUGGING AND ABANDONMENT
REPORTS

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

| NO. OF COPIES RECEIVED | | |
|---|---|---|
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| SANTA FE | | |
| FILE | | |
| U.S.G.S. | | |
| LAND OFFICE | | |
| OPERATOR | | |

# OIL CONSERVATION DIVISION

P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Form C-103
Revised 10-1-78

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: M14474

## 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.)

OIL WELL [ ] GAS WELL [ ] OTHER- brine

7. Unit Agreement Name:

1. Name of Operator: PERMIAN BRINE SALES, INC.

8. Farm or Lease Name: Arnott Ramsey

2. Address of Operator: Rt. 3 Box 3033 Odessa, Texas 79763

9. Well No.: 2

4. Location of Well: UNIT LETTER P, 165 FEET FROM THE South LINE AND 165 FEET FROM THE East LINE, SECTION 16 TOWNSHIP 25S RANGE 37E NMPM.

10. Field and Pool, or Wildcat: None

15. Elevation (Show whether DF, RT, GR, etc.): 3150 GR

12. County: Lea

16. 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 [X] | REMEDIAL WORK [ ] | ALTERING CASING [ ] |
| TEMPORARILY ABANDON [ ] | | COMMENCE DRILLING OPNS. [ ] | PLUG AND ABANDONMENT [ ] |
| PULL OR ALTER CASING [ ] | CHANGE PLANS [ ] | CASING TEST AND CEMENT JOB [ ] | |
| OTHER [ ] | | OTHER [ ] | |

17. 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.

The well was never converted to a fresh water well. It is now proposed to plug the well by setting a cast iron bridge plug, testing the casing to 200 PSIG, and then filling the casing with cement.

CIBP - 1140 (WELL DATA)
Converted to Surface by UNIVERSAL (KERMIT)

TONY & EDDIE SAW WORK

THE [illegible] MUST BE NOTIFIED 24 [illegible] OR TO THE BEGINNING OF [illegible] WORK ON THE C-103

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

SIGNED W. L. Anderson TITLE President DATE 5/11/83

ORIGINAL SIGNED BY JERRY SEXTON
DISTRICT I SUPERVISOR

APPROVED BY _____ TITLE _____ DATE MAY 19 1983

CONDITIONS OF APPROVAL, IF ANY:

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

| NO. OF COPIES RECEIVED | | |
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| U.S.G.S. | | |
| LAND OFFICE | | |
| OPERATOR | | |

# OIL CONSERVATION DIVISION

P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Form C-103
Revised 10-1-78

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: M 14474

## 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.)

7. Unit Agreement Name:

OIL WELL [ ] GAS WELL [ ] OTHER- BRINE WELL

1. Name of Operator: PERMIAN BRINE SALES, INC.

8. Farm or Lease Name: ARNOTT RAMSEY

2. Address of Operator: RT. 3 BOX 3033 ODESSA, TEXAS 79763

9. Well No.: 3

4. Location of Well: UNIT LETTER P, 220 FEET FROM THE SOUTH LINE AND 465 FEET FROM THE EAST LINE, SECTION 16 TOWNSHIP 25 S RANGE 37 E NMPM.

10. Field and Pool, or Wildcat: NONE

15. Elevation (Show whether DF, RT, GR, etc.): 3150 GL

12. County: LEA

16. 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 | [X] | REMEDIAL WORK | [ ] | ALTERING CASING | [ ] |
| TEMPORARILY ABANDON | [ ] | | | COMMENCE DRILLING OPNS. | [ ] | PLUG AND ABANDONMENT | [ ] |
| PULL OR ALTER CASING | [ ] | CHANGE PLANS | [ ] | CASING TEST AND CEMENT JOB | [ ] | | |
| OTHER | [ ] | | | OTHER | [ ] | | |

17. 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.

SET CIBP AT 1145 FEET, CIRCULATED CEMENT TO SURFACE INSIDE CASING. LAID DOWN TUBING. FILLED CASING BACK UP WITH CEMENT. WELDED PLATE AND MARKER ON CASING.

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

SIGNED O. L. Anderson TITLE PRESIDENT DATE AUGUST 30, 1983

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

PERMIAN BRINE SALES, INC.

JAL BRINE STATION

---

# WATER ANALYSES

Robert.

# WATER ANALYSIS REPORT

NL

NL Testing Chemicals/Petrolite Corp.
P.O. Box 4428, Houston, Texas 77210

Permian Brine
COMPANY

PHONE NUMBER

DATE 4-24-84

FIELD

COUNTY OR PARISH

STATE New Mexico

LEASE OR UNIT Jal

WELL(S) NAME OR NO. 1# MONITOR WELL

WATER SOURCE (FORMATION)

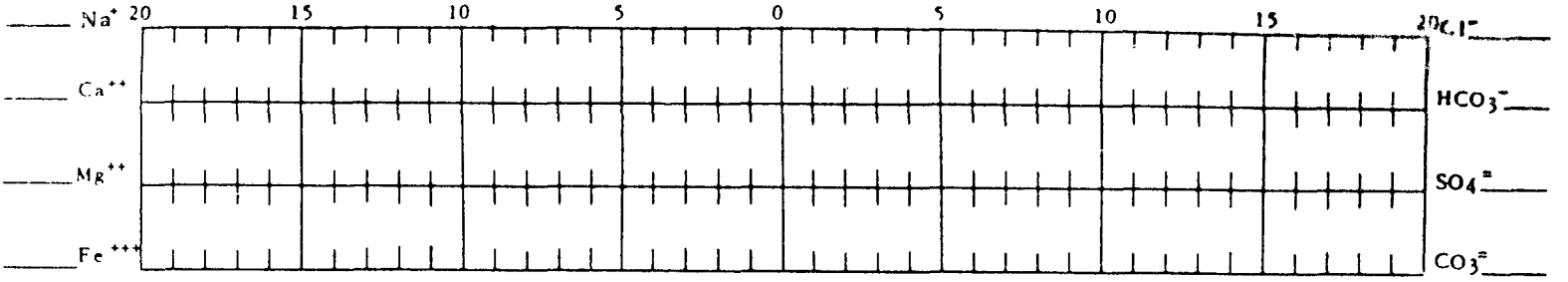
| DEPTH, FT. | BHT, F | SAMPLE SOURCE | TEMP, F | WATER, BBL/DAY | OIL, BBL/DAY | GAS, MCF/DAY |
|---|---|---|---|---|---|---|
| | | | | | | |

DATE SAMPLED

TYPE OF WATER
☐ PRODUCED ☐ SUPPLY ☐ WATERFLOOD ☐ SALT WATER DISPOSA

## WATER ANALYSIS PATTERN

(NUMBER BESIDE ION SYMBOL INDICATES me/l* SCALE UNIT)




## DISSOLVED SOLIDS

| CATIONS | me/l* | mg/l* |
|---|---|---|
| Total Hardness | 7.2 | |
| Calcium, Ca++ | .2 | 4.0 |
| Magnesium, Mg++ | 1.0 | 12.2 |
| Iron (Total) Fe+++ | | |
| Barium, Ba++ | | |
| Sodium, Na+ (calc.) | 21 | 483.0 |
| | | |

| ANIONS | | |
|---|---|---|
| Chloride, Cl- | 11.3 | 400.0 |
| Sulfate, SO4 | 4.4 | 212.5 |
| Carbonate, CO3 | | |
| Bicarbonate, HCO3 | 6.5 | 396.5 |
| Hydroxyl, OH | | |
| Sulfide, S- | 21 | |

## DISSOLVED GASES

| | |
|---|---|
| Hydrogen Sulfide, $H_2S$ | _____ mg/l* |
| Carbon Dioxide, $CO_2$ | _____ mg/l* |
| Oxygen, $O_2$ | _____ mg/l* |

## PHYSICAL PROPERTIES

| | |
|---|---|
| pH | 7.8 |
| Eh (Redox Potential) | _____ MV |
| Specific Gravity | |
| Turbidity, JTU Units | |
| Total Dissolved Solids (calc.) | 1025 mg/l* |
| Stability Index @____F | |
| @____F | |
| $CaSO_4$ Solubility @____F | _____ mg/l* |
| @____F | _____ mg/l* |
| Max. $CaSO_4$ Possible (calc.) | _____ mg/l* |
| Max. $BaSO_4$ Possible (calc.) | _____ mg/l* |
| Residual Hydrocarbons | _____ ppm(Vol/Vo |

CONDUCTANCE 11,000 MMHOS

## SUSPENDED SOLIDS (QUALITATIVE)

Iron Sulfide ☐ Iron Oxide ☐ Calcium Carbonate ☐ Acid Insoluble ☐

*NOTE: me/l and mg/l are commonly used interchangeably for epm and ppm respectively. Where epm and ppm are used, corrections should be made for specific gravity.

*REMARKS AND RECOMMENDATIONS:*

change bal OK

received
4-30-84

| BTC ENGINEER | DIST. NO. | ADDRESS | OFFICE PHONE | HOME PHONE |
|---|---|---|---|---|
| | | | | |

ANALYZED (Perry) DATE 4/30/84 DISTRIBUTION ☐ CUSTOMER ☐ AREA OR ☐ DISTRICT OFFICE ☐ BTC ENGINEER ☐ FILE ☐ BTC SALES SUPERVISOR

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

Joseph Goldberg
SECRETARY
Ted Guambana
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

April 17, 1984

"Mac" McCutchin, Geologist
Permian Brine Sales, Inc.
P.O. Box 1591
Odessa, TX 79760

Dear Mr. McCutchin:

I am sending you the draft of an outline that I have put together to help guide the preparation of discharge plans for brine wells. Please note that this outline is subject to change - in fact, after our telephone conversation last week I altered the language of Section III.C.2 to clarify the matter of "area of review." Also, note that this outline is only intended as a guide: you need not prepare a discharge plan according to this format. The codes in bold type throughout the outline refer to Sections in the Water Quality Control Commission Regulations that apply to brine wells: these regulations are your ultimate guide as to what to include in the discharge plan application.

Sincerely,

Paige Grant

Paige Grant
Water Resource Specialist
Ground Water Section

PG:egr

Enclosure

msz

# PERMIAN BRINE SALES, INC.

**24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN**

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531


March 30, 1984


RECEIVED

APR 05 1984

GROUND WATER/HAZARDOUS WASTE BUREAU


Paige Grant
Environmental Improvement Division
Box 968
Sante Fe, New Mexico 87504-0968

RE: In response to your letter of February 20, 1984.

Dear Mr. Grant:

Thank you for your letter advising us of our permit status. We will work with your department in every way to assure a smooth transfer of permit responsibility. We are already preparing our section 5 application.

In response to your next to final paragraph, the Arnott-Ramsay #2 and #3 wells were plugged in July of 1983. Cast iron bridge plugs were set (1,140' in #2 and 1,145' in #3), the casings were tested to 200 P.S.I., and the entire well bores were filled with cement. Tony Plattsmier of the N.M.O.C.C. witnessed most of the procedures.

If you have any question, please call me at 915-332-0531.

Sincerely,

PERMIAN BRINE SALES, INC.

R.D. Hickerson
Operations Manager

RDH/rdt

STATE OF NEW MEXICO
# ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

TONEY ANAYA
GOVERNOR

March 13, 1984

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88240
(505) 393-6161

Permian Brine Sales
Route 3, Box 3033
Odessa, Texas 79763

SUBJECT: Final Inspection Plugged Brine Wells
Arnott Ramsey #2-P 16-25-37
Arnott Ramsey #3-P 16-25-37

Gentlemen:

In response to your notice that the above-listed brine wells were ready for final inspection, our Field Inspector checked the surface location on March 9, 1984. It was observed that you did not have the regulation dry-hole marker installed. This should be corrected.

The regulation of brine wells has been transferred from the Oil Conservation Division to the EID. When the above has been corrected you should notify Mr. Dave Boyer with the EID in Santa Fe at: P.O. Box 968, Santa Fe, NM 87504 (Phone 505-984-0020)

Very truly yours,

OIL CONSERVATION DIVISION

Jerry Sexton
Supervisor, District I

ed

cc: File
Mr. Dave Boyer

RECEIVED
MAR 14 1984
GROUND WATER/HAZARDOUS WASTE
BUREAU

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO

ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

ROBERT McNEILL
SECRETARY

ROBERT L. LOVATO, M.A.P.A.
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

P 506 253 751

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

*(See Reverse)*

| | |
|---|---|
| Sent to A L Hickerson | |
| Street and No. P.O. Box 1591 | |
| P.O., State and ZIP Code Odessa, TX 79760 | |
| Postage | $ |

February 20, 1984

Mr. A.L. Hickerson, President
Permian Brine Sales, Inc.
P.O. Box 1591
Odessa, TX 79760

Dear Mr. Hickerson:

For your information, the responsibility for regulating brine extraction wells in the state of New Mexico was transfered in September, 1983 from the Oil Conservation Division (OCD) of the Energy and Minerals Department, to the Environmental Improvement Division (EID) of the Health and Environment Department.

The transfer will probably have no effect on your operation until 1986, when, if you plan to continue producing brine at your facility, you will need to start the process of applying for renewed approval of your discharge plan. Your present approval expires December 18, 1987, five years after the date the plan was approved.

At that time, you will need to prepare a discharge plan which includes the elements required under Section 5 as well as Section 3 of the Water Quality Control Commission (WQCC) Regulations (copy enclosed). Prior to December 20, 1982, a discharge plan consisted of only those elements listed in Section 3. Section 5 was added to the regulations in order to comply with federal Environmental Protection Agency (EPA) regulations to protect drinking water from pollution that might occur due to injection of fluids underground. The preparation of a Part 5 UIC application will require you to provide considerably more technical information than was needed for Part 3 discharge plan approval. It is for this reason that we recommend you begin to prepare your discharge plan renewal about eighteen months before the date that you current permit lapses. This should allow ample time for preparation, review, correction and final submittal of your new plan.

In the meantime, you are required to operate your facility in compliance with the standards of Section 3 of the WQCC Regulations. As time permits, we will

undertake a review of your present discharge plan and your field operation, to assure that it meets those standards.

I do have one question regarding your wells Arnott-Ramsay #2 and #3, both in T25S, R37E, Section 16, SW¼SW¼SW¼. These are listed in the 1982 report by Lee Wilson and Associates, UIC Evaluation of Salt Extraction Wells in New Mexico (prepared for OCD), as abandoned wells. Please describe the procedures used to plug these wells prior to abandonment.

If you have any questions or require further information, please contact me at the above address and telephone number (ext. 285).

Sincerely,

Paige Grant

Paige Grant
Hydrologist
Ground Water Section

PG:egr

Enclosure

cc: John Guinn, EID District IV, Manager
EID Field Office, Hobbs
Joe Ramey, Director, OCD

DTB

NOTICE OF PUBLICATION

STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION

SANTA FE, NEW MEXICO

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission Regulations, the following proposed discharge plan has been submitted for approval to the Director of the Oil Conservation Division, P. O. Box 2088, State Land Office Building, Santa Fe, New Mexico 87501, telephone (505) 827-3260.

PERMIAN BRINE SALES, INC., P. O. Box 1591, Odessa, Texas 79760, telephone (915) 332-0531, Al Hickerson requests approval of their discharge plan for their brine in situ extraction wells and facilities located in: Section 16, Township 25 South, Range 37 East, Lea County; Section 17, Township 22 South, Range 27 East, Eddy County; and Section 24, Township 18 South, Range 28 East, NMPM, Eddy County, New Mexico. Permian Brines Sales, Inc. injects water down their injection well to an underlying salt formation thereby dissolving the salt, forming a brine water solution with a total dissolved solids content of approximately 300,000 mg/L. Permian Brine Sales, Inc. extracts and sells the brine water solution to various companies for use in oil and gas production.

Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. Prior to ruling on any proposed discharge plan or its modification, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and a public hearing may be requested by any interested person. Requests for a public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the Director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN Under the Seal of the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 12th day of November, 1982.

STATE OF NEW MEXICO

OIL CONSERVATION DIVISION

JOE D. RAMEY

Director

S E A L

STATE OF NEW MEXICO
# ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

December 18, 1982

Permian Brine Sales, Inc.
P. O. Box 1591
Odessa, Texas 79760

Re: GWB-6 Discharge Plan

Gentlemen:

The Discharge Plan submitted for the brine production facility and in site extraction well located in Section 16, Township 25 South, Range 37 East, NMPM, Eddy County, New Mexico, is hereby approved.

The discharge plan was submitted pursuant to section 3-106 of the Water Quality Control Commission regulations. It is approved pursuant to section 109. Please note subsections 3-109.E and 3-109.F which provide for possible future amendment of the plan. Please also be advised that the approval of this plan does not relieve you of liability should your operation result in actual pollution of surface or ground waters which may be actionable under other laws and/or regulations.

Yours very truly,

JOE D. RAMEY
Director

JDR/jc

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

P. O. BOX 1591

ODESSA, TEXAS
79760

PHONE 332-0531



RECEIVED
JAN - 7 1983
OIL CONSERVATION DIVISION
SANTA FE


January 3, 1983

State of New Mexico
Energy and Minerals Department
Oil Conservation Division
Box 2088
Santa Fe, New Mexico 87501

Attn: Joe D. Ramey. Division Director

Te: GWB-6 Discharge Plan

Dear Mr. Ramey:

This will acknowledge your letter of December 18, 1982, which was in response to our application for a discharge plan for in SITU brine extraction well at our Jal, New Mexico station. Copies of this correspondence is attached. As indicated by red underlining, we wish to correct the location of this station, in contrast to that which your letter refers: namely,

Section 16, Township 25 South, Range 37 East,
Lea County, New Mexico

Should you feel that additional information is required, please do not hesitate to contact me.

Very truly yours,
PERMIAN BRINE SALES, INC.

A.L. HICKERSON
PRESIDENT

ALH/lah
Attached

STATE OF NEW MEXICO
# ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

RECEIVED
JAN - 7 1983
OIL CONSERVATION DIVISION
SANTA FE

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

December 18, 1982

Permian Brine Sales, Inc.
P. O. Box 1591
Odessa, Texas 79760

Re: GWB-6 Discharge Plan

Gentlemen:

The Discharge Plan submitted for the brine production facility and ~~in site extraction well located~~ in Section 16, Township 25 South, Range 27 East, NMPM, Eddy County, New Mexico, is hereby approved.

Corr 37 EAST LEA "

The discharge plan was submitted pursuant to section 3-106 of the Water Quality Control Commission regulations. It is approved pursuant to section 109. Please note subsections 3-109.E and 3-109.F which provide for possible future amendment of the plan. Please also be advised that the approval of this plan does not relieve you of liability should your operation result in actual pollution of surface or ground waters which may be actionable under other laws and/or regulations.

Yours very truly,

JOE D. RAMEY
Director

JDR/jc

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

P. O. BOX 1591 ODESSA, TEXAS 79760 PHONE 332-0531



RECEIVED
JAN - 7 1983
OIL CONSERVATION DIVISION
SANTA FE


November 8, 1982

State of New Mexico
Energy and Minerals Department
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

Attention: Mr. Joe D. Ramey
Division Director

Dear Sir:

Pursuant to your letter of September 9, 1982, and to subsequent telephone conversations with Mr. Oscar Simpson, attached hereto is a filing of a discharge plan for an in situ extraction well for brine. This filing is for the well located in:

Section 16, Township 25 South,
Range 37 East in Lea County.

If additional information is required, please call me.

Very truly yours,

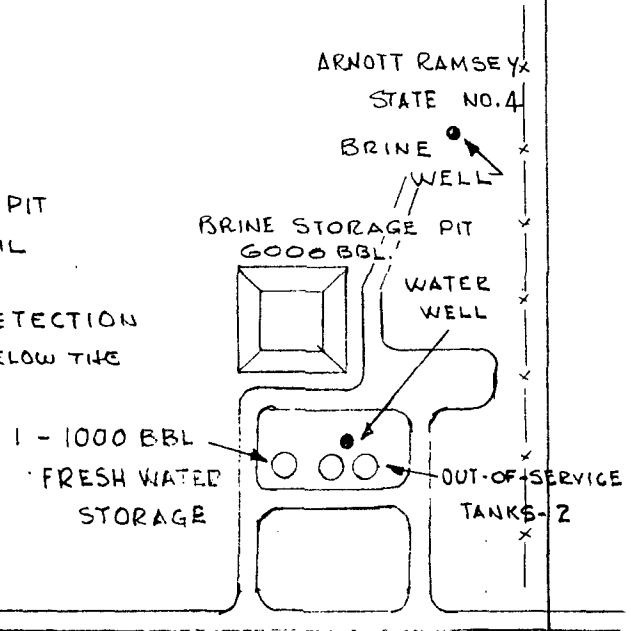
PERMIAN BRINE SALES, INC.

A.L. Hickerson
President

ALH/rdt
Attachment

CC/Mr. Cecil Brown
Unichem, Inc.

THE BRINE STORAGE PIT
IS LINED WITH 30 MIL
DUPONT HYPALON.
THERE IS A LEAK DETECTION
SYSTEM INSTALLED BELOW THE
FLOOR OF THE PIT



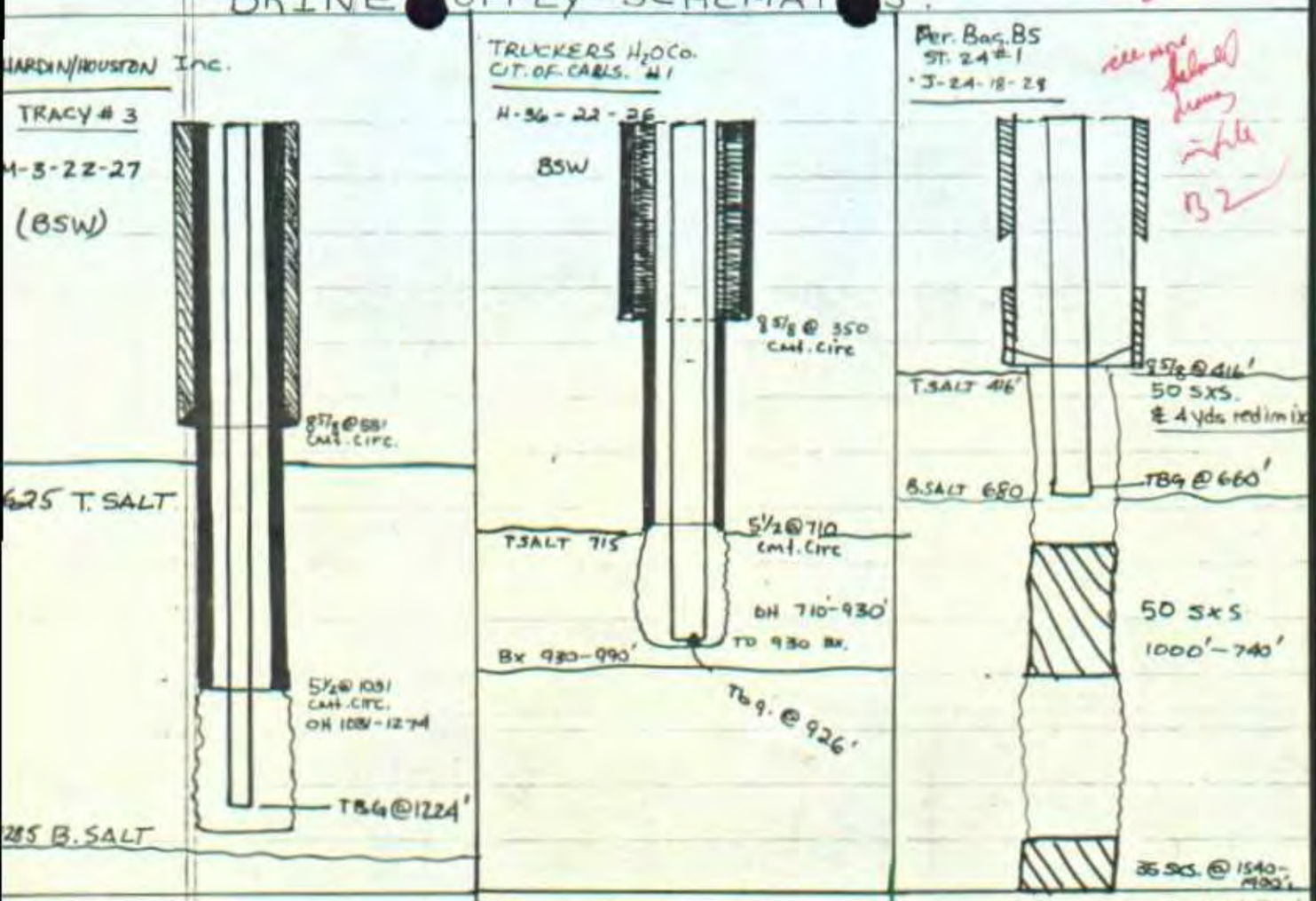

ST. HWY. 128

SE/4 SE/4 SEC. 16
RGE. 37 E TWP. 25 S
LEA CO. NEW MEX.

SCALE 1" = 200'

| PERMIAN BRINE SALES, INC.<br>ODESSA, TEXAS | | |
|---|---|---|
| JAL BRINE STATION | | |
| DATE: 11-5-82 | R.C. McCUTCHAN<br>P.E. TEX. 9844 | DRAWING NO.<br>1 |

# BRINE SUPPLY SCHEMATICS:




Communication by Fracture

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

P. O. BOX 1591 ODESSA, TEXAS 79760 PHONE 332-0531


November 8, 1982

State of New Mexico
Energy and Minerals Department
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

Attention: Mr. Joe D. Ramey
Division Director

Dear Sir:

Pursuant to your letter of September 9, 1982, and to subsequent telephone conversations with Mr. Oscar Simpson, attached hereto is a filing of a discharge plan for an in situ extraction well for brine. This filing is for the well located in:

Section 16, Township 25 South,
Range 37 East in Lea County.

If additional information is required, please call me.

Very truly yours,

PERMIAN BRINE SALES, INC.

A.L. Hickerson
President

ALH/rdt
Attachment

CC/Mr. Cecil Brown
Unichem, Inc.

# JAL BRINE STATION

The Jal Brine Station is located in the SE/4, SE/4 Section 16, Township 25 South, Range 37 East, Lea County, New Mexico. This station is approximately 2 1/2 miles East of Jal on State Highway 128. See map 1 and drawing No. 1, attached.

The pumping rate is 40 GPM at 175 PSI pressure. The brine well, designated as Arnott Ramsey State No. 4 is located 515' FSL and 100' FEL. Section 16. It was drilled to a total depth of 1591', plugged back to 1582'. 1258' of 5 1/2" O.D., 17#/ft., casing was set and 400 sacks of cement were circulated. 1582' of 2 7/8" tubing was hung in the hole. Opposite the exposed salt section.

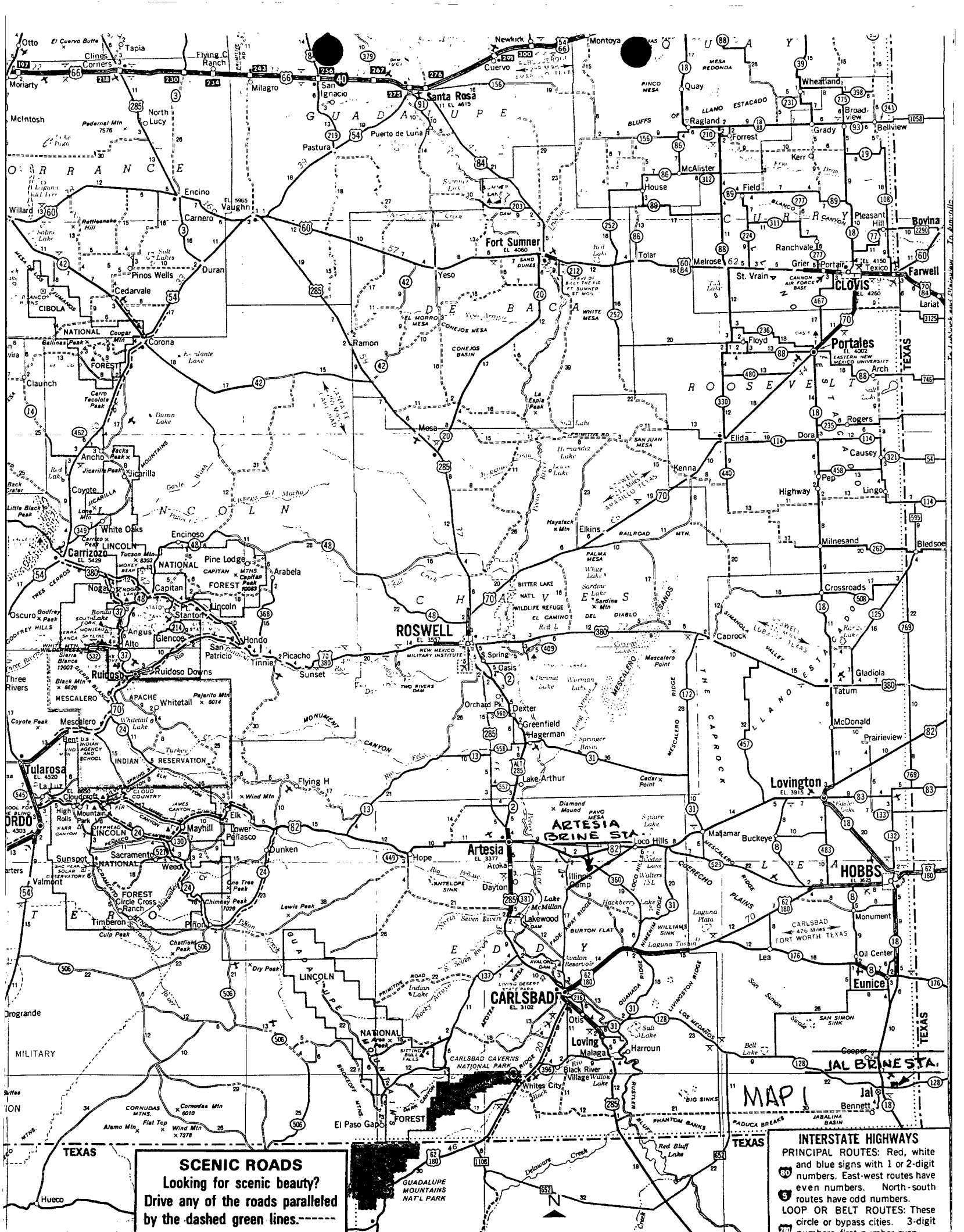
The Fresh Water well #1 is 460' deep and has a TDS concentration of 900 PPM.

The Jal Brine Station site is located on the typical Southeast New Mexico plains. No major elevation changes in this area and the highway barrow ditches adequately carry the meager precipitation that occurs at this location.

Sample connections are located on the well heads and fresh water samples are also available at the storage tank.

See exhibit 1, attached drillers log showing the lithological character of the underground formations at this site.

The water well at the station site will provide a monitoring facility.


SCENIC ROADS
Looking for scenic beauty?
Drive any of the roads paralleled by the dashed green lines.------
INTERSTATE HIGHWAYS
PRINCIPAL ROUTES: Red, white and blue signs with 1 or 2-digit numbers. East-west routes have even numbers. North-south routes have odd numbers.
LOOP OR BELT ROUTES: These circle or bypass cities. 3-digit
MAP 1
ROSWELL
CARLSBAD
ARTESIA
Artesia
Lakewood
Hope
Dayton
Atoka
Illinois Camp
Loco Hills
Maljamar
Buckeye
HOBBS
Lovington
Tatum
Gladiola
McDonald
Prairieview
Crossroads
Caprock
Milnesand
Bledsoe
Elkins
Kenna
Elida
Dora
Causey
Rogers
Pep
Highway
Lingo
Portales
Floyd
Arch
Fort Sumner
Yeso
Ramon
Mesa
Tolar
Melrose
Grier
Portair
Texico
CLOVIS
Farwell
Lariat
Bovina
Ranchvale
St. Vrain
Pleasant Hill
Field
House
McAlister
Quay
Wheatland
Broadview
Bellview
Grady
Forrest
Kerr
Ragland
Santa Rosa
Puerto de Luna
Pastura
Encino
Vaughn
Willard
Carnero
Duran
Pinos Wells
Cedarvale
CIBOLA
NATIONAL FOREST
Corona
Claunch
Ancho
Jicarilla
Coyote
White Oaks
Encinoso
Carrizozo
Pine Lodge
Arabela
Capitan
Lincoln
Stanton
Noga
Oscuro
Alto
Angus
Glencoe
Hondo
San Patricio
Picacho
Tinnie
Sunset
Ruidoso
Ruidoso Downs
Three Rivers
Mescalero
Whitetail
Tularosa
La Luz
Cloudcroft
High Rolls
Mountain Park
Mayhill
Elk
Lower Peñasco
Dunken
Sacramento
Weed
Sunspot
Valmont
Timberon
Piñon
Circle Cross Ranch
Flying H
Wind Mtn
Orchard Pk.
Dexter
Greenfield
Hagerman
Lake Arthur
Oasis
S. Spring
Picosa
Mescalero Point
Cedar Point
Diamond Mound
Pavo Mesa
Square Lake
Illinois Camp
Lake McMillan
Walters
Monument
Oil Center
Lea
Eunice
Hobbs
Seven Rivers
Otis
Loving
Malaga
Harroun
Black River Village
Whites City
Carlsbad Caverns National Park
Guadalupe Mountains Nat'l Park
El Paso Gap
Cornudas Mtns.
Cornudas
Wind Mtn
Flat Top
Alamo Mtn.
Hueco
Delaware Creek
Red Bluff Lake
Bell Lake
Jal
Bennett
Jal Brine Sta.
Cooper
San Simon
Salt Lake
Lake Arrowhead
Avalon Reservoir
Lake Carlsbad
Indian Lake
Brantley Lake
Sumner Lake
Ute Lake
Conchas Lake
Tucumcari
Amarillo
Clovis
Portales
Roswell
Carlsbad
Hobbs
Lovington
Artesia
Alamogordo
El Paso
Las Cruces
Albuquerque
Santa Fe
Gallup
Farmington
Silver City
Deming
Lordsburg
Socorro
Truth or Consequences
Gallup
Grants
Los Alamos
Taos
Raton
Las Vegas
Clayton
Tucumcari
Logan
Newkirk
Montoya
Cuervo
Milagro
San Ignacio
Flying C Ranch
Clines Corners
Moriarty
Otto
Tapia
McIntosh
North Lucy
Encino
Vaughn
Willard
Carnero
Duran
Pinos Wells
Cedarvale
CIBOLA
NATIONAL FOREST
Corona
Claunch
Ancho
Jicarilla
Coyote
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Encinoso
Carrizozo
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Lincoln
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San Patricio
Picacho
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Ruidoso Downs
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Pavo Mesa
Square Lake
Illinois Camp
Lake McMillan
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Oil Center
Lea
Eunice
Hobbs
Seven Rivers
Otis
Loving
Malaga
Harroun
Black River Village
Whites City
Carlsbad Caverns National Park
Guadalupe Mountains Nat'l Park
El Paso Gap
Cornudas Mtns.
Cornudas
Wind Mtn
Flat Top
Alamo Mtn.
Hueco
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Sumner Lake
Ute Lake
Conchas Lake
Tucumcari
Amarillo
Clovis
Portales
Roswell
Carlsbad
Hobbs
Lovington
Artesia
Alamogordo
El Paso
Las Cruces
Albuquerque
Santa Fe
Gallup
Farmington
Silver City
Deming
Lordsburg
Socorro
Truth or Consequences
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Grants
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Taos
Raton
Las Vegas
Clayton
Tucumcari
Logan
Newkirk
Montoya
Cuervo
Milagro
San Ignacio
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Clines Corners
Moriarty
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Capitan
Lincoln
Stanton
Noga
Oscuro
Alto
Angus
Glencoe
Hondo
San Patricio
Picacho
Tinnie
Sunset
Ruidoso
Ruidoso Downs
Three Rivers
Mescalero
Whitetail
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Cloudcroft
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Sunspot
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Orchard Pk.
Dexter
Greenfield
Hagerman
Lake Arthur
Oasis
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Cedar Point
Diamond Mound
Pavo Mesa
Square Lake
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Lake McMillan
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Ute Lake
Conchas Lake
Tucumcari
Amarillo
Clovis
Portales
Roswell
Carlsbad
Hobbs
Lovington
Artesia
Alamogordo
El Paso
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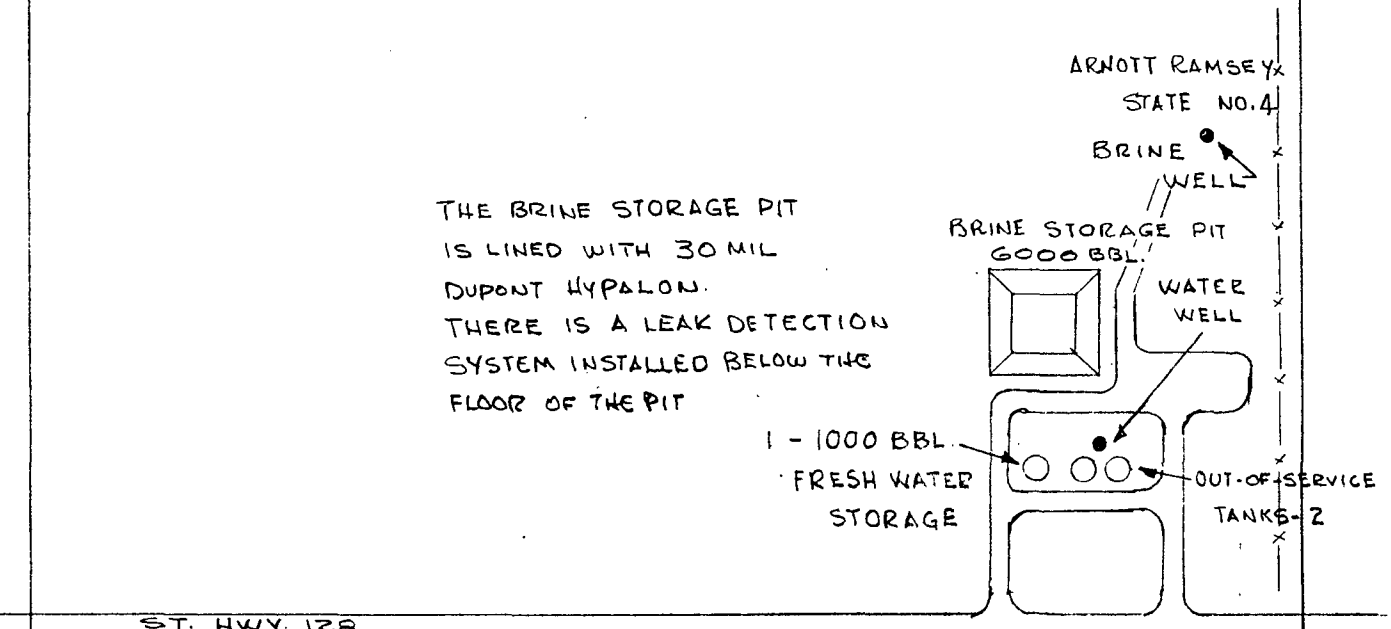
Albuquerque
Santa Fe
Gallup
Farmington
Silver City
Deming
Lordsburg
Socorro
Truth or Consequences
Gallup
Grants
Los Alamos
Taos
Raton
Las Vegas
Clayton
Tucumcari
Logan




THE BRINE STORAGE PIT IS LINED WITH 30 MIL DUPONT HYPALON. THERE IS A LEAK DETECTION SYSTEM INSTALLED BELOW THE FLOOR OF THE PIT

SE/4 SE/4 SEC. 16
RGE. 37 E TWP. 25 S
LEA CO. NEW MEX.

SCALE 1" = 200'

PERMIAN BRINE SALES, INC.
ODESSA, TEXAS

JAL BRINE STATION

| DATE: 11-5-82 | R.C. McCUTCHAN P.E. TEX. 9844 | DRAWING NO. 1 |
|---|---|---|

...on is to be filed with the appropriate District Office of the Commission not later than ... days after the completion of any newly-drilled or ... well. It shall be accompanied by one copy of all electrical and radioactivity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

## INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

| Southeastern New Mexico | | | | Northwestern New Mexico | | | |
|---|---|---|---|---|---|---|---|
| T. Anhy | 1035 | T. Canyon | | T. Ojo Alamo | | T. Penn. "B" | |
| T. Salt | 1155 | T. Strawn | | T. Kirtland-Fruitland | | T. Penn. "C" | |
| B. Salt | | T. Atoka | | T. Pictured Cliffs | | T. Penn. "D" | |
| T. Yates | | T. Miss | | T. Cliff House | | T. Leadville | |
| T. 7 Rivers | | T. Devonian | | T. Menefee | | T. Madison | |
| T. Queen | | T. Silurian | | T. Point Lookout | | T. Elbert | |
| T. Grayburg | | T. Montoya | | T. Mancos | | T. McCracken | |
| T. San Andres | | T. Simpson | | T. Gallup | | T. Ignacio Qtzte | |
| T. Glorieta | | T. McKee | | Base Greenhorn | | T. Granite | |
| T. Paddock | | T. Ellenburger | | T. Dakota | | T. | |
| T. Blinebry | | T. Gr. Wash | | T. Morrison | | T. | |
| T. Tubb | | T. Granite | | T. Todilto | | T. | |
| T. Drinkard | | T. Delaware Sand | | T. Entrada | | T. | |
| T. Abo | | T. Bone Springs | | T. Wingate | | T. | |
| T. Wolfcamp | | T. | | T. Chinle | | T. | |
| T. Penn. | | T. | | T. Permian | | T. | |
| T Cisco (Bough C) | | T. | | T. Penn. "A" | | T. | |

## OIL OR GAS SANDS OR ZONES

No. 1, from ..... to ..... No. 4, from ..... to .....

No. 2, from ..... to ..... No. 5, from ..... to .....

No. 3, from ..... to ..... No. 6, from ..... to .....

## IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from 450 To 475' to 260 feet. .....

No. 2, from ..... to ..... feet. .....

No. 3, from ..... to ..... feet. .....

No. 4, from ..... to ..... feet. .....

## FORMATION RECORD (Attach additional sheets if necessary)

| From | To | Thickness in Feet | Formation | From | To | Thickness in Feet | Formation |
|---|---|---|---|---|---|---|---|
| 0 | 10 | 10 | Caliche | | | | |
| 10 | 60 | 50 | Sand | | | | |
| 60 | 1035 | 975 | Red Beds | | | | |
| 1035 | 1155 | 120 | Rustler Anhydrite | | | | |
| 1155 | 1591 | 436 | Salt With Shale And Anhydrite Stringers | | | | |

EXHIBIT 1

ARNOTT RAMSAY #2
OK 11

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

*.= please attach pertinent documents

ARNOTT RAMSEY #2

I. OPERATOR / LOCATION INFORMATION

Operator PERMIAN BRINE SALES

Address P.O. Box 1591

ODESSA, TEXAS 79760 Phone

Well unit # P Location 165/S 165/E

T. 25 R. 32 Sec. 16 SE 1/4 . SE 1/4 SE 1/4 .444

County LEA

Purpose of well (brine supply, LPG storage, potash dissolution)

BRINE SUPPLY

II. DRILLING / SITING INFORMATION

Contractor Not known

Date drilling started " Date drilling completed "

Drilling method Rotary

Elevation of ground surface 3104 How measured —

Date measured 1-10-64 Order of survey —

Name of surveyor John West

Total depth of hole N.K.

Attach schematic of well, include open hole interval, perforations, etc. *
7" casing to 1100 ft. open hole in salt to T.D.

Type of drilling fluid N.K.

Type of drilling mud if used (brand if known) N.K.

List any additives to the drilling mud, or any other chemicals put down well:

N.K.

Describe casing tests performed N.K.

Other tests N.K.

* = please attach pertinent documents

II. DRILLING / SITING (continued)

Casing, tubing, and cementing record (please attach copy)*

Note: if a copy is not available detail casing record on back of this sheet using the following format. Include brand or type of cement if known.

| From | To | Size of Hole | Size of Casing | Weight per Foot | Sacks of Cement | Estimated Top of cmt. |
|---|---|---|---|---|---|---|
| 0 | 1100 | NK | 7" | NK | NK | Circulated |

Was mudcake on bore wall removed before cementing production casing? NK

Was salt saturated cementing material used opposite salt formation? NK

Is site within 1/2 mile of another well? If so, use note to explain. No

Site preparation (concrete pad, graded dirt, pit, etc) Cellar

Type of surface seal or well-head (locking security cap, welded, etc.) Well Head

Comments (include problems encountered while drilling, loss of circulation, deviation of hole from vertical, centralizers used, tools lost or stuck, fracturing techniques used, etc.) NK

(use back of sheet if more space is required)

* = please attach pertinent documents

## III. FORMATION INFORMATION

Formation Record

| From | To | Thickness | Formation (name, description) |
|---|---|---|---|

Same as NO 4 well

Logs (specify type) None

Identify where logs are on file None

* = please attach pertinent documents

## IV. AQUIFER INFORMATION

Aquifers encountered during drilling

| From | To | Aquifer Description | Amount of Water entering hole | Quality of Water |
|---|---|---|---|---|
| Same as No 3 | | | | |

**Note:** if water quality analyses are available please attach.*

Source of aquifer description NK

Depth at which water was first encountered NK

Depth to which water rose NK

Source of water level data NK

Comments (include information regarding determination of piezometric level and method of sealing off water zone) NK

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

* = please attach pertinent documents

V. PRODUCTION / BRINE STORAGE INFORMATION

Method of production (describe fully) water pumped down Tubing and out annulus

Was well used previously for some purpose other than brine supply, potash dissolution, or LPG storage. If so use note to explain. Brine Supply only

Use of brine Sold for drilling fluid

Source of injection water (be specific) Water well

Attach detailed production history (include dates of production, amount of water injected, injection rates, amount of brine produced, production rates, method of gaging injection/production rates )*

Note: If the cavity was used for LPG storage include volumes of product injected and withdrawn as well as a summary of the maximum and minimum pressures during injection, storage and withdrawal.

Chemical analyses of injection water (attach)*

Note : Chemical analyses should include sampling point and method, pH, temperature, method of analysis, name and location of laboratory, etc.

Chemical analyses of water produced (attach)*

Not Known

* = please attach pertinent documents

V. PRODUCTION / BRINE STORAGE (continued)

Brine storage facilities (describe) steel Tanks

Current condition/status of brine storage pit: Salvaged or converted to fresh water ?

Is brine storage pit currently being monitored for leakage? —

Specify company or agency which is monitoring leakage —

If pit leakage has been monitored in past use note to explain. —

Comments on production history (note if production rates or brine concentrations have changed through time) —

* = please attach pertinent documents

VI. ABANDONMENT / PLUGGING RECORD

Date well abandoned/plugged Not yet plugged *

Reason for well abandonment or plugging Lost circulation

Method of Plugging (describe fully, include amounts of cement, est. top, plug type, depth, etc.) Plan to set cement plug in bottom, middle and top of 7" casing.

VII. Further comments (subsidence noted, subsidence monitoring, leakage noted, natural subsidence features noted nearby, LPG storage data, etc.)

No subsidence
No leakage

Recorded by R. L. Dickerson

Date 11-17-81

PBS - ~~Ed~~ bo get there
after the problem occurred.

Salt plugging in casing

Remedy — caused a fracture
in ? Rustler

TRIED to correct plugging - caused
lost pulls

(possible repeat)

ARNOTT - RAMSAY #3

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

BY 17

*.= please attach pertinent documents

I. OPERATOR / LOCATION INFORMATION ARNOTT RAMSEY #3

Operator PERMIAN BRINE SALES

Address P.O. BOX 1591

ODESSA, TEXAS, 79760 Phone

Well unit # P Location 220/S 460/E

T. 25 R. 37 Sec. 16 SE 1/4 . SE 1/4 SE 1/4 .444

County LEA

Purpose of well (brine supply, LPG storage, potash dissolution)

BRINE SUPPLY

II. DRILLING / SITING INFORMATION

Contractor NOT KNOWN

Date drilling started 11 Date drilling completed 11

Drilling method ROTARY

Elevation of ground surface 3104' How measured —

Date measured 1-10-64 Order of survey —

Name of surveyor JOHN WEST

Total depth of hole 1860

Attach schematic of well, include open hole interval, perforations, etc. *
7" casing cemented to 1223 ft. OPEN HOLE TO 1860 ft.

Type of drilling fluid Water

Type of drilling mud if used (brand if known)

NOT KNOWN

List any additives to the drilling mud, or any other chemicals put down well:

NOT KNOWN

Describe casing tests performed NOT KNOWN

Other tests

* = please attach pertinent documents

II. DRILLING / SITING (continued)

Casing, tubing, and cementing record (please attach copy)*

Note: if a copy is not available detail casing record on back of this sheet using the following format. Include brand or type of cement if known.

| From | To | Size of Hole | Size of Casing | Weight per Foot | Sacks of Cement | Estimated Top of cmt. |
|---|---|---|---|---|---|---|
| 0 | 1230 | 10" | 7" | — | — | Circulated |

Was mudcake on bore wall removed before cementing production casing? Not known

Was salt saturated cementing material used opposite salt formation? N.K.

Is site within 1/2 mile of another well? If so, use note to explain. 400 ft west of No 1 well

Site preparation (concrete pad, graded dirt, pit, etc) Caliche

Type of surface seal or well-head (locking security cap, welded, etc.) Well Head

Comments (include problems encountered while drilling, loss of circulation, deviation of hole from vertical, centralizers used, tools lost or stuck, fracturing techniques used, etc.) We started operating this well in 1975. Records of original drilling are sketchy.

(use back of sheet if more space is required)

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

* = please attach pertinent documents

III. FORMATION INFORMATION

Formation Record

| From | To | Thickness | Formation (name, description) |
|---|---|---|---|

Same as No. 4

Logs (specify type) None

Identify where logs are on file —

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

* = please attach pertinent documents

IV. AQUIFER INFORMATION

Aquifers encountered during drilling

| From | To | Aquifer Description | Amount of Water entering hole | Quality of Water |
|---|---|---|---|---|
| 400 | 500 | Sand | to 200' | fair |

Note: if water quality analyses are available please attach.* None

Source of aquifer description cuttings

Depth at which water was first encountered 400

Depth to which water rose 200'

Source of water level data Sand Zone, measurements

Comments (include information regarding determination of piezometric level and method of sealing off water zone)

Cemented off zone

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

* = please attach pertinent documents

V. PRODUCTION / BRINE STORAGE INFORMATION

Method of production (describe fully) Pumped water down Tubing and circulated brine out 7" - 2 7/8 annulus

Was well used previously for some purpose other than brine supply, potash dissolution, or LPG storage. If so use note to explain. only Brine Supply

Use of brine Sold for drilling fluid

Source of injection water (be specific) Water production well

Attach detailed production history (include dates of production, amount of water injected, injection rates, amount of brine produced, production rates, method of gaging injection/production rates )*

Note: If the cavity was used for LPG storage include volumes of product injected and withdrawn as well as a summary of the maximum and minimum pressures during injection, storage and withdrawal.

Chemical analyses of injection water (attach)*

Note : Chemical analyses should include sampling point and method, pH, temperature, method of analysis, name and location of laboratory, etc.

Chemical analyses of water produced (attach)*

No record of volume of water injected
Brine produced & sold - Volume by truck sales
No record before 1976

1976 - 115,204 BBL
1977 - 293,801 "
1978 - 448,883 "
1979 - 626,072 "
1980 - 740,777 "
2,225,000

No brine analyses available

37,083/mo

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

* = please attach pertinent documents

V. PRODUCTION / BRINE STORAGE (continued)

Brine storage facilities (describe) 2 - 1000 BBL steel tanks

Current condition/status of brine storage pit Tanks salvaged or converted to fresh water storage

Is brine storage pit currently being monitored for leakage? See report on file

Specify company or agency which is monitoring leakage

If pit leakage has been monitored in past use note to explain.

Comments on production history (note if production rates or brine concentrations have changed through time)

Made 100% brine while operating.

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

* = please attach pertinent documents

VI. ABANDONMENT / PLUGGING RECORD

Date well abandoned/plugged Not yet plugged

Reason for well abandonment or plugging Cannot circulate well

Method of Plugging (describe fully, include amounts of cement, est. top, plug type, depth, etc.) plugging application made Well set plugs on bottom middle and top of 7" casing

VII. Further comments (subsidence noted, subsidence monitoring, leakage noted, natural subsidence features noted nearby, LPG storage data, etc.)

No subsidence

Recorded by A. L. Anderson

Date 11-17-81

ARNOTT-RAMSAY ST. #4

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981 B 13 12

*.= please attach pertinent documents

I. OPERATOR / LOCATION INFORMATION ARNOTT-RAMSAY ST #4

Operator PERMIAN BRINE SALES, INC

Address P.O. Box 1591

ODESSA, TEXAS 79760 Phone

Well unit # P Location 515/S 100/E

T. 25 R. 37 Sec. 16 SE 1/4 . SE 1/4 SE 1/4 .444

County LEA

Purpose of well (brine supply, LPG storage, potash dissolution)

BRINE SUPPLY

II. DRILLING / SITING INFORMATION

Contractor PERMIAN BRINE SALES, INC (REVERSE UNIT)

Date drilling started 10-8-80 Date drilling completed 3-10-~~80~~

Drilling method ROTARY

Elevation of ground surface 3104' How measured —

Date measured ~~3-10-64~~ 1-10-64 Order of survey — ??? maybe from map

Name of surveyor John West

Total depth of hole 1582'

Attach schematic of well, include open hole interval, perforations, etc. *
5½" casing cemented to 1269 ft. OPEN HOLE TO 1582 ft.

Type of drilling fluid BRINE

Type of drilling mud if used (brand if known) SALT WATER GEL

List any additives to the drilling mud, or any other chemicals put down well:

NONE

Describe casing tests performed Pressure test to 1000# before drilling cement plug

Other tests Tested to ~~500~~ 1000# after drilling plug.



ARNOTT-RAMSAY STATE #4

* = please attach pertinent documents

II. DRILLING / SITING (continued)

Casing, tubing, and cementing record (please attach copy)*

Note: if a copy is not available detail casing record on back of this sheet using the following format. Include brand or type of cement if known.

| From | To | Size of Hole | Size of Casing | Weight per Foot | Sacks of Cement | Estimated Top of cmt. |
|---|---|---|---|---|---|---|
| 0 | 1269 | 7 7/8 | 5 1/2 | 17# | 400 | circ to 60' |

Was mudcake on bore wall removed before cementing production casing? NO

Was salt saturated cementing material used opposite salt formation? Did not cement through salt section — or even to the interface?

Is site within 1/2 mile of another well? If so, use note to explain. ~~yes~~

350 North of No 2 well

Site preparation (concrete pad, graded dirt, pit, etc) Graded Dirt

Type of surface seal or well-head (locking security cap, welded, etc.) Well Head — Screwed

Comments (include problems encountered while drilling, loss of circulation, deviation of hole from vertical, centralizers used, tools lost or stuck, fracturing techniques used, etc.) No PROBLEMS

(use back of sheet if more space is required)

* = please attach pertinent documents

III. FORMATION INFORMATION

Formation Record

| From | To | Thickness | Formation (name, description) |
|---|---|---|---|

**Section 6** **LOG OF WELL**

| Depth in Feet From | Depth in Feet To | Thickness in Feet | Color | Type of Material Encountered |
|---|---|---|---|---|
| 0 | 25 | 25 | White | Caliche & rock |
| 25 | 60 | 35 | Grey | Sandy shale |
| 60 | 70 | 10 | " | Sand rock |
| 70 | 112 | 42 | Red | Shale |
| 112 | 130 | 18 | " | Red rock |
| 130 | 160 | 30 | " | Sandy shale |
| 160 | 205 | 45 | Grey | Sandy shale |
| 205 | 370 | 165 | Red | Shale |
| 370 | 400 | 30 | Grey | Sandy shale |
| 400 | 500 | 100 | " | Sand, consolidated |
| 500 | 1042 | 642 | RED | RED BEDS |
| 1042 | 1269 | 227 | GRAY | ANHYDRITE - DOLOMITE - SALT |
| 1269 | 1591 | 422 | " | SALT W/ ANHYDRITE STRINGERS |

Logs (specify type) NONE

Identify where logs are on file

* = please attach pertinent documents

IV. AQUIFER INFORMATION

Aquifers encountered during drilling

| From | To | Aquifer Description | Amount of Water entering hole | Quality of Water |
|---|---|---|---|---|
| 400 | 500 | | | |
| 400 | 500 | Sand | to 200' | FAIR |

Note: if water quality analyses are available please attach.* None

Source of aquifer description Cuttings

Depth at which water was first encountered 400'

Depth to which water rose 200'

Source of water level data Sand line measurement

Comments (include information regarding determination of piezometric level and method of sealing off water zone)

Cemented off zone

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

* = please attach pertinent documents

V. PRODUCTION / BRINE STORAGE INFORMATION

Method of production (describe fully) Pumped water down tubing and circulated brine out 5½-7⅞ annulus.

Was well used previously for some purpose other than brine supply, potash dissolution, or LPG storage. If so use note to explain. only brine supply

Use of brine Sold for drilling fluid

Source of injection water (be specific) Water production well

Attach detailed production history (include dates of production, amount of water injected, injection rates, amount of brine produced, production rates, method of gaging injection/production rates )*

Note: If the cavity was used for LPG storage include volumes of product injected and withdrawn as well as a summary of the maximum and minimum pressures during injection, storage and withdrawal.

Chemical analyses of injection water (attach)*

Note : Chemical analyses should include sampling point and method, pH, temperature, method of analysis, name and location of laboratory, etc.

Chemical analyses of water produced (attach)*

~7 month @ 10,000 bbl/mo

No record of volume of water injected
Brine produced 69739 in 1981
(all from this well) Rate 45 gpm Pres 160 #
Volume measured by truck sales
No analyses available of brine or water

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

* = please attach pertinent documents

V. PRODUCTION / BRINE STORAGE (continued)

Brine storage facilities (describe) LINED PIT

Current condition/status of brine storage pit IN SERVICE
CONDITION OK

Is brine storage pit currently being monitored for leakage? YES

Specify company or agency which is monitoring leakage We have open sump pipe for visual observation

If pit leakage has been monitored in past use note to explain.

Comments on production history (note if production rates or brine concentrations have changed through time)
No change
100% saturation

* = please attach pertinent documents

VI. ABANDONMENT / PLUGGING RECORD

Date well abandoned/plugged —

Reason for well abandonment or plugging —

Method of Plugging (describe fully, include amounts of cement, est. top, plug type, depth, etc.) —

VII. Further comments (subsidence noted, subsidence monitoring, leakage noted, natural subsidence features noted nearby, LPG storage data, etc.)

No subsidence
No leakage

Recorded by A. L. Anderson

Date 11-11-81

ADD TO 3-12 file

Mr. Paul Kautz
New Mexico Oil Conservation Commission
P.O. Box 1980
Hobbs, New Mexico 88240

Dear Sir:

Attached is a copy of the workover and attempt to seal the lost circulation zone in the No. 2 brine well.

This work was done by the Permian Corporation, who were owners of the station at that time.

I cannot find a record of the previous work on the well. It is my understanding that the well was plugged and a "kill" truck was used in attempt to un-plug the casing or tubing. At this time circulation was lost and not recovered.

I do not have any record of the work done on the No. 1 well.

If additional information is needed, please let me know.

Very truly yours,
PERMIAN BRINE SALES, INC.

A. L. Hickerson

A.L. HICKERSON
PRESIDENT

ALH/lah
attached

SALINE #2 at JAL, NEW MEXICO

APRIL 1, 1974

7:30 AM m.s.t. - Rig up Clark Well Service - Pull on pipe string to determine if string in tight. Pipe was tight. McCullough was called to run free point. Water level - 600 feet.

12:30 PM m.s.t. - Magnetic free point was run. Due to coating (scale) on pipe string, the magnetic free point was not 100% effective. McCullough Hobbs Yard was notified to bring on the "spring type" free point tool. While waiting on other tool, we pulled twenty times on tubing string, working up to 40,000 pounds after several pulls, each time slacking off completely between pulls.

1:15 PM m.s.t. - Caliper type free point run. Caliper tight in 2 7/8" - Too loose in 4 1/2" - came out of hole with tool.

NOTE: The I.D. of the 7" casing is 7 1/4" - 5 3/8" wash pipe will go in the surface, but will not go over the 5 3/4" tool joints on the 4 1/2" drill pipe.

Put well head manifold on and pumped 15 minutes (90 psi - no return water), then shut down, removed well head - and rigged up for one more caliper (free point) attempt. Tubing now full of water. The water should help the free point tool go through the 2 7/8" tubing. Time is now 3:20 pm m.s.t.

4:55 PM m.s.t. - The caliper type free point tool went through the 2 7/8" after adjusting the caliper diameter to 4" OD, but at that setting the caliper spring tension was not enough to take a reading in the 4 1/2" drill pipe. We came out of the hole - picked up a full joint of 2 7/8. The plan now is to turn the tubing string clockwise 1 3/4 round (tighten). The turn clockwise 1 round and hold torque in that position and fire 200 grains of primer cord from the wire line suspended at the first tool joint below the 2 7/8 x 4 1/2 change-over. (Tool joint we want to break is at 1223' down hole.)
The 7" surface pipe is set to 1229'. The 2 7/8 x 4 1/2 changeover is at 1192'.

Start out with tubing string at 6:00 PM mst and got out at 7:10 PM mst - Shut down with 1223' pipe on the bank (including the one joint of 4 1/2")

SALINE #2 at JAL, NEW MEXICO

APRIL 2, 1974

8:am mst - Pipe (about 1300' plus-minus of X Line 3 1/2" spec. drill pipe) unloaded at 8:35 AM mst. Started at that time picking up subs and 3 1/2" drill pipe.

On bottom at 10:40 am mst, with 3 1/2" drill pipe and fishing sub - Began to fish at 10:42 AM. Fishing continued until 11:30 AM. We touched the fish 20' lower than expected, thus indicating that the fish may have slipped sideways and the top of the 4 1/2" drill pipe could have slipped out of the 7" surface pipe. Pipe talley indicated verification of this. Wind is now approaching 50 MPH with excessive dust. We laid one joint of 3 1/2 x line drill pipe down, and shut down rig until tomorrow at 7:00 AM mst.

Royce McGee

SALINE #2 BRINE WELL
Wednesday - April 3, 1974

7:00 AM mst - Start out of the hole with the x-line 3 1/2" rented drill pipe and fishing sub.
8:07 AM mst - Out of the hole.
8:30 AM to 9:30 AM mst - Talk to Dean Murray and John Draper.
9:30 AM - Call Haliburton for the squeeze job.
10:45 AM mst - Haliburton pickup arrived with the RTTS squeeze packer and we started in the hole with 2 7/8" tubing on it - - Strapping the tubing on the way down.
Haliburton cement and pump trucks arrive.
12:00 Noon - we set the RTTS packer at 1173' and prepared to test the surface casing for leaks.
12:40 PM - Casing tested to 300 psi - No leaks.
12:45 PM - Pulled 5 joints (148') and set squeeze packer at 1,025' in the surface pipe - Ready for squeeze job. After the cement is pumped very slowly into the lost circulation zone, we plan to displace clear water in the 7" casing below the packer, so the top of the cement should be at about 50' inside the 7" casing. We will drill this out in the morning.
12:55 PM - 5 joints pull out and the RTTS packer is set - Ready for Haliburton to tie onto.
1:00 PM - Start cement job.
1:20 PM - Cement pumped down and displaced with water. Cement was pumped as slow as possible with almost no pressure. Pressure increased to 200 psi just as we completed the water displacement, (a good indication).
1:40 PM - Pulling unit crew released - Wait on cement.

SALINE #2 BRINE WELL
Thursday - April 4, 1974

7:00 AM mst - Start rig motor - 800' of new 2 7/8" on location ready to unload.
7:20 AM - Unload tubing. Open valve on tubing string in well.
8:00 AM - Release packer and reset it in the same place. Pumped a small amount into tubing to see if the cement held. The cement did not hold - no pressure when pumping - disconnected to find a vacuum on the tubing.
8:10 AM - Called Haliburton for second stage on the squeeze job.
9:05 AM - Haliburton pump truck arrived.
9:35 AM - Bulk cement truck arrived.
10:00 AM - Start second state - Pumping cement at 4 bbl per minute 50 sack stage - same mixture as 1st stage. We will displace this time with 8 bbls of water - just enough to pump the cement past the RTTS packer.
10:20 AM - Cement pumped - water displacement of 8 bbls behind the cement went in on the vacuum at 1 1/2 bbls per minute. Wait on cement.
3:00 PM - Started pumping to fill hole to determine if we have a cement bridge. Pumped 48 bbls at 2 bbls per minute. Pressure never exceeded 20 psi. (18 bbls would displace slightly more than our tubing and casing). This indicated no results from the second or the first squeeze jobs. We pumped the balance of fresh water on hand at the well in tubing at 3 bbls per minute. Only pressure encountered was restriction pressure due to the increase in volume. We pumped 172 bbls at 3 bbls per minute, plus the 48 bbls at 2 bbls per minute. Total of 220 bbls of water - No pressure increase that indicated any benefit gained from the 2 stages of (100 sack) cement.
3:00 PM - Release RTTS packer and came out of hole - laying down tubing. Released Haliburton pump truck.

5:30 PM - Rigged down and dismissed rig.

CONCLUSION:

The lost circulation condition of our well was uneffected by two stages of cement squeeze job. Each stage consisted of the following:

50 sacks of class "C" cement.
8% gel.
10 lbs gilsonite.
1/2 lbs flocele.
3% calcium chloride per sack.

---

Slurry weight - 12.5 lbs/gal.
Slurry yield - 2.22 cu. ft./sack.
Water - 11.5 gals/sack.

SALINE #2 BRINE WELL

Both stages of cement was pumped into position, slow - (1.5 BPM). The first stage was displaced with 12 bbls of water. The second stage was displaced with 8 bbls of water - (2 bbls of water below the packer).

No pumping pressure encountered on the first stage except near the end of the water displacement, the pressure did increase to 200 psi. No pumping pressure encountered on the second stage while pumping cement. When we started displacing with water, the water went in on the vacuum (pump not used). Well shut in on vacuum.

After the proper time had expired, we pumped into the well with water as we outlined earlier in this report. It was concluded that no effect was gained from either squeeze stage.

After reviewing this situation with John Draper, we concluded to stop and evaluate before spending additional funds on a condition that may be impossible to correct. The "wash out" or cavern leading to the lost circulation zone may be more expensive to block off that the cost of another brine well.

**********

Royce McVeen

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NEW MEXICO OIL CONSERVATION COMMISSION

RECEIVED

JAN 17 1980

O. C. D.

ARTESIA, OFFICE

Form C-103
*Supersedes Old C-102 and C-103*
Effective 1-1-65

5a. Indicate Type of Lease: State ☐ Fee ☒

5. State Oil & Gas Lease No.

# 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. OIL WELL ☐ GAS WELL ☐ OTHER- Brine Water Well

7. Unit Agreement Name

2. Name of Operator
Permian Brine Sales & Service, Inc.

8. Farm or Lease Name
Eugenie

3. Address of Operator
Box 1591, 212 W. 5th St., Odessa, Texas 79760

9. Well No.
2

4. Location of Well
UNIT LETTER M, 1288 FEET FROM THE South LINE AND 497 FEET FROM THE West LINE, SECTION 17 TOWNSHIP 22S RANGE 27E NMPM.

10. Field and Pool, or Wildcat

15. Elevation *(Show whether DF, RT, GR, etc.)*
GL 3126

12. County
Eddy

16. 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 ☐ | | COMMENCE DRILLING OPNS. ☐ | PLUG AND ABANDONMENT ☐ |
| PULL OR ALTER CASING ☐ | CHANGE PLANS ☐ | CASING TEST AND CEMENT JOB ☐ | |
| OTHER ☐ | | OTHER ☐ | |

17. 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.

Completion

Ran 285' of 17# 5½" casing. B.J. Cemented on 11/6/79 with 125 sx Class C cement with 2% A-7 Calcium Chloride. Cement circulated. Let set 36 hours. Drilled out plug with cable tools. No water.

Ran 583' of 6.5# 2 7/8 tubing. B.J. Cemented 11/20/79 with 100 sx of Class C cement with 2% A-7 Calcium Chloride cement circulated. Let set 24 hours.

November 21, 1979 fractured across to Eugenie No. 1 in salt & shale stringer between 576' and 592'.

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

SIGNED A. L. Hickerson TITLE President DATE

A.L. Hickerson

APPROVED BY W. A. Gressett TITLE SUPERVISOR, DISTRICT II DATE JAN 18 1980

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JAN 10 1980
O. C. D.
ARTESIA, OFFICE

Form C-103
*Supersedes Old C-102 and C-103*
Effective 1-1-65

5a. Indicate Type of Lease: State ☐ Fee ☒
5. State Oil & Gas Lease No.

# 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. OIL WELL ☐ GAS WELL ☐ OTHER- Brine Water Well

7. Unit Agreement Name

2. Name of Operator
Permian Brine Sales & Service, Inc. ✓

8. Farm or Lease Name
Eugenie

3. Address of Operator
Box 1591, 212 W. 5th St., Odessa, Texas 79760

9. Well No.
2

4. Location of Well
UNIT LETTER M , 1288 FEET FROM THE South LINE AND 497 FEET FROM THE West LINE, SECTION 17 TOWNSHIP 22S RANGE 27E NMPM.

10. Field and Pool, or Wildcat

15. Elevation *(Show whether DF, RT, GR, etc.)*
GL 3126

12. County
Eddy

16. 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 ☐ | | COMMENCE DRILLING OPNS. ☐ | PLUG AND ABANDONMENT ☐ |
| PULL OR ALTER CASING ☐ | CHANGE PLANS ☐ | CASING TEST AND CEMENT JOB ☐ | |
| OTHER ☐ | | OTHER ☐ | |

17. 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.

It is proposed to set the 5½" casing and cement @ 285' instead of 350' as originally approved. All fresh water has been penetrated and the red beds are sloughing on the cable tools.

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

SIGNED A. L. Hickerson TITLE Pres President DATE

APPROVED BY W. A. Gressett TITLE SUPERVISOR, DISTRICT II DATE JAN 18 1980

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Form C-105
Revised 1-1-65

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WELL COMPLETION OR RECOMPLETION REPORT AND LOG
JAN 10 1980
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ARTESIA, OFFICE

5a. Indicate Type of Lease: State ☐ Fee ☒
5. State Oil & Gas Lease No.
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JAN 17 1980
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ARTESIA, OFFICE

1a. TYPE OF WELL
b. TYPE OF COMPLETION
OIL WELL ☐ GAS WELL ☐ DRY ☐ OTHER Brine Water Well
NEW WELL ☒ WORK OVER ☐ DEEPEN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ OTHER

7. Unit Agreement Name
8. Farm or Lease Name: Eugenie
9. Well No.: 2
10. Field and Pool, or Wildcat

2. Name of Operator: Permian Brine Sales & Service, Inc.
3. Address of Operator: Box 1591, 212 W. 5th St., Odessa, Texas 79760
4. Location of Well
UNIT LETTER M LOCATED 1288 FEET FROM THE South LINE AND 497 FEET FROM THE West LINE OF SEC. 17 TWP. 22S RGE. 27E NMPM
12. County: Eddy

| 15. Date Spudded | 16. Date T.D. Reached | 17. Date Compl. (Ready to Prod.) | 18. Elevations (DF, RKB, RT, GR, etc.) | 19. Elev. Cashinghead |
|---|---|---|---|---|
| Oct. 22, 1979 | 11-19-79 | 11-22-79 | GL 3126 | - |

| 20. Total Depth | 21. Plug Back T.D. | 22. If Multiple Compl., How Many | 23. Intervals Drilled By | Rotary Tools | Cable Tools |
|---|---|---|---|---|---|
| 618' | 583' | | → | | X |

24. Producing Interval(s), of this completion — Top, Bottom, Name: Salt Top 456' Bottom 592'
25. Was Directional Survey Made: No
26. Type Electric and Other Logs Run: None
27. Was Well Cored: No

28. CASING RECORD (Report all strings set in well)

| CASING SIZE | WEIGHT LB./FT. | DEPTH SET | HOLE SIZE | CEMENTING RECORD | AMOUNT PULLED |
|---|---|---|---|---|---|
| 5½" | 17# | 285' | 8" | 125 sx Circulated | None |
| 2½" | 6.5# | 583' | 5" | 100 sx Circulated | None |

29. LINER RECORD

| SIZE | TOP | BOTTOM | SACKS CEMENT | SCREEN |
|---|---|---|---|---|
| | Non | None | | |

30. TUBING RECORD

| SIZE | DEPTH SET | PACKER SET |
|---|---|---|
| | None | |

31. Perforation Record (Interval, size and number): None

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

| DEPTH INTERVAL | AMOUNT AND KIND MATERIAL USED |
|---|---|
| None | |

33. PRODUCTION

| Date First Production | Production Method (Flowing, gas lift, pumping — Size and type pump) | Well Status (Prod. or Shut-in) |
|---|---|---|
| 11-22-79 | Water Pump | Brine Water |

| Date of Test | Hours Tested | Choke Size | Prod'n. For Test Period → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Gas — Oil Ratio |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| Flow Tubing Press. | Casing Pressure | Calculated 24-Hour Rate → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Oil Gravity — API (Corr.) |
|---|---|---|---|---|---|---|
| | | | | | | |

34. Disposition of Gas (Sold, used for fuel, vented, etc.)
Test Witnessed By

35. List of Attachments

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED A. L. Hickerson TITLE President DATE 11-30-79
A. L. Hickerson

## INSTRUCTIONS

This form is to be filled with the appropriate District Office of the Commission not later than [illegible] days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

## INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

| Southeastern New Mexico | | | | Northwestern New Mexico | | | |
|---|---|---|---|---|---|---|---|
| T. Anhy | 225' | T. Canyon | | T. Ojo Alamo | | T. Penn. "B" | |
| T. Salt | 456' | T. Strawn | | T. Kirtland-Fruitland | | T. Penn. "C" | |
| B. Salt | 592' | T. Atoka | | T. Pictured Cliffs | | T. Penn. "D" | |
| T. Yates | | T. Miss | | T. Cliff House | | T. Leadville | |
| T. 7 Rivers | | T. Devonian | | T. Menefee | | T. Madison | |
| T. Queen | | T. Silurian | | T. Point Lookout | | T. Elbert | |
| T. Grayburg | | T. Montoya | | T. Mancos | | T. McCracken | |
| T. San Andres | | T. Simpson | | T. Gallup | | T. Ignacio Qtzte | |
| T. Glorieta | | T. McKee | | Base Greenhorn | | T. Granite | |
| T. Paddock | | T. Ellenburger | | T. Dakota | | T. | |
| T. Blinebry | | T. Gr. Wash | | T. Morrison | | T. | |
| T. Tubb | | T. Granite | | T. Todilto | | T. | |
| T. Drinkard | | T. Delaware Sand | | T. Entrada | | T. | |
| T. Abo | | T. Bone Springs | | T. Wingate | | T. | |
| T. Wolfcamp | | T. | | T. Chinle | | T. | |
| T. Penn. | | T. | | T. Permian | | T. | |
| T Cisco (Bough C) | | T. | | T. Penn. "A" | | T. | |

## OIL OR GAS SANDS OR ZONES

No. 1, from ..... to .....  No. 4, from ..... to .....

No. 2, from ..... to .....  No. 5, from ..... to .....

No. 3, from ..... to .....  No. 6, from ..... to .....

## IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from ..... to ..... feet. .....

No. 2, from ..... to ..... feet. .....

No. 3, from ..... to ..... feet. .....

No. 4, from ..... to ..... feet. .....

## FORMATION RECORD (Attach additional sheets if necessary)

| From | To | Thickness in Feet | Formation | From | To | Thickness in Feet | Formation |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

P. O. BOX 1591

ODESSA, TEXAS
79760

PHONE 332-0531



RECEIVED

JAN 17 1980

O. C. D.
ARTESIA, OFFICE


November 30, 1979

EUGENIE No.2 - Sec 17-T22S-R27E

Carlsbad, New Mexico

| | |
|---|---|
| 0 to 18 | TOP SOIL WITH GRAVEL |
| 18 to 19 | CAVE |
| 19 to 46 | CALICHE & GRAVEL |
| 46 to 50 | SAND & GRAVEL - SOME WATER |
| 50 to 58 | GRAVEL & LIME |
| 58 to 64 | LIME |
| 64 to 65 | RED BEDS |
| 65 to 78 | RED SAND |
| 78 to 107 | GRAVEL |
| 107 to 163 | BROWN CLAY, GRAVEL & SAND |
| 163 to 171 | RED BEDS |
| 171 to 178 | LIME VERY HARD |
| 178 to 225 | RED BEDS |
| 225 to 237 | ANHYDRITE & RED BEDS |
| 237 to 252 | LIME & ANHYDRITE W/ SOME GYP |
| 252 to 268 | RED BED |
| 268 to 280 | LIME W/GYP. STRINGERS |
| 280 to 285 | ANHYDRITE |
| 285 to 305 | GYP. W/SOME RED BEDS |
| 305 to 320 | GYP. & ANHYDRITE |
| 320 to 330 | RED BEDS |
| 330 to 360 | ANHYDRITE W/LIME & SAND |

360 to 410----------HARD ROCK & ANHYDRITE

410 to 430----------ANHYDRITE W/SOME LIME

430 to 437----------GRAY LINE (HARD) & ANHYDRITE

437 to 445----------ANHYDRITE

445 to 456----------ANHYDRITE & GRAY LIME

456 to 568----------SALT

568 to 576----------SALT & BLUE SHALE STRINGER

576 to 592----------SALT

592 to 610----------ANHYDRITE

NEW MEXICO OIL CONSERVATION COMMISSION

# WELL LOCATION AND ACREAGE DEDICATION PLAT

Form C-102
Supersedes C-128
Effective 1-1-65

All distances must be from the outer boundaries of the Section

| Operator | Lease | Well No. |
|---|---|---|
| Permian Brine Sales & Service, Inc. | Salt Water | 2 |

| Unit Letter | Section | Township | Range | County |
|---|---|---|---|---|
| M | 17 | 22South | 27East | Eddy |

Actual Footage Location of Well:
1288 feet from the South line and 497 feet from the West line

| Ground Level Elev. | Producing Formation | Pool | Dedicated Acreage: |
|---|---|---|---|
| 3126.4 | Salt | | Acres |

1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below.

2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

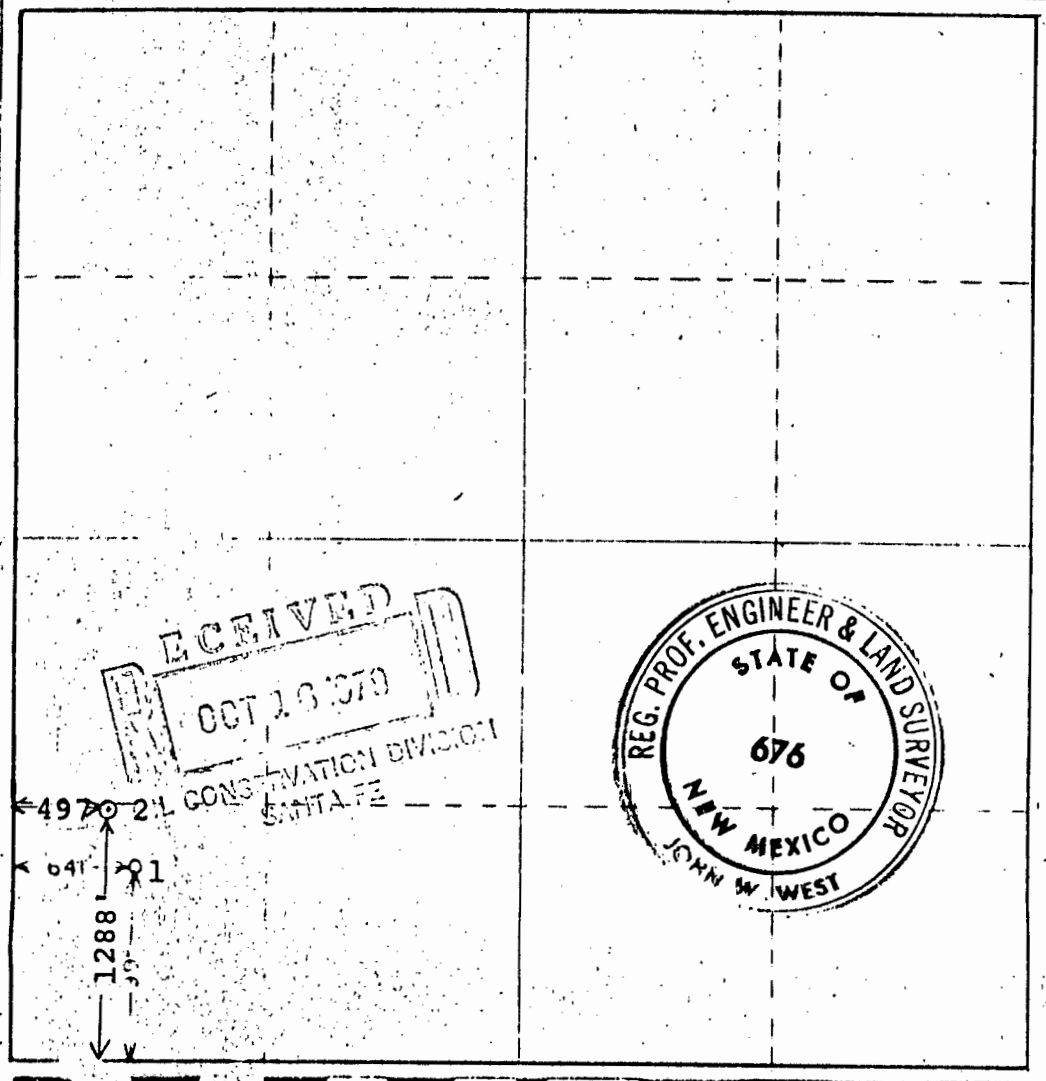
3. If more than one lease of different ownership is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling. etc?

☐ Yes ☐ No If answer is "yes," type of consolidation _____

If answer is "no," list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary.) _____

No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interests, has been approved by the Commission.

RECEIVED
SEP 5 1979
O. C. C.
ARTESIA, OFFICE




## CERTIFICATION

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

A. L. Peckerson

Name: President

Position: Permian Brine Sales & Service, Inc.

Company: 8-28-79

Date

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

Aug. 15, 1979

Date Surveyed

Registered Professional Engineer and/or Land Surveyor

John W. West

Certificate No. John W. West 676
Ronald J. Eidson 3239

| NO. OF COPIES RECEIVED | | |
|---|---|---|
| DISTRIBUTION | | |
| SANTA FE | ✓ | |
| FILE | | |
| U.S.G.S. | | |
| LAND OFFICE | | |
| OPERATOR | | |

30-015-23031

NEW MEXICO OIL CONSERVATION COMMISSION

RECEIVED

SEP 5 1979

O. C. C.

ARTESIA, OFFICE

Form C-101
Revised 1-1-65

5A. Indicate Type of Lease STATE ☐ FEE ☒

5. State Oil & Gas Lease No.

## APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. Type of Work

b. Type of Well: DRILL ☒ DEEPEN ☐ PLUG BACK ☐

OIL WELL ☐ GAS WELL ☐ OTHER Brine Water Well SINGLE ZONE ☐ MULTIPLE ZONE ☐

7. Unit Agreement Name

8. Farm or Lease Name: Eugenie

2. Name of Operator: Permian Brine Sales & Service, Inc. ✓

9. Well No.: 2

3. Address of Operator: Box 1591, 212 W. 5th St., Odessa, Texas 79760

10. Field and Pool, or Wildcat: Wildcat

4. Location of Well: UNIT LETTER M LOCATED 1288 FEET FROM THE South LINE AND 497 FEET FROM THE West LINE OF SEC. 17 TWP. 22S RGE. 27E NMPM

12. County: Eddy

| 19. Proposed Depth | 19A. Formation | 20. Rotary or C.T. |
|---|---|---|
| 600' | Salt | C.T. |

| 21. Elevations (Show whether DF, RT, etc.) | 21A. Kind & Status Plug. Bond | 21B. Drilling Contractor | 22. Approx. Date Work will start |
|---|---|---|---|
| 3126 G.L. | one well $5,000 applied for #610 057402 2 | Not selected yet | Oct. 1, 1979 |

23.

PROPOSED CASING AND CEMENT PROGRAM

| SIZE OF HOLE | SIZE OF CASING | WEIGHT PER FOOT | SETTING DEPTH | SACKS OF CEMENT | EST. TOP |
|---|---|---|---|---|---|
| 8" | 5 1/2" | 17# | 350' | 75 Sx. | Circulated |
| 4 3/4" | 2 7/8" | 6.4# | 580' | 50 Sx. | Circulated |
| | | | | | |

We propose to drill an 8" cable tool hole through the fresh water to 350', hang 5 1/2" casing, and circulate cement. Then drill a 4 3/4" hole inside the 5 1/2" casing to the bottom of the rock salt at approximately 600', hang 2 7/8" tubing to 580' and circulate cement. We then will fracture the rock salt section between 580-600 with fresh water across to the Eugenie #1 well, 327' away, Fresh water will then be circulated down the 2 7/8 in well No. 2, through the salt section to well No. 1 and out the tubing to storage for sale.

City of Carlsbad Notified

APPROVAL VALID FOR 90 DAYS UNLESS DRILLING COMMENCED,

EXPIRES 1-15-80

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: IF PROPOSAL IS TO DEEPEN OR PLUG BACK, GIVE DATA ON PRESENT PRODUCTIVE ZONE AND PROPOSED NEW PRODUCTIVE ZONE. GIVE BLOWOUT PREVENTER PROGRAM, IF ANY.

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

Signed C. V. Alexander Title President Date 9-4-79

(This space for State Use)

APPROVED BY W. A. Gressett TITLE SUPERVISOR, DISTRICT II DATE OCT 15 1979

CONDITIONS OF APPROVAL, IF ANY:

Cement must be circulated to surface behind 5 1/2" & 2 7/8" casing

Notify N.M.O.C.C. in sufficient time to witness cementing the 5 1/2" & 2 7/8" casing

OIL CONSERVATION DIVISION
ARTESIA, NEW MEX. 88210

TO: WAYNE PRICE

FROM: TIM GUM

DATE: 10-18-99

NUMBER OF SHEETS ( INCLUDING TRANSMITTAL SHEET ) 3

THIS TRANSMITTAL IS BEING FORWARDED TO YOU.

IF YOU HAVE ANY PROBLEMS WITH THIS TRANSMISSION, PLEASE CALL 505-748-1283.

FAX NUMBER (505) 748-9720

**P & S BRINE SALES**
**LIMITED PARTNERSHIP**
P.O. BOX 1769
EUNICE, NEW MEXICO 88231

October 18, 1999

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

Re: Mechanical Integrity Testing Supply Wells

Dear Mr. Wayne Price:

P & S Brine Sales would like to proceed with the cavern pressure test on the well in Eunice, October 25, 1999,8:00 am to 12:00 pm.

We are also in the process of purchasing Salado Brine Sales, #2 Brine Station. We would also like to proceed with the cavern pressure test on October 27, 1999, 8:00 am to 12:00 pm.

If possible, we would like to take the option to preform the cavern survey at a later date on both locations.

Sincerely yours,

Paul Prather
Owner

wp

P. & S. BRINE SALES, L.P.
(JAL)

| MONTH | BBLS. INJECTED | BBLS. SOLD |
|---|---|---|
| JANUARY | 0 | 0 |
| FEBRUARY | 0 | 0 |
| MARCH | 0 | 0 |
| APRIL | 0 | 0 |
| MAY | 0 | 0 |
| JUNE | 0 | 0 |
| JULY | 0 | 0 |
| AUGUST | 0 | 0 |
| SEPTEMBER | 0 | 0 |
| OCTOBER | | |
| NOVEMBER | | |
| DECEMBER | | |

THIS HAS BEEN PLUGGED. S.M.

| TOTALS BY QUARTER: | | | |
|---|---|---|---|
| 1998 | 0 | 1st QRTR. | 0 |
| | 0 | 2nd QRTR. | 0 |
| | 0 | 3rd QRTR. | 0 |
| | | 4th QRTR | |

Suzanne McReynolds
OFFICE MANAGER

10-7-98
DATE

P. & S. BRINE SALES, L.P.
P. O. BOX 1769
EUNICE, NM 88231

RECEIVED
OCT 16 1998
Environmental Bureau
Oil Conservation Division

P. & S. BRINE SALES, L.P.
(JAL)

| MONTH | BBLS. INJECTED | | BBLS. SOLD |
|---|---|---|---|
| JANUARY | 0 | | 0 |
| FEBRUARY | 0 | | 0 |
| MARCH | 0 | | 0 |
| APRIL | 0 | | 0 |
| MAY | 0 | | 0 |
| JUNE | 0 | | 0 |
| JULY | | | |
| AUGUST | | | |
| SEPTEMBER | | | |
| OCTOBER | | | |
| NOVEMBER | | | |
| DECEMBER | | | |
| TOTALS BY QUARTER: | 0 | 1st QRTR. | 0 |
| 1998 | 0 | 2nd QRTR. | 0 |
| | | 3rd QRTR. | |
| | | 4th QRTR | |

Suzanne M Reynolds
OFFICE MANAGER

7-8-98
DATE

P. & S. BRINE SALES, L.P.
P. O. BOX 1769
EUNICE, NM 88231

P. & S. BRINE SALES, L.P.
(JAL)

| MONTH | BBLS. INJECTED | | BBLS. SOLD |
|---|---|---|---|
| JANUARY | 0 | | 0 |
| FEBRUARY | 0 | | 0 |
| MARCH | 0 | | 0 |
| APRIL | | | |
| MAY | | | |
| JUNE | | | |
| JULY | | | |
| AUGUST | | | |
| SEPTEMBER | | | |
| OCTOBER | | | |
| NOVEMBER | | | |
| DECEMBER | | | |
| TOTALS BY QUARTER: | 0 | 1st QRTR. | 0 |
| 1998 | | 2nd QRTR. | |
| | | 3rd QRTR. | |
| | | 4th QRTR | |

Suzanne M'Reynolds
OFFICE MANAGER

4-8-98
DATE

P. & S. BRINE SALES, L.P.
P. O. BOX 1769
EUNICE, NM 88231

P. & S. BRINE SALES, L.P.
(JAL)

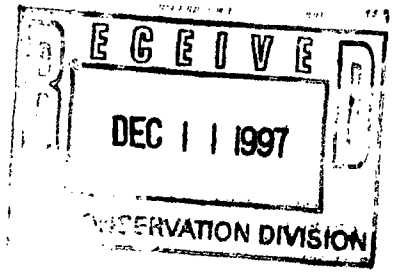
| MONTH | BBLS. INJECTED | | BBLS. SOLD |
|---|---|---|---|
| JANUARY | 0 | | 0 |
| FEBRUARY | 0 | | 0 |
| MARCH | 0 | | 0 |
| APRIL | 0 | | 0 |
| MAY | 0 | | 0 |
| JUNE | 0 | | 0 |
| JULY | 0 | | 0 |
| AUGUST | 0 | | 0 |
| SEPTEMBER | 0 | | 0 |
| OCTOBER | 0 | | 0 |
| NOVEMBER | 0 | | 0 |
| DECEMBER | 0 | | 0 |
| TOTALS BY QUARTER: | 0 | 1st QRTR. | 0 |
| 1997 | 0 | 2nd QRTR. | 0 |
| | 0 | 3rd QRTR. | 0 |
| | 0 | 4th QRTR | 0 |

Suzanne McReynolds
OFFICE MANAGER

1-27-98
DATE

P. & S. BRINE SALES, L.P.
P. O. BOX 1769
EUNICE, NM 88231

P & S BRINE SALES
LIMITED PARTNERSHIP
P.O. BOX 1769
EUNICE, NEW MEXICO 88231




December 5, 1997

Mr. Mark Ashley
Oil Conservation Division
2040 South Pacheco Street
Santa Fe, New Mexico 87505

Re: Requested Fluids Report

RECEIVED
DEC 1 1 1997
Environmental Bureau
Oil Conservation Division

Dear Mr. Mark Ashley:

Concerning your request of fluids injected and produced at the Jal brine well owned by P & S Brine Sales, we do not have the records to provide you this information. This well has changed hands four times. It has had no production for the last eighteen months.

Presently, this well is temporarily abandoned.

If we can be of further assistance, please contact this office.

Sincerely,

Paul Prather
Owner

P. & S. BRINE SALES, L.P.
(JAL)

| MONTH | BBLS. INJECTED | | BBLS. SOLD |
|---|---|---|---|
| JANUARY | 0 | | 0 |
| FEBRUARY | 0 | | 0 |
| MARCH | 0 | | 0 |
| APRIL | 0 | | 0 |
| MAY | 0 | | 0 |
| JUNE | 0 | | 0 |
| JULY | 0 | | 0 |
| AUGUST | 0 | | 0 |
| SEPTEMBER | 0 | | 0 |
| OCTOBER | 0 | | 0 |
| NOVEMBER | 0 | | 0 |
| DECEMBER | | | |
| TOTALS BY QUARTER: | 0 | 1st QRTR. | 0 |
| 1997 | 0 | 2nd QRTR. | 0 |
| | 0 | 3rd QRTR. | 0 |
| | | 4th QRTR | |

Suzanne McReynolds
OFFICE MANAGER

12-9-97
DATE

P. & S. BRINE SALES, L.P.
P. O. BOX 1769
EUNICE, NM 88231

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

# OIL CONSERVATION DIVISION

310 Old Santa Fe Trail, Room 206
Santa Fe, New Mexico 87503

Form C-103
Revised 1-1-89

WELL API NO. 30-025-31279

5. Indicate Type of Lease STATE [X] FEE [ ]

6. State Oil & Gas Lease No. M-14474

## 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.)

7. Lease Name or Unit Agreement Name: Arnott Ramsey State

1. Type of Well: OIL WELL [ ] GAS WELL [ ] OTHER Brine Well

2. Name of Operator: P+S Brine Sales

8. Well No. 6

3. Address of Operator: Box 1769 Eunice, N.M.

9. Pool name or Wildcat: Salt Section

4. Well Location
Unit Letter P : 581 Feet From The South Line and 93 Feet From The East Line

Section 16 Township 21 Range 37 NMPM Lea County

10. Elevation (Show whether DF, RKB, RT, GR, etc.)

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 | [X] |
| 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.

1. Rigged up Pool-
2. Test Casing to 500#
3. RAN 1000' 2 3/8 Tubing
4. Pumped 30 sack cement
5. Circ. cement to surface
6. Pulled Tubing.
7. filled Top 98 casing w/ cement
8. Installed Dry hole marker -
9. Cut off Dead Men-
10. Cleaned Location 6/8/98

JAKE REQUESTED INQUIRY ON P+A
COPIES FROM WELL FILE
LWP
1/18/00

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

SIGNATURE Paul Prather TITLE Prather DATE 6-8-98

TYPE OR PRINT NAME Paul Prather TELEPHONE NO. 394-2545

(This space for State Use)

APPROVED BY Larry W. Hill TITLE [illegible] DATE NOV 06 1998

CONDITIONS OF APPROVAL, IF ANY:

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

# OIL CONSERVATION DIVISION

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

Form C-103
Revised 1-1-89

WELL API NO.

5. Indicate Type of Lease STATE [X] FEE [ ]

6. State Oil & Gas Lease No. M-14474

## 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.)

7. Lease Name or Unit Agreement Name: Arnott Ramsey State

1. Type of Well: OIL WELL [ ] GAS WELL [ ] OTHER Brine well

2. Name of Operator: P & S Brine Sales

8. Well No. 6

3. Address of Operator: P.O. Box Drawer 1769 Eunice, NM

9. Pool name or Wildcat: Salt Section

4. Well Location
Unit Letter P : 581 Feet From The South Line and 93 Feet From The East Line

Section 16 Township 25 Range 37 NMPM Lea County

10. Elevation (*Show whether DF, RKB, RT, GR, etc.*)

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 | [X] | 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.

Well presently has a cast iron bridge plug set at 1000 ft.
Notify OCD before commencing.

1) Rig up unit.
2) Pressure test casing to 500#
3) Run in hole with 2 3/8" tubing to 1000 ft. and circulate cement to surface.
4) Install dry hole marker, cut anchors and clean location.

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

SIGNATURE Eddie W. Seay TITLE Agent DATE 4-6-98

TYPE OR PRINT NAME Eddie W. Seay TELEPHONE NO. 392-2236

(This space for State Use)

APPROVED BY Gary W. Wink TITLE GARY W. WINK FIELD REPRESENTATIVE II DATE APR 09 1998

CONDITIONS OF APPROVAL, IF ANY:

District I
PO Box 1980, Hobbs, NM 88241-1980
District II
PO Drawer DD, Artesia, NM 88211-0719
District III
1000 Rio Brazos 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-101
Revised February 10, 1994
Instructions on back
Submit to Appropriate District Office
State Lease - 6 Copies
Fee Lease - 5 Copies

☐ AMENDED REPORT

# APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

| [1] Operator Name and Address. | [2] OGRID Number |
|---|---|
| P & S BRINE SALES, L.P.<br>P. O. BOX 1769<br>EUNICE, NM 88231 | [3] API Number<br>30 - 0 |

| [4] Property Code | [5] Property Name | [6] Well No. |
|---|---|---|
| | ARNOTT RAMSEY STATE | 6 |

## [7] Surface Location

| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| P | 16 | 25S | 37E | | 581 | SOUTH | 93 | EAST | LEA |

## [8] Proposed Bottom Hole Location If Different From Surface

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

| [9] Proposed Pool 1 | [10] Proposed Pool 2 |
|---|---|
| BRINE SEC | |

| [11] Work Type Code | [12] Well Type Code | [13] Cable/Rotary | [14] Lease Type Code | [15] Ground Level Elevation |
|---|---|---|---|---|
| P | W | WIRE LINE | S | 3106 |
| **[16] Multiple** | **[17] Proposed Depth** | **[18] Formation** | **[19] Contractor** | **[20] Spud Date** |
| NO | 1200' | SALT SEC | P & S BRINE | 11-10 |

## [21] Proposed Casing and Cement Program

| Hole Size | Casing Size | Casing weight/foot | Setting Depth | Sacks of Cement | Estimated TOC |
|---|---|---|---|---|---|
| 8½" | 7" | 23# | 1000' | 400SAC | SURFACE |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

[22] Describe the proposed program. If this application is to DEEPEN or PLUG BACK give the data on the present productive zone and proposed new productive zone. Describe the blowout prevention program, if any. Use additional sheets if necessary.

1. PULL TUBING FROM WELL
2. SET CAST IRON BRIDGE PLUG 1000ft
3. TEST TO 500# W/CHART REC. FOR O.C.D.
4. T.A.

Charlie was there
We TA well -
We find the owner

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

Signature: Paul Prather

Printed name: PAUL PRATHER

Title: OWNER

Date: 10/22/97

Phone: 505 394 2545

**OIL CONSERVATION DIVISION**

Approved by:

Title:

Approval Date: Expiration Date:

Conditions of Approval:
Attached ☐

District I
PO Box 1980, Hobbs, NM 88241-1980
District II
PO Drawer DD, Artesia, NM 88211-0719
District III
1000 Rio Brazos 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-101
Revised February 10, 1994
Instructions on back
Submit to Appropriate District Office
State Lease - 6 Copies
Fee Lease - 5 Copies

☐ AMENDED REPORT

# APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

| [1] Operator Name and Address. | [2] OGRID Number |
|---|---|
| P & S BRINE SALES, L.P.<br>P. O. BOX 1769<br>EUNICE, NM 88231 | 153709 |
| | [3] API Number<br>30 - 0 |

| [4] Property Code | [5] Property Name | [6] Well No. |
|---|---|---|
| 18896 | ARNOTT RAMSEY STATE | 6 |

## [7] Surface Location

| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| P | 16 | 25S | 37E | | 581 | SOUTH | 93 | EAST | LEA |

## [8] Proposed Bottom Hole Location If Different From Surface

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

| [9] Proposed Pool 1 | [10] Proposed Pool 2 |
|---|---|
| BRINE SEC | |

| [11] Work Type Code | [12] Well Type Code | [13] Cable/Rotary | [14] Lease Type Code | [15] Ground Level Elevation |
|---|---|---|---|---|
| P | W | WIRE LINE | S | 3106 |
| **[16] Multiple** | **[17] Proposed Depth** | **[18] Formation** | **[19] Contractor** | **[20] Spud Date** |
| NO | 1200' | SALT SEC | P & S BRINE | 11-10 |

## [21] Proposed Casing and Cement Program

| Hole Size | Casing Size | Casing weight/foot | Setting Depth | Sacks of Cement | Estimated TOC |
|---|---|---|---|---|---|
| 8½" | 7" | 23# | 1000' | 400SAC | SURFACE |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

[22] Describe the proposed program. If this application is to DEEPEN or PLUG BACK give the data on the present productive zone and proposed new productive zone. Describe the blowout prevention program, if any. Use additional sheets if necessary.

1. PULL TUBING FROM WELL
2. SET CAST IRON BRIDGE PLUG
3. TEST TO 500# W/CHART REC. FOR O.C.D.
4. T.A.

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

Signature: Paul Prather

Printed name: PAUL PRATHER

Title: OWNER

Date: 10/22/97

Phone: 505 394 2545

**OIL CONSERVATION DIVISION**

Approved by: Gary W. Wink

Title: GARY W. WINK
FIELD REPRESENTATIVE II

Approval Date: APR 09 1998

Expiration Date:

Conditions of Approval:
Attached ☐

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

# OIL CONSERVATION DIVISION

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

Form C-103
Revised 1-1-89

WELL API NO. 30-025-26999

5. Indicate Type of Lease STATE [X] FEE [ ]

6. State Oil & Gas Lease No. M-14474

## 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.)

7. Lease Name or Unit Agreement Name: Arnott Ramsey State

1. Type of Well: OIL WELL [ ] GAS WELL [ ] OTHER Brine Well

2. Name of Operator: P&S Brine Sale L.P.

8. Well No. #4

3. Address of Operator: Box 1769, Eunice, NM 88231

9. Pool name or Wildcat: Wildcat

4. Well Location
Unit Letter P : 515 Feet From The South Line and 100 Feet From The East Line
Section 16 Township 25S Range 37E NMPM Lea County

10. Elevation (*Show whether DF, RKB, RT, GR, etc.*)

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 | [X] |
| 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.

October 19, 1993

Set Cast Iron Bridge Plug at 1,000', circulate 110 sacks cement from 1,000' to surface, cut wellhead, install marker and clean location.

COPIES FROM WELL FILE LWP 1/18/02

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

SIGNATURE Lee Roy Gaylor TITLE VP/Op. Mgr. DATE 3-4-94

TYPE OR PRINT NAME Lee Roy Gaylor TELEPHONE NO. 505-392-65

(This space for State Use)

APPROVED BY Charles Perrin TITLE OIL & GAS INSPECTOR DATE DEC 14 1995

CONDITIONS OF APPROVAL, IF ANY:

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

**Fax: 1-505-394-2426**

October 19, 1999

Mr. Paul Prather
P&S Brine Sales
P.O. Box 7169
Eunice, New Mexico 88231

**Re: Mechanical Integrity Testing of Brine Supply Wells.**

This is a reminder that New Mexico Oil Conservation Division (NMOCD) will be witnessing mechanical integrity test for all brine supply wells during the time period between October 25 through November 2, 1999. A schedule was sent to each operator on September 11, 1999.

Please have your well(s) ready for testing on the date and time you are scheduled. If there is some emergency which interferes with the scheduled date and time please call and notify NMOCD. Please note the Quality Oil (Salado Brine Sales) well near Jal, NM has been re-scheduled for October 29, 1999 at 11am-3pm.

Please note that if you were scheduled to "isolate the cavern and pressure test casing, and run a cavern survey", you will have the option this time to defer this procedure and just perform the annual open hole pressure test, however no bleed-off will be allowed. The NMOCD will notify you when these other conditions will be required.

**Failure to notify NMOCD may result in your operations being suspended until testing is complete.**

If you require any further information or assistance please do not hesitate to write or call me at (505-827-7155) or notify Mr. Roger Anderson at (505-827-7152).

Sincerely Yours,

Wayne Price-Pet. Engr. Spec.
Environmental Bureau

601 W. ILLINOIS
HOBBS, NEW MEXICO 88240
(505) 392-2236
FAX (505) 392-6949

# EDDIE SEAY CONSULTING

ENVIRONMENTAL,
GEOLOGICAL & REGULATORY
SPECIALISTS

PEAK
CONSULTING SERVICES

SEP 2 1 1998

September 15, 1998

Oil Conservation Division
Environmental Bureau
ATTN: Mark Ashley
2040 South Pacheco St.
Santa Fe, NM 87505

RE: Closure of BW-007 Brine Facility for P & S Brine

Dear Mark:

The final closure for the brine part of this facility has been completed. The well has been plugged and abandoned, all C-103's were filed. Charlie Perrin with the OCD witnessed some of the closure operations. Analysis of pit residue and fresh water was done and have been previously sent to OCD. The pit was cleaned out and disposed of at an approved OCD SWD. The liner was inspected and no leaks or tears were found. The leak detection system was checked and was dry. Fresh water was put into the pit to hold down liner. Only fresh water will be sold at the facility. All the tanks were used for fresh water and will remain on location. This should close the brine portion of this facility.

If you have any question or need additional information, please call.

Sincerely,

Eddie W. Seay, Agent

Submit 3 Copies to Appropriate District Office

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-103
Revised 1-1-89

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

# OIL CONSERVATION DIVISION

310 Old Santa Fe Trail, Room 206
Santa Fe, New Mexico 87503

WELL API NO.

5. Indicate Type of Lease STATE [X] FEE [ ]

6. State Oil & Gas Lease No. M-14474

## 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.)

7. Lease Name or Unit Agreement Name: ARNOLT RAMSEY STATE

1. Type of Well: OIL WELL [ ] GAS WELL [ ] OTHER BRINE WELL

2. Name of Operator: P+S BRINE SALES

8. Well No. 6

3. Address of Operator: BOX 1769 EUNICE, N.M.

9. Pool name or Wildcat: SALT SECTION

4. Well Location
Unit Letter P : 581 Feet From The South Line and 93 Feet From The EAST Line

Section 16 Township 25 Range 37 NMPM LEA County

10. Elevation (Show whether DF, RKB, RT, GR, etc.)

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 | [X] |
| 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.

1. Rigged up Pool-
2. Test Casing to 500#
3. RAN 1000' 2 3/8 Tubing
4. Pumped 30 sack cement
5. Circ. cement to surface
6. Pulled Tubing.
7. filled Top 98 casing w/ cement
8. Installed Dry hole Marker -
9. Cut off Dead Men-
10. Cleaned Location

Copy

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

SIGNATURE Paul Prather TITLE Pset/mgr DATE 6-8-98

TYPE OR PRINT NAME PAUL PRATHER TELEPHONE NO. 394-2545

(This space for State Use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

March 17, 1998

RECEIVED
APR 20 1998
OIL CONSERVATION DIVISION

New Mexico Oil Conservation Division
Environmental Bureau
ATTN: Mark Ashley
2040 South Pacheco
Santa Fe, NM 87505

RE: P & S Brine BW-007

Dear Mark:

Find within analysis which were requested for closure, the freshwater well and the fluid from the brine pit. No soil test will be done because P & S is going to leave both fresh water tanks for future use. The C-103 was sent to OCD in Hobbs for approval. Whenever we get the approval, plans will be made for P & A and final closure.

If you have any questions, please call.

Sincerely,

Eddie W. Seay

Eddie W. Seay, Agent
601 W. Illinois
Hobbs, NM 88242
(505)392-2236

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

# CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page of

| | |
|---|---|
| Company Name: | Eddie Seay Consulting |
| Project Manager: | Eddie W Seay |
| Address: | 601 W Illinois |
| City: | Hobbs State: NM Zip: 88240 |
| Phone #: | 392-2236 |
| Fax #: | |
| Project #: | P+S Brine - Paul Prather |
| Project Name: | P+S Brine BW. 007 |
| Project Location: | Jal N.M. |

**BILL TO** PO #:

| | |
|---|---|
| Company: | |
| Attn: | |
| Address: | |
| City: | |
| State: | Zip: |
| Phone #: | |
| Fax #: | |

| LAB I.D. # | Sample I.D. | COMP(C) OR GRAB(G) | # CONTAINERS | MATRIX: GROUNDWATER | WASTEWATER | SOIL | OIL | SLUDGE | OTHER: | PRESERVATION: ACID: | ICE / COOL | OTHER: | SAMPLING: DATE | TIME | ANALYSIS REQUEST: General Chemistry | TPH | BTEX | CL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H3570-1 | #1 Fresh water well | ✓ | 1 | ✓ | | | | | | | ✓ | | 4/12 | 9am | ✓ | | | |
| -2 | #2 Fluid from Brine Pit | ✓ | 1 | ✓ | | | | | | | ✓ | | 4/12 | 9:30 | ✓ | ✓ | ✓ | ✓ |

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above-stated reasons or otherwise.

| | | | |
|---|---|---|---|
| Sampler Relinquished: | Date: 4/12 | Received By: | Phone Result ☐ Yes ☐ No Additional Fax #: |
| Relinquished By: | Time: 1:15 | Received By: (Lab Staff) | Fax Results: ☐ Yes ☐ No |
| | Date: | | REMARKS: Samples for closure |
| | Time: | | |
| Delivered By: (Circle One) UPS - Fed Ex - Bus - Other: | | Sample Condition: Cool ☐ Yes ☐ No; Intact ☐ Yes ☐ No | CHECKED BY: (Initials) |

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
EDDIE SEAY CONSULTING
ATTN: EDDIE SEAY
601 W. ILLINOIS
HOBBS, NM 88240
FAX TO:

Receiving Date: 04/09/98
Reporting Date: 04/14/98
Project Owner: PAUL PRATHER
Project Name: P&S BRINE BW007
Project Location: JAL, NM

Sampling Date: 04/09/98
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: JS
Analyzed By: BC

| LAB NUMBER | SAMPLE ID | TPH (mg/L) | Cl (mg/L) | BENZENE (mg/L) | TOLUENE (mg/L) | ETHYL BENZENE (mg/L) | TOTAL XYLENES (mg/L) |
|---|---|---|---|---|---|---|---|
| ANALYSIS DATE: | | 04/10/98 | 04/10/98 | 04/09/98 | 04/09/98 | 04/09/98 | 04/09/98 |
| H3570-2 | FLUID FROM BRINE PIT | 16.3 | 267000 | <0.002 | <0 .002 | <0.002 | <0.006 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Quality Control | | 202 | 472 | 0.098 | 0.094 | 0.094 | 0.287 |
| True Value QC | | 200 | 500 | 0.100 | 0.100 | 0.100 | 0.300 |
| % Accuracy | | 101 | 94.4 | 97.7 | 93.9 | 93.8 | 95.6 |
| Relative Percent Difference | | 2.0 | 0.8 | 5.6 | 3.5 | 2.3 | 2.9 |

METHODS: TRPHC-EPA 600/4-79-020, 418.1;Cl-EPA 600/4-79-020 325.3 BTEX-EPA SW-846-8020

Burgess J.A. Cooke. Ph. D.

4/14/98
Date

PLEASE NOTE: **Liability and Damages.** **Cardinal's** liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by **Cardinal** within thirty (30) days after completion of the applicable service. In no event shall **Cardinal** be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by **Cardinal**, regardless of whether such claim is based upon any of the above-stated reasons or otherwise.

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
EDDIE SEAY CONSULTING
ATTN: EDDIE W. SEAY
601 W. ILLINOIS
HOBBS, NM 88240
FAX TO:

Receiving Date: 04/09/98
Reporting Date: 04/15/98
Project Owner: PAUL PRATHER
Project Name: P&S BRINE BW007
Project Location: JAL, NM

Sampling Date: 04/09/98
Sample Type: GROUNDWATER
Sample Condition: INTACT
Sample Received By: JS
Analyzed By: AH

| LAB NUMBER | SAMPLE ID | P-Alkalinity (mg/L) | T-Alkalinity (mg/L) | Hardness (mg/L) | Chloride (mg/L) | Sulfates (mg/L) | pH (s.u.) |
|---|---|---|---|---|---|---|---|
| ANALYSIS DATE | | 4/13/98 | 4/13/98 | 04/13/98 | 04/13/98 | 04/13/98 | 04/14/98 |
| H3570-1 | FRESH WATER | 0 | 180 | 260 | 56 | 111 | 7.38 |
| | WELL | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Quality Control | | NR | NR | NR | 472 | 91.0 | 7.07 |
| True Value QC | | NR | NR | NR | 500 | 83.0 | 7.00 |
| % Accuracy | | NR | NR | NR | 94.4 | 99 | 101 |
| Relative Percent Difference | | NR | NR | NR | 0.8 | 0.5 | 1.4 |
| METHODS: | EPA 600/4-79-020, | - | - | 130.2 | 325.3 | 375.4 | 150.1 |
| | Standard Method | 2320 B | 2320 B | - | - | - | - |

| LAB NUMBER | SAMPLE ID | Hydroxides (mg/L) | Carbonates (mg/L) | Bicarbonates (mg/L) | Conductivity (umhos/cm) | TDS (mg/L) |
|---|---|---|---|---|---|---|
| ANALYSIS DATE | | 4/13/98 | 04/13/98 | 04/13/98 | 04/14/98 | 04/13/98 |
| H3570-1 | FRESH WATER | 0 | 0 | 220 | 764 | 342 |
| | WELL | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Quality Control | | NR | NR | NR | 1445 | NR |
| True Value QC | | NR | NR | NR | 1413 | NR |
| % Accuracy | | NR | NR | NR | 102 | NR |
| Relative Percent Difference | | NR | NR | NR | 0.3 | NR |
| METHODS: | EPA 600/4-79-020, | - | - | - | 120.1 | 160.1 |
| | Standard Method | 2320 B | 2320 B | 2320 B | - | - |

Gayle A. Potter, Chemist

04/15/98
Date

PLEASE NOTE: **Liability and Damages**. **Cardinal's** liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by **Cardinal** within thirty (30) days after completion of the applicable service. In no event shall **Cardinal** be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by **Cardinal**, regardless of whether such claim is based upon any of the above-stated reasons or otherwise.

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

# OIL CONSERVATION DIVISION

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

Form C-103
Revised 1-1-89

WELL API NO.

5. Indicate Type of Lease STATE [X] FEE [ ]

6. State Oil & Gas Lease No. M-14474

## 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.)

7. Lease Name or Unit Agreement Name: Arnott Ramsey State

1. Type of Well: OIL WELL [ ] GAS WELL [ ] OTHER Brine well

2. Name of Operator: P & S Brine Sales

8. Well No. 6

3. Address of Operator: P.O. Box Drawer 1769 Eunice, NM

9. Pool name or Wildcat: Salt Section

4. Well Location
Unit Letter P : 581 Feet From The South Line and 93 Feet From The East Line

Section 16 Township 25 Range 37 NMPM Lea County

10. Elevation (*Show whether DF, RKB, RT, GR, etc.*)

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 | [X] | 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.

Well presently has a cast iron bridge plug set at 1000 ft.
Notify OCD before commencing.

1) Rig up unit.
2) Pressure test casing to 500#
3) Run in hole with 2 3/8" tubing to 1000 ft. and circulate cement to surface.
4) Install dry hole marker, cut anchors and clean location.

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

SIGNATURE Eddie W. Seay TITLE Agent DATE 4-6-98

TYPE OR PRINT NAME Eddie W. Seay TELEPHONE NO. 392-2236

(This space for State Use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

District I
PO Box 1980, Hobbs, NM 88241-1980
District II
PO Drawer DD, Artesia, NM 88211-0719
District III
1000 Rio Brazos 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-101
Revised February 10, 1994
Instructions on back
Submit to Appropriate District Office
State Lease - 6 Copies
Fee Lease - 5 Copies

☐ AMENDED REPORT

# APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

| 1 Operator Name and Address. | 2 OGRID Number |
|---|---|
| P & S BRINE SALES, L.P.<br>P. O. BOX 1769<br>EUNICE, NM 88231 | 3 API Number<br>30 - 0 |

| 4 Property Code | 5 Property Name | 6 Well No. |
|---|---|---|
| | ARNOTT RAMSEY STATE | 6 |

## 7 Surface Location

| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| P | 16 | 25S | 37E | | 581 | SOUTH | 93 | EAST | LEA |

## 8 Proposed Bottom Hole Location If Different From Surface

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

| 9 Proposed Pool 1 | 10 Proposed Pool 2 |
|---|---|
| BRINE SEC | |

| 11 Work Type Code | 12 Well Type Code | 13 Cable/Rotary | 14 Lease Type Code | 15 Ground Level Elevation |
|---|---|---|---|---|
| P | W | WIRE LINE | S | 3106 |
| **16 Multiple** | **17 Proposed Depth** | **18 Formation** | **19 Contractor** | **20 Spud Date** |
| NO | 1200' | SALT SEC | P & S BRINE | 11-10 |

## 21 Proposed Casing and Cement Program

| Hole Size | Casing Size | Casing weight/foot | Setting Depth | Sacks of Cement | Estimated TOC |
|---|---|---|---|---|---|
| 8½" | 7" | 23# | 1000' | 400SAC | SURFACE |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

22 Describe the proposed program. If this application is to DEEPEN or PLUG BACK give the data on the present productive zone and proposed new productive zone. Describe the blowout prevention program, if any. Use additional sheets if necessary.

1. PULL TUBING FROM WELL
2. SET CAST IRON BRIDGE PLUG 1000ft
3. TEST TO 500# W/CHART REC. FOR O.C.D.
4. T.A.

Charlie was there when we TA'd well - We had the chart

| 23 I hereby certify that the information given above is true and complete to the best of my knowledge and belief. | OIL CONSERVATION DIVISION |
|---|---|
| Signature: Paul Prather | Approved by: |
| Printed name: PAUL PRATHER | Title: |
| Title: OWNER | Approval Date: / Expiration Date: |
| Date: 10/22/97 / Phone: 505 394 2545 | Conditions of Approval: Attached ☐ |

Submit to Appropriate
District Office
State Lease – 6 copies
Fee Lease – 5 copies

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

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

Form C-101
Revised 1-1-89

API NO. ( assigned by OCD on New Wells)

5. Indicate Type of Lease STATE [X] FEE [ ]

6. State Oil & Gas Lease No. M-14474

## APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. Type of Work:
DRILL [X] RE-ENTER [ ] DEEPEN [ ] PLUG BACK [ ]

b. Type of Well:
OIL WELL [ ] GAS WELL [ ] OTHER Brine Well SINGLE ZONE [X] MULTIPLE ZONE [ ]

7. Lease Name or Unit Agreement Name: ARNOTT RAMSEY STATE

2. Name of Operator: P & S Brine Sales

8. Well No. 6

3. Address of Operator: P.O. Drawer 1769

9. Pool name or Wildcat: Salt Section

4. Well Location
Unit Letter P : _____ Feet From The _____ Line and _____ Feet From The _____ Line

Section 16 Township 25S Range 37E NMPM Lea County

| 10. Proposed Depth | 11. Formation | 12. Rotary or C.T. |
|---|---|---|
| 1500' | Salt | Rotary |

| 13. Elevations (Show whether DF, RT, GR, etc.) | 14. Kind & Status Plug. Bond | 15. Drilling Contractor | 16. Approx. Date Work will start |
|---|---|---|---|
| 3106 | | Capstar | 12-28-93 |

17. PROPOSED CASING AND CEMENT PROGRAM

| SIZE OF HOLE | SIZE OF CASING | WEIGHT PER FOOT | SETTING DEPTH | SACKS OF CEMENT | EST. TOP |
|---|---|---|---|---|---|
| 8 3/4" | 7" | 32# | 1000' | 400 sacks | 1000' |
| | | | | | |
| | | | | | |

12-28-93
Riged up Capstar Drilling Co.
Drilled to 1000'
Ran 7" 32# casing
Halliburton cemented-circulate back to surface, 400 sacks
Test plug & casing to 500# for 30 minutes
Top off salt @ 1235'
Drilled to 1500' T.D.
Ran tubing & started circulating 10# Brine

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: IF PROPOSAL IS TO DEEPEN OR PLUG BACK, GIVE DATA ON PRESENT PRODUCTIVE ZONE AND PROPOSED NEW PRODUCTIVE ZONE. GIVE BLOWOUT PREVENTER PROGRAM, IF ANY.

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

SIGNATURE Paul D. Prather TITLE Partner DATE 12-30-93

TYPE OR PRINT NAME Paul D. Prather TELEPHONE NO. (505) 394-2545

(This space for State Use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

March 16, 1998

**Certified Mail**
**Return Receipt No. P-288-259-046**

Mr. Paul Prather
P&S Brine Sales
P.O. Box 7169
Eunice, New Mexico 88231

**RE: Discharge Plan BW-007 Closure**
**Brine Extraction Facility**
**Lea County, New Mexico**

Dear Mr. Prather:

The New Mexico Oil Conservation Division (OCD) has reviewed the Eddie Seay Consulting Services plan dated February 24, 1998 for closure of the brine extraction portion of the Jal Brine Station. The plan was submitted on behalf of Mr. Paul Prather. It contains Mr Prather's plan for closure of the brine extraction portion of the Jal Brine Station with continued use of the fresh water well and brine storage pit for fresh water sales.

The above referenced plan is approved with the following conditions:

1. Pursuant to Rule 202, OCD approval will be obtained from the OCD Hobbs District Office prior to plugging and abandonement. Approval will be requested on OCD Form C-103 "Sundry Notices and Reports on Wells" (OCD Rule 1103.A.).

2. The soils beneath all tanks that will be removed will be sampled for BTEX, TPH, and chlorides with results submitted to the OCD Santa Fe Division Office and the OCD Hobbs District Office by April 20, 1998.

3. All liquids and solids removed from the lined brine storage pit will be sampled for BTEX and TPH prior to disposal at an OCD approved site. Sample results shall be submitted to the OCD Santa Fe Division Office and the OCD Hobbs District Office by April 20, 1998.

4. If the lined brine storage pit is found to be leaking or contains any hydrocarbons, Mr. Prather will submit a remediation plan to the OCD Santa Fe Division Office with a copy to the OCD Hobbs District Office.

5. The remaining fresh water well will be sampled for major cations and anions with results submitted to the OCD Santa Fe Division Office and the OCD Hobbs District Office by April 20, 1998.

6. Mr. Prather will notify the OCD Hobbs District Office at least 72 hours in advance of all activities.

7. Upon completion of plugging and clean up restoration operations as required, Mr. Prather shall contact the OCD Hobbs District Office to arrange for an inspection of the well and location.

8. Within thirty days after completing all required restoration work, Mr. Prather shall file with the OCD Hobbs District Office, in triplicate, a record of the work done on Form C-103 as provided in Rule 1103. Mr. Prather shall also file with the OCD Santa Fe Division Office a final report to close out discharge plan BW-007. It shall contain a description of all activities. Final closure of discharge plan BW-007 will be issued upon review of all necessary reports.

9. The OCD shall not approve the record of plugging or release any bonds until all necessary reports have been filed and the location has been inspected and approved by the OCD.

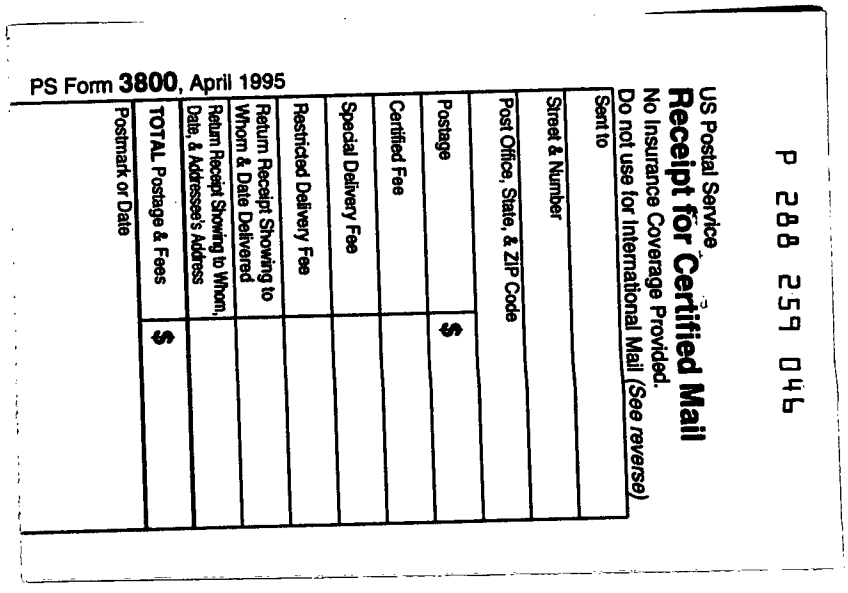
Please be advised that OCD approval does not relieve Mr. Prather of liability if contamination exists which is beyond the scope of the closure plan or if the activities fail to adequately determine the extent of contamination related to Mr. Prather's activities. In addition, OCD approval does not relieve Mr. Prather of responsibility for compliance with any other federal, state or local laws and/or regulations.

If you have any questions, please feel free to contact me (505) 827-7155.

Sincerely,

Mark Ashley
Geologist

xc: OCD Hobbs Office
Eddie Seay Consulting
601 W. Illinois
Hobbs, New Mexico 88240

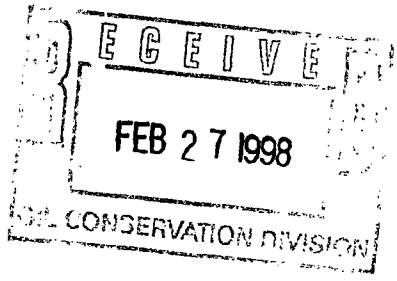


601 W. ILLINOIS
HOBBS, NEW MEXICO 88240
(505) 392-2236
FAX (505) 392-6949

# EDDIE SEAY CONSULTING

ENVIRONMENTAL,
GEOLOGICAL & REGULATORY
SPECIALISTS

PEAK
CONSULTING SERVICES




February 24, 1998

EMNRD - OCD Environmental Bureau
2040 S. Pacheco Street
Santa Fe, NM 87505
ATTN: Mark Ashley

RE: Discharge Plan BW-007
Lea Co., NM

Dear Mr. Ashley:

It is the wish of my client, Mr. Prather, to not renew the discharge plan, but to close the brine portion of the facility and only sell fresh water. All brine portions of the facility will be removed, discontinued or P & A as OCD approves. Listed are the proposed closure activities we would like to do:

1) The brine well at present has a CIBP at bottom of casing. The casing will be tested as per OCD rules and if test passes, the well will be filled from top to bottom with class C cement. Wellhead will be cut off and dry hole marker erected. Anchors will be cut and location cleaned.

2) Any tanks associated with brine storage will be removed. The soils around area will be tested for chloride content and will be picked up and disposed of at an OCD approved facility.

3) The lined brine storage pit will be vacuumed clean and all salt residue removed. The liner will be inspected and the leak detection sump will be inspected. The lined pit would then be filled with fresh water and used in the fresh water sales operations.

4) The fresh water well which is on this location, will be tested. A final report of work done will be submitted to OCD.

If you have any questions or need additional information, please call.

Sincerely,

Eddie W. Seay, Agent

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

February 5, 1998

Certified Mail
Return Receipt No. P-288-259-013

Mr. Paul Prather
P&S Brine Sales
P.O. Box 7169
Eunice, New Mexico 88231

**RE: Discharge Plan BW-007 Renewal**
**Brine Extraction Facility**
**Lea County, New Mexico**

Dear Mr. Prather:

On February 4, 1998 the New Mexico Oil Conservation Division (OCD) disapproved the P&S Brine Sales (P&S) discharge plan application to convert the existing Class II brine well (BW-007) to a Class I cavern disposal well (UIC-CLI-006). Since the Class I application has been disapproved, P&S must either renew or close the brine extraction discharge plan (BW-007) pursuant to Water Quality Control Commission (WQCC) Regulations.

P&S has until March 9, 1998 to respond to the OCD with one of the following options:

1. Renew the discharge plan by submitting the original discharge plan renewal application and one copy to the OCD Santa Fe Division Office along with a discharge plan fee of $740. A copy of the discharge plan renewal application is to be submitted to the OCD Hobbs District Office. Please make all checks payable to: NMED-Water Quality Management.

2. Close the discharge plan by submitting a closure plan that includes, at a minimum, a description of closure measures, maintenance and monitoring plans, and post-closure maintenance and monitoring. Please submit the original closure plan and one copy to the OCD Santa Fe Division Office and one copy to the OCD Hobbs District Office. The OCD must approve of the closure plan prior to the beginning of closure activities.

If you have any questions, please feel free to contact me (505) 827-7155.

Sincerely,

Mark Ashley
Geologist
xc: OCD Hobbs Office

To ....Mark..Ashley.....

**From**

DONNA PITZER

***Energy & Minerals Department***
OIL CONSERVATION DIVISION
P O Box 1980
Hobbs NM 88241

**Telephone Number** (505) 393-6161

- ☐ **For Your Files**
- ☐ **Prepare a Reply for My Signature**
- ☐ **For Your Review and Return**
- ☐ **For Your Information**
- ☑ **For Your Handling**
- ☐ **For Your Approval**
- ☐ **As Per Your Request**
- ☐ **For Your Signature**
- ☑ **Please Advise**
- ☐ **For Your Attention**

Do you have a record of a Brine Well at this Location. Please send us a copy of your well file. Thanks

District I
PO Box 1980, Hobbs, NM 88241-1980
District II
PO Drawer DD, Artesia, NM 88211-0719
District III
1000 Rio Brazos 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-101
Revised February 10, 1994
Instructions on back
Submit to Appropriate District Office
State Lease - 6 Copies
Fee Lease - 5 Copies

☐ AMENDED REPORT

# APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

| 1 Operator Name and Address | 2 OGRID Number |
|---|---|
| P & S BRINE SALES, L.P.<br>P. O. BOX 1769<br>EUNICE, NM 88231 | 3 API Number<br>30 - 0 |

| 4 Property Code | 5 Property Name | 6 Well No. |
|---|---|---|
| | ARNOTT RAMSEY STATE | 6 |

## 7 Surface Location

| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| P | 16 | 25S | 37E | | 515<br>581 | SOUTH | 100<br>93 | EAST | LEA |

## 8 Proposed Bottom Hole Location If Different From Surface

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

| 9 Proposed Pool 1 | 10 Proposed Pool 2 |
|---|---|
| BRINE SEC | |

| 11 Work Type Code | 12 Well Type Code | 13 Cable/Rotary | 14 Lease Type Code | 15 Ground Level Elevation |
|---|---|---|---|---|
| P | W | WIRE LINE | S | 3106 |
| **16 Multiple** | **17 Proposed Depth** | **18 Formation** | **19 Contractor** | **20 Spud Date** |
| NO | 1200' | SALT SEC | P & S BRINE | 11-10 |

## 21 Proposed Casing and Cement Program

| Hole Size | Casing Size | Casing weight/foot | Setting Depth | Sacks of Cement | Estimated TOC |
|---|---|---|---|---|---|
| 8½" | 7" | 23# | 1000' | 400SAC | SURFACE |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

22 Describe the proposed program. If this application is to DEEPEN or PLUG BACK give the data on the present productive zone and proposed new productive zone. Describe the blowout prevention program, if any. Use additional sheets if necessary.

1. PULL TUBING FROM WELL
2. SET CAST IRON BRIDGE PLUG
3. TEST TO 500# W/CHART REC. FOR O.C.D.
4. T.A.

| 23 I hereby certify that the information given above is true and complete to the best of my knowledge and belief. | OIL CONSERVATION DIVISION |
|---|---|
| Signature: Paul Prather | Approved by: |
| Printed name: PAUL PRATHER | Title: |
| Title: OWNER | Approval Date: / Expiration Date: |
| Date: 10/22/97 / Phone: 505 394 2545 | Conditions of Approval: Attached ☐ |

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

February 5, 1998

**Certified Mail**
**Return Receipt No. P-288-259-013**

Mr. Paul Prather
P&S Brine Sales
P.O. Box ~~7169~~ 1069
Eunice, New Mexico 88231

**RE: Discharge Plan BW-007 Renewal**
**Brine Extraction Facility**
**Lea County, New Mexico**

Dear Mr. Prather:

On February 4, 1998 the New Mexico Oil Conservation Division (OCD) disapproved the P&S Brine Sales (P&S) discharge plan application to convert the existing Class II brine well (BW-007) to a Class I cavern disposal well (UIC-CLI-006). Since the Class I application has been disapproved, P&S must either renew or close the brine extraction discharge plan (BW-007) pursuant to Water Quality Control Commission (WQCC) Regulations.

P&S has until March 9, 1998 to respond to the OCD with one of the following options:

1. Renew the discharge plan by submitting the original discharge plan renewal application and one copy to the OCD Santa Fe Division Office along with a discharge plan fee of $740. A copy of the discharge plan renewal application is to be submitted to the OCD Hobbs District Office. Please make all checks payable to: NMED-Water Quality Management.

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If you have any questions, please feel free to contact me (505) 827-7155.

Sincerely,

Mark Ashley
Geologist
xc: OCD Hobbs Office

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

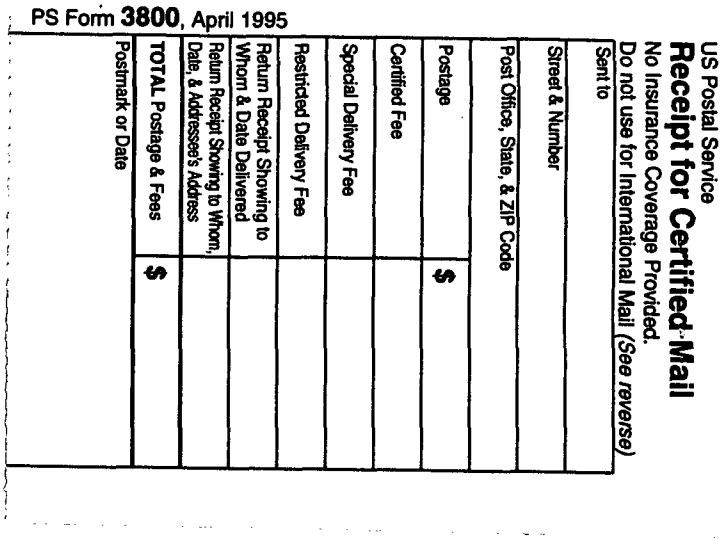
OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

February 5, 1998

**Certified Mail**
**Return Receipt No. P-288-259-013**

Mr. Paul Prather
P&S Brine Sales
P.O. Box 7169
Eunice, New Mexico 88231

**RE: Discharge Plan BW-007 Renewal**
**Brine Extraction Facility**
**Lea County, New Mexico**


PS Form 3800, April 1995

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Restricted Delivery Fee
Return Receipt Showing to Whom & Date Delivered
Return Receipt Showing to Whom, Date, & Addressee's Address
TOTAL Postage & Fees $
Postmark or Date

P 288 259 013

Dear Mr. Prather:

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If you have any questions, please feel free to contact me (505) 827-7155.

Sincerely,

Mark Ashley
Geologist
xc: OCD Hobbs Office

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

November 24, 1997

Mr. Paul Prather
P&S Brine Sales
P.O. Box 7169
Eunice, New Mexico 88231

RE: Mechanical Integrity Testing of Brine Supply Wells

Dear Mr. Paul Prather:

Enclosed is a copy of the mechanical integrity test conducted on your brine well. Please retain this copy for your records.

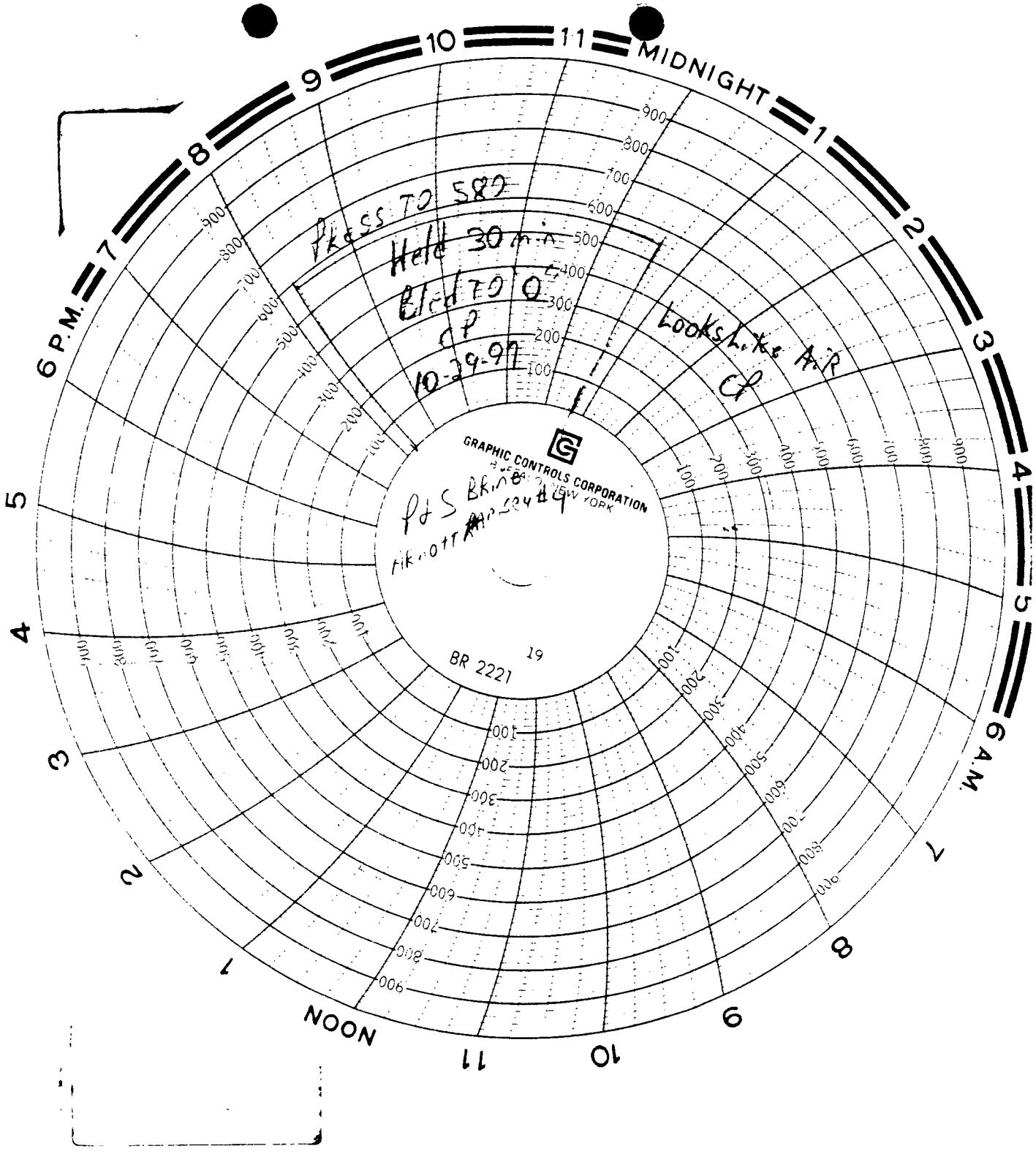
As a condition of discharge plan approval, all brine facilities are required to submit a quarterly report listing, by month, the volumes of fluids injected and produced. The New Mexico Oil Conservation Division (OCD) has not received any quarterly reports for the Eunice or the Jal brine stations. Please update all delinquent quarterly reports by January 26, 1997.

On behalf of the OCD, I would like to thank you for your time and cooperation during the testing. If you have any questions, please contact me at (505) 827-7155.

Sincerely,

Mark Ashley
Geologist

Attachment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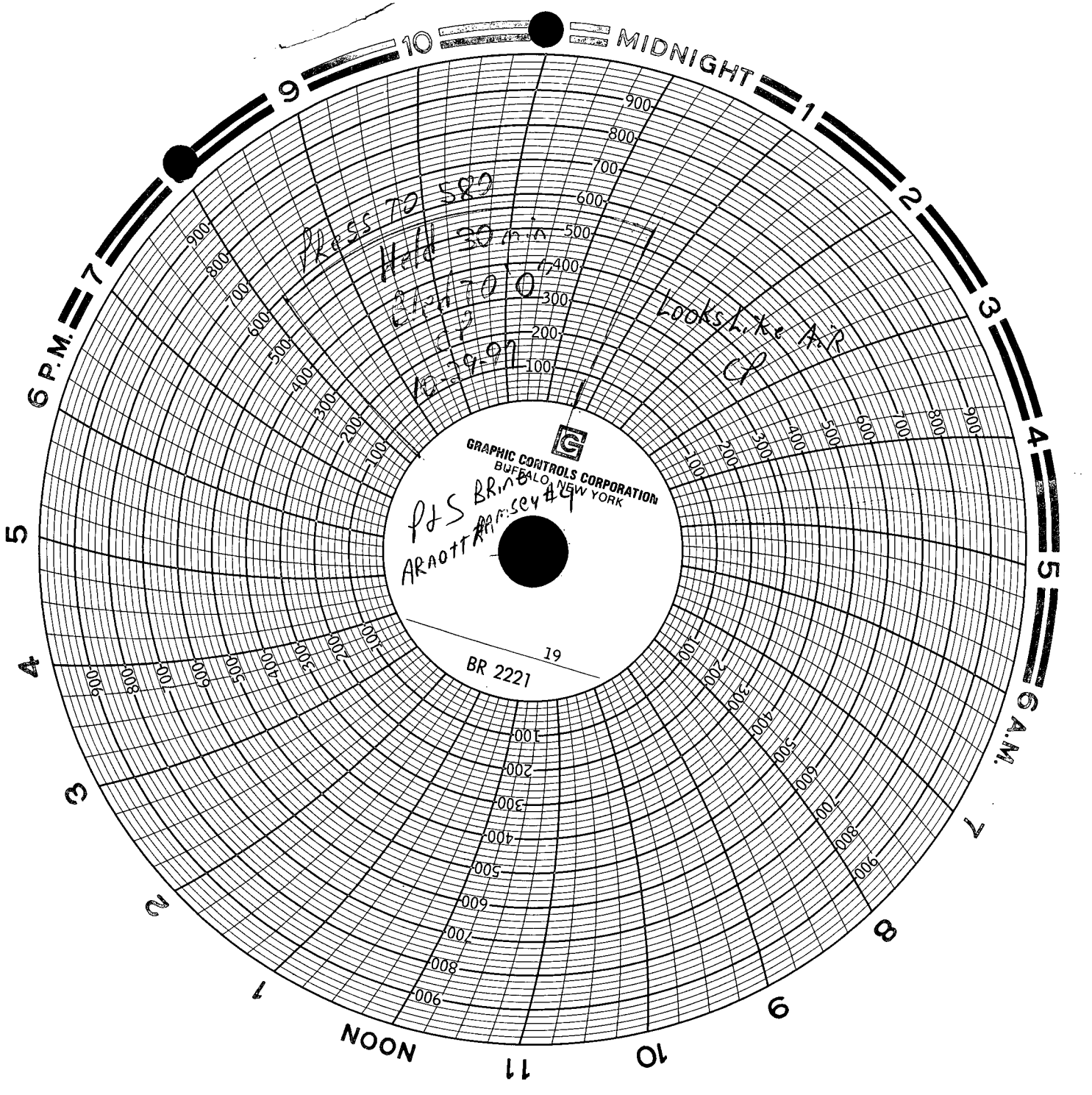
GRAPHIC CONTROLS CORPORATION
BR 2221
19


MIDNIGHT
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BUFFALO, NEW YORK
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P&S BR.
ARNOTT RAMSEY #4

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

August 12, 1997

**Certified Mail**
**Return Receipt No. P-288-258-950**

Mr. Paul Prather
P&S Brine Sales
P.O. Box 7169
Eunice, New Mexico 88231

**RE: Mechanical Integrity Testing of Brine Supply Wells**

| | |
|---|---|
| **Annual Test** | **Discharge Plan Renewal Test** |
| **Eunice Brine Station BW-002** | **Jal Brine Station BW-007** |
| **Lea County, New Mexico** | **Lea County, New Mexico** |

Dear Mr. Prather:

The Underground Injection Control Program of the Federal Safe Drinking Water Act requires that operators demonstrate mechanical integrity of all injection wells by ensuring that there are no leaks in the tubing, casing, or packer, and that the injected fluid is confined within the injection zone through proper cementing.

All brine wells that operate without a packer will be required to have an annual open hole pressure test equal to 1.5 times the normal operating pressure or 300 psi, whichever is greater, for four hours with a maximum of 10 percent bleed-off allowed. Every five years or at the time of discharge plan renewals they will be required to have an open hole pressure test equal to 1.5 times the normal operating pressure or 300 psi, whichever is greater, for four hours with zero bleed-off.

All brine wells that operate with a packer will be required to have an annual casing/tubing annulus pressure test equal to 300 psi for 30 minutes.

Operators will be responsible for providing equipment and shall bear all costs incurred. The date and time of all tests will be scheduled and witnessed by the New Mexico Oil Conservation Division.

Please have the Eunice Brine Station ready for testing on September 17, 1997 at 7:00 AM, and the Jal Brine Station ready for testing on September 17, 1997 at 8:30 AM as outlined below.

For brine wells operating without a packer:

1) The cavern must be pressured up and stabilized for a period of at least 24 hours prior to testing.

2) The system shall be tested to 1.5 times the normal operating pressure or 300 psi, whichever is greater, for a period of four hours. A maximum of 10 percent bleed-off will be allowed for annual tests. Testing conducted every five years or at the time of discharge plan renewal will have zero bleed-off.

3) A continuous recording pressure chart with an 8 hour clock shall be installed on the casing/tubing annulus. The pressure range shall not be greater than 1,000 psi.

4) Have well head prepared for test. All valves should be in good working order.

5) All gauges shall be in good working order.

6) Have manpower and equipment available for pressure test.

For brine wells operating with a packer:

1) Have the casing/tubing annulus and tubing loaded with inert fluid prior to testing.

2) The casing/tubing annulus shall be tested to 300 psi for 30 minutes.

3) A continuous recording pressure chart with an 8 hour clock shall be installed on the casing/tubing annulus. The pressure range shall not be greater than 1,000 psi.

4) Have well head prepared for test. All valves should be in good working order.

5) All gauges shall be in good working order.

6) Have manpower and equipment available for pressure test.

If you have any questions regarding this matter, please feel free to contact me at (505) 827-7155.

Sincerely,

Mark Ashley
Geologist

PS Form **3800**, April 1995

US Postal Service
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P 288 258 950

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| Restricted Delivery Fee | |
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| Return Receipt Showing to Whom, Date, & Addressee's Address | |
| TOTAL Postage & Fees | $ |
| Postmark or Date | |

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

# MEMORANDUM OF MEETING OR CONVERSATION

| ☒ Telephone ☐ Personal | Time | Date 8-20-96 |
|---|---|---|

| Originating Party | Other Parties |
|---|---|
| EDDIE SEAY | MARK ASHLEY |

Subject P+S BRINE - JAL

Discussion P+S HAS SUBMITTED AN APPLICATION TO CONVERT THEIR BRINE FACILITY INTO A CLASS I CAVERN DISPOSAL WELL. THEY WOULD LIKE TO HAVE PERMISSION POSTPONE THE SCHEDULED 1996 MIT & DT REVIEW AND MAKE THEM BOTH PART OF THE NEW CLASS I PERMIT.

Conclusions or Agreements

WE WILL ALLOW THEIR PROPOSAL UNTIL THE CLASS I PERMIT IS APPROVED

Distribution

Signed Mark Ashley

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

August 16, 1996

Certified Mail
Return Receipt No. P-288-258-827

Mr. Paul Prather
P&S Brine Sales
P.O. Box 7169
Eunice, New Mexico 88231

**RE: Mechanical Integrity Testing of Brine Supply Wells**

| | |
|---|---|
| **Annual Test** | **Annual Test** |
| **Jal Brine Station BW-007** | **Eunice Brine Station BW-002** |
| **Lea County, New Mexico** | **Lea County, New Mexico** |

Dear Mr. Prather:

The Underground Injection Control Program of the Federal Safe Drinking Water Act requires that operators demonstrate mechanical integrity of all injection wells by ensuring that there are no leaks in the tubing, casing, or packer, and that the injected fluid is confined within the injection zone through proper cementing.

All brine wells that operate without a packer will be required to have an annual open hole pressure test equal to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for four hours with a maximum of 10 percent bleed-off allowed. Every five years or at the time of discharge plan renewals they will be required to have an open hole pressure test equal to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for four hours with zero bleed-off.

All brine wells that operate with a packer will be required to have an annual casing/tubing annulus pressure test equal to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for four hours.

Operators will be responsible for providing equipment and shall bear all costs incurred. The date and time of all tests will be scheduled and witnessed by the New Mexico Oil Conservation Division.

Please have the Eunice Brine Station ready for testing on September 19, 1996 at 8:00 AM, and the Jal Brine Station ready for testing on September 19, 1996 at 9:00 AM as outlined below.

For brine wells operating without a packer:

1) The cavern must be pressured up and stabilized for a period of at least 24 hours prior to testing.

2) The system shall be tested to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for a period of four hours. A maximum of 10 percent bleed-off will be allowed for annual tests. Testing conducted every five years or at the time of discharge plan renewal will have zero bleed-off.

3) A continuous recording pressure chart with an 8 hour clock shall be installed on both the casing/tubing annulus and tubing. The pressure range shall not be greater than 1,000 psig.

4) Have well head prepared for test. All valves should be in good working order. All casing/tubing annulus and tubing valves shall be open.

5) All gauges shall be in good working order.

6) Have manpower and equipment available for pressure test.

For brine wells operating with a packer:

1) Have the casing/tubing annulus and tubing loaded with inert fluid prior to testing.

2) The casing/tubing annulus shall be tested to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for four hours.

3) A continuous recording pressure chart with an 8 hour clock shall be installed on the casing/tubing annulus. The pressure range shall not be greater than 1,000 psig.

4) Have well head prepared for test. All valves should be in good working order.

5) All gauges shall be in good working order.

6) Have manpower and equipment available for pressure test.

If you have any questions regarding this matter, please feel free to contact me at (505) 827-7155.

Sincerely,

Mark Ashley
Geologist

P 288 258 827

US Postal Service
**Receipt for Certified Mail**
No Insurance Coverage Provided.
*Do not use for International Mail (See reverse)*

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| Postage | $ |
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| Restricted Delivery Fee | |
| Return Receipt Showing to Whom & Date Delivered | |
| Return Receipt Showing to Whom, Date, & Addressee's Address | |
| TOTAL Postage & Fees | $ |
| Postmark or Date | |

PS Form **3800**, April 1995

**ACKNOWLEDGEMENT OF RECEIPT OF CHECK/CASH**

I hereby acknowledge receipt of check No. 1162 dated 4/8/92,

or cash received on 4/13/92 in the amount of $ 690.00

from P+S BRINE SALES

for P+S JAL (Facility Name) BW-7 (DP No.)

Submitted by: [signature] Date: 4/13/92

Submitted to ASD by: _____ Date: _____

Received in ASD by: [signature] Date: 4/13

Filing Fee ___ New Facility ___ Renewal X

Modification ___ Other _____ (specify)

Organization Code 521.07 Applicable FY 80

To be deposited in the Water Quality Management Fund.

Full Payment X or Annual Increment ___

---

LeaCounty State Bank
P.O. Box 400 • Hobbs, New Mexico 88241

P & S BRINE SALES
P. O. BOX 1769
EUNICE, NM 88231

1162

95-183/1122

4-8 19 92

Pay to the order of NMED - Water Quality Management $ 690.00

Six Hundred Ninety dollars and NO/100 Dollars

YOUR ENDORSEMENT ON THIS CHECK ACKNOWLEDGES PAYMENT ON THE FOLLOWING ACCOUNT(S).

| | | | |
|---|---|---|---|
| (Jal) | Discharge Plan BW-7 Flat Fee | | |
| | | | |
| | | | |

R. Suzanne McReynolds

⑈000 1162⑈ ⑆122018361⑆ 0558 1001⑈

Rocky Mountain Bank Note G

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

March 30, 1992

CERTIFIED MAIL
RETURN RECEIPT NO. P-670-683-510

Mr. Paul Prather
P & S Brine Sales, Inc.
P. O. Box 1769
Eunice, New Mexico 88231

**RE: Approval of Discharge Plan BW-7**
**P & S Brine Sales Jal Station**
**Lea County, New Mexico**

Dear Mr. Prather:

The **discharge plan renewal BW-7 for P & S Brine Sales Jal Station** located in the SE/4 SE/4, Section 16, Township 25 South, Range 37 East, NMPM, Lea County, New Mexico, **is hereby approved** under the conditions contained in the enclosed attachment. The renewal application consists of the original discharge plan as approved December 18, 1982; and renewal of the discharge plan approved May 21, 1986; the renewal application dated September 17, 1991; and the materials dated January 2, 1992, submitted as supplements to the application.

The discharge plan renewal was submitted pursuant to Section 5-101.B.3 of the New Mexico Water Quality Control Commission Regulations. It is approved pursuant to Sections 5-101.A and 3-109.C. Please note Sections 3-109.E and 3-109.F which provide for possible future amendments or modifications of the plan. Please be advised that the approval of this plan does not relieve you of liability should your operation result in actual pollution of surface water, ground water, or the environment which may be actionable under other laws and/or regulations.

The monitoring and reporting shall be as specified in the enclosed attachment. Please note that Section 3-104 of the regulations requires that "When a plan has been approved, discharges must be consistent with the terms and conditions of the plan." Pursuant to Section 3-107.C you are required to notify the Director of any facility expansion, production increase, or process modification that would result in any change in the discharge of water quality or volume.

Pursuant to Section 3-109.G.4, this plan is for a period of five (5) years. This approval will expire March 30, 1997, and you should submit an application for renewal in ample time before this date. Note that under Section 5-101.G of the regulations, if a discharger submits a discharge plan renewal application at least 180 days before the discharge plan expires and is in compliance with the approved plan, then the existing discharge plan will not expire until the application for renewal has been approved or disapproved.

The discharge plan renewal application for the P & S Brine Sales Jal Station is subject to the WQCC Regulation 3-114 discharge plan fee. Every billable facility submitting a discharge plan renewal will be assessed a fee equal to the filing fee of fifty (50) dollars plus one-half of the flat fee or six-hundred and ninety (690) dollars.

The OCD has received your $50 filing fee. The flat fee for an approved discharge plan may be paid in a single payment due at the time of approval, or in equal annual installments over the duration of the discharge plan, with the first payment due at the time of approval. The flat fee (total payment or installment) is due upon receipt of this letter.

Please make all checks out to the **NMED - Water Quality Management** and send to the OCD Santa Fe Office.

On behalf of the staff of the Oil Conservation Division, I wish to thank you and your staff for your cooperation during this discharge plan review.

Sincerely,

William J. LeMay
Director

WJL/kmb

Attachment

cc: Chris Eustice - OCD Hobbs Office

**ATTACHMENT TO DISCHARGE PLAN BW-7 APPROVAL**
**P & S BRINE SALES JAL STATION**
**MONITORING AND REPORTING REQUIREMENTS**
(March 30, 1992)

1. Payment of Discharge Plan Fees: The $690 flat fee (either total payment or installment) will be paid upon receipt of this approval letter.

2. Mechanical Integrity Testing: An annual mechanical integrity test (MIT) will be conducted on the brine well and the results submitted to the OCD Santa Fe Office. Since an MIT isolating the casing from the formation was conducted in December 1991, this test is not required until your discharge plan is up for renewal in 5 years.

3. Injection/Production Volumes: A quarterly report will be submitted listings of the volume of fluids injected and produced beginning with first quarter (Jan.-March) 1992. The report will be submitted to the OCD Santa Fe Office at the end of each quarter.

4. Monitor Well Inspections: The monitor well will be checked at a minimum of monthly. The date of inspection, results, and inspectors initials well be recorded and submitted annually to the OCD Santa Fe Office.

5. Containment of Spills: Adequate containment will be maintained around all brine loading valves. The containment will be inspected and maintained to prohibit leaks, spills and overflows. Berms will be maintained around all tanks (other than freshwater) to contain one-third greater than the volume of the largest tank or all interconnected tanks.

6. Sump Inspection: The sump that collects spilled brine at the loading area will be cleaned out and visually inspected on an annual basis. Any new sumps or below-grade tanks will be approved by the OCD prior to installation.

State of New Mexico
Energy, Minerals and Natural Resources Department
OIL CONSERVATION DIVISION
P.O. Box 2088
Santa Fe, NM 87501

RECEIVED
JAN 21 1992
OIL CONSERVATION DIVISION
SANTA FE

# *DISCHARGE PLAN APPLICATION FOR BRINE EXTRACTION FACILITIES*

*(Refer to OCD Guidelines for assistance in completing the application.)*

☐ NEW ☒ RENEWAL

I. FACILITY NAME: P & S Brine Sales BW-7

II. OPERATOR: P & S Brine

ADDRESS: P.O. Box 1768 Eunice, NM 88231

CONTACT PERSON: Paul Prather PHONE: 394-2545

III. LOCATION: SE /4 SE /4 Section 16 Township 25-S Range 37-E
*Submit large scale topographic map showing exact location.*

IV. Attach the name and address of the landowner of the facility site.
The State of New Mexico

V. Attach a description of the types and quantities of fluids at the facility.

VI. Attach a description of all fluid transfer and storage and fluid and solid disposal facilities.

VII. Attach a description of underground facilities (i.e. brine extraction well).

VIII. Attach a contingency plan for reporting and clean-up of spills or releases.

IX. Attach geological/hydrological evidence demonstrating that brine extraction operations will not adversely impact fresh water.

X. Attach such other information as is necessary to demonstrate compliance with any other OCD rules, regulations and/or orders.

XI. CERTIFICATION

*I hereby certify under penalty of law that I have personnaly examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.*

Name: Paul Prather Title: Owner

Signature: Paul Prather Date: 1-2-92

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

DISCHARGE PLAN RENEWAL

1. Will adhere to OCD Rule 116 and WQQC Rule 5-208 as indicated, and file appropriate forms on same. (Attachment 1)

2. P & S Brine chose to pull tubing, run packer to base of casing and pressure test casing. The chart is enclosed. Test was witnessed by Mr. Ray Smith of the OCD. Well tested good. (Attachment 2)

   The only buried line from well to brine pit approx. 300 ft. long; 2 1/2" PVC Schedule 40, 8 yrs. old.

3. P & S has no record of production prior to purchasing brine facility. Production since acquiring facility is listed within. (Attachment 3)

   P & S would like to file production records quarterly, starting March - June - Sept. - Dec., if this is agreeable to OCD.

4. The brine storage pond was installed according to OCD specs. at that time, with the bottom contoured at 4" drop per fifty feet. Also a sand pond was put down between the liner and caliche to prevent punctures and also to enhance the migration of a leak to the lateral. If a leak is detected, pond will be drained and repaired or a double liner installed.

   Since this is an older single liner pond, we feel that weekly inspection of the monitor well sump is warranted.

   A marker will be installed to keep 1 1/2 ft. freeboard on pond. Inspection log kept at brine station. (Attachment 4)

5. Copies of analysis for fresh water and brine are included. (Attachment 5)

   Samples were taken from the load lines at fresh water tank and brine pit.

6. According to information from OCD, Hobbs office, the frac pressure of the salt formation varies from 900 to 1100 psi.

   P & S Brine uses a 7 1/2 hp electric pump to circulate product. Maximum pressure for the pump is 180 psi, normal working pressure is 50 psi. Without changing complete operation, frac pressure will never be achieved.

7. Our normal operating procedure is to inject fresh water down casing and produce brine from tubing. It is necessary to backflush or reverse flow well to keep salt buildup in tubulars. Once a month for 24 hrs. will be adequate for our operation.

8. Spill containment and collecting system presently in use at the brine system is an underground steel vessel with a pump which has a water level shut off switch. When water runs into sump, the pump puts it back into the brine pit. This system was in use when P & S took operation. The driving area was contoured so spillage would drain to the sump and be pumped back into brine storage pit. P & S will clean out and inspect sump. Also have plans to revamp loading area and collection system when it becomes necessary. (Attachment 8)

9. Loading areas were installed with poly tubs to contain leaks and spills from loading. Also a PVC line was run from each tub to the sump to prevent overflow at loading tubs. Area has been cleaned up and maintained and will be kept maintained. (Attachment 9)

10. Bond renewal enclosed. (Attachment 10)

DISTRICT I
P.O.Box 1980, Hobbs, NM 88241-1980

DISTRICT II
P.O. Drawer DD, Artesia, NM 88211-0719

DISTRICT III
1000 Rio Brazos Rd, Aztec, NM 87410

State of New Mexico
Energy, Minerals and Natural Resources Department

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

SUBMIT 2 COPIES TO APPROPRIATE DISTRICT OFFICE IN ACCORDANCE WITH RULE 116 PRINTED ON BACK SIDE OF FORM

# NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

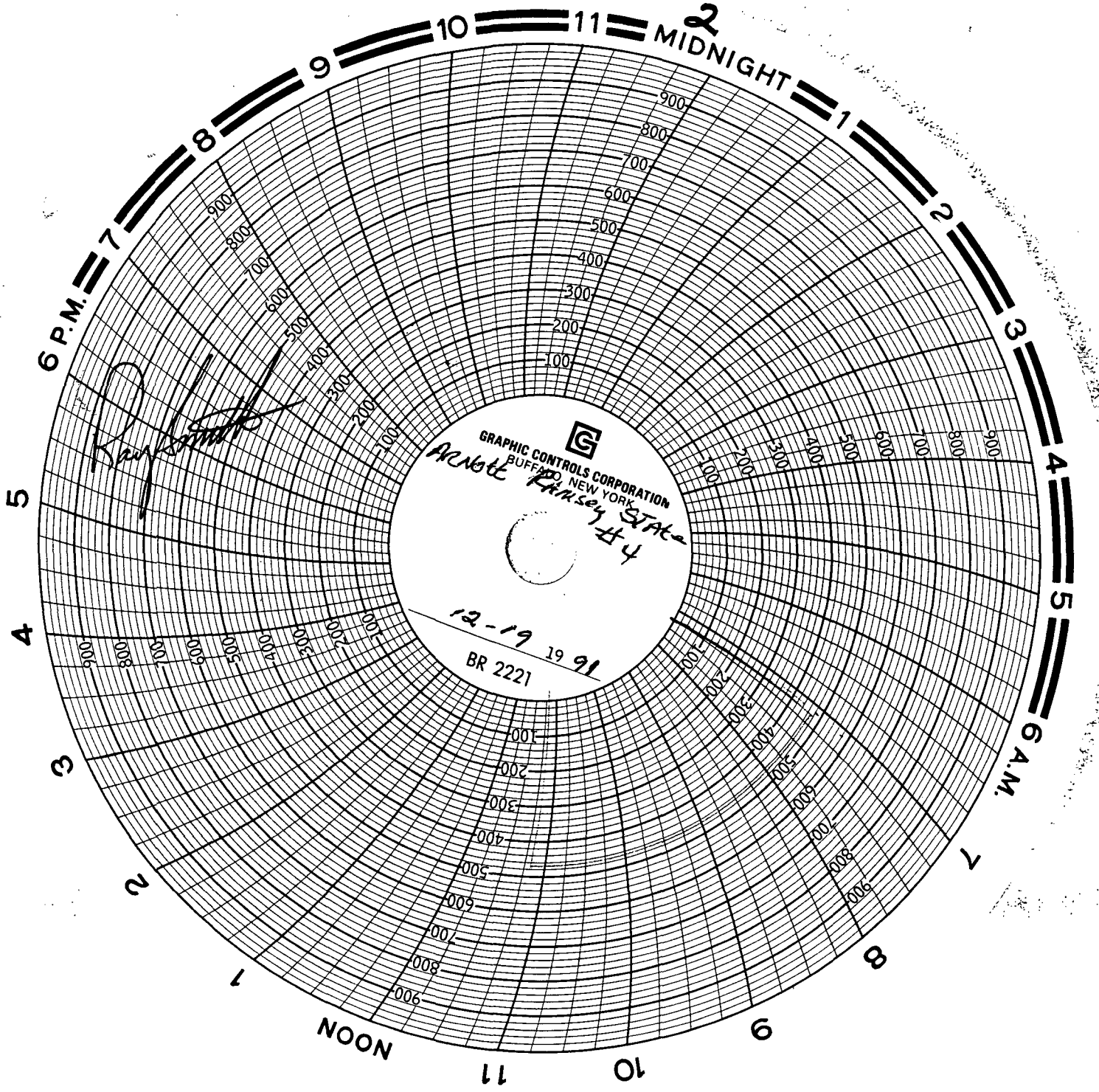
| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OPERATOR | | | | | | | | ADDRESS | | | | | TELEPHONE # |
| REPORT OF | FIRE | | BREAK | | SPILL | | LEAK | | BLOWOUT | | OTHER* | | |
| TYPE OF FACILITY | DRLG WELL | | PROD WELL | | TANK BTRY | | PIPE LINE | GASO PLNT | OIL RFY | | OTHER* | | |
| FACILITY NAME: | | | | | | | | | | | | | |
| LOCATION OF FACILITY Qtr/Qtr Sec. or Footage | | | | | | | | | SEC. | TWP. | RGE. | COUNTY | |
| DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK | | | | | | | | | | | | | |
| DATE AND HOUR OF OCCURRENCE | | | | | | | | DATE AND HOUR OF DISCOVERY | | | | | |
| WAS IMMEDIATE NOTICE GIVEN? | YES | NO | NOT REQUIRED | | IF YES, TO WHOM | | | | | | | | |
| BY WHOM | | | | | DATE AND HOUR | | | | | | | | |
| TYPE OF FLUID LOST | | | | | QUANTITY OF LOSS | | | VOLUME RECOVERED | | | | | |
| DID ANY FLUIDS REACH A WATERCOURSE? | YES | NO | QUANTITY | | | | | | | | | | |
| IF YES, DESCRIBE FULLY** | | | | | | | | | | | | | |
| DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN** | | | | | | | | | | | | | |
| DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN** | | | | | | | | | | | | | |
| DESCRIPTION OF AREA | FARMING | | GRAZING | | URBAN | | OTHER* | | | | | | |
| SURFACE CONDITIONS | SANDY | SANDY LOAM | CLAY | | ROCKY | | WET | | DRY | | SNOW | | |
| DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)** | | | | | | | | | | | | | |

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED | PRINTED NAME AND TITLE | DATE

*SPECIFY

**ATTACH ADDITIONAL SHEETS IF NECESSARY


MIDNIGHT
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12
GRAPHIC CONTROLS CORPORATION
BUFFALO, NEW YORK
Arnott Ramsey State
12-19 19 91
BR 2221

3

P & S BRINE
Jal Station

| Brine Production | Bbls. |
|---|---|
| 09-89 | 825 |
| 10-89 | 6,010 |
| 11-89 | 8,575 |
| 12-89 | 3,276 |
| 01-90 | 19,045 |
| 02-90 | 33,525 |
| 03-90 | 19,514 |
| 04-90 | 17,053 |
| 05-90 | 11,560 |
| 06-90 | 15,845 |
| 07-90 | 15,765 |
| 08-90 | 13,200 |
| 09-90 | 16,405 |
| 10-90 | 11,245 |
| 11-90 | 8,342 |
| 12-90 | 17,540 |
| 01-91 | 5,564 |
| 02-91 | 7,880 |
| 03-91 | 13,460 |
| 04-91 | 10,669 |
| 05-91 | 6,025 |
| 06-91 | 910 |
| 07-91 | 7,921 |
| 08-91 | 5,717 |
| 09-91 | 6,712 |
| 10-91 | 546 |
| 11-91 | 110 |
| Total Brine Bbls. | 283,239 |

4

# MONITOR WELL INSPECTION

| JANUARY | FEBRUARY | MARCH | APRIL |
|---|---|---|---|
| 1. | 1. | 1. | 1. |
| 2. | 2. | 2. | 2. |
| 3. | 3. | 3. | 3. |
| 4. | 4. | 4. | 4. |

| MAY | JUNE | JULY | AUGUST |
|---|---|---|---|
| 1. | 1. | 1. | 1. |
| 2. | 2. | 2. | 2. |
| 3. | 3. | 3. | 3. |
| 4. | 4. | 4. | 4. |

| SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER |
|---|---|---|---|
| 1. Steve 9/4/91 Dry | 1. Paul 10/3/91 Dry | 1. Paul 11/4/91 OK | 1. Dirk 12/5/91 OK |
| 2. Dirk 9/10/91 ok | 2. S.P. 10/11/91 Dry | 2. Eddie 11/14/91 Dry | 2. Steve 12/14/91 Dry |
| 3. Steve 9/19/91 Dry | 3. Dirk 10/17/91 OK | 3. Steve 11/21/91 Dry | 3. Paul 12/19/91 OK |
| 4. Butch 9/25 OK | 4. Steve 10/24 | 4. Butch 11/30/91 OK | 4. Butch 12/27/91 OK |

5

REACTION

REACTION CHEMICAL ENTERPRISES, INC.
P.O. BOX 3868 ODESSA, TEXAS 79760-3868
915/332-4324

# WATER ANALYSIS

COMPANY: P & S
LEASE: WATER STA.
WELL: 0
SAMPLE: BRINE

DATE OF RUN: 12-04-91
SAMPLE DATE: UNKNOWN
RUN # 1995

| | Mg./L. | Meq./L. |
|---|---|---|
| TOTAL HARDNESS - CaCO3 | 18,500.0 | |
| TOTAL ALKALINITY - CaCO3 | - | |
| TOTAL DISSOLVED SOLIDS | 238,240.4 | |
| CALCIUM - Ca | 676.0 | 33.8 |
| MAGNESIUM - Mg | 4,084.8 | 334.8 |
| SODIUM - Na | 86,212.5 | 3,748.4 |
| BARIUM - Ba | 0.0 | |
| BICARBONATE - HCO3 | 17.1 | 0.3 |
| CARBONATE - CO3 | 0.0 | |
| SULFATE - SO4 | 4,250.0 | 88.5 |
| CHLORIDE - CL | 143,000.0 | 4,028.2 |
| CARBON DIOXIDE - CO2 | 44.0 | |
| HYDROGEN SULFIDE - H2S | 0.0 | |
| TOTAL IRON - Fe | 0.0 | |
| TEMPERATURE | 75.0 | |
| pH | 7.500 | |
| SPECIFIC GRAVITY | 1.154 | |
| LBS/GAL | 9.6 | |

STABILITY INDEX (Stiff-Davis)

SI=pH-pCa-pAlk-K

| DEGREES F. | S.I. |
|---|---|
| 77 | -0.38 |
| 100 | -0.10 |
| 180 | 1.82 |

| CaSO4 | Mg./L. |
|---|---|
| SOLUBILITY : | 7,367 |
| ACTUAL : | 2,301 |
| SATURATION % : | 31.2 |

ANALYZED BY: WALLENDER

5

REACTION

REACTION CHEMICAL ENTERPRISES, INC.
P.O. BOX 3868 ODESSA, TEXAS 79760-3868
915/332-4324

# WATER ANALYSIS

COMPANY: P & S
LEASE: WATER STA.
WELL: 0
SAMPLE: FRESH

DATE OF RUN: 12-04-91
SAMPLE DATE: UNKNOWN
RUN # 1994

| | Mg./L. | Meq./L. |
|---|---|---|
| TOTAL HARDNESS - CaCO3 | 250.0 | |
| TOTAL ALKALINITY - CaCO3 | - | |
| TOTAL DISSOLVED SOLIDS | 409.0 | |
| CALCIUM - Ca | 34.0 | 1.7 |
| MAGNESIUM - Mg | 40.1 | 3.3 |
| SODIUM - Na | 40.7 | 1.8 |
| BARIUM - Ba | 0.0 | |
| BICARBONATE - HCO3 | 36.6 | 0.6 |
| CARBONATE - CO3 | 0.0 | |
| SULFATE - SO4 | 150.0 | 3.1 |
| CHLORIDE - CL | 107.6 | 3.0 |
| CARBON DIOXIDE - CO2 | 88.0 | |
| HYDROGEN SULFIDE - H2S | 0.0 | |
| TOTAL IRON - Fe | 0.0 | |
| TEMPERATURE | 75.0 | |
| pH | 8.600 | |
| SPECIFIC GRAVITY | 1.000 | |
| LBS/GAL | 8.3 | |

STABILITY INDEX (Stiff-Davis)

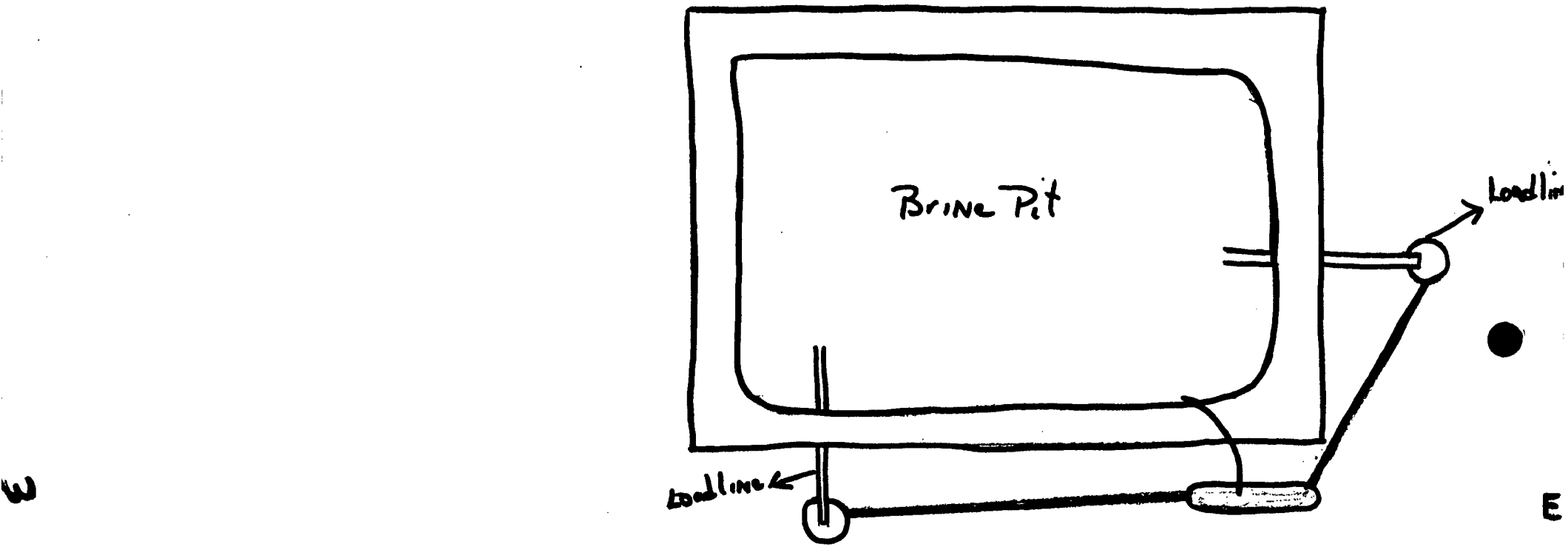
SI=pH-pCa-pAlk-K

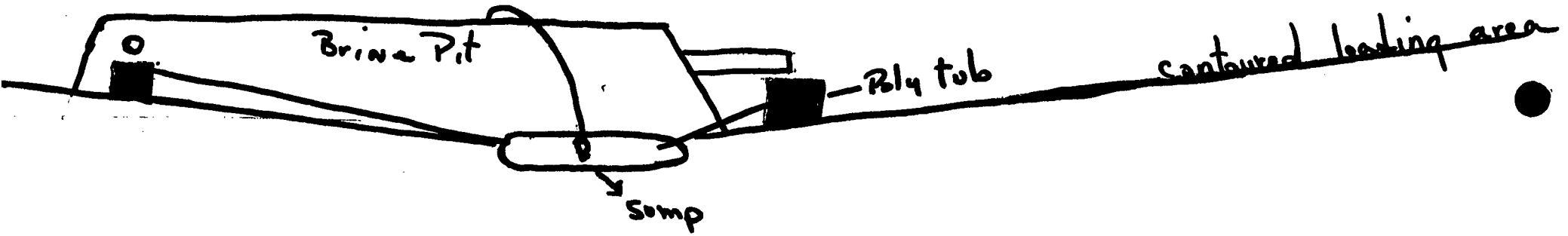
| DEGREES F. | S.I. |
|---|---|
| 77 | 0.13 |
| 100 | 0.49 |
| 180 | 1.21 |

| CaSO4 | Mg./L. |
|---|---|
| SOLUBILITY : | 1,530 |
| ACTUAL : | 116 |
| SATURATION % : | 7.6 |

ANALYZED BY: WALLENDER

8+9


Brine Pit
Loadline
Loadline
W
E


Brine Pit
Blg tub
contoured loading area
Sump

S

UNDERWRITERS INDEMNITY COMPANY

8 Greenway Plaza, Suite 1450
Houston, Texas 77046

# PREMIUM NOTICE — CONTINUOUS FORM BOND

| Principal and Address | Bond No. | Premium Period | Billing Date |
|---|---|---|---|
| P & S Brine Sales dba Paul Prather<br>P.O. Box 769<br>Eunice, NM 88231 | B01942 | 10-6-91 to 10-6-92 | 10-24-91 |
| | Amount of Bond | Premium Charge | Program Code |
| | $ 5,000 | $ 250 | |
| | Description of Bond | | |
| | One-Well Plugging Bond | | |
| General Agent and Address | Obligee and Address | | |
| Leavell/Danford Ins. Agcy., Inc.<br>P.O. Box 1889<br>Eunice, NM 88231 | State of New Mexico | | |

The bond described above is continuous in form. The indicated premium for the next premium period will be charged to your account unless we are furnished with proper evidence of termination of our liability prior to the beginning of the premium term.

This premium notice does not create a new obligation. The company's liability under said bond is not cumulative and its aggregate liability under said bond on account of all defaults committed during the term of said bond shall not in any event exceed the amount of said bond.

PRODUCER

Leavell/Danford Ins. Agcy., Inc.
P.O. Box 1889
Eunice, NM 88231

UN1002 3/88

CERTIFICATE OF AUTHORITY NO. 11164

# GENERAL POWER OF ATTORNEY

## CERTIFIED COPY

KNOW ALL MEN BY THESE PRESENTS: That **UNDERWRITERS INDEMNITY COMPANY**, a corporation organized and existing under the laws of the State of Texas, and having its principal office in the City of Houston, Texas, does hereby constitute and appoint:

ROY C. DIE

its true and lawful attorney-in-fact to execute, seal and deliver for and on its behalf as surety, any and all bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof, which are or may be allowed, required or permitted by law, statute, rule, regulation, contract or otherwise, in an amount not to exceed:

**********FIFTY THOUSAND AND NO/100 DOLLARS**********

and the execution of all such instrument(s) in pursuance of these presents, shall be binding upon said **UNDERWRITERS INDEMNITY COMPANY** as fully and amply, to all intents and purposes, as if the same had been duly executed and acknowledged by its regularly elected officers at its principal office.

This Power of Attorney is executed, and may be cerified to and may be revoked, pursuant to and by authority of Article V, Section 6(C) of the By-Laws adopted by the Board of Directors of **UNDERWRITERS INDEMNITY COMPANY**, at a meeting called and held on the 23rd day of January 1985, of which the following is a true transcript of said Section 6(C):

"The President or any Vice President, Assistant Vice President, Secretary or Resident Secretary shall have power and authority

(1) To appoint Attorneys-in-fact, and to authorize them to execute on behalf of the Company, and attach the Seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof, and

(2) to appoint special Attorneys-in-fact, who are hereby authorized to certify to copies of any power-of-attorney issued in pursuance of this section and/or any of the By-laws of the Company, and

(3) to remove, at any time, any such Attorney-in-fact or Special Attorney-in-fact and revoke the authority given to him."

Further, this Power of Attorney is signed and sealed by facsimile pursuant to resolution of the Board of Directors of said Company adopted at a meeting duly called and held on the 23rd day of January, 1985, of which the following is a true excerpt:

"Now therefore the signatures of such officers and the seal of the Company may be affixed to any such power of attorney or any certificate relating thereto by facsimile, and any such power of attorney or certificate bearing such facsimile signatures or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by facsimile signatures and facsimile seal shall be valid and binding upon the Company in the future with respect to any bond or undertaking to which it is attached."

IN TESTIMONY WHEREOF, **UNDERWRITERS INDEMNITY COMPANY** has caused this instrument to be signed and its corporate seal to be affixed by its authorized officer, E. H. Frank, III, on this the third day of March, 1987.

E. H. Frank, III President

STATE OF TEXAS
COUNTY OF HARRIS

On this the 3rd day of March, 1987, before me came the individual who executed the preceding instrument, to me personally known, and, being duly sworn, said that he is the therein described and authorized officer of **UNDERWRITERS INDEMNITY COMPANY**; that the seal affixed to said instrument is the Corporate Seal of said Company; that the said Corporate Seal and his signature were duly affixed by order of the Board of Directors of said Company.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal, at the City of Houston, Texas, the day and year first above written.

Mary Williams NOTARY PUBLIC, Harris County, Texas

**CERTIFICATION**

I, the undersigned officer of **UNDERWRITERS INDEMNITY COMPANY**, do hereby certify that I have compared the foregoing copy of the Power of Attorney and affidavit, and the copy of the Section of the By-Laws of said Company as set forth in said Power of Attorney, and that the same are correct transcripts thereof, and of the whole of the said originals, and that the said Power of Attorney has not been revoked and is now in full force and effect.

IN TESTIMONY WHEREOF, I have hereunto set my hand this 6th day of October, 19 89

Pat Doehring Assistant Secretary

Only a certified copy of Power of Attorney bearing the Certificate of Authority No. printed in red on the upper right corner is binding. Photo-copies, carbon copies or other reproductions of this document are invalid and not binding upon the Company.

**ANY INSTRUMENT ISSUED IN EXCESS OF THE PENALTY AMOUNT STATED ABOVE IS TOTALLY VOID AND WITHOUT VALIDITY.**

UNI020 (3/89)

Form O & G B-1
Adopted 6-17-77
Revised 10-1-78

# STATE OF NEW MEXICO

## ONE-WELL PLUGGING BOND

FOR CHAVES, EDDY, LEA, McKINLEY, RIO ARRIBA, ROOSEVELT, SANDOVAL, AND SAN JUAN COUNTIES ONLY

BOND NO. B01942
(For Use of Surety Company)

AMOUNT OF BOND $5,000.00

COUNTY Lea

NOTE: For wells less than 5,000 feet deep, the minimum bond is $5,000.00*
For wells 5,000 feet to 10,000 feet deep, the minimum bond is $7,500.00*
For wells more than 10,000 feet deep, the minimum bond is $10,000.00

* Under certain conditions, a well being drilled under a $5,000.00 or $7,500.00 bond may be permitted to be drilled as much as 500 feet deeper than the normal maximum depth, i.e., a well being drilled under a $5,000.00 bond may be permitted to go to 5,499 feet, and a well being drilled under a $7,500.00 bond may be permitted to go to 10,500 feet (See Rule 101)

File with Oil Conservation Division, P.O.Box 2088, Santa Fe 87504

KNOW ALL MEN BY THESE PRESENTS:

That P & S BRINE SALES DBA PAUL PRATHER, (An individual) (a partnership) (a corporation organized in the State of New Mexico, with its principal office in the city of Eunice, State of New Mexico, and authorized to do business in the State of New Mexico), as PRINCIPAL, and UNDERWRITERS INDEMNITY COMPANY, a corporation organized and existing under the laws of the State of Texas, and authorized to do business in the State of New Mexico, as SURETY, are held firmly bound unto the State of New Mexico, for the use and benefit of the Oil Conservation Division of New Mexico pursuant to Section 65-3-11, New Mexico Statutes Annotated, 1953 Compilation, as amended, in the sum of FIVE THOUSAND AND NO/100---------- Dollars lawful money of the United States, for the payment of which, well and truly to be made, said PRINCIPAL and SURETY hereby bind themselves, their successors and assigns, jointly and severally, firmly by these presents.

The conditions of this obligation are such that:

WHEREAS, The above principal has heretofore or may hereafter enter into oil and gas leases, or carbon dioxide ($CO_2$) gas leases, or helium gas leases with the State of New Mexico; and

WHEREAS, The above principal has heretofore or may hereafter enter into oil and gas leases, or carbon dioxide ($CO_2$) gas leases, or helium gas leases on lands patented by the United States of America to private individuals, and on lands otherwise owned by private individuals; and

WHEREAS, The above principal, individually, or in association with one or more other parties, has commenced or may commence the drilling of one well not to exceed a depth of 1269' feet, to prospect for and produce oil or gas, or carbon dioxide ($CO_2$) gas or helium gas, or does own or may acquire, own or operate such well, or such well started by others on land embraced in said State oil and gas leases, or carbon dioxide ($CO_2$) leases, or helium gas leases, and on land patented by the United States of America to private individuals, and on land otherwise owned by private individuals, the identification and location of said well being Arnott Ramsey State #4-P SE¼
(Here state exact legal subdivision by 40-acre tract or lot)
Section 16, Township 25S (North) (South), Range 37E (East) (West), N.M.P.M. Lea County, New Mexico.

NOW, THEREFORE, If the above bounden principal and surety or either of them or their successors or assigns, or any of them, shall plug said well when dry or when abandoned in accordance with the rules, regulations, and orders of the Oil Conservation Division of New Mexico in such way as to confine the oil, gas, and water in the strata in which they are found, and to prevent them from escaping into other strata;

THEN, THEREFORE, This obligation shall be null and void; otherwise and in default of complete compliance with any and all of said obligations, the same shall remain in full force and effect.

10-17-89
Mailed original to [illegible]
Copy mailed to insured. &

P & S BRINE SALES DBA PAUL PRATHER
PRINCIPAL
P.O. Box 769
Eunice, NM 88231
Address

By Paul D. Prather
Signature

Title

(Note: Principal, if corporation, affix corporate seal here.)

UNDERWRITERS INDEMNITY COMPANY
SURETY
8 Greenway Plaza, Suite 1450
Houston, TX 77046
Address

By Roy C. Die Attorney-in-Fact

(Note: Corporate surety affix corporate seal here.)

## ACKNOWLEDGEMENT FORM FOR NATURAL PERSONS

STATE OF New Mexico )
COUNTY OF Lea ) ss.

On this 6th day of October, 19 89, before me personally appeared Paul D. Prather, to me known to be the person (persons) described in and who executed the foregoing instrument and acknowledged that he (they) executed the same as his (their) free act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and seal on the day and year in this certificate first above written.

Rhonda Danford
Notary Public

June 17, 1993
My Commission expires

## ACKNOWLEDGEMENT FORM FOR CORPORATION

STATE OF _____ )
COUNTY OF _____ ) ss.

On this 6th day of October, 19 89, before me personally appeared _____, to me personally known who, being by me duly sworn, did say that he is _____ of _____ and that the foregoing instrument was signed and sealed on behalf of said corporation by authority of its board of directors, and acknowledged said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and seal on the day and year in this certificate first above written.

Notary Public

My Commission expires

## ACKNOWLEDGEMENT FORM FOR CORPORATE SURETY

STATE OF Texas )
COUNTY OF Harris ) ss.

On this 6th day of October, 1989, before me appeared Roy C. Die, to me personally known, who, being by me duly sworn, did say that he is Attorney-in-Fact of Underwriters Indemnity Company and that the foregoing instrument was signed and sealed on behalf of said corporation by authority of its board of directors, and acknowledged said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and seal on the day and year in this certificate first above written.

Doris Williams Shirley
Notary Public

June 4, 1993
My Commission Expires

(Note: Corporate surety must attach power of attorney.)

APPROVED BY:

OIL CONSERVATION DIVISION OF NEW MEXICO

By _____

Date _____

OIL CONSERVATION DIVISION
RECEIVED
'91 NOV 12 AM 10 14

## ACKNOWLEDGEMENT OF RECEIPT OF CHECK/CASH

I hereby acknowledge receipt of check No. 1105 dated 10/29/91,
or cash received on 11/4/91 in the amount of $ 50.00
from P&S BRINE SALES
for P&S TAL BRINE STATION BW-7
(Facility Name) (DP No.)
Submitted by: Raymond C. Anderson Date: 11/4/91
Submitted to ASD by: Dorothy Montoya Date: 11/7/91
Received in ASD by: _____ Date: _____

Filing Fee X New Facility ___ Renewal X
Modification ___ Other _____
(specify)

Organization Code 521.07 Applicable FY 80 th

To be deposited in the Water Quality Management Fund.

Full Payment ___ or Annual Increment ___

---

Lea County State Bank
P.O. Box 400 • Hobbs, New Mexico 88241

P & S BRINE SALES
P. O. BOX 1769
EUNICE, NM 88231

1105

95-183/1122

10-29 19 91

Pay to the order of NMED - Water Quality Management $ 50.00

Fifty dollars and NO/100 Dollars

YOUR ENDORSEMENT ON THIS CHECK ACKNOWLEDGES PAYMENT ON THE FOLLOWING ACCOUNT(S).

| | | | |
|---|---|---|---|
| | Filing Fee | | |
| | Discharge Plan Fee - BW7 | | |
| | | | |
| | | | |

R. Suzanne McReynolds

⑈000 1105⑈ ⑆122018361⑆ 0558 1006⑈

Brass Mountain Bank Note G

Lea County State Bank
P.O. Box 400 • Hobbs, New Mexico 88241

P & S BRINE SALES
P. O. BOX 1769
EUNICE, NM 88231

1105

95-183/1122

10-29 1991

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| | | |
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| Filing Fee | | |
| Discharge Plan Fee - BW7 | | |
| | | |
| | | |

P. Suzanne McReynolds

⑈000 1105⑈ ⑆122018361⑆ 0558 1001⑈

Rocky Mountain Bank Note G

Mr. Paul Prather
P & S Brine Sales, Inc.
P. O. Box 1769
Eunice, New Mexico 88231

RECEIVED
NOV 04 1991
OIL CONSERVATION DIV.
SANTA FE

**RE: Discharge Plan Fee for BW-7**
**P & S Brine Sales, Inc.**

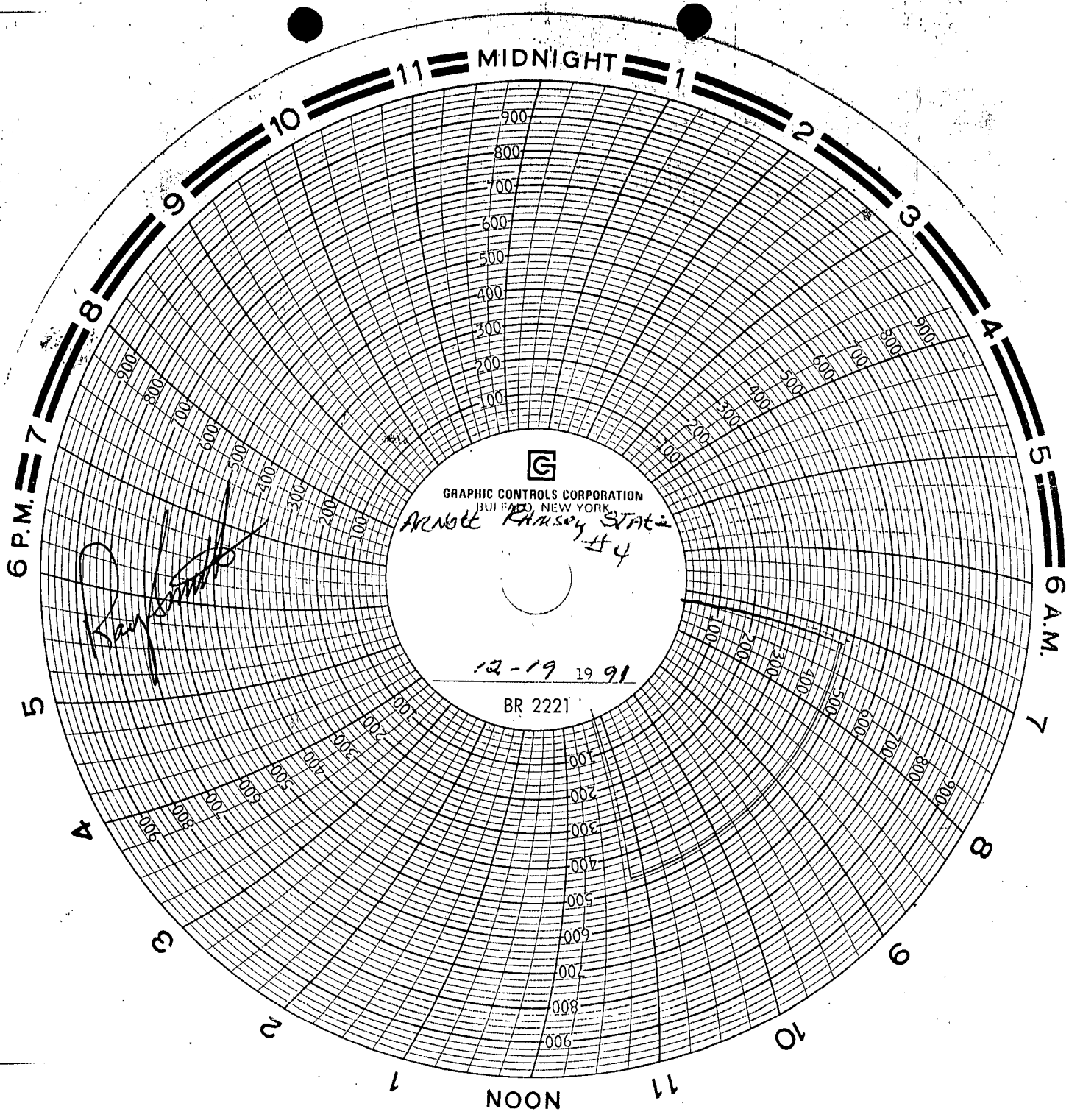
Dear Mr. Prather:

Pursuant to the New Mexico Water Quality Control Commission (WQCC) Regulation 3-114 "every billable facility submitting a discharge plan for approval, modification or renewal shall pay the fees specified in this section to the Water Quality Management Fund." Enclosed is a copy of WQCC Rule 3-114 effective as of August 18, 1991.

The Oil Conservation Division (OCD) requested a discharge plan renewal application for the P & S Brine Sales Jal Station on August 14, 1991, prior to the effective date of the WQCC Rule 3-114. The OCD received your discharge plan (BW-7) renewal application on September 20, 1991, which is after the effective date of the WQCC discharge plan fee regulation 3-114.

The discharge plan renewal application for the P & S Brine Sales Jal Station is subject to the WQCC regulation 3-114 discharge plan fee. Every billable facility submitting a discharge plan renewal will be assessed a fee equal to the filing fee of fifty (50) dollars plus one-half of the flat fee or six-hundred and ninety (690) dollars.

The $50 filing fee is due immediately and is nonrefundable. The flat fee for an approved discharge plan may be paid in a single payment due at the time of approval, or in equal annual installments over the duration of the discharge plan, with the first payment due at the time of approval.




R&S Brine
Sol station

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

October 21, 1991

**CERTIFIED MAIL**
**RETURN RECEIPT NO. P-106-675-373**

Mr. Paul Prather
P & S Brine Sales, Inc.
P. O. Box 1769
Eunice, New Mexico 88231

**RE: Discharge Plan Fee for BW-7**
**P & S Brine Sales, Inc.**

Dear Mr. Prather:

Pursuant to the New Mexico Water Quality Control Commission (WQCC) Regulation 3-114 "every billable facility submitting a discharge plan for approval, modification or renewal shall pay the fees specified in this section to the Water Quality Management Fund." Enclosed is a copy of WQCC Rule 3-114 effective as of August 18, 1991.

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The $50 filing fee is due immediately and is nonrefundable. The flat fee for an approved discharge plan may be paid in a single payment due at the time of approval, or in equal annual installments over the duration of the discharge plan, with the first payment due at the time of approval.

Please make all checks out to the **NMED - Water Quality Management** and send to the OCD Santa Fe Office. If you have any questions, please do not hesitate to contact me at (505) 827-5824.

Sincerely,

Kathy M. Brown

Kathy M. Brown
Geologist

Enclosure

xc: OCD Hobbs Office

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Ecological Services
Suite D, 3530 Pan American Highway, NE
Albuquerque, New Mexico 87107

OIL CONSERVATION DIVISION
RECEIVED
'91 OCT 15 AM 10 01

October 9, 1991

Mr. William J. Lemay
Director, New Mexico Energy, Minerals
and Natural Resources Department
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87504-2088

Dear Mr. Lemay:

The U.S. Fish and Wildlife Service (Service) has reviewed the Public Notice dated September 24, 1991, regarding the effects of granting a State of New Mexico groundwater discharge permit on fish, shellfish, and wildlife resources in New Mexico.

The Service has determined there are no wetlands or other environmentally sensitive habitats that will be adversely affected by the following activity.

(BW-7) - P & S Brine Sales, Eunice, New Mexico

If you have any questions, please call Richard Roy at (505) 883-7877.

Sincerely,

Richard J. Donaldson

for Jennifer Fowler-Propst
Field Supervisor

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals and Natural Resources Department,
Forestry and Resources Conservation Division, Santa Fe, New Mexico
Regional Administrator, U.S. Environmental Protection Agency, Dallas, Texas
Regional Director, U.S. Fish and Wildlife Service, Fish and Wildlife
Enhancement, Albuquerque, New Mexico

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

October 15, 1991

**CERTIFIED MAIL**
**RETURN RECEIPT NO. P-106-675-371**

Mr. Paul Prather
P & S Brine Sales, Inc.
P. O. Box 1769
Eunice, New Mexico 88231

**RE: Discharge Plan BW-7**
**P & S Brine Sales, Inc.**

Dear Mr. Prather:

The Oil Conservation Division (OCD) received your discharge plan renewal application dated September 17, 1991, for your Jal Brine Station. With the exception of a change in name from Permian Brine Sales to P & S Brine Sales, all of this information has been on file with the OCD since May 10, 1984. A majority of the required information is either missing, out of date, or does not meet the current OCD rules and regulations. In addition, P & S Brine Sales failed to address any of the OCD comments stated in their letter dated August 14, 1991.

The purpose of a discharge plan is to prevent and/or stop groundwater contamination from effluent or leachate discharges. This consists of more than simply submitting outdated paperwork. The OCD takes great care in reviewing discharge plans and we are more than willing to work with P & S Brine Sales in developing a satisfactory discharge plan.

Please address all of the following comments which were previously stated in our discharge plan renewal request dated August 14, 1991.

1. **Notification of Spills**

Under Part XI. of your discharge renewal application you stated notification of spills or releases would be "to Oil Commission within hours". All unauthorized discharges (ie. major leaks and spills), must be reported to the OCD District Office within 48 hours of the event (WQCC Rule 5-208). Commit to report all unauthorized discharges to the OCD District Office within 48 hours.

2. **Mechanical Integrity Testing**

Pursuant to revised OCD guidelines for discharge plans at brine facilities, all wells must be pressure tested (open- hole) to 500 psi for 4 hours on an annual basis. A pressure test isolating the casing from the formation using either a bridge plug or a packer must be conducted at least once every 5 years or during well workovers.

The results from a current pressure test will be required prior to the approval of any brine facility discharge plan application or renewal. If the immediate test is performed using the open-hole method than a pressure test isolating the casing from the formation is required within the next 1 1/2 years. An OCD representative must be on site to witness all pressure tests and we request 10 days before the test to allow us to make arrangements.

The MIT chart enclosed in P & S Brine Sales renewal application is dated July 6, 1983. Submit a proposal for testing and ensuring the mechanical integrity of the well accorking to the above requirements. Also, submit information on any buried brine pipelines including age and material of the lines.

3. **Volumes of Injection Fluids and Brine**

The OCD requires a quarterly report listing, by month, of the volume of fluids injected and produced for comparison to detect underground losses. The OCD has no quarterly volume reports on file for P & S Brine Sales (or Permian Brine Sales) Jal Station. Submit a proposal and schedule for reporting injection fluid and brine production volumes.

In your renewal application you state that the calculated diameter of the brine cavern is 26 feet based on the total volume of brine produced through 1983. To calculate the current size of the cavity the OCD must have the date of first brine production and the total volume of brine produced to date. This information is necessary to evaluate subsidence potential for your brine station. Submit the required information.

4. **Brine Storage Pond**

The OCD is concerned over the potential for leaks in your single-lined brine storage pond. A letter from Permian Brine Sales to the EID dated August 20, 1984 states that the liner rests on a caliche substrate. Is there any type of protective substance between the caliche and the liner which would prevent the caliche from puncturing a hole in the liner? The OCD is also concerned about the ability of a leak to be detected by the leak detection system. Provide evidence that a leak in your pond would migrate to the leak detection lateral/sump and not travel directly down to groundwater. P & S Brine Sales did not address this issue at all in the discharge plan renewal application.

To adequately detect leaks at present, the OCD requires that the monitor well (sump) be checked monthly. A record of the date of inspection, results, and inspectors initials must be submitted annually to the OCD, at the same time the annual pressure test results are submitted. Commit to monthly inspections of your monitor well and annual submission of the results. Note, if a leak is detected in your brine storage pond the OCD must be notified within 48 hours.

The freeboard of your pond in the southeast corner was less than one foot. Because various weather conditions could cause brine to spill over the top of the pond, the OCD requires that you keep a minimum of one and one-half (1-1/2) foot of freeboard in your pond. Commit to maintaining a minimum of 1-1/2 foot of freeboard in your pond.

5. **Freshwater Analysis**

The OCD requires a current analysis of your freshwater supply well **and** produced brine. Your discharge plan renewal application did not have an analysis for produced brine, and the freshwater analysis you submitted was performed by Permian Brine Sales in April of 1984. Analysis will be for concentrations of major cations/anions and Total Dissolved Solids (see OCD Guidelines for Brine Facilities section VII.C.4.). Include the location and method of sampling. Submit the required analyses of your injection and production fluids.

6. **Maximum Injection Pressure.**

Pursuant to WQCC Regulations Section 5-206, the maximum injection pressure at the wellhead shall not initiate new fractures or propagate existing fractures in the continuing zone. Your discharge plan renewal application states that up through 1983 the operating pressure was 200 psi. What is your current operating pressure? What is your maximum injection pressure and how does this value compare with the fracture pressure of the salt? What mechanism do you have to ensure that the maximum value will no be exceeded?

7. **Operating Procedures**

The OCD requires that all one-well brine extraction operations inject freshwater down the annulus and recover brine up the tubing. In your discharge plan renewal application you state that freshwater is injected down both the tubing and the casing. In addition, the OCD inspection of your facility on February 6, 1991, revealed that your well was valved to inject freshwater down the tubing and produce brine out of the annulus. Submit a plan/commitment for operating procedures which meet the OCD requirements.

Reverse flow is only allowed once a month for 24 hours for clean-out. If an alternative operating method is desired then a written request must be submitted to the OCD which describes the proposed operating procedures and how the mechanical integrity of the casing will be guaranteed.

8. **Spill Collection/Containment System**

Your discharge plan renewal application contained no information on your spill collection system presently in use. Submit materials detailing the spill containment and collection system currently in operation. Include drawing and diagrams and elaborate on the materials and sizes of the various components of the system. Note that the OCD requires that all new underground tanks (ie.sumps) have positive leak detection. All existing sumps must be cleaned out and visually inspected on an annual basis.

9. **Brine Loading Area**

Your discharge plan renewal application did not address how you will contain brine spilled at the loading area. As previously stated, the loading area has had consistent spillage identified repeatedly by both OCD and EID staff. This area must be cleaned-up and have containment to keep spilled brine off of the ground surface. Submit a proposal to contain spills at your brine loading area. Provide an explanation and diagrams detailing how spilled brine is to be contained; include paving and curbing where appropriate and indicate where the spilled brine drains to.

10. **Plugging Bond**

The $5000 single-well plugging bond included in your discharge plan renewal is on the old OCD bond form which does not include brine wells. You must either have your plugging bond transferred onto the new form, or obtain a new single well plugging bond. The correct bond forms were enclosed in the original OCD discharge plan renewal request. Again, I have enclosed the proper bond forms.

Submitting the materials requested above is necessary prior to further review of your discharge plan renewal application.

If you have any questions, please do not hesitate to contact me at (505) 827-5824.

Sincerely,

Kathy M. Brown
Geologist

Enclosures

xc: OCD Hobbs Office

THE REPRODUCTION OF

THE

FOLLOWING

DOCUMENT ( S )

CANNOT BE IMPROVED

DUE TO

THE CONDITION OF

THE ORIGINAL

STATE OF NEW MEXICO
County of Bernalillo ss

Thomas J. Smithson being duly sworn declares and says that he is National Advertising manager of the **Albuquerque Journal** , and that this newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chaper 167, Session Laws of 1937, and that payment therefore has been made or assessed as court costs; that the notice, a copy of which is hereto attached, was published in said paper in the regular daily edition,

for 1 times, the first publication being on the 3 day

of Oct, 1991, and the subsequent consecutive

publications on ....., 1991.

Thomas J. Smithson

Sworn and subscribed to before me, a Notary Public in and for the County of Bernalillo and State of New Mexico, this 3 day of Oct, 1991.

PRICE $24.27

Statement to come at end of month.

CLA-22-A (R-12/91) ACCOUNT NUMBER C81184

OFFICIAL SEAL
Bernadette Ortiz
BERNADETTE ORTIZ
NOTARY PUBLIC-NEW MEXICO
FILED WITH SECRETARY OF STATE
My Commission Expires 12-18-93

NOTICE OF PUBLICATION
STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission Regulations, the following discharge plan renewal application has been submitted to the Director of the Oil Conservation Division, State Land Office Building, P.O. Box 2088, Santa Fe, New Mexico 87504-2088, Telephone, (505) 827-5800:

(BW-7) P & A X Brine Sales, Paul Prather, P.O. Box 1768, Eunice, New Mexico, 88231, has submitted a renewal application for the previously approved discharge plan for their insitu extraction brine well facility (formerly owned by Permian Brine Sales Inc.). The P & S Brine Sales Jal Station is located in the SE/4, SE/4, Section 16, Township 25, South, Range 37 East, NMPM, Lea County, New Mexico. Fresh water is injected into the Salado Formation at an approximate depth of 1260 feet and brine is extracted with an average total dissolved solids concentrations of about 280,000 mg/L. Groundwater most likely to be affected by an accidental discharge is at a depth of 400 feet with a total dissolved solids concentration of 1025 mg/L. Pockets of ground water may exist in the area at depths as shallow as 50 feet, with higher or lower concentrations of TDS. The discharge plan addresses how spills, leaks, and other accidental discharges to the surface will be managed.

Any interested person may obtain further information from the Oil Conservation Discharge Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. The discharge plan application may be viewed at the above address between 8:00 a.m. and 5:00 p.m., Monday through Friday. Prior to ruling on any proposed discharge plan or its modification, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and public hearing may be requested by any interested person. Requests for public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest. If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 24th day of September, 1991.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION
s/William J. Lemay
Director

Journal: October 3, 1991

# Affidavit of Publication

STATE OF NEW MEXICO )
) ss.
COUNTY OF LEA )

**Joyce Clemens** being first duly sworn on oath deposes and says that he is **Adv. Director** of THE LOVINGTON DAILY LEADER, a daily newspaper of general paid circulation published in the English language at Lovington, Lea County, New Mexico; that said newspaper has been so published in such county continuously and uninterruptedly for a period in excess of Twenty-six (26) consecutive weeks next prior to the first publication of the notice hereto attached as hereinafter shown; and that said newspaper is in all things duly qualified to publish legal notices within the meaning of Chapter 167 of the 1937 Session Laws of the State of New Mexico.

That the notice which is hereto attached, entitled

**Notice Of Publication**

and numbered ..... in the

..... Court of Lea County, New Mexico, was published in a regular and entire issue of THE LOVINGTON DAILY LEADER and not in any supplement thereof, once each week on the same day of the week, for **one (1)** consecutive weeks, beginning with the issue of **October 1**, 19**91** and ending with the issue of **October 1**, 19**91**.

And that the cost of publishing said notice is the sum of $**29.76** which sum has been (Paid) (~~Assessed~~) as Court Costs

Joyce Clemens

Subscribed and sworn to before me this **15th** day of **October**, 19**91**.

Mrs. Jean Jenkins
Notary Public, Lea County, New Mexico

My Commission Expires **Sept. 28**, 19**94**.

LEGAL NOTICE
NOTICE OF PUBLICATION
STATE OF NEW MEXICO ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 24th day of September, 1991.

STATE OF NEW Mexico OIL CONSERVATION DIVISION
WILLIAM J. LEMAY,
Director

SEAL

Published in the Lovington Daily Leader October 1, 1991.

## NOTICE OF PUBLICATION

## STATE OF NEW MEXICO
## ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
## OIL CONSERVATION DIVISION

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GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 24th day of September, 1991.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

S E A L

WILLIAM J. LEMAY, Director

10/90

State of New Mexico
Energy, Minerals and Natural Resources Department
OIL CONSERVATION DIVISION
P.O. Box 2088
Santa Fe, NM 87501

OIL CONSERVATION DIVISION
RECEIVED
'91 SEP 20 AM 9 38

*DISCHARGE PLAN APPLICATION FOR OILFIELD SERVICE FACILITIES*

*(Refer to OCD Guidelines for assistance in completing the application.)*

I. TYPE: INSITU BRINE MINING WELL

II. OPERATOR: P & S BRINE SALES

ADDRESS: P. O. BOX 1768 EUNICE, NM 88231

CONTACT PERSON: PAUL PRATHER PHONE: 394-2545

III. LOCATION: SE /4 SE /4 Section 16 Township 25-S Range 37-E
Submit large scale topographic map showing exact location.

IV. Attach the name and address of the landowner of the facility site.
THE STATE OF NEW MEXICO

V. Attach a description of the facility with a diagram indicating location of fences, pits, dikes, and tanks on the facility.

VI. Attach a description of all materials stored or used at the facility.

VII. Attach a description of present sources and quantites of effluent and waste solids.
NONE

VIII. Attach a description of current liquid and solid waste collection/treatment/disposal procedures.
NONE

IX. Attach a description of proposed modifications to existing collection/treatment/disposal systems.
NONE

X. Attach a routine inspection, maintenance plan and reporting to ensure permit compliance.

XI. Attach a contingency plan for reporting and clean-up of spills or releases.
NOTIFICATION TO OIL COMMISSION WITHIN HOURS

XII. Attach geological/hydrological evidence demonstrating that disposal of oil field wastes will not adversely impact fresh water.

XIII. Attach such other information as is necessary to demonstrate compliance with any other OCD rules, regulations and/or orders.

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: PAUL PRATHER Title: OWNER

Signature: Paul Prather Date: 9-17-91

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

## INTRODUCTION

P & S Brine Sales, Inc. operates an insitu brine mining well in southeastern Lea County, approximately two miles east of Jal on state highway no. 128. The legal description of this site is: SE/4 SE/4, Section 16, Range 37-E, Township 25-S, (see map No. 1). The well is designated as P & S Brine Sales, - Arnott Ramsey State No. 4. The well was completed in 1981 and has been in continuous operation since that date.

The produced brine is used primarily in oil field operations as a drilling fluid and as a "kill" fluid. (To neutralize well bore pressures in producing wells for workover maintenance.) Smaller amounts of brine are sold to industry for the regeneration of zeolite water softeners. Fresh water is also sold at this site for industrial purposes. Drawing No. 1, is a sketch of the operations area.

## DEVELOPMENT OF THE BRINE WELL

The brine well was completed in March 1981. It was drilled to 1269' with a 7-7/8" bit. 5½" = 17#/ft casing was set at 1258' in an anhydrite stringer in the Salado salt section. The casing was cemented with 400 sacks of Class H cement with 2% $CACL_2$. The cement was circulated to 60' and was cemented from the surface to this depth through 1" pipe. The cement plug was drilled out at 1271' and the casing string tested to 500 PSI.

The well was drilled to a T.D. of 1591' with a 4-3/4" bit. 2-7/8" tubing was run to 1582' in the open hole. See New Mexico Oil Conservation Division, well reports form C-103, well completion report and log, form C-105 and drawing No. 2, attached.

A mechanical integrity test on this brine well was performed on July 6, 1983 and reported to the Oil Conservation Commission. A copy of this test is attached.

## WATER WELL

The water well located on the site, furnishes fresh water for the solution mining of the brine. See Drawing No. 1. This well was drilled several years ago by the pervious owner and no records are available

of the original drilling. However, P & S Brine has established the depth as 459'. A 5 hp 45 GPM submersible pump is landed at 418'. The static water level stands at 250'.

This water well is used for monitoring purposes. A recent analysis of the water is attached. At this depth, it would indicate the well producing water from either the Santa Rosa or Chinle formations of the Triassic. Conductance tests of the well water are periodically observed to check for any contamination. The most recent April 24, 1984 indicated 11,000 M MHOS.

BRINE PRODUCTION PROCEDURES

The fresh water from the water well is produced into the 1,000 bbl fresh water storage tank. A 10hp submersible pump with capacity of 60 GPM is submerged in the fresh water storage tank and discharges at 200 PSI to either the tubing or casing of the brine well through approximately 400' of 2-3/8" O.D. fiberglass line pipe (rated at 450 PSI). This flow pattern indicates the flow is reversible in the well. The produced brine discharges from the well to the brine storage pit through approximately 300' of 2-3/8" O.D. PVC, Sch. 40 line pipe. Truck loading is accomodated at both the brine pit for brine and at the 1,000 bbl storage tank for fresh water. From the volume of brine produced and sold since initial operations began, a calculated maximum diameter of the cavern is 26'. Brine production for 1983 averaged 8800 bbl/month.

BRINE WELL PLUGGING AND ABANDONMENT

Plugging will be accomplished by using one Baker Model S cast iron bridge plug. This plug is set by lowering it down the casing on an electric wire line to the predetermined depth, just above the casing shoe. This plug is made with two sets of slips, one above and one below the plug body, and a solid steel guide shoe at the base of the plug. The plug is disengaged from the wire line setting tool and the slips actuated by firing a power charge within the setting tool. This plug then provides a pressure seal. After the plug has been set the casing will be evacuated of mud and/or other fluids by air displacement. Then a calculated volume of Class C cement slurry will be pumped down the casing until it is completely filled. The exposed casing, at the surface, will be sealed by welding a steel plate over the open end of the casing.

The salt formations in West Texas and New Mexico are always overlain with a relatively thick section (20' to 50') of anhydrite. This impervious and insoluable formation material provides an excellent casing seat and after cementing a perfect seal that prevents the circulation of fluids from the salt cavern to the upper formations behind the casing. Consequently, setting the bridge plug at this point in the casing (opposite an anhydrite lens) and filling with cement protects the overlying formations from contamination should a casing failure occur at some future time.

AREA OF REVIEW

Applying the criteria, as stated in the Water Control Commission Regulations, Section 5-202-B-2; the regulations state "...where the well field production at all times exceeds injection to produce a net withdrawal;" then a one-quarter mile area of review shall prevail. Since the production of saturated brine by fresh water solution mining results in a 7.14% increase in produced fluid over injection fluid these conditions provide compliance with the above regulations.

Below is a listing of all wells within the area of review.

1. P & S Brine - Arnott Ramsey No. 2 P & A Brine Well
2. P & S Brine - Arnott Ramsey No. 3 P & A Brine Well

The plugging and abandonment reports of these wells, as reported to the oil conservation division are attached. Also, please refer to the recent letter dated March 30, 1984 from P & S Brine Sales, Inc. by Mr. R.D. Hickerson to Paige Grant.

3. Gulf - Arnott Ramsey No. 7; 610' FSL, 660' FEL, Sec 16 8-5/8" csg @ 376' - 230 sx cement; producing oil well. 4½" csg @ 3700' - 1580 sx cement
4. Mobil - Federal No. 2X; 660' FSL, 330 FWL, Sec 15 8-5/8" csg @ 1060' - 500 sx cement; 5½" csg @ 3700' - 1,000 sx cement; producing oil well.

There are five residences, across state highway No. 128 to the south of the brine station, in the NE/4 of Sec 21, see Map 2; all have water wells.

A trailer house has been recently located immediately east of the brine station in the SE/4 of Sec 15. However, this residence obtains water from the city of Jal's water line, parallelling the state highway on the north, producing water from the city well in the SW/4 of Sec 13, R-37-E, TWP 25 S.

NOTE

The following descriptions, figures and maps have been liberally abstracted and reproduced from "Ground Water Report 6 - Geology and Ground Water Conditions or Southern Lea County, New Mexico", by Alexander Nicholson, Jr. and Alfred Clebsch, Jr.

## GEOLOGY AND HYDROLOGY

Southern Lea County overlies a large subsurface structural feature known as the Permian Basin. Oil exploration have revealed highly complex subsurface geology involving rocks ranging from the Precambrian and Early Paleozoic to the Permian Age. However, the early Paleozoic has little significance relating to potable and industrially usable ground waters in this area. The oldest formations exposed in this area are Triassic in age; the only other rocks to be seen at the surface are Tertiary and Quaternary in age. Only the Mesozic and younger formations yield potable water. See Table No. 3.

Figure No. 1 shows the distribution of geologic units exposed in the Jal area. The contacts between the Ogallala and Quaternary Alluvium formations are generalized because of poor exposures, due to the large areas covered by drift sand.

### STRATIGRAPHY

The southwestern part of the county overlies the Delaware Basin and the eastern part overlies the Central Basin platform. Between these two areas is the back-reef or shelf area. See Table No. 3. These general areas are defined on the basis of sedimentary depositional environments that existed during Permian time. The boundary between the basin and shelf areas is fairly sharp being marked by a complex of reef deposits; the boundary between the shelf area and the platform is transitional.

Since the earlier Palezoic formations are not revelant to this report, the description of these older formations will be omitted and this outline shall begin with the upper Permian.

The salt section, being mined at the Jal site, is the Salado formation and is assigned to the middle section of the Ochoa series of the upper Permian. This series is chiefly evaporite deposits. The lower most formation of this series is the Castile formation, which is chiefly

anhydrite with some halite beds. Overlying the Castile is the Salado formation, which extends across both the Deleware and Midland Basins and across the Central Basin platform; it ranges in thickness from zero to 2,000 feet. The formation is mainly halite containing some anhydrite stringers. The Rustler formation overlies the Salado and usually has a massive anhydrite bed at its base but also includes red beds and salt.

A sequence of red beds overlie the Rustler, consisting of micaeous red silt stone, shale and sandstone and are commonly cemented with gypsum. The age of these beds have been assigned to both the Permian and Triassic by various geologists based on localities of study. The lower section is called the Dewey Lake and is differeniated from the upper section by a zone of coarse, frosted quartz grains in the lower ten feet. The upper section is referred to as the Tecovas formation.

The hydrologic significance of these red beds is not completely understood, however, it is doubtful that any wells in Lea County produce water from them.

The Mesozic is represented in the area only by the Upper Triassic rocks of the Dockum group. This group is divisible into the Santa Rosa sandstone and the Chinle formation. The Santa Rosa is the principal aquifer in the western part of the county. The Chinle also provides an underground source of water both of these formations are at depths of 400+ feet and are highly mineralized.

The Cenozoic period is represented by the Ogallala formation of the Tertiary of Plicoene age. It underlies most of the county and ranges in thickness from a few inches to 300 feet. It is chiefly a calcareous, unconsolidated sand but contains clay, silt and gravel. The Ogallala is one of the major aquifers in this area.

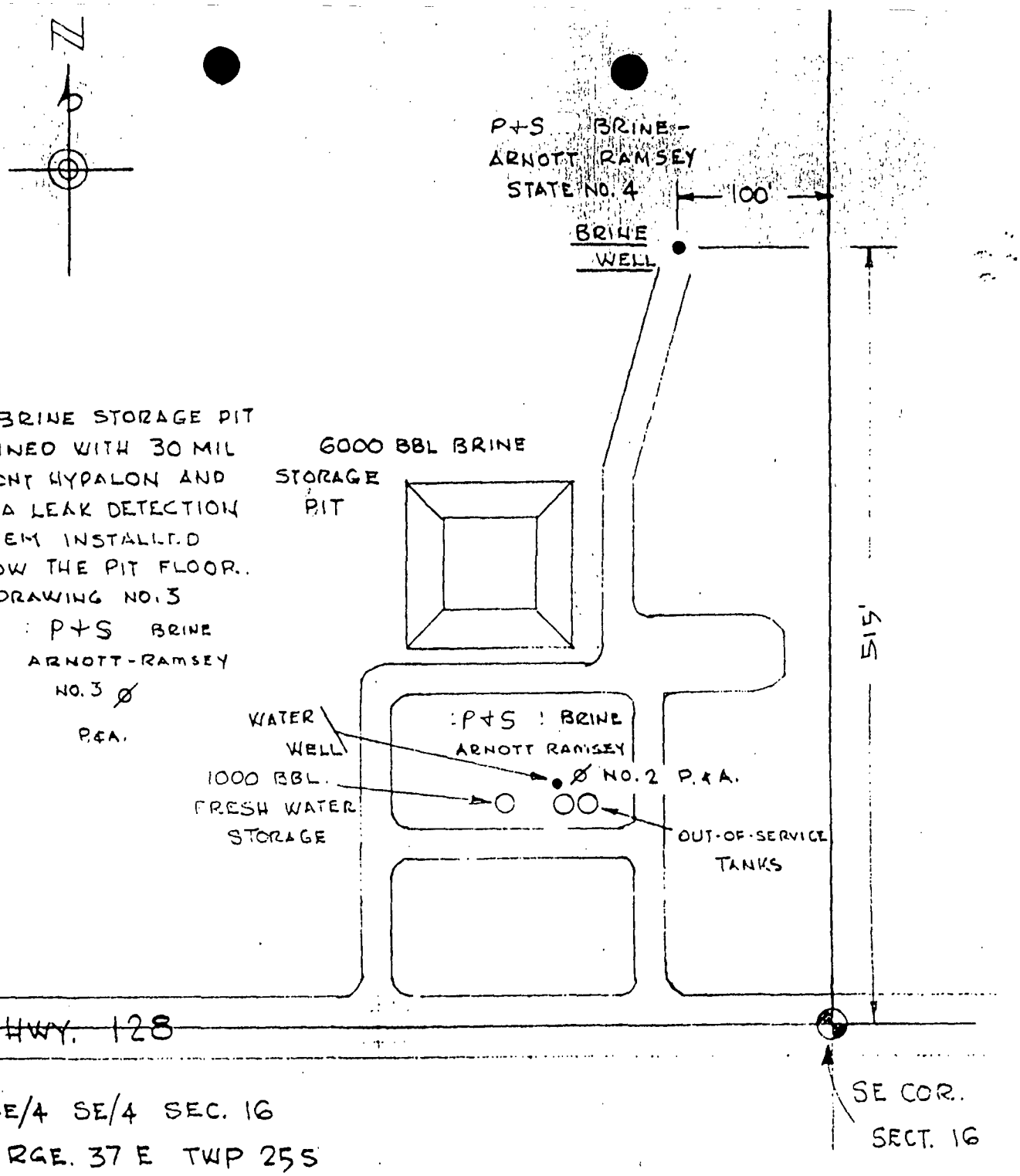
The Quaternary age sediments are present in southern Lea County in the form of alluvial deposits, probably of both Pleistocene and recent age and dune sands of recent age. The alluvium was deposited in topographically low areas where the Ogallala formation had been stripped away. The dune sands mantle the older alluvium and the Ogallala over most of the area. These Quaternary alluvial deposits vary in thickness from 15 to 30 feet and are an important source of ground water in the eastern part of the county, especially along the major drainages.

Figure No. 2 shows the water table elevations in Tertiary and Quaternary formations and the areal boundaries of these aquifers. The figure also indicates the Piezometric countours and areal extent of the Triassic formations.

Figure No. 13 shows a typical cross-section of an area immediately north of the Jal brine station site. These type of depressions, an erosional feature, are found throughout this area. These features are formed both by subsidence and sub-surface collapse resulting from solution of the evaporites.

DRAINAGE

There is no integrated drainage in southern Lea County, hence there is no through-going drainage to the Pecos River to the west and south. All stream courses are ephemeral and only one, Monument Draw has significant length; it traverses the eastern part of the county from north to south for approximately 35 miles and extends into Texas. See Figure No. 3.




THE BRINE STORAGE PIT IS LINED WITH 30 MIL DUPONT HYPALON AND HAS A LEAK DETECTION SYSTEM INSTALLED BELOW THE PIT FLOOR. SEE DRAWING NO. 3

P+S BRINE
ARNOTT-RAMSEY
NO. 3 ∅
P&A.

SE/4 SE/4 SEC. 16
RGE. 37 E TWP 25 S
LEA CO. NEW MEXICO

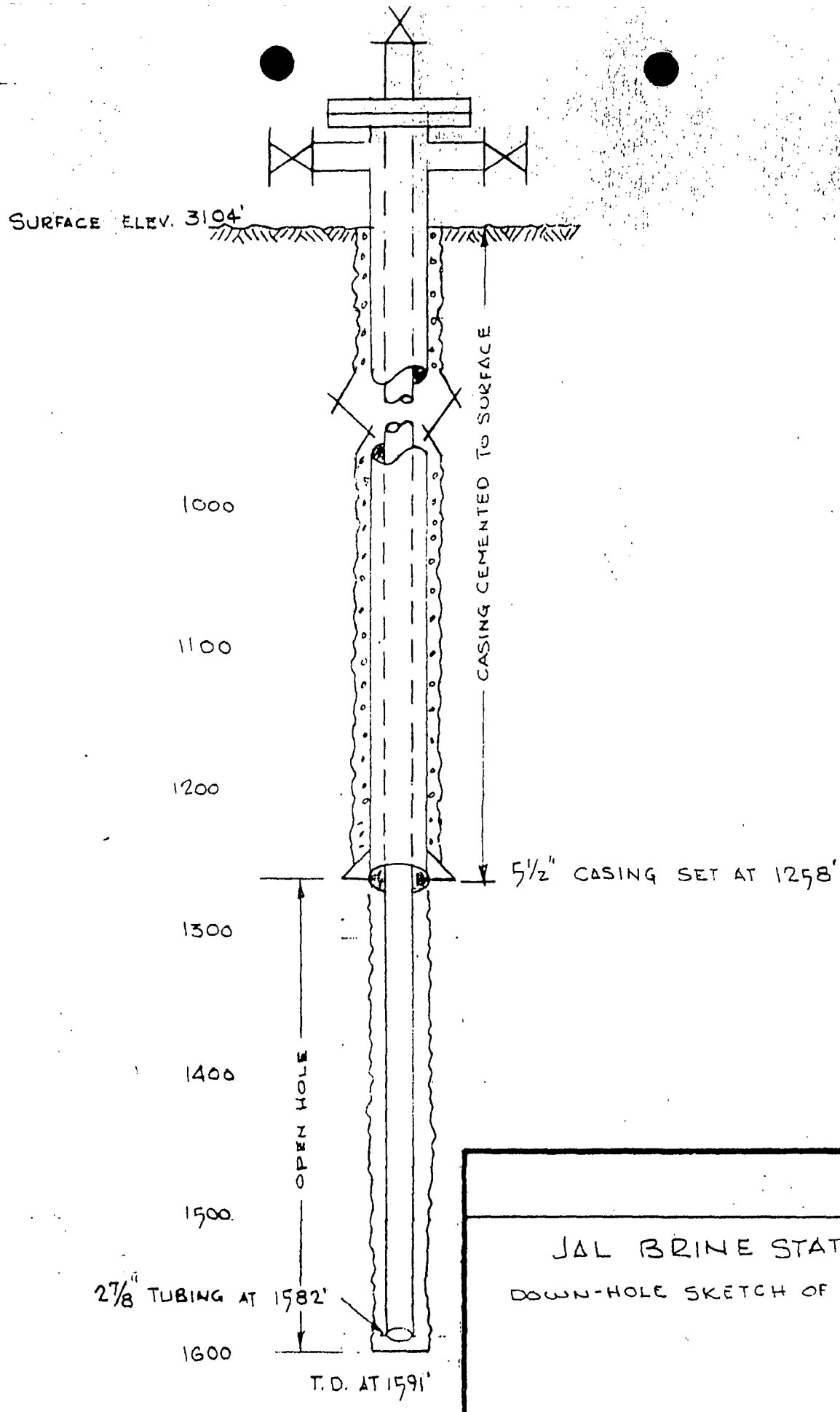
SCALE 1" = 100'

LAYOUT OF OPERATING FACILITIES

JAL BRINE STATION

BY: R.C. McCUTCHAN
TEX. P.E. 9844

DRAWING NO.: 1



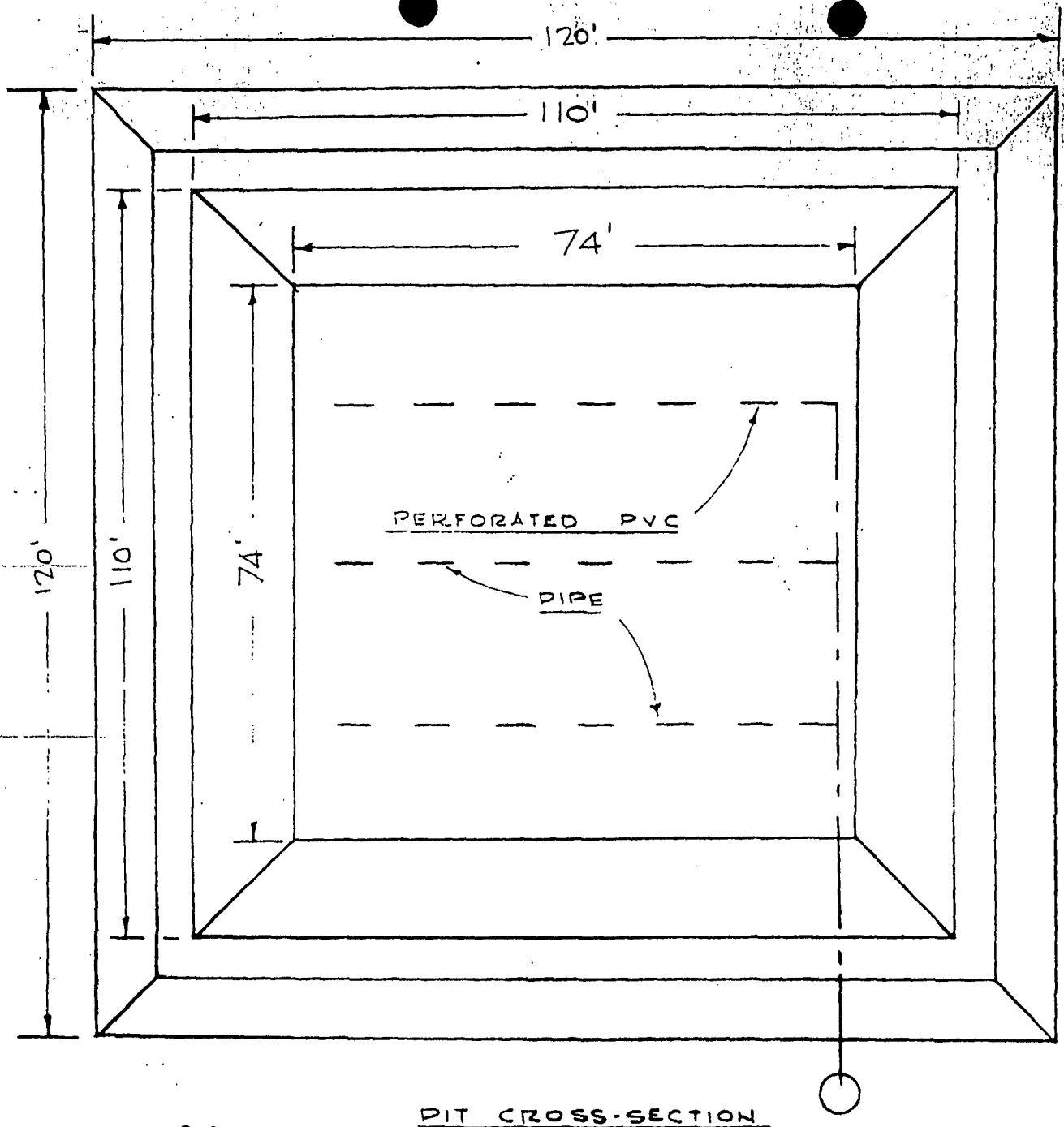

# JAL BRINE STATION

DOWN-HOLE SKETCH OF BRINE WELL

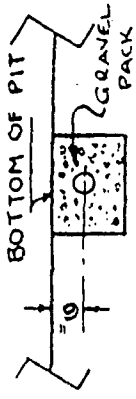
BY:
R.C. McCUTCHAN
TEX. P.E. 9844

DRAWING NO.:
2

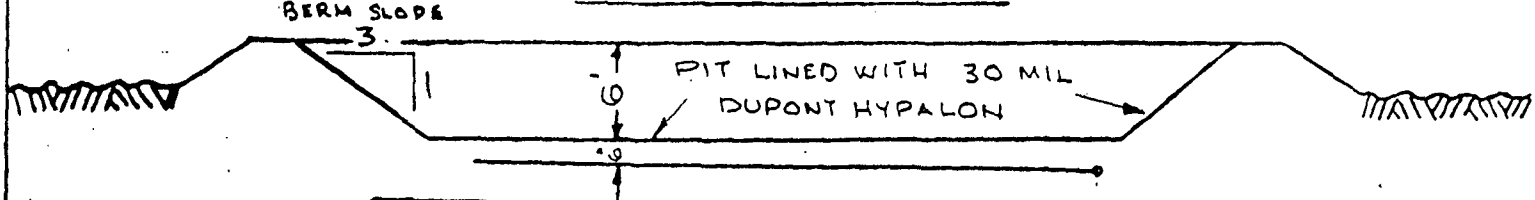
# BRINE STORAGE PIT




CROSS-SECTION OF LEAK DETECTION PIPING



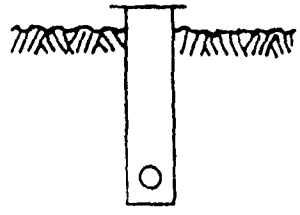

PIT CROSS-SECTION




NO SCALE

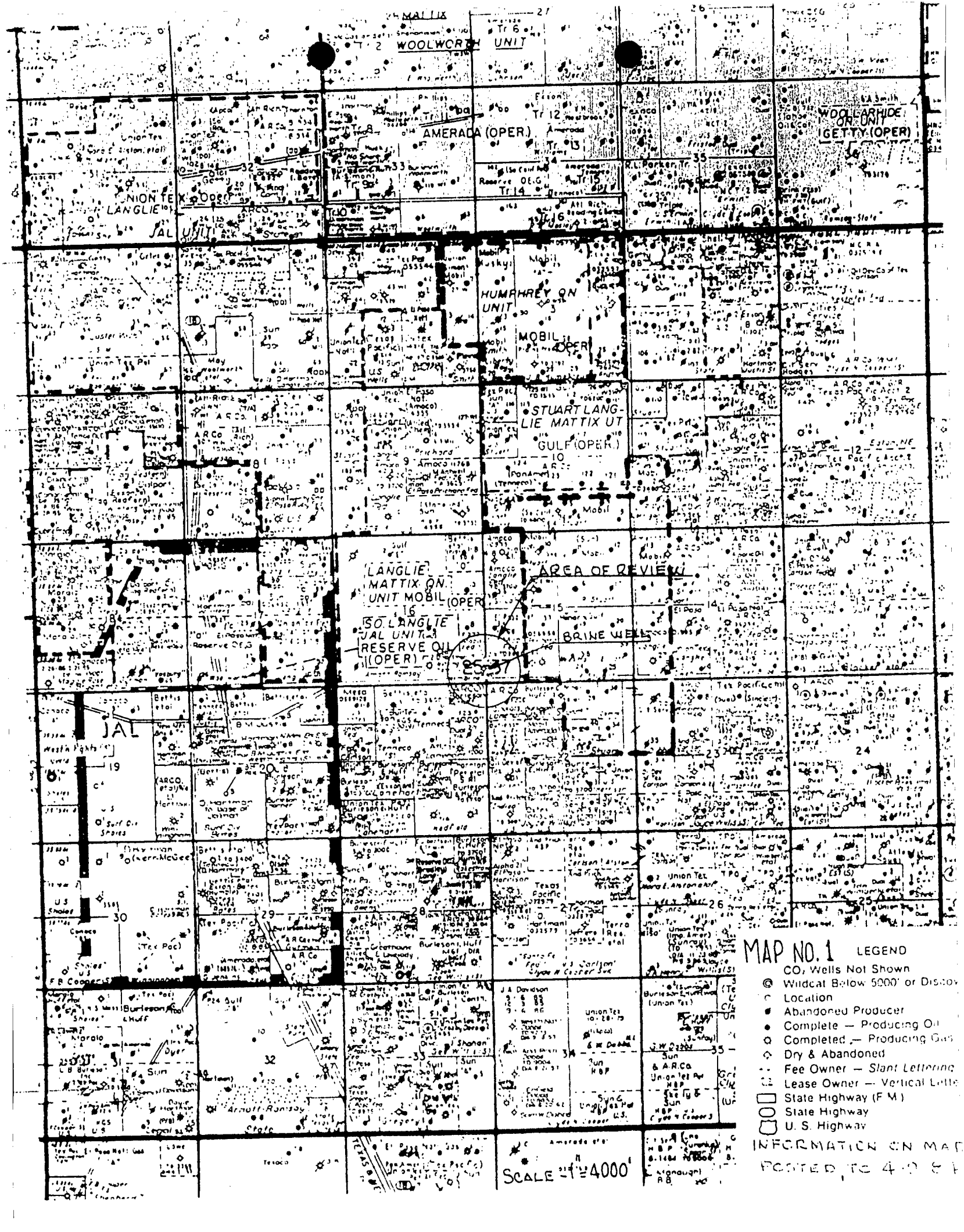
DETAILS OF BRINE STORAGE PIT
JAL BRINE STATION

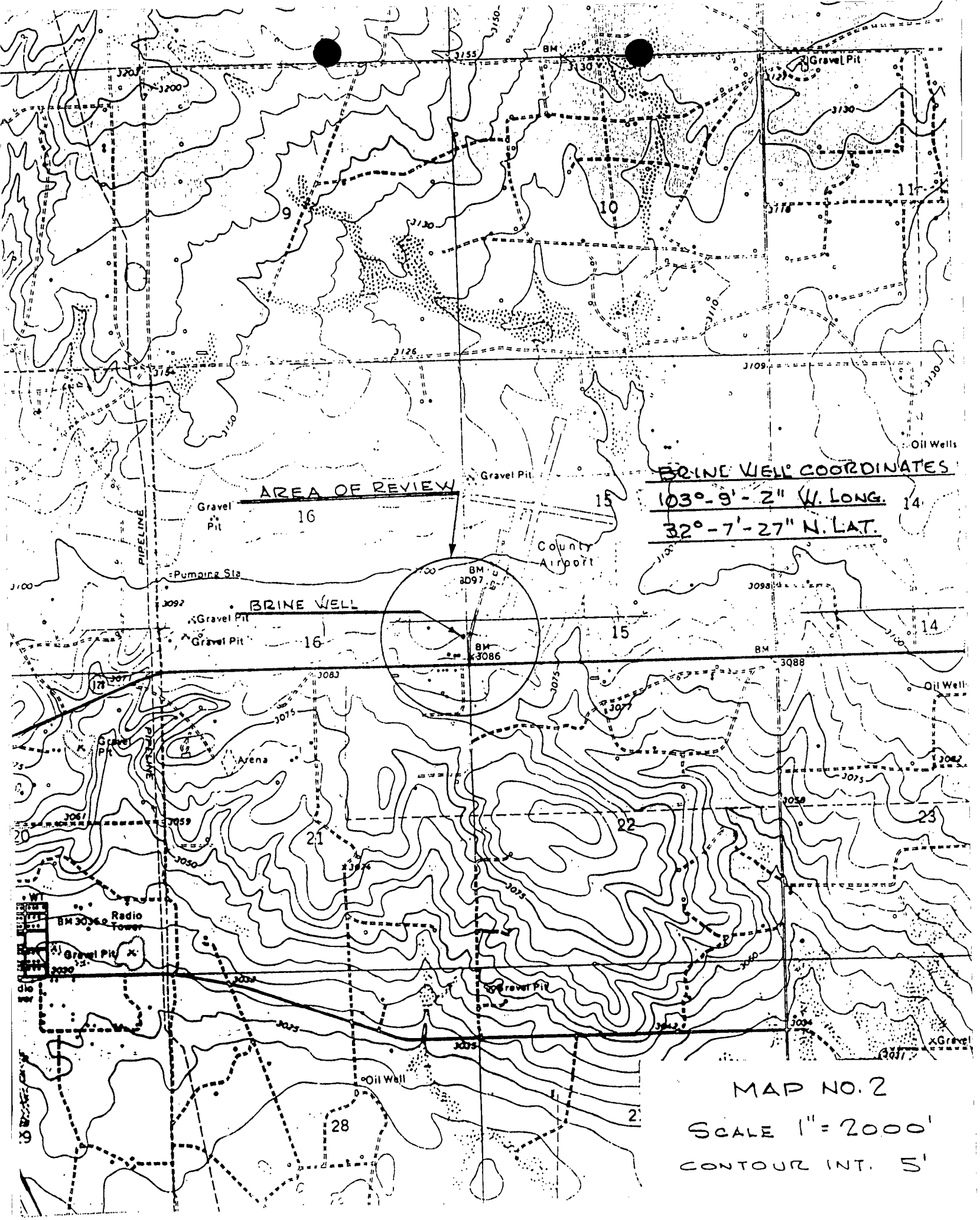
| | | |
|---|---|---|
| | BY R.C. McCUTCHAN TEX. P.E. 9844 | DRAWING NO 3 |



LEAK DETECTION SUMP

Form 203 5-57—88017-D


MATTIX
WOOLWORTH UNIT
AMERADA (OPER.)
WOOLARHOE UNIT
GETTY (OPER)
UNION TEX. (OPER)
LANGLIE JAL UNIT
HUMPHREY ON UNIT
MOBIL OPER.
STUART LANGLIE MATTIX UT
GULF (OPER.)
LANGLIE MATTIX ON. UNIT MOBIL (OPER)
SO. LANGLIE JAL UNIT RESERVE OIL (OPER)
AREA OF REVIEW
BRINE WELLS
JAL
Arnott-Ramsay
Texaco
Amerada
Scale 1" = 4000'
MAP NO. 1 LEGEND
CO2 Wells Not Shown
Wildcat Below 5000' or Discov
Location
Abandoned Producer
Complete — Producing Oil
Completed — Producing Gas
Dry & Abandoned
Fee Owner — Slant Lettering
Lease Owner — Vertical Lette
State Highway (F.M.)
State Highway
U. S. Highway
INFORMATION ON MAP
POSTED TO 4-0 &




MAP NO. 2

SCALE 1" = 2000'

CONTOUR INT. 5'

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

| NO. OF COPIES RECEIVED | | |
|---|---|---|
| DISTRIBUTION | | |
| SANTA FE | | |
| FILE | | |
| U.S.G.S. | | |
| LAND OFFICE | | |
| OPERATOR | | |

OIL CONSERVATION DIVISION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Jal #4

Form C-103
Revised 10-1-78

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: M14474

## 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.)

OIL WELL [ ] GAS WELL [ ] OTHER- Brine Well

7. Unit Agreement Name:

Name of Operator: Permian Brine Sales & Service, Inc.

8. Farm or Lease Name: Arnott Ramsey State

Address of Operator: P.O. Box 1591 Odessa, Texas 79760

9. Well No.: 4

Location of Well: UNIT LETTER P, 515 FEET FROM THE South LINE AND 100 FEET FROM THE East LINE, SECTION 16 TOWNSHIP 25S RANGE 37E NMPM.

10. Field and Pool, or Wildcat: Wildcat

15. Elevation (Show whether DF, RT, GR, etc.)

12. County

16. 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 [ ] | | COMMENCE DRILLING OPNS. [ ] | PLUG AND ABANDONMENT [ ] |
| PULL OR ALTER CASING [ ] | CHANGE PLANS [ ] | CASING TEST AND CEMENT JOB [X] | |
| OTHER [ ] | | OTHER [ ] | |

17. 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.

Open Hole Drilled to 1269'
17# - 5½" casing cemented with 400 sacks
Class H with 2% $CaCl_2$
Circulated to 60' - cemented
0-60' through 1" pipe - waited 48 hours.
Drilled out cement plug to 1271' - tested casing and cement.
Held 500# for 30 minutes.
Drilled ahead to 1591 feet, and hung 2 7/8 tubing in open hole @ 1582 ft.

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

SIGNED A.L. Hickerson TITLE President DATE 3-18-81

A.L. Hickerson

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

| DISTRIBUTION | |
|---|---|
| SANTA FE | |
| FILE | |
| U.S.G.S. | |
| LAND OFFICE | |
| OPERATOR | |

NEW MEXICO OIL CONSERVATION COMMISSION

# WELL COMPLETION OR RECOMPLETION REPORT AND LOG

Form C-105
Revised 10-1-78

Indicate Type of Lease: STATE [X] FEE [ ]

State Oil & Gas Lease No.: M-4474

1a. TYPE OF WELL
b. TYPE OF COMPLETION
OIL WELL [ ] GAS WELL [ ] DRY [ ] OTHER
NEW WELL [ ] WORK OVER [ ] DEEPEN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] OTHER

7. Unit Agreement Name

8. Farm or Lease Name: Arnott Ramsey State

2. Name of Operator: Permian Brine Sales & Service, Inc.

9. Well No.: 4

3. Address of Operator: P.O. Box 1591, Odessa, Texas 79760

10. Field and Pool, or Wildcat: Wildcat

4. Location of Well
UNIT LETTER P LOCATED 515 FEET FROM THE South LINE AND 100 FEET FROM THE East LINE OF SEC. 16 TWP. 25S RGE. 37E NMPM

12. County: Lea

| 15. Date Spudded | 16. Date T.D. Reached | 17. Date Compl. (Ready to Prod.) | 18. Elevations (DF, RKB, RT, GR, etc.) | 19. Elev. Casinghead |
|---|---|---|---|---|
| 10-8-80 | 3-10-81 | 3-10-81 | 3104 G.L. | 3106 |

| 20. Total Depth | 21. Plug Back T.D. | 22. If Multiple Compl., How Many | 23. Intervals Drilled By | Rotary Tools | Cable Tools |
|---|---|---|---|---|---|
| 1591' | 1582 | - | → | 120-1591 | 0-120 |

24. Producing Interval(s), of this completion — Top, Bottom, Name
Salt Section Open Hole 1258-1591

25. Was Directional Survey Made: NO

26. Type Electric and Other Logs Run: NONE

27. Was Well Cored: NO

28. CASING RECORD (Report all strings set in well)

| CASING SIZE | WEIGHT LB. FT. | DEPTH SET | HOLE SIZE | CEMENTING RECORD | AMOUNT PULLED |
|---|---|---|---|---|---|
| 5 1/2" | 17# | 1258' | 7 7/8 | 400 SX | NONE |

29. LINER RECORD

| SIZE | TOP | BOTTOM | SACKS CEMENT | SCREEN |
|---|---|---|---|---|
| | | | | |

30. TUBING RECORD

| SIZE | DEPTH SET | PACKER SET |
|---|---|---|
| | | |

31. Perforation Record (Interval, size and number)
Open Hole 1258-1591

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

| DEPTH INTERVAL | AMOUNT AND KIND MATERIAL USED |
|---|---|
| | |

33. PRODUCTION

| Date First Production | Production Method (Flowing, gas lift, pumping — Size and type pump) | Well Status (Prod. or Shut-in) |
|---|---|---|
| | | |

| Date of Test | Hours Tested | Choke Size | Prod'n. For Test Period → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Gas — Oil Ratio |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| Flow Tubing Press. | Casing Pressure | Calculated 24-Hour Rate → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Oil Gravity — API (Corr.) |
|---|---|---|---|---|---|---|
| | | | | | | |

34. Disposition of Gas (Sold, used for fuel, vented, etc.)

Test Witnessed By

35. List of Attachments

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED A.L. Hickerson TITLE President DATE 3-11-81

A.L. Hickerson

This form is to be filed with the appropriate district office of the Commission not later than [redacted] days after the completion of any newly-drilled or deepened well. It shall be accompanied by [redacted] copy of all electrical and radioactivity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filled in quintuplicate except on state land, where six copies are required. See Rule 1105.

## INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

| Southeastern New Mexico | | | Northwestern New Mexico | | |
|---|---|---|---|---|---|
| T. Anhy 1035 | T. Canyon | | T. Ojo Alamo | T. Penn. "B" | |
| T. Salt 1155 | T. Strawn | | T. Kirtland-Fruitland | T. Penn. "C" | |
| B. Salt | T. Atoka | | T. Pictured Cliffs | T. Penn. "D" | |
| T. Yates | T. Miss | | T. Cliff House | T. Leadville | |
| T. 7 Rivers | T. Devonian | | T. Menefee | T. Madison | |
| T. Queen | T. Silurian | | T. Point Lookout | T. Elbert | |
| T. Grayburg | T. Montoya | | T. Mancos | T. McCracken | |
| T. San Andres | T. Simpson | | T. Gallup | T. Ignacio Qtzte | |
| T. Glorieta | T. McKee | | Base Greenhorn | T. Granite | |
| T. Paddock | T. Ellenburger | | T. Dakota | T. | |
| T. Blinebry | T. Gr. Wash | | T. Morrison | T. | |
| T. Tubb | T. Granite | | T. Todilto | T. | |
| T. Drinkard | T. Delaware Sand | | T. Entrada | T. | |
| T. Abo | T. Bone Springs | | T. Wingate | T. | |
| T. Wolfcamp | T. | | T. Chinle | T. | |
| T. Penn. | T. | | T. Permian | T. | |
| T Cisco (Bough C) | T. | | T. Penn. "A" | T. | |

## OIL OR GAS SANDS OR ZONES

No. 1, from ..... to ..... No. 4, from ..... to .....

No. 2, from ..... to ..... No. 5, from ..... to .....

No. 3, from ..... to ..... No. 6, from ..... to .....

## IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from 450 To 475' to 260 feet. .....

No. 2, from ..... to ..... feet. .....

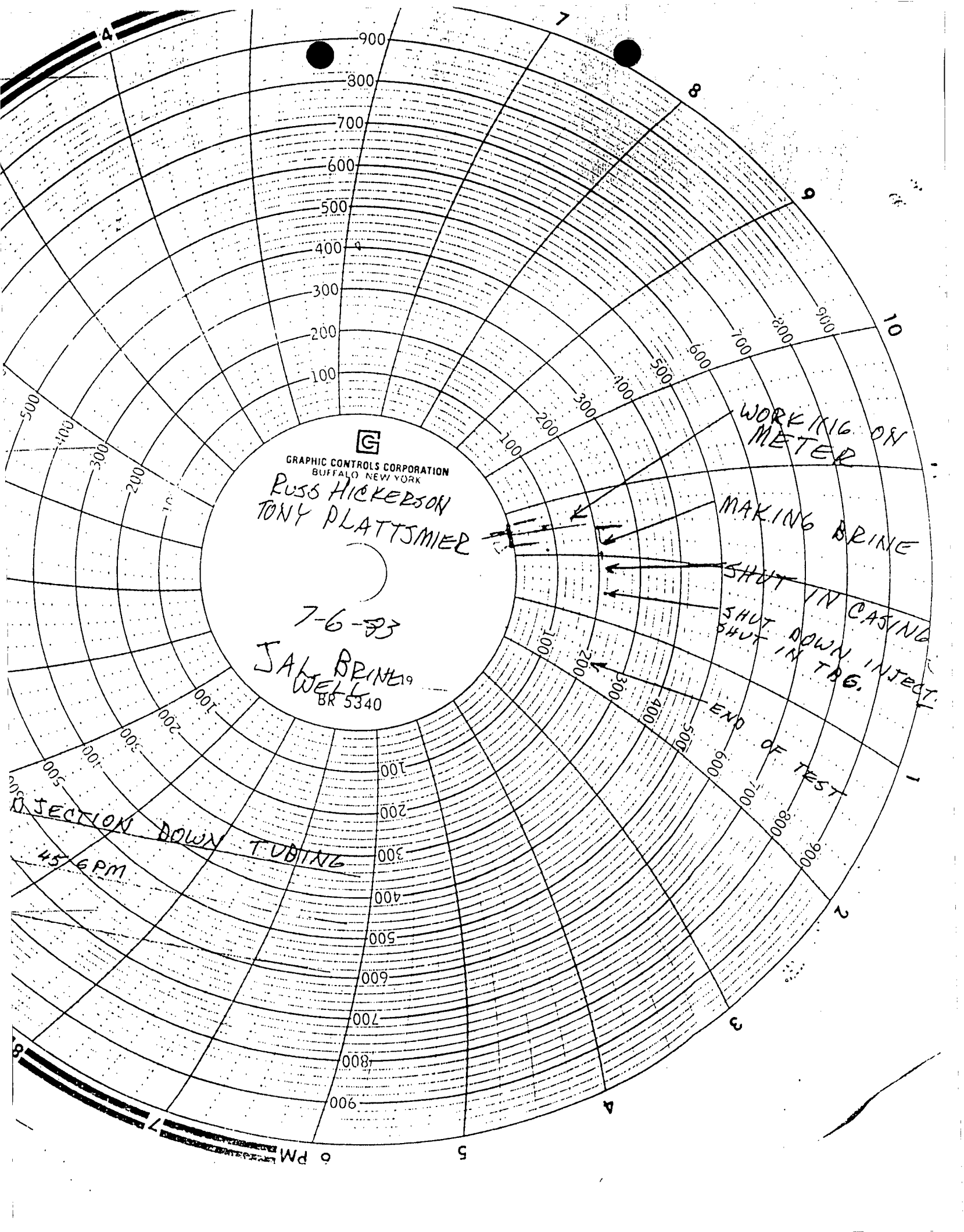
No. 3, from ..... to ..... feet. .....

No. 4, from ..... to ..... feet. .....

## FORMATION RECORD (Attach additional sheets if necessary)

| From | To | Thickness in Feet | Formation | From | To | Thickness in Feet | Formation |
|---|---|---|---|---|---|---|---|
| 0 | 10 | 10 | Caliche | | | | |
| 10 | 60 | 50 | Sand | | | | |
| 60 | 1035 | 975 | Red Beds | | | | |
| 1035 | 1155 | 120 | Rustler Anhydrite | | | | |
| 1155 | 1591 | 436 | Salt With Shale And Anhydrite Stringers | | | | |

EXHIBIT 1


GRAPHIC CONTROLS CORPORATION
BUFFALO NEW YORK
RUSS HICKERSON
TONY PLATTSMIER
7-6-93
SALT BRINE
WELL
BR 5340
WORKING ON METER
MAKING BRINE
SHUT IN CASING
SHUT DOWN INJECT
SHUT IN TBG.
END OF TEST
INJECTION DOWN TUBING
45 GPM

12. The test for mechanical integrity of the underground casing and cavern is accomplished by pressuring the well to 1 ½ times the normal operating pressure. This is done by pumping fresh water into the well, through the tubing while the casing outlet is closed. A record of the volume of fresh water pumped and the time required to reach the test pressure is recorded. The well is then shut-in and is left in this condition for at least four hours. The pressures are monitored on a pressure recorder at the well site.

Small reductions in the test pressure, during the test period, are the result of salt entering solution. This process is influenced by the downhole conditions in the salt strata. If the well has a large cavern capacity and has not been circulated at high volume rates in the recent past, the fluid in the underground system is fully saturated. Therefore, the volume of fresh water required to pressure the cavern will be comparatively less than under the opposite conditions. The shut-in pressure will also indicate minimum change, over the test period, due to the fact that the comparatively small amount of fresh water entering solution will not materially effect the huge volume of saturated brine in the cavern. Conversely, if brine has been produced at a high rate immediately preceeding the test then, not only is the water used for pressuring entering solution, but some of the previously pumped fresh water for brine production is also dissolving salt, and thus enlarging the cavern during the pressure test.

TABLE 3. STRATIGRAPHIC UNITS IN SOUTHERN LEA COUNTY, N. MEX.

| Geologic age | | Geologic unit | Thickness (ft) | General character | Water-bearing properties |
|---|---|---|---|---|---|
| Cenozoic Quaternary | Recent and Pleistocene | Sand | 0–30± | Dune sand, unconsolidated stabilized to drifting, semiconsolidated at depth; fine- to medium-grained. | Above the zone of saturation, hence, does not yield water to wells. Aids recharge to underlying formations by permitting rapid infiltration of rainwater. |
| | | Alluvium | 0–400± | Channel and lake deposits; alternating thickbedded calcareous silt, fine sand, and clay; thickest in San Simon Swale; less than 100 feet thick in most places. | Saturated and highly permeable in places in east end of Laguna Valley. Forms continuous aquifer with Ogallala formation. Wells usually yield less than 30 gpm. Locally above the water table. |
| Cenozoic Tertiary | Pliocene | Ogallala | 0–300± | Semiconsolidated fine-grained calcareous sand capped with thick layer of caliche; contains some clay, silt, and gravel. | Major water-bearing formation of the area. Unsaturated in many localities, such as north side of Grama Ridge, west side of Eunice Plain, Antelope Ridge area, and Rattlesnake Ridge. Greatest saturated thickness along east side of Eunice Plain, west of Monument Draw, where wells yield up to 30 gpm. Highest yields, up to 700 gpm, obtained from wells along south edge of Eunice Plain, east of Jal. |
| Mesozoic Cretaceous | | Undifferentiated | 35± | Small isolated and buried residual blocks of limestone, about 3 miles east of Eunice. | Possibly small isolated bodies of water locally. |
| Mesozoic Triassic | Dockum group | Chinle formation | 0–1,270± | Claystone, red and green; minor fine-grained sandstones and siltstones; underlies all of eastern part of southern Lea County area; thins westward; absent in extreme west. | Yields small quantities of water from sandstone beds. Yields are rarely over 10 gpm. Water has high sulfate content. |
| | | Santa Rosa sandstone | 140–300± | Sandstone, chiefly red but locally white, gray, or greenish-gray; fine- to coarse-grained; exposed in extreme west; underlies Cenozoic rocks in western part of area, and is present at depth in eastern part. | Yields small quantities of water over most of the area. Some wells are reported to yield as much as 100 gpm. Water has high sulfate content. |
| Paleozoic | Permian or Triassic | Undifferentiated | 90–400+ | Siltstone, red, shale, and sandstone; present at depth under all of southern Lea County. | No wells are known to be bottomed in the red beds. Probably can yield very small quantities of high-sulfate water. |
| Paleozoic | Ordovician through Permian | | 6,500–17,000± | Thick basin deposits ranging in character from evaporites to coarse clastics; thinnest on the east side of the area over the Central basin platform, thickest toward the southwest. | No presently usable water supply available from these rocks. Source of highly mineralized oil-field waters. |
| Precambrian | | | | Granite, granodioritic and other igneous and metamorphic rocks; complex structure. | Not hydrologically significant. |

## TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX.

LOCATION NUMBER: Explanation in section on well-numbering system.

OWNERS: EPNG, El Paso Natural Gas Co.; MCRA, Maljamar Cooperative Repressuring Agreement.

AQUIFER: Tr, Triassic rocks; To, Ogallala formation; Qal, Quaternary alluvium.

DEPTH OF WELL: M, measured; all other depths are reported.

ALTITUDE: Altitudes interpolated from topographic maps. Probable error less than 10 feet.

WATER LEVEL: Measured depths are given to nearest tenth of a foot; reported depths are given to nearest foot. All are non-pumping water levels except as noted otherwise in remarks column.

SURFACE DIAMETER OF WELLS: Expressed in inches unless otherwise indicated. Diameters of cased, drilled wells are given in inches. Diameters and rectangular dimensions of dug wells are given in feet.

METHOD OF LIFT: Lw, lift pump, windmill powered; Li, lift pump, internal-combustion-engine powered; Le, lift pump electrically driven; Te, turbine pump, electrically driven; Ti, turbine pump, internal-combustion-engine powered; Je, jet pump, electrically driven; N, unequipped or partly equipped.

USE OF WATER: D, domestic; L, domestic use other than drinking, such as watering lawns and gardens; P, public supply; I, irrigation; In, industrial; S, stock; N, none; O, observation.

REMARKS: EY, reported estimated yield; gpm, gallons per minute; gpd, gallons per day; MWP, measured while pumping; PR, pumped recently; WBZ, water-bearing zone.

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16.32.27.441 | Buffalo Oil Co. | To | 265 | 4,300 | 200(?) | — | — | 8⅝ | — | In | Perforations 194-254 feet. |
| 35.400 | Drew Taylor | To | 246M | 4,265 | 160(?) | — | — | 8¼ | Te | In,D | Taylor well 2. Northwest well of 3. EY 60-80 gpm. |
| 17.32.2.433 | MCRA | To | 200 | 4,240 | 60 | 1948 | — | 7 | Te | In,D | Well 6. EY 50 gpm. |
| 2.434 | MCRA | To | 192 | 4,240 | 60 | 6- 1-50 | 1948 | 7 | Te | In,D | Well 5. EY 50 gpm. |
| 2.443 | MCRA | To | 190 | — | — | — | — | 7 | Te | In,D | Well 7. EY 50 gpm. |
| 3.140 | Buffalo Oil Co. | To | — | — | — | — | — | — | — | In | Buffalo-Taylor well 3. Chemical analysis in table 8. |
| 3.320a | do. | To | — | 4,250 | 175.6 | 7-21-54 | — | 6 | N | N | Buffalo-Taylor well 2. Nearby well pumping. |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 17.32.4.442 | W. Taylor | Qal | — | 4,180 | 82.9 | 6- 3-54 | — | 6 | N | N | — |
| 11.231 | MCRA | To | 139 | 4,180 | — | — | 1947 | 7 | Te | In,D | Well 4. |
| 17.32.11.233 | MCRA | To(?) | 140 | 4,200 | 70 | 9-20-47 | — | 8 | Li | In,D | Well 2. EY 9 gpm. |
| 11.411 | MCRA | To(?) | 200 | 4,170 | 70 | 6-15-46 | — | 8 | Te | In,D | Well 1. EY 90 gpm. |
| 11.411a | MCRA | To(?) | 130 | — | 70 | 9-23-47 | — | 8 | Li | In,D | Well 3. EY 50 gpm. |
| 17.33.13.341 | Potash Co. of America | To | 252M | 4,124 | 149.7 | 11-20-53 | 1952 | 6 | N | O | — |
| 18.322 | Kewanee Oil Co. | To | 220 | 4,230 | — | — | — | 10¾ | Te | In,D | Two wells. Chemical analysis in table 8. |
| 26.422 | Phillips Oil Co. | To | — | 4,125 | 161.2 | 11-20-53 | 1950 | 8 | N | In,O | — |
| 28.110 | — | To | 241M | 4,185 | 198.0 | 5-11-54 | — | 7 | N | N | — |
| 30.124 | Walter Williams | Qal | — | 4,045 | 70.0 | 7-29-54 | — | 7 | Lw | S | PR |
| 18.33.14.111 | — | Qal | 40M | 3,965 | 35.8 | 6- 3-54 | — | 5 | N | N | — |
| 19.142 | — | Tr(?) | — | 3,820 | >140 | 12- 9-58 | — | 4 | Lw | S | — |
| 34.133 | — | Tr | 200M | 3,760 | 177.4 | 12- 9-58 | — | 8½ | N | N | — |
| 19.32.8.200 | — | Tr | — | 3,650 | 365.3 | 12- 9-58 | — | 7½ | Lw | S | Chemical analysis in table 8. |
| 36.100 | W. M. Snyder | Tr | 485 | 3,565 | — | — | — | — | Li | D,S | — |
| 19.33.5.213 | — | Tr | — | 3,710 | >299 | 12- 9-58 | — | — | Lw | S | — |
| 26.244 | Mark Smith | Qal | 101 | 3,600 | 92.9 | 7- 1-54 | — | — | Lw | D,S | MWP |
| 19.34.9.114 | Scharbauer Cattle Co. | Tr(?) | 53 | 3,790 | 28.6 | 6- 3-54 | — | 6 | Lw | S | Chemical analysis in table 8. |
| 31.131 | Clark Scharbauer | Qal | — | 3,625 | 65.8 | 7- 1-54 | — | 6 | Lw | S | MWP |
| 19.35.5.121 | Gene Dalmont | To | 88 | 3,890 | 50 | 7-28-54 | — | 8 | Ti | I | — |
| 5.234 | Jules Smith | To | 90 | 3,860 | 35 | — | — | — | Lw | D,S | — |
| 10.113 | N. T. Roberts | To | 36 | 3,860 | 19.9 | 7-28-54 | — | 6 | Lw | S | EY 5 gpm. |
| 12.444 | — | Qal | — | 3,740 | 34.2 | 7-28-54 | — | 3 ft. | Lw | S | — |
| 19.35.17.122 | J. D. Roberts | Qal | 50 | 3,855 | 29.9 | 7-28-54 | — | 3×3 ft. | Lw | D,S | Dug 0-30 feet; drilled 30-50 feet. |
| 22.334 | — | Qal | — | 3,740 | 23.5 | 7-28-54 | — | 8 | Lw | N | — |
| 24.121 | — | Qal | — | 3,735 | 28.6 | 11-16-53 | — | 6 ft. | N | N | — |
| 25.424 | — | Qal | — | 3,675 | 22.6 | 11-16-53 | — | — | N | N | Uncased shothole. |
| 25.434 | — | Qal | — | 3,660 | 22.8 | 11-16-53 | — | 6 | Lw | S | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 19.36.5.233 | Tom Green | To | 60 | 3,815 | 52.3 | 7-28-54 | — | — | Lw | D,S | — |
| 19.313 | — | Qal | 44.6M | 3,685 | 18.6 | 11-16-53 | — | — | N | N | Uncased shothole. |
| 20.111 | Tom Green | Qal | — | 3,695 | 25.7 | 7-28-54 | — | — | Lw | S | EY 10 gpm. PR |
| 25.123 | — | To | 43M | 3,680 | 16.0 | 3-18-54 | — | 6 | N | N | Northwest well of six. Chemical analysis in table 8. |
| 19.36.26.224 | J. E. Weir | Qal | 12.7M | 3,650 | 6.7 | 5- 7-54 | — | 4×5 ft. | N | N | At Monument Spring. |
| 28.422 | Mrs. Abi Hall | To | 52M | 3,720 | 36.6 | 3-18-54 | — | 7 | N | N | — |
| 28.441 | do. | To | 27M | 3,680 | 22.7 | 3-18-54 | — | 6 | N | N | — |
| 32.110 | S. P. Jordan | Qal | 32 | 3,645 | 19 | 11-20-29 | — | — | — | — | Chemical analysis in table 8. |
| 32.324 | — | Qal | 30 | 3,630 | 27.2 | 7-28-54 | — | 4×4 ft. | Lw | N | — |
| 19.37.4.110 | V. Linam | To | 29 | 3,680 | 21 | 9-19-29 | — | — | — | — | Chemical analysis in table 8. |
| 18.111 | Amerada Oil Co. | To | 134 | 3,705 | 35 | 9- -47 | 1947 | 10¾ | Ti | D | Monument District Camp. WBZ 67-108 feet, 112-125 feet. EY 385 gpm. |
| 18.331 | EPNG | To | — | 3,710 | 51.9 | 3-18-54 | — | 10 | N | N | — |
| 20.242 | Humble Oil Co. | — | 80 | 3,660 | Dry | — | 1937 | — | N | N | Plugged and abandoned. |
| 21.132 | do. | To | 67 | 3,635 | — | — | 1937 | — | — | — | State "D" well 2. EY 30 gpm. |
| 19.37.25.422 | — | To | — | 3,600 | 40 | 4- 6-54 | — | — | Lw | S | — |
| 29.333 | — | Qal | — | 3,595 | 13.3 | 7-28-54 | — | 7 | Lw | D | MWP |
| 29.344 | Hobbs School district | Qal | 30± | — | 21.5 | 3-23-60 | — | 8 | Te | P | — |
| 29.344a | do. | Qal | 30± | — | — | — | — | 6 | Te | P | Chemical analysis in table 8. |
| 30.113 | Continental Oil Co. | Qal | 60 | 3,660 | — | — | — | — | Te | D | Pumps dry in summer. |
| 20.32.1.322 | W. M. Snyder | Qal | 30 | 3,510 | 21.8 | 7- 1-54 | — | 6 | Li | S | Water not potable. |
| 18.235 | Freeport Sulfur Co. | Tr | 400 | 3,450 | 89.2 | 3-24-54 | 1954 | 8 | Li | In | WBZ 215-243 feet. |
| 27.144 | Joel Frey | Qal | 25 | 3,545 | 12.3 | 6-11-54 | — | — | Lw | N | — |
| 30.142 | — | Qal | — | 3,530 | 9.9 | 6-11-54 | — | 8⅝ | N | N | Located in sink. |
| 36.214 | Mrs. Bingham | Qal | 60 | 3,588 | 46.6 | 6- 6-55 | 1950 | 7¼ | Lw | D | West well of three. |
| 20.33.15.221 | — | Tr | — | 3,570 | 336.1 | 4-20-55 | — | 4 | Li | N | — |
| 24.122 | D. C. Berry | Tr | 700± | 3,630 | 300± | — | — | 10 | Lw | S | — |
| 20.34.17.334 | Mark Smith | Tr | 200 | 3,635 | 140 | 7- 1-54 | 1940 | 10 | Lw | S | MWP |
| 22.223 | D. C. Berry | Tr | 235 | 3,655 | — | — | — | 10 | Lw | S | — |
| 20.35.1.221 | J. L. Wood | Qal | 35 | 3,655 | 24.5 | 11-16-53 | — | 4×4 ft. | N | O | — |
| 31.113 | Leo Sims | To | 85 | 3,740 | 68.4 | 6-25-54 | — | 6 | Lw | S | PR |
| 33.433 | do. | To | 135 | 3,700 | 94.1 | 6-25-54 | — | 7 | Lw | S | MWP |
| 35.333 | do. | To | 105 | 3,690 | 88.9 | 4-15-54 | — | — | Lw | D,S | MWP Southeast well of two. |
| 20.36.1.412 | Amerada Oil Co. | Qal | 72M | 3,565 | 33.1 | 5-30-54 | — | 7 | N | N | — |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20.36.5.321 | — | Qal | — | 3,635 | 28.3 | 11-16-53 | — | 6 | Lw | S | — |
| 12.141 | — | Qal | 40 ± M | 3,550 | 29.5 | 3-25-54 | — | — | Lw | S | — |
| 12.222 | Sunray Oil Co. | Qal | 56 | 3,560 | 29.0 | 3-30-54 | — | 7 | Lw | I, | Water not potable. |
| 20.36.15.222 | Continental Oil Co. | Tr | 700 | 3,575 | — | — | — | - | Ln | D | — |
| 15.421 | H. S. Record | Qal | 50 | 3,575 | 35.7 | 3-30-54 | 1938 | 8½ | Lw | S | Water not potable. MWP. Chemical analysis in table 8. |
| 24.423 | — | Qal | 50 ± M | 3,540 | 36.4 | 3-25-54 | — | 7 | Lw | In | Water used to soak wooden tanks. |
| 25.312 | Stanolind Oil and Gas Co. | Tr | 225 | 3,550 | 117.3 | 3-25-54 | — | 6 | Lw | D | — |
| 26.244 | Amerada Oil Co. | Tr | 265 | 3,555 | — | — | — | 7½ | Li | In | Water used for oil well drilling. |
| 32.112 | Leo Sims | Tr | 612 | 3,640 | 300 | 4-15-54 | — | — | Lw | S | — |
| 35.244 | Humble Oil Co. | Tr | 230 | 3,550 | — | — | 1938 | — | — | In | Federal Fopeano well 2. EY 18 gpm. |
| 20.27.3.341 | — | Qal | — | 3,560 | 19.5 | 4- 1-54 | — | 7½ | Lw | S | Water not potable. |
| 20.37.4.111 | Jim Cooper | Qal | 40 | 3,560 | — | — | — | — | Je | L | Chemical analysis in table 8. |
| 4.221 | Nolan and Lane | Qal | 45 | 3,555 | 31.4 | 4- 2-54 | 1940 | 6 | Lw | D | Chemical analysis in table 8. |
| 4.314 | — | Qal | 48M | 3,550 | 32.8 | 4- 2-54 | — | 8 | N | N | — |
| 4.341 | Humble Oil Co. | Qal | 106 | 3,550 | — | — | 1935 | — | — | — | Plugged and abandoned. |
| 4.444 | — | Qal | 30 ± M | 3,560 | 23.5 | 4- 1-54 | — | 8 | N | N | — |
| 5.333 | Amerada Oil Co. | Qal | 75 | 3,555 | — | — | 1954 | 7 | Ti | In | WBZ 55-65 feet. |
| 7.133 | — | Qal | — | 3,555 | 27.1 | 3-29-54 | — | 8½ | N | N | — |
| 7.241 | — | Qal | 28.5M | 3,550 | 26.4 | 3-29-54 | — | 8½ | N | N | About 70 feet northwest of windmill. |
| 7.434 | — | Qal | — | 3,540 | 25.2 | 3-30-54 | — | 8½ | Lw | S | MWP. |
| 8.321 | Amerada Oil Co. | Qal | 86 | 3,550 | 30 | 1 23-54 | 1951 | 7 | Tu | In | Reportedly had no measurable drawdown at 50 gpm. |
| 20.37.8.424 | Tidewater Oil Co. | Qal | 62 | 3,545 | 25.9 | 3-22-54 | — | — | Li | D | EY less than 1 gpm. |
| 9.110 | W. H. Laughlin | Qal | 53 | 3,558 | 34.0 | 11-16-53 | — | 4×6 ft. | N | O | — |
| 9.331 | Skelly Oil Co. | Qal | — | 3,545 | 18.0 | 3-22-54 | — | 7 | N | N | — |
| 13.321 | Earl Kornegay | Qal(?) | 78M | 3,545 | 75.7 | 4- 2-54 | — | — | Lw | S | — |
| 16.144 | — | Qal | 56M | 3,525 | 13.2 | 2- 8-53 | — | 6 | N | N | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 17.131 | — | Qal | — | 3,540 | 24.8 | 4- 1-54 | — | 7½ | Lw | N | — |
| 20.431 | — | Qal | 40 | 3,510 | 24.1 | 3-26-54 | — | 12 | Lw | S | PR |
| 21.400 | — | Qal | — | 3,500 | 43.0 | 3-26-54 | — | 7 | N | N | — |
| 28.122 | Gulf Oil Corp. | Qal | 60 | 3,500 | 29.3 | 3-26-54 | — | 7 | N | N | — |
| 28.244 | — | Qal | 42±M | 3,490 | 37.4 | 3-26-54 | — | 6 | Lw | S | PR |
| 29.111 | Mid-Continent Petroleum Co. | Qal | — | 3,520 | 43.8 | 3-25-54 | — | 7 | N | N | — |
| 31.144 | Humble Oil Co. | Qal | 144 | 3,600 | — | — | — | — | — | — | WBZ gray sand, 60-98 feet. |
| 20.37.31.211 | Humble Oil Co. | Qal | 125 | 3,540 | Dry | — | — | — | — | — | Penetrated red beds at 40 feet. |
| 35.441 | Continental Oil Co. | Qal | 63M | 3,480 | 53.4 | 3-23-54 | — | 12 | N | N | — |
| 36.330 | do. | Qal | 120 | — | — | — | — | — | Te | In,D | One of two wells supplying pump station for lease houses. |
| 20.38.6.143 | — | To | — | 3,575 | 45.9 | 4- 6-54 | — | — | Lw | S | PR |
| 7.222 | William Walker | To(?) | 112 | — | — | — | — | 24 | Ti | I | — |
| 7.411 | A. E. Galloway | To(?) | 125 | — | — | — | — | — | Ti | I | — |
| 8.231 | City of Eunice | Qal | — | 3,570 | — | — | — | — | Te | P | West well of two. EY 600 gpm. |
| 8.232 | do. | Qal | — | 3,570 | — | — | — | — | Te | P | East well of two. |
| 8.311 | A. E. Galloway | Qal | 125 | 3,570 | 64.1 | 4- 2-54 | — | — | Ti | I | — |
| 9.124 | — | Qal | 40±M | 3,570 | 35.2 | 4- 2-54 | — | — | Lw | S | — |
| 11.414 | — | To | 33M | 3,565 | 30.7 | 12- 9-53 | — | 3½ ft. | N | N | — |
| 20.38.12.244 | — | To | — | 3,565 | 43.7 | 12- 7-53 | — | 6½ | N | N | — |
| 16.133 | Earl Kornegay | Qal | — | 3,560 | 50 | 3-22-54 | — | — | Lw | S | — |
| 17.113 | Amerada Oil Co. | Qal | 120 | 3,565 | — | — | 1951 | 7 | Ti | In | EY 40 gpm. |
| 17.141 | Earl Kornegay | Qal | 105±M | 3,555 | 59.3 | 3-22-54 | — | 7 | N | N | — |
| 17.142 | do. | Qal | 96M | 3,555 | 57.2 | 3-22-54 | — | — | N | N | — |
| 17.333 | Amerada Oil Co. | Qal | 116 | — | — | — | — | 7 | Ti | In | EY 35 gpm. |
| 17.334 | do. | Qal | 168 | 3,550 | 72.8 | 3-22-54 | — | — | N | N | — |
| 18.242 | do. | Qal | 124 | 3,565 | 50 | 3- -52 | — | 7 | Je | D | EY 17 gpm. |
| 19.320 | Continental Oil Co. | Qal | 115 | 3,545 | 78.8 | 4- 2-54 | — | 8 | Le | D | Chemical analysis in table 8. |
| 31.341 | — | Qal | 70±M | 3,490 | 66.7 | 3-23-54 | — | 6 | N | N | — |
| 20.39.7.133 | — | To | — | 3,565 | 43.6 | 12- 7-53 | — | 7½ | N | N | — |
| 18.344 | Earl Kornegay | To | 60±M | 3,540 | 46.2 | 12- 9-53 | — | — | N | N | Located northwest of windmill. |
| 21.33.2.231 | The Texas Co. | Tr | 1,150 | 3,810 | — | — | — | — | Li | D | Chemical analysis in table 8. |
| 21.33.2.422 | D. C. Berry | To | 120 | 3,805 | 107.2 | 6-28-54 | — | — | Lw | D | Chemical analysis in table 8. |
| 2.442 | do. | To | — | 3,800 | 72.9 | 6-28-54 | — | 10 | Lw | S | Located on west side of sink and west of earthen tank. |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21.33.2.442a | do. | To | — | — | — | — | — | — | Lw | D,S | Located on east side of earthen tank. Chemical analysis in table 8. |
| 18.112 | do. | To | — | 3,900 | 143.0 | 6-21-54 | — | — | Lw | S | — |
| 28.124 | San Simon Ranch | Tr | 224 | 3,690 | 179.5 | 6-30-54 | — | 7½ | N | N | "Standard" well. |
| 21.34.8.422 | do. | To | 120 | 3,705 | 105.8 | 6-30-54 | — | — | Lw | S | — |
| 13.324 | Wilson Oil Co. | Tr | 335 | 3,655 | 200 | 1943 | 1943 | — | Li | D | — |
| 25.225 | do. | To | 220 | 3,660 | 150 | 1954 | — | — | Li | In,D | — |
| 21.34.24.222 | Mid-Continent Oil Co. | Tr(?) | 125 | 3,655 | — | — | — | — | Li | D | — |
| 35.233 | San Simon Ranch | To | 80M | 3,665 | 67.0 | 6- 6-55 | — | 7¼ | N | N | "Christmas" well. |
| 21.35.1.122 | Amerada Oil Co. | Tr | 312 | 3,550 | 175 | 6- 7-54 | 1954 | 7 | Li | In | EY 9 gpm. |
| 7.211 | Wilson Oil Co. | Tr | 430 | 3,700 | 340 | 1940(?) | 1940 | — | Li | D | One of two water wells at Wilson Camp. |
| 14.111 | San Simon Ranch | Tr | 250 | 3,580 | 147.3 | 6- 7-55 | — | 6 | Lw | S | "Scharbauer" well. |
| 24.223 | do. | Tr | — | 3,620 | 205.7 | 4-14-54 | — | — | Lw | S | — |
| 27.321 | — | To | — | 3,615 | 21.8 | 12- 8-58 | — | — | N | N | — |
| 27.321a | — | To | — | 3,620 | — | — | — | — | Lw | S | Chemical analysis in table 8. |
| 21.35.30.411 | San Simon Ranch | To | 58M | 3,630 | 35.6 | 11-25-53 | — | 7½ | Lw | S | — |
| 21.36.9.222 | W. L. Van Noy | Tr | 447 | 3,605 | <350 | — | — | 8 | Li | P | EY 6 gpm. Public supply for Oil Center. Chemical analysis in table 8. |
| 10.112 | Humble Oil Co. | Tr | 495 | — | — | — | — | — | N | N | WBZ sand, 385-395 feet. |
| 19.222 | Pacific-Western Oil Co. | To(?) | 230M | 3,630 | 216.0 | 1- 7-54 | — | 8 | N | N | — |
| 25.235 | Frontier Country Club | To | 200 | 3,555 | 139.0 | 4-22-55 | 1955 | 8⅝ | — | — | Unfinished well. Recently bailed. |
| 28.243 | — | To | 197M | 3,585 | 174.5 | 1-15-54 | — | 6¾ | N | N | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21.36.29.144 | Humble Oil Co. | To(?) | 305 | 3,630 | — | — | 1935 | — | N | N | WBZ sand, 225-305 feet. |
| 33.223 | — | To | 215±M | 3,590 | 205.5 | 11-12-53 | — | 6½ | N | N | — |
| 36.242 | W. M. Snyder | To | — | 3,505 | 113.3 | 1-15-54 | — | 6 | Lw | S | MWP |
| 21.37.6.244 | — | To | — | 3,495 | 70.3 | 3-23-54 | — | 8 | Li | — | — |
| 10.211 | Continental Carbon Black Co. | Qal | 76 | 3,440 | 26 | 1953 | 1945 | 8 | Te | In,D | — |
| 11.311 | — | Qal | 77M | 3,426 | 39.1 | 12- 8-53 | — | 7¼ | N | N | — |
| 12.341 | Terry and McNeil | Qal | 100 | 3,450 | 76.3 | 10- 2-53 | — | 7 | Ti | In | — |
| 13.111 | Western Oil Field Corp. | Qal | 185 | 3,425 | 60 | 10- 2-53 | 1953 | — | — | — | Drilled for oil. |
| 14.123 | — | Qal | — | 3,420 | 25.4 | 12- 8-53 | — | 6 | Lw | S | — |
| 18.442 | T. Davis | To | 125 | 3,510 | 99.7 | 1-10-54 | — | 7 | Ti | D,S | — |
| 21.111 | — | To | — | 3,460 | 73.1 | 1-10-54 | — | 7¾ | N | N | — |
| 21.37.22.211 | — | To | 49M | 3,420 | 37.7 | 4-21-55 | — | — | N | N | — |
| 22.413 | — | To | — | 3,410 | 75.0 | 10- 1-53 | — | 7 | N | N | — |
| 23.211 | Skelly Oil Co. | To(?) | 81 | 3,420 | 42.5 | 10- 1-53 | 1948 | — | N | N | Skelly Eunice Plant 2, well 1. Initial yield, 55 gpm. |
| 23.213 | do. | To(?) | 83 | 3,410 | 45.8 | 10- 1-53 | 1948 | — | N | N | Skelly Eunice Plant 2, well 2. |
| 23.231 | do. | To(?) | 84 | 3,410 | 43.0 | 10- 1-53 | 1948 | — | N | N | Skelly Eunice Plant 2, well 3. Initial yield, 100 gpm. |
| 23.233 | do. | To(?) | 81 | 3,405 | 44.1 | 10- 1-53 | 1948 | — | N | N | Skelly Eunice Plant 2, well 4. Initial yield, 60 gpm. |
| 23.300 | Gulf Oil Corp. | To | 100 | 3,390 | 59 | 5-31-50 | 1948 | 10¾ | Te | In,D | Gulf Eunice Gasoline Plant, well 22. |
| 21.37.23.331 | — | To | — | 3,385 | 72.9 | 10- 1-53 | — | 8½ | N | N | — |
| 23.331a | Gulf Oil Corp. | To | 96 | 3,390 | 61 | 5-31-50 | — | 7 | Te | In,D | Gulf Eunice Plant, well 23. |
| 26.325 | do. | To | 101 | 3,365 | 64 | 12- 3-48 | — | — | Te | In,D | Gulf Eunice Plant, Cone well 1 |
| 26.400 | do. | Qal | 160 | 3,365 | 53 | 7-23-51 | — | 5⅜ | N | N | Gulf Eunice Plant, well 5. |
| 27.232 | do. | To | 99 | 3,400 | 62 | 1948 | 1948 | 7 | Te | In,D | Gulf Eunice Plant, well 14. Initial yield, 55 gpm. |
| 27.241 | do. | To | 150 | 3,385 | 60 | 1948 | — | 7 | N | N | Gulf Eunice Plant, well 4. |
| 30.414 | — | To | — | 3,480 | 101.6 | 1-11-54 | — | — | Lw | In | — |
| 32.121 | Skelly Oil Co. | To | 92M | 3,400 | 90.7 | 1-15-54 | — | 6½ | N | N | — |
| 33.110 | City of Eunice | To | 130 | 3,450 | — | — | — | 6 | N | N | Old public-supply well. WBZ 90-130 feet. Chemical analysis in table 8. |
| 21.37.33.111 | Magnolia Oil Co. | To | 110(?) | 3,450 | 103.8 | 12-10-53 | — | 6 | Ti | In,D | Water used for oil well flooding. Chemical analysis in table 8. |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21.37.33.210 | City of Eunice | Tr | 350 | 3,430 | — | 1911 | — | 6 | N | N | Old public-supply well. WBZ 320-350 feet. Chemical analysis in table 8. EY 10 gpm. |
| 33.211 | — | To | 103M | 3,430 | 99.6 | 11-12-53 | — | 10¾ | N | N | — |
| 33.233 | City of Eunice | To | 135 | 3,435 | 100 | 1944 | — | 8 | Te | P | City well 1. Perforated 100-130 feet. Chemical analysis in table 8. |
| 35.423 | Gulf Oil Corp. | Qal | 110 | 3,375 | 61 | 5-17-50 | — | 10¾ | Te | In,D | Gulf Eunice Plant, well 21. |
| 35.442 | do. | Qal | 87 | 3,360 | 59 | 11-14-51 | — | 7 | Te | In,D | Gulf Eunice Plant, well 17. WBZ sand and gravel, 65-74 feet. |
| 21.37.36.144 | P. Wallach | Qal | 66 ± M | 3,370 | 47.8 | 10- 9-53 | — | 6 | Lw | S | — |
| 36.344 | do. | Qal | — | 3,360 | 49.8 | 10- 9-53 | — | 8¾ | Lw | S | — |
| 21.38.6.133 | Ray McNeil | Qal | 90+ | 3,550 | 79.4 | 12- 7-53 | — | 7 | N | N | — |
| 6.133a | do. | To | 90? | — | — | — | — | — | Lw | — | Chemical analysis in table 8. |
| 6.133b | do. | To | 108 | — | — | — | — | — | N | N | do. |
| 8.144 | Humble Oil Co. | — | 133 | 3,565 | Dry | — | — | — | — | — | Plugged and abandoned. |
| 22.33.13.200 | San Simon Ranch | Tr | 508 | 3,510 | — | — | — | — | Lw | S | WBZ 420-470 feet. |
| 22.34.12.111 | do. | Qal | 62 | 3,530 | 48 | — | 1951 | — | Lw | D,S | — |
| 12.114 | do. | Qal | 16M | 3,515 | 12.6 | 3-17-54 | — | — | Lw | S | Is an infiltration tunnel about 70 feet long and 5 feet in diameter feeding 2 windmills, 1 centrifugal pump and 1 siphon. |
| 22.36.1.333 | Gulf Oil Co. | To | 150 | 3,490 | 111.2 | 11-12-53 | — | — | Li | L | Chemical analysis in table 8. |
| 2.444 | — | — | — | — | — | — | — | — | Lw | S | Chemical analysis in table 8. |
| 8.443 | United Carbon Co. | Tr | 1,000 ± | 3,580 | 700 | — | — | 8 | Le | In,D | Three wells. EY 30 gpm each. Chemical analysis in table 8. |
| 11.224 | Texas-Pacific Coal and Oil Co. | To | 120+ | 3,500 | 113.8 | 11-12-53 | — | 8 | Lw | D | Chemical analysis in table 8. |
| 13.222 | Ohio Oil Co. | Tr(?) | — | 3,455 | Flowing | — | — | 7 | N | N | Capped and flowing. |
| 25.434 | R. L. Robinson | To | — | 3,430 | 118.5 | 11-23-53 | — | — | Li | S | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 22.36.35.314 | do. | To | 197 | 3,490 | 187.4 | 11-23-53 | — | — | Lw | S | — |
| 1.152 | G. Sims | Qal | — | 3,350 | 47.6 | 10-14-53 | — | — | N | N | Open, uncased hole. |
| 1.440 | do. | Qal | — | — | — | — | — | — | Lw | S | Chemical analysis in table 8. |
| 2.442 | Humble Oil Co. | Qal | 86M | 3,360 | 53.3 | 10- 9-53 | — | 7 | N | N | Initial yield, 68 gpm. |
| 3.133 | Sinclair Oil and Gas Co. | To | 120 | 3,425 | 90 | — | 1946 | — | Je | D | — |
| 3.134 | do. | — | 52M | 3,420 | Dry | 9-28-53 | — | — | N | N | — |
| 3.440 | Cities Service Oil Co. | To | — | 3,390 | 75.8 | 9-29-53 | — | 7½ | N | N | — |
| 4.211 | City of Eunice | To | 155 | 3,445 | 110 | 1953 | 1953 | 10 | Te | P | Well 12. Initial yield, 100 gpm; yield in 1953, 60 gpm. |
| 4.213 | do. | To | 155 | 3,440 | 114.8 | 3- 6-54 | 1952 | 10 | Te | P | Well 11. EY 60 gym. |
| 4.214a | Eunice Cemetery Assoc. | To | 115±M | 3,435 | 108.2 | 9-29-53 | — | 6½ | N | N | — |
| 22.37.4.233 | City of Eunice | To | 155 | 3,435 | 110 | 1951 | 1951 | 8 | Te | P | Well 9. |
| 4.421 | Sinclair Oil and Gas Co. | To | 114±M | 3,430 | 90.1 | 9-28-53 | — | 7⅝ | N | N | — |
| 4.424 | Skelly Oil Co. | To | 164 | — | <139 | — | 1950 | 8⅝ | Ti | In,D | Skelly Eunice Plant 1, well 13. Initial yield, 150 gpm; dropped to 20 gpm. |
| 8.441 | Shell Oil Co. | To | 168 | 3,400 | 60 | 1953 | 1936 | 6⅝ | Lw | D | — |
| 9.313a | Humble Oil Co. | To | 166M | 3,400 | 72.7 | 9-29-53 | 1944 | 9½ | N | N | Humble—J. L. Greenwood well 2. |
| 9.331 | do. | To | 160 | — | — | — | 1945 | 7⅝ | Te | D | Humble—J. L. Greenwood well 4. |
| 9.333 | do. | To | 172 | — | — | — | 1946 | 4 | Te | In | Humble—J. L. Greenwood well 5. Water used for oil well flooding. |
| 22.37.9.441 | Humble Oil Co. | To | 104±M | 3,410 | 85.5 | 9-29-53 | 1940 | 6⅝ | N | N | Humble—J. L. Greenwood well 1. |
| 10.213 | Gulf Oil Corp. | To | 220 | 3,400 | 100 | 1950 | — | — | Lw | D | Gulf-Brunson lease well. |
| 10.320 | Skelly Oil Co. | To | — | 3,395 | 81.0 | 9-29-53 | — | 11½ | N | N | — |
| 11.324 | — | Qal | 100M | 3,350 | 45.3 | 10-16-53 | 1952 | 5 | N | N | — |
| 11.444 | Leo Sims | Qal | — | 3,345 | 58.7 | 10-16-53 | — | 8⅝ | Lw | S | — |
| 12.114 | G. Sims | Qal | 84M | 3,340 | 53.9 | 10-14-53 | — | 7 | N | N | — |
| 12.443 | do. | Qal | 59M | 3,335 | 53.9 | 10-14-53 | — | 15 | N | N | — |
| 12.443a | do. | Qal | 59M | 3,335 | 53.3 | 10-14-53 | — | — | N | N | Uncased and open. |
| 15.333 | H. O. Sims | To | — | 3,380 | 81.0 | 9- -53 | — | 4¾ | Lw | D,S | — |
| 16.432 | Skelly Oil Co. | To | 135 | — | — | — | — | 7 | Ti | In,D | Skelly Eunice Plant 1, well 11. EY 40 gpm. |
| 16.443 | do. | To | 136 | 3,385 | 80.9 | 9-28-53 | 1947 | 8⅝ | Ti | In,D | Skelly Eunice Plant 1, well 10. |
| 22.37.21.221 | — | To(?) | — | 3,380 | 76.5 | 9- -53 | — | 6⅝ | N | N | — |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 22.37.21.421 | — | To(?) | — | 3,360 | 62.0 | 9- -53 | — | 4½ | N | N | — |
| 22.331 | Skelly Oil Co. | To(?) | 115± | 3,350 | 69.0 | 9-29-53 | 1949 | — | Ti | In,D | Skelly Eunice Plant 1, well 12. EY 40 gpm. |
| 23.233 | Leo Sims | Qal | 77M | 3,345 | 55.0 | 10-14-53 | — | 14 | N | N | Open and uncased. |
| 23.441 | O. I. Boyd | Qal | 70± | 3,335 | 55.3 | 10-12-53 | — | — | Lw | S | Dug. |
| 23.441a | do. | Qal | 70± | 3,335 | 55.2 | 10-12-53 | — | 7½ | N | N | — |
| 24.133a | G. Sims | Qal | 127M | 3,322 | 59.3 | 4-21-55 | — | 10 | Li | N | — |
| 24.133b | do. | Qal | 80 | — | — | — | — | — | Lw | N | Chemical analysis in table 8. |
| 25.313 | Marshal Drinkard | Qal | 69M | 3,300 | 50.1 | 10-14-53 | 1945 | 13½ | N | N | — |
| 27.334b | Skelly Oil Co. | Qal | 127M | 3,335 | 54.4 | 9- -53 | — | 8½ | N | N | Skelly Eunice Plant 1, well 9. |
| 27.410 | do. | To? | 182 | — | — | — | — | 7 | Te | In,D | EY 25 gpm. Perforations 150-170 feet. |
| 22.37.28.323 | Clower Drilling Co. | Qal | — | 3,353 | 66.1 | 9- -53 | — | 9¼ | N | N | — |
| 34.221 | Humble Oil Co. | Qal and Tr | 229 | 3,520 | — | — | 1938 | — | — | In | WBZ 58-61 feet, 138-146 feet, 185-192 feet. EY 22 gpm. |
| 36.141a | Tom Linebury | Qal | 40 | 3,300 | 32.2 | 10-12-54 | — | — | Lw | S | — |
| 36.141b | do. | Qal | 46 | 3,300 | 31.1 | 6- 3-55 | — | 6 | N | N | — |
| 22.38.18.234 | The Texas Co. | Tr | 386M | 3,360 | 180 | 10- -53 | 1953 | — | Li | In | WBZ gray sand, 325-380 feet. EY 20 gpm. |
| 19.222 | do. | Tr | — | 3,365 | 146.0 | 10-14-53 | — | 7 | N | N | — |
| 23.32.4.222 | C. H. and W. O. James | Tr | 550 | 3,630 | — | — | 1931 | 8 | Lw | S | EY 10 gpm. |
| 21.222 | Frank and Charles James | Tr | 550 | 3,700 | 500 | — | — | 8 | Li | S | — |
| 23.33.12.322 | San Simon Ranch | Tr | 400 | 3,685 | — | — | 1953 | — | Lw | S | WBZ 370-400 feet. |
| 23.33.28.334 | Brinninstool | Tr | 575 | 3,675 | 500 | — | — | — | Lw | D,S | EY 2.5 gpm. |
| 23.34.1.444 | San Simon Ranch | Qal | 144±M | 3,360 | 137.3 | 11-25-53 | — | 6 | N | N | — |
| 31.340 | Continental Oil Co. | Tr | 678 | 3,620 | — | — | 1953 | 8 | Li | In | EY 47 gpm. Chemical analysis in table 8. |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 23.35.27.444 | — | To | — | 3,480 | 117.2 | 3- -53 | — | 7 | N | N | — |
| 23.36.15.414 | J. E. Matkins | To(?) | 230 | 3,390 | 148.4 | 12- 4-53 | — | 6 | Lw | D,S | — |
| 16.343 | do. | Tr | 1,100 | 3,465 | 150 | 1952 | — | — | Lw | S | — |
| 22.434 | Texas Pacific Coal and Oil Co. | To | 210±M | 3,395 | 188.6 | 12- 1-53 | — | 8½ | N | N | — |
| 23.111 | do. | To | — | 3,370 | 143.6 | 12- 4-53 | — | 8 | Li | In | — |
| 31.233 | J. Combass | To | — | — | — | — | — | — | Lw | S | Chemical analysis in table 8. |
| 23.36.35.211 | J. Combass | To | 170 | 3,330 | 123.0 | 3- -53 | — | 6½ | N | N | — |
| 36.341 | EPNG | To | 250 | 3,330 | 124 | — | — | 10¾ | Ti | In,D | Jal Plant 4, well 8. |
| 36.342 | EPNG | To | 261 | 3,330 | 120 | — | 1952 | — | Ti | In,D | Jal Plant 4, well 7. |
| 23.37.2.133 | — | To | — | 3,304 | 62.8 | 10-16-53 | — | — | N | N | — |
| 2.422 | — | Qal | — | 3,295 | 64.1 | 6- 3-55 | — | 6 | Lw | S | — |
| 3.421 | H. O. Sims | To | 80 | 3,295 | 64.1 | 10-16-53 | — | — | Lw | D,S | — |
| 4.114 | — | To | 84—M | 3,341 | 81.8 | 12- 3-53 | — | 5½ | N | N | — |
| 4.211 | Skelly Oil Co. | Tr(?) | 226 | 3,340 | — | — | 1947 | 10¾ | Lc | D | H. O. Sims Camp well 1. EY 10 gpm. |
| 6.144 | — | To | — | 3,375 | 102.9 | 12- 3-53 | — | 6½ | Lw | S | — |
| 20.333 | Bert Steeler | Qal(?) | 177 | 3,300 | 117 | — | 1939 | — | Lw | D,S | — |
| 25.132 | M. L. Goins | To(?) | — | 3,215 | 28.3 | 10-15-53 | — | 7 | Lw | S | — |
| 27.441 | — | Qal | — | 3,270 | 78.3 | 3- 4-53 | — | 5½ | Lw | S | — |
| 23.37.31.442 | EPNG | To(?) | 173 | 3,300 | 118 | 1952 | 1952 | 12½ | Tc | In,D | Jal Plant 4, well 4. |
| 32.122 | — | To(?) | — | 3,300 | 99.0 | 7-23-54 | — | 6 | Lw | S | — |
| 32.331 | EPNG | To(?) | 173 | 3,310 | — | — | — | 20 | Tc | In,D | Jal Plant 4, well 1. WBZ 115-171 feet. EY 40 gpm. |
| 33.122 | — | To(?) | 120M | 3,310 | 91.2 | 3- 4-53 | — | 9 | N | N | — |
| 23.38.5.233 | Humble Oil Co. | Tr | 400M | 3,385 | 189.8 | 10-15-53 | 1943 | 7½ | N | N | W. F. Scarbrough well 1. EY 14 gpm. |
| 8.214 | Tom Linebury | Tr | — | 3,372 | 198.3 | 10-15-53 | — | 6½ | Lw | D,S | — |
| 24.32.5.322 | Frank James | Tr | 550 | 3,650 | — | — | — | 10 | Lw | D,S | — |
| 10.344 | do. | Qal | 60 | 3,588 | 31.1 | 6- 3-55 | 1910 | 6 | Lw | S | Located in sink. |
| 33.422 | Richard Ritz | Tr | 367M | 3,510 | 313.4 | 2-18-58 | — | 12 | Lw | S | EY 0.25 gpm. |
| 24.33.10.113 | Carl Johnson | Qal | 36±M | 3,595 | 24.6 | 11-27-53 | — | 6½ | Lw | S | — |
| 24.33.23.311 | — | Tr | 232M | 3,565 | 208.6 | 11-27-53 | — | 9½ | N | N | — |
| 24.444 | — | Qal | — | 3,530 | 16.9 | 11-27-53 | — | 5½ | Lw | S | — |
| 33.231 | Carl Johnson | Qal | — | 3,460 | 93.2 | 3-17-54 | — | 6 | Lw | D,S | — |
| 24.34.4.111 | — | To | — | 3,570 | 51.3 | 6- 3-55 | — | — | Lw | S | — |
| 5.444 | — | To | 78(?) | 3,590 | 66.6 | 4-21-55 | — | — | Lw | N | — |
| 10.112 | Madera Ranch | To | 83M | 3,525 | 71.8 | 4-27-53 | — | 6 | N | N | — |
| 10.422 | do. | To | 94M | 3,315 | 63.2 | 4-27-53 | — | 7½ | N | N | — |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 24.34.35.122 | do. | Tr | 258M | 3,410 | 223.9 | 3-29-53 | — | 6 | Lw | S | — |
| 24.35.30.341 | do. | Tr | 150±M | 3,320 | 139.6 | 11-27-53 | — | 6 | Lw | S | — |
| 24.36.3.111 | — | To | — | 3,400 | 181.1 | 3-12-53 | — | 7½ | N | N | — |
| 3.333 | Charles Whitten | To(?) | 190±M | 3,390 | 181.1 | 3-12-53 | — | 11½ | N | N | — |
| 9.133 | do. | To | 230 | 3,395 | 195.0 | 3- 6-53 | 1948 | 7 | N | N | — |
| 13.314 | Humble Oil Co. | To | 160 | — | — | — | 1941 | — | — | — | WBZ sand, 138-158 feet. EY 10 gpm. |
| 24.36.15.222 | Canmex Oil Co. | To | 200 | 3,370 | 181.3 | 3-12-53 | 1937 | 7 | Lw | D | — |
| 22.220 | Continental Oil Co. | Tr | 692 | 3,340 | — | — | — | 8¼ | Li | D | A. H. Meyers "A" well 1. Intake set at about 475 feet. Maximum yield 6 gpm. |
| 23.222 | — | To | — | 3,345 | 147.9 | 3- 6-53 | — | 6¼ | Lw | I | Measurement made inside pipe column. |
| 27.221 | J. R. Wilson | To | — | 3,320 | 122.9 | 3- 6-53 | — | 10 | N | N | — |
| 24.37.5.111 | EPNG | To | 175 | 3,275 | 111 | 9- 8-52 | 1952 | 10¾ | Te | In,D | Jal Plant 4, well 6. |
| 7.431 | Fowler Hair | To | 132M | 3,300 | 119.9 | 3- 6-53 | — | 6¼ | N | N | — |
| 10.123 | Trinity Production Co. | Tr | 747 | 3,260 | 120 | 2- -53 | 1953 | — | Li | In | EY 42 gpm. Chemical analysis in table 8. |
| 14.211 | Fowler Hair | To(?) | 72M | 3,205 | 64.5 | 3- 3-53 | — | 5 | N | N | — |
| 24.37.16.342 | — | To | 106M | 3,235 | 67.7 | 3-11-53 | — | 9 | N | N | — |
| 16.423 | Humble Oil Co. | To | 150 | 3,240 | — | — | 1951 | 6⅝ | Te | D | Fowler-Ellenburger Camp well 1. WBZ 90-150 feet. |
| 17.422 | Fowler Hair | To | 92M | 3,260 | 86.5 | 3- 4-53 | — | 7½ | N | N | — |
| 19.234 | — | To | 124M | 3,290 | 117.4 | 3- 5-53 | — | 10 | Lw | S | — |
| 21.444 | Dollarhide Water Co. | To | 74M | 3,210 | 69.6 | 3- 2-53 | — | 7½ | N | N | — |
| 25.322 | Fowler Hair | To | — | 3,136 | 76.1 | 3- 3-53 | — | 6½ | Lw | D,S | — |
| 34.320 | Plains Production Co. | To | 75±M | 3,160 | 56.8 | 3- 2-53 | — | 12 | N | N | — |
| 25.33.20.443 | — | Tr | — | 3,395 | 200-250 | 8-18-58 | — | 6 | Lw | D,S | — |
| 31.244 | Nick Ritz | Tr | 320 | 3,400 | 257.5 | 7-26-54 | — | 8 | Lw | S | — |
| 25.34.1.132 | Madera Ranch | Tr | 300+ | 3,385 | 231.0 | 4-15-53 | — | 6 | N | N | — |

# JAL BRINE STATION

## GEOLOGIC & HYDROLOGIC FIGURES

# EXPLANATION

QUATERNARY — Pleistocene and Recent

Sand

*Thin cover of drift sand in most places; locally dunes 20-40 feet high*

Qal

Alluvium

*Sand and gravel along dry washes; silt and sand in lake beds; includes some wind-deposited sand around depressions*

TERTIARY — Pliocene

To

Ogallala formation

*Chiefly sand, poorly to well-cemented with calcium carbonate; contains some clay, silt, and gravel; capped in most places by caliche*

Ku

Cretaceous rocks, undifferentiated

*Slumped blocks of buff, tan, or white fossiliferous limestone*

Upper Triassic

TRC / TRS / TRd

Dockum group

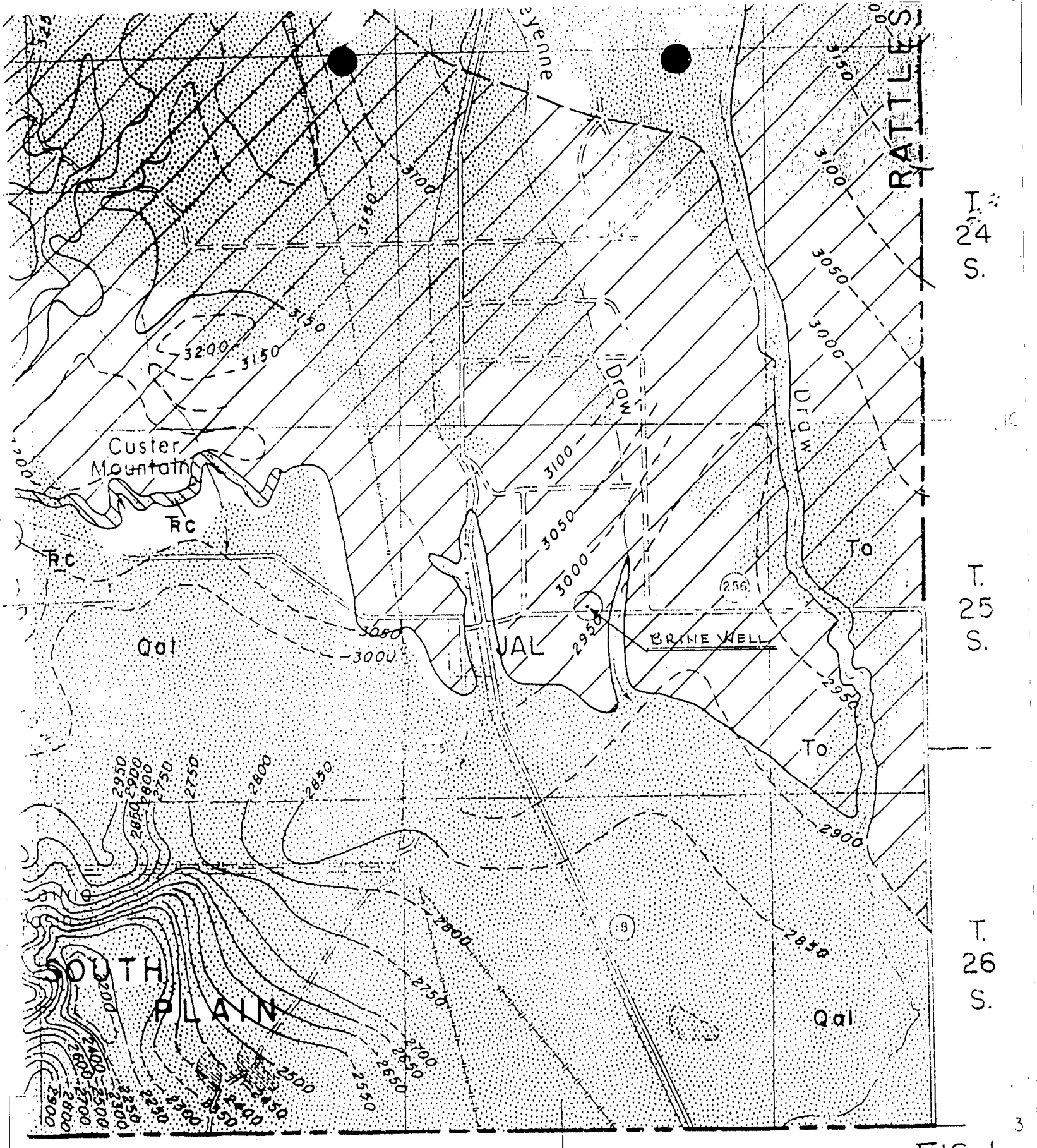
TRC-*Chinle formation, red and green claystone, minor siltstone, and fine-grained sandstone;* TRS-*Santa Rosa sandstone, red to white poorly sorted, coarse-grained, crossbedded sandstone;* TRd-*rocks of the Dockum group, undifferentiated*

3500

Contours on the red-bed surface

*Dashed where approximate or inferred. Contour interval 50 feet. Datum mean sea level*

FIG. 1 EXPLA.




WINKLER COUNTY

SCALE 1" = 2 MILES

Geology by Alexander Nicholson, Jr., 195
Contours on buried red-bed surface
compiled by Alexander Nicholson, Jr.,
Alfred Clebsch, Jr., and S R Ash from

FIG. 1

# EXPLANATION

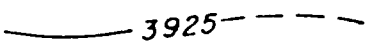
$\frac{150}{252}$ ○

Water well

*Upper figure is depth to water; lower figure is depth of well. Open circles are wells finished in Tertiary or Quaternary rocks; solid circles are wells finished in Triassic rocks*

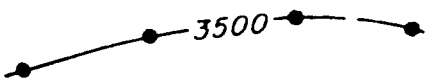
F = Flowing
R = Reported
P = Water level measured while pumping
D = Dry
? = Uncertainty as to aquifer
> = More than
< = Less than

(See tables 6 and 7 for detailed well data.)



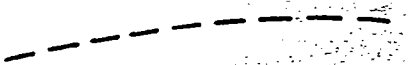

Water-table contour in Tertiary or Quaternary rocks

*Dashed where inferred or uncertain. Contour interval 25 feet. Datum mean sea level*



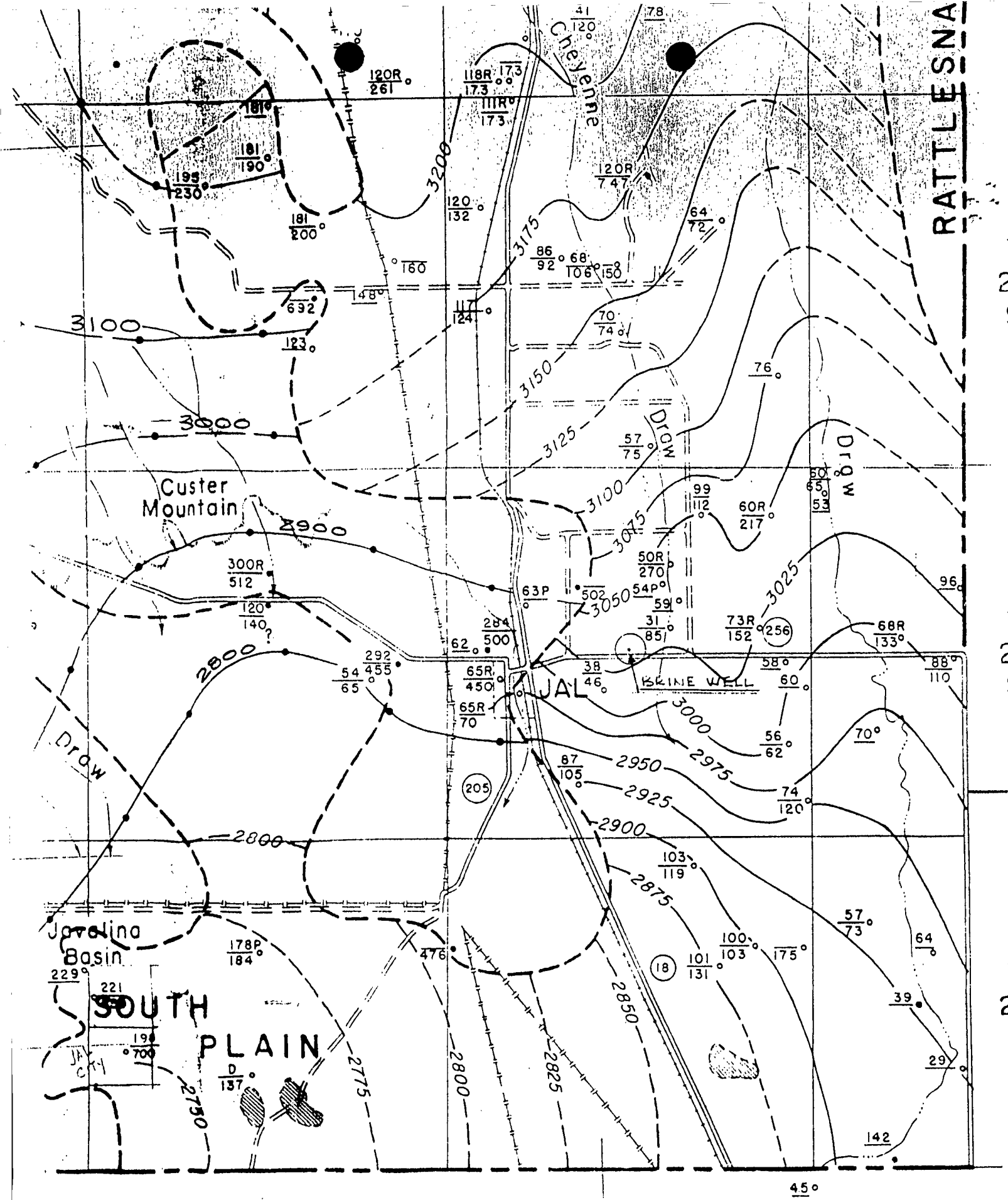

Water-table or piezometric contour on water body in Triassic aquifers

*Dashed where inferred or uncertain. Contour interval 100 feet. Datum mean sea level*



Approximate position of boundary between Triassic rocks and saturated Tertiary and Quaternary rocks

FIG. 2 EXPLA.




SCALE 1" = 2 MILES

103°10'

FIG. 2

WINKLER COUNTY

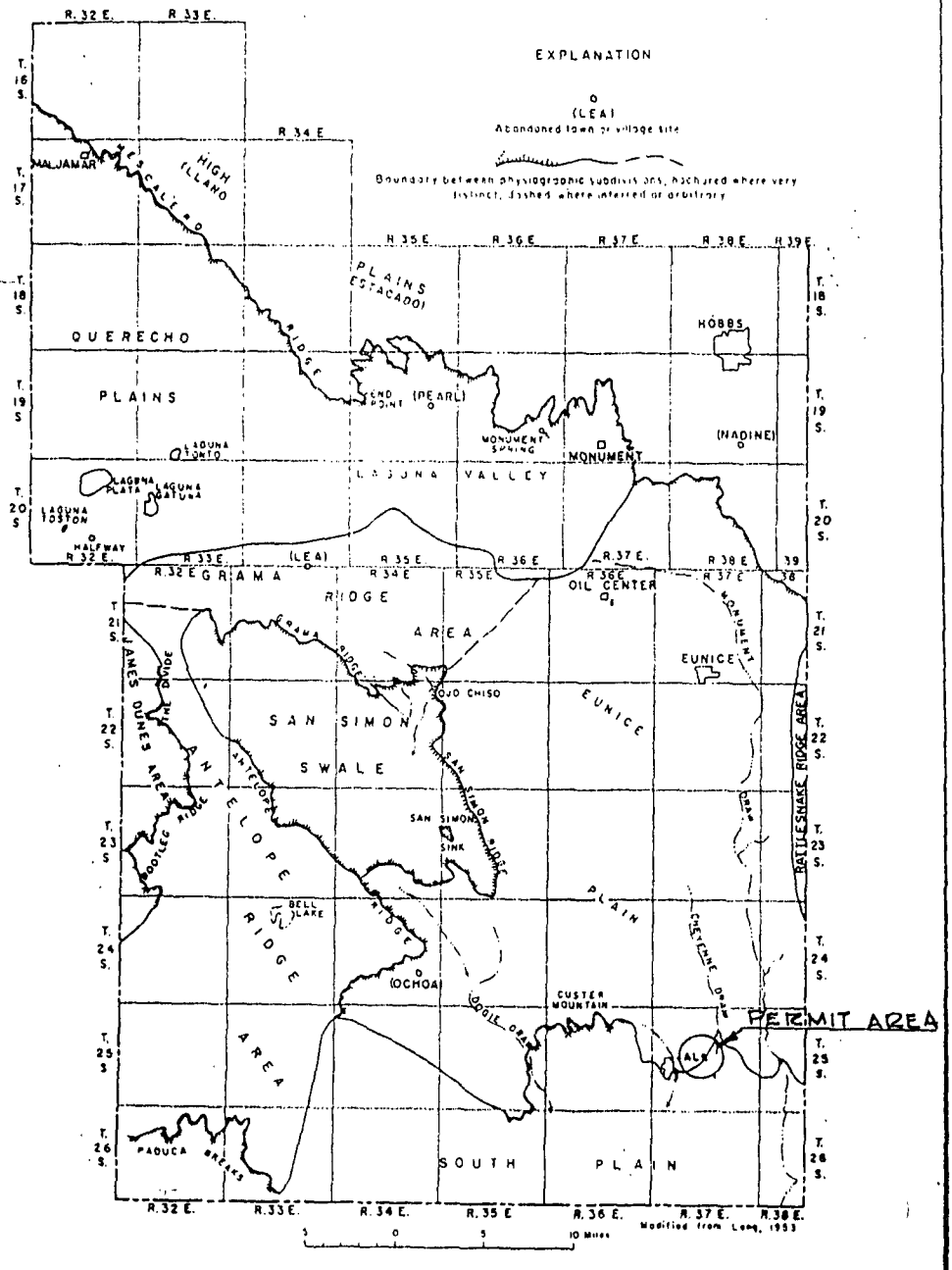



*Figure 3*

PHYSIOGRAPHIC SUBDIVISIONS OF SOUTHERN LEA COUNTY, N. MEX.

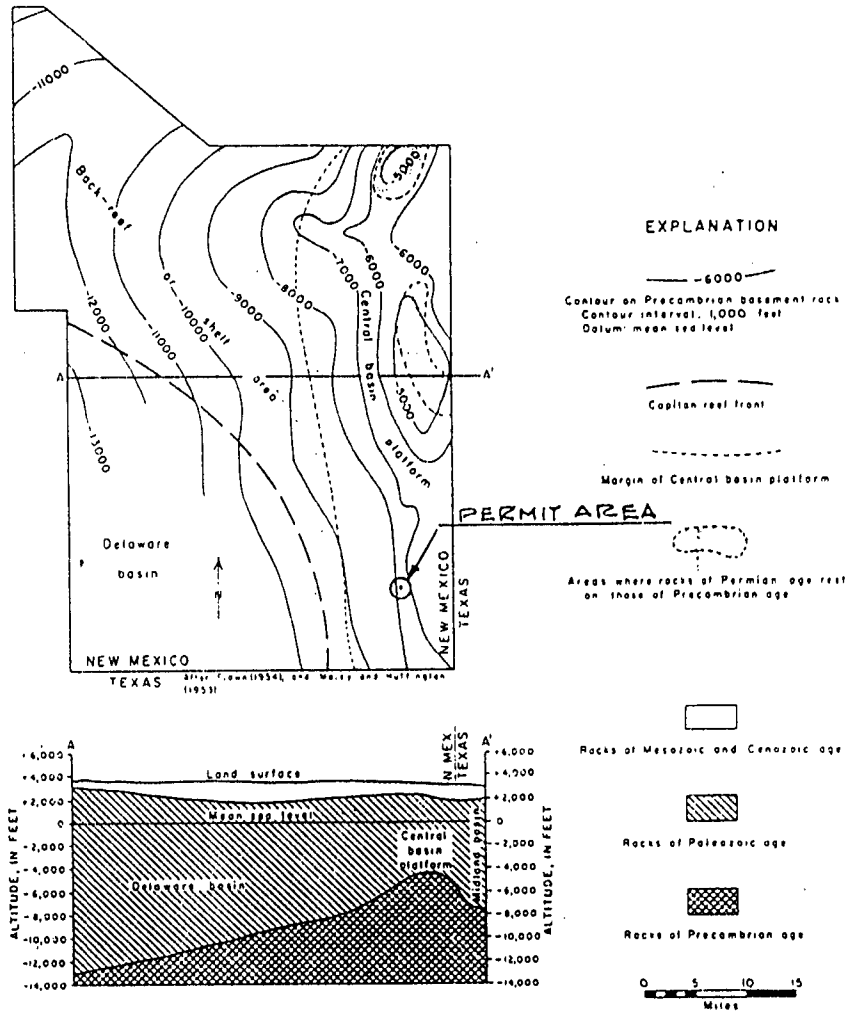



Figure 13

STRUCTURE MAP AND CROSS SECTION OF THE DELAWARE BASIN AND CENTRAL BASIN PLATFORM, LEA COUNTY, N. MEX.

# JAL BRINE STATION

## WELL PLUGGING AND ABANDONMENT REPORTS

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

| NO. OF COPIES RECEIVED | | |
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| LAND OFFICE | | |
| OPERATOR | | |

# OIL CONSERVATION DIVISION

P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Revised 10-1-78

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: M14474

## 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.)

7. Unit Agreement Name:

OIL WELL [ ] GAS WELL [ ] OTHER- brine

1. Name of Operator: PERMIAN BRINE SALES, INC.

8. Farm or Lease Name: Arnott Ramsey

2. Address of Operator: Rt. 3 Box 3033 Odessa, Texas 79763

9. Well No.: 2

4. Location of Well: UNIT LETTER P, 165 FEET FROM THE South LINE AND 165 FEET FROM THE East LINE, SECTION 16 TOWNSHIP 25S RANGE 37E NMPM.

10. Field and Pool, or Wildcat: None

15. Elevation (Show whether DF, RT, GR, etc.): 3150 GR

12. County: Lea

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 | [X] | REMEDIAL WORK | [ ] | ALTERING CASING | [ ] |
| TEMPORARILY ABANDON | [ ] | | | COMMENCE DRILLING OPNS. | [ ] | PLUG AND ABANDONMENT | [ ] |
| PULL OR ALTER CASING | [ ] | CHANGE PLANS | [ ] | CASING TEST AND CEMENT JOB | [ ] | | |
| OTHER | [ ] | | | OTHER | [ ] | | |

17. 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.

The well was never converted to a fresh water well. It is now proposed to plug the well by setting a cast iron bridge plug, testing the casing to 200 PSIG, and then filling the casing with cement.

CIBP. - 1140 (WELL DATA)
Converted to Saltwater by UNIVERSAL (KERMIT)

TONY & EDDIE SAW WORK

THE OPERATOR MUST BE NOTIFIED 24 HOURS PRIOR TO THE BEGINNING OF PLUGGING OPERATIONS FOR THE C-103

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

SIGNED C. L. Henderson TITLE President DATE 5/11/83

APPROVED BY ORIGINAL SIGNED BY JERRY SEXTON DISTRICT I SUPERVISOR TITLE _____ DATE MAY 19 1983

CONDITIONS OF APPROVAL, IF ANY:

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

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| OPERATOR | | |

# OIL CONSERVATION DIVISION

P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Form C-103
Revised 10-1-78

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: M 14474

## 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.)

OIL WELL [ ] GAS WELL [ ] OTHER- BRINE WELL

7. Unit Agreement Name:

1. Name of Operator: PERMIAN BRINE SALES, INC.

8. Farm or Lease Name: ARNOTT RAMSEY

2. Address of Operator: RT. 3 BOX 3033 ODESSA, TEXAS 79763

9. Well No.: 3

4. Location of Well: UNIT LETTER P, 220 FEET FROM THE SOUTH LINE AND 465 FEET FROM THE EAST LINE, SECTION 16 TOWNSHIP 25 S RANGE 37 E NMPM.

10. Field and Pool, or Wildcat: NONE

15. Elevation (Show whether DF, RT, GR, etc.): 3150 GL

12. County: LEA

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 [X] | REMEDIAL WORK [ ] | ALTERING CASING [ ] |
| TEMPORARILY ABANDON [ ] | | COMMENCE DRILLING OPNS. [ ] | PLUG AND ABANDONMENT [ ] |
| PULL OR ALTER CASING [ ] | CHANGE PLANS [ ] | CASING TEST AND CEMENT JOB [ ] | |
| OTHER [ ] | | OTHER [ ] | |

17. 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.

SET CIBP AT 1145 FEET, CIRCULATED CEMENT TO SURFACE INSIDE CASING. LAID DOWN TUBING. FILLED CASING BACK UP WITH CEMENT. WELDED PLATE AND MARKER ON CASING.

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

SIGNED [signature] TITLE PRESIDENT DATE AUGUST 30, 1983

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

JAL BRINE STATION

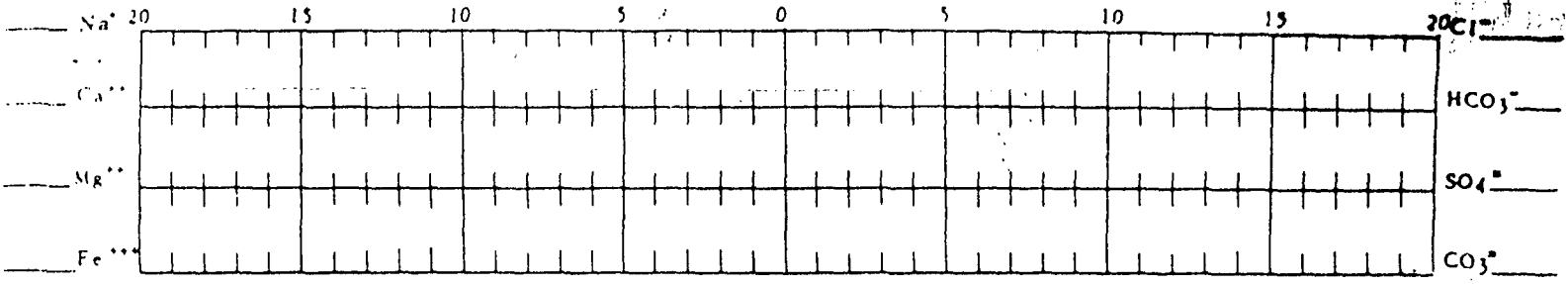
WATER ANALYSES

COMPANY

| FIELD | | | | COUNTY OR PARISH | | |
|---|---|---|---|---|---|---|
| LEASE OR UNIT: Jal | | WELL(S) NAME OR NO.: 1# MONITOR WELL | | WATER SOURCE (FORMATION) | | |
| DEPTH, FT. | UNIT, F | SAMPLE SOURCE | TEMP, F | WATER, BBL/DAY | OIL, BBL/DAY | GAS, MMCF/DAY |
| DATE SAMPLED | TYPE OF WATER: ☐ PRODUCED ☐ SUPPLY ☐ WATERFLOOD ☐ SALT WATER DISPOSAL | | | | | |

## WATER ANALYSIS PATTERN

(NUMBER BESIDE ION SYMBOL INDICATES me/l* SCALE UNIT)




## DISSOLVED SOLIDS

| CATIONS | me/l* | mg/l* |
|---|---|---|
| Total Hardness | 7.2 | |
| Calcium, Ca++ | .2 | 4.0 |
| Magnesium, Mg++ | 1.0 | 12.2 |
| Iron (Total) Fe+++ | | |
| Barium, Ba++ | | |
| Sodium, Na+ (calc.) | 21 | 483.0 |
| | | |
| **ANIONS** | | |
| Chloride, Cl- | 11.3 | 400.0 |
| Sulfate, SO4= | 4.4 | 212.5 |
| Carbonate, CO3= | | |
| Bicarbonate, HCO3- | 6.5 | 396.5 |
| Hydroxyl, OH- | | |
| Sulfide, S= | <1 | |

## DISSOLVED GASES

| | |
|---|---|
| Hydrogen Sulfide, $H_2S$ | _____ mg/l* |
| Carbon Dioxide, $CO_2$ | _____ mg/l* |
| Oxygen, $O_2$ | _____ mg/l* |

## PHYSICAL PROPERTIES

| | |
|---|---|
| pH | 7.8 |
| Eh (Redox Potential) | _____ MV |
| Specific Gravity | |
| Turbidity, JTU Units | |
| Total Dissolved Solids (calc.) | 1025 mg/l* |
| Stability Index @___F | |
| @___F | |
| $CaSO_4$ Solubility @___F | _____ mg/l* |
| @___F | _____ mg/l* |
| Max. $CaSO_4$ Possible (calc.) | _____ mg/l* |
| Max. $BaSO_4$ Possible (calc.) | _____ mg/l* |
| Residual Hydrocarbons | _____ ppm(Vol/Vol |

CONDUCTANCE 11,000 MMHOS

## SUSPENDED SOLIDS (QUALITATIVE)

Iron Sulfide ☐ Iron Oxide ☐ Calcium Carbonate ☐ Acid Insoluble ☐

*REMARKS AND RECOMMENDATIONS:*

change bad OK

received
4-30-84

*NOTE: me/l and mg/l are commonly used interchangeably for epm and ppm respectively. Where epm and ppm are used, corrections should be made for specific gravity.

| ENGINEER | DIST. NO. | ADDRESS | OFFICE PHONE | HOME PHONE |
|---|---|---|---|---|
| ANALYSIS (Rw ...) | DATE 4/11/84 | DISTRIBUTION ☐ CUSTOMER ☐ AREA OR DISTRICT OFFICE ☐ DIST. SALES SUPERVISOR ☐ DIST. LAB | | |

# P & S Brine Sales

PUMPER CHECKS WELL DAILY

| Sun | Mon | Tue. | Wed. | Thur. | Fri. | Sat. |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 ✓ | 4 ✓ | 5 ✓ | 6 ✓ | 7 |
| 8 | 9 ✓ | 10 ✓ | 11 ✓ | 12 ✓ | 13 ✓ | 14 |
| 15 | 16 ✓ | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | | | | | |

September, 1991

Form O & G B-1
Adopted 6-17-77
Revised 10-1-78

# STATE OF NEW MEXICO

## ONE-WELL PLUGGING BOND

FOR CHAVES, EDDY, LEA, McKINLEY, RIO ARRIBA, ROOSEVELT, SANDOVAL, AND SAN JUAN COUNTIES ONLY

BOND NO. B01942
(For Use of Surety Company)

AMOUNT OF BOND $5,000.00

COUNTY Lea

NOTE: For wells less than 5,000 feet deep, the minimum bond is $5,000.00*
For wells 5,000 feet to 10,000 feet deep, the minimum bond is $7,500.00*
For wells more than 10,000 feet deep, the minimum bond is $10,000.00

* Under certain conditions, a well being drilled under a $5,000.00 or $7,500.00 bond may be permitted to be drilled as much as 500 feet deeper than the normal maximum depth, i.e., a well being drilled under a $5,000.00 bond may be permitted to go to 5,499 feet, and a well being drilled under a $7,500.00 bond may be permitted to go to 10,500 feet (See Rule 101)

File with Oil Conservation Division, P.O.Box 2088, Santa Fe 87504

KNOW ALL MEN BY THESE PRESENTS:

That P & S BRINE SALES DBA PAUL PRATHER, (An individual) (a partnership) (a corporation organized in the State of New Mexico, with its principal office in the city of Eunice, State of New Mexico, and authorized to do business in the State of New Mexico), as PRINCIPAL, and UNDERWRITERS INDEMNITY COMPANY, a corporation organized and existing under the laws of the State of Texas, and authorized to do business in the State of New Mexico, as SURETY, are held firmly bound unto the State of New Mexico, for the use and benefit of the Oil Conservation Division of New Mexico pursuant to Section 65-3-11, New Mexico Statutes Annotated, 1953 Compilation, as amended, in the sum of FIVE THOUSAND AND NO/100---------- Dollars lawful money of the United States, for the payment of which, well and truly to be made, said PRINCIPAL and SURETY hereby bind themselves, their successors and assigns, jointly and severally, firmly by these presents.

The conditions of this obligation are such that:

WHEREAS, The above principal has heretofore or may hereafter enter into oil and gas leases, or carbon dioxide ($CO_2$) gas leases, or helium gas leases with the State of New Mexico; and

WHEREAS, The above principal has heretofore or may hereafter enter into oil and gas leases, or carbon dioxide ($CO_2$) gas leases, or helium gas leases on lands patented by the United States of America to private individuals, and on lands otherwise owned by private individuals; and

WHEREAS, The above principal, individually, or in association with one or more other parties, has commenced or may commence the drilling of one well not to exceed a depth of 1269' feet, to prospect for and produce oil or gas, or carbon dioxide ($CO_2$) gas or helium gas, or does own or may acquire, own or operate such well, or such well started by others on land embraced in said State oil and gas leases, or carbon dioxide ($CO_2$) leases, or helium gas leases, and on land patented by the United States of America to private individuals, and on land otherwise owned by private individuals, the identification and location of said well being Arnott Ramesy State #4-P SE¼
(Here state exact legal subdivision by 40-acre tract or lot)
Section 16, Township 25S (North) (South), Range 37E (East) (West), N.M.P.M. Lea County, New Mexico.

NOW, THEREFORE, If the above bounden principal and surety or either of them or their successors or assigns, or any of them, shall plug said well when dry or when abandoned in accordance with the rules, regulations, and orders of the Oil Conservation Division of New Mexico in such way as to confine the oil, gas, and water in the strata in which they are found, and to prevent them from escaping into other strata;

THEN, THEREFORE, This obligation shall be null and void; otherwise and in default of complete compliance with any and all of said obligations, the same shall remain in full force and effect.

P & S BRINE SALES DBA PAUL PRATHER
PRINCIPAL

P.O. Box 769
Eunice, NM 88231
Address

By Paul D. Prather
Signature

Title

(Note: Principal, if corporation, affix corporate seal here.)

UNDERWRITERS INDEMNITY COMPANY
SURETY

8 Greenway Plaza, Suite 1450
Houston, TX 77046
Address

By R. C. Die
Roy C. Die Attorney-in-fact

(Note: Corporate surety affix corporate seal here.)

ACKNOWLEDGEMENT FORM FOR NATURAL PERSONS

STATE OF New Mexico )
COUNTY OF Lea ) ss.

On this 6th day of October, 19 89, before me personally appeared Paul D. Prather, to me known to be the person (persons) described in and who executed the foregoing instrument and acknowledged that he (they) executed the same as his (their) free act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and seal on the day and year in this certificate first above written.

Rhonda Danford
Notary Public

June 17, 1993
My Commission expires

ACKNOWLEDGEMENT FORM FOR CORPORATION

STATE OF _____ )
COUNTY OF _____ ) ss.

On this 6th day of October, 19 89, before me personally appeared _____, to me personally known who, being by me duly sworn, did say that he is _____ of _____ and that the foregoing instrument was signed and sealed on behalf of said corporation by authority of its board of directors, and acknowledged said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and seal on the day and year in this certificate first above written.

Notary Public

My Commission expires

ACKNOWLEDGEMENT FORM FOR CORPORATE SURETY

STATE OF Texas )
COUNTY OF Harris ) ss.

On this 6th day of October, 1989, before me appeared Roy C. Die, to me personally known, who, being by me duly sworn, did say that he is Attorney-in-Fact of Underwriters Indemnity Company and that the foregoing instrument was signed and sealed on behalf of said corporation by authority of its board of directors, and acknowledged said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and seal on the day and year in this certificate first above written.

Doris Williams Shirley
Notary Public

Ju[illegible] 1993
My Co[illegible]
(Note: Corp[illegible] r of attorney.)

STATE OF TEXAS NOTARY PUBLIC SURETY BOND JUNE 6 1993

APPROVED BY:

OIL CONSERVATION DIVISION OF NEW MEXICO

By _____

Date _____

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

August 14, 1991

**CERTIFIED MAIL**
**RETURN RECEIPT NO. P-756-666-149**

Mr. Paul Prather
P & S Brine Sales, Inc.
P. O. Box 1769
Eunice, New Mexico 88231

**RE: Discharge Plan BW-7 (formerly DP-324)**
**Transfer of ownership from Permian Brine Sales, Inc. to P & S Brine Sales, Inc.**

Dear Mr. Prather:

The Oil Conservation Division (OCD) has been informed that P & S Brine, Inc. has purchased the Permian Brine Sales Jal Station located in Section 16, Township 25 South, Range 37 East, NMPM, Lea County, New Mexico. Pursuant to the Water Quality Control Commission (WQCC) Regulation 3-111, prior to the transfer of a facility with an approved discharge plan, the transferor (Permian Brine Sales) shall notify the transferee (P & S Brine) in writing of the existence of the discharge plan, and provide to the director a copy of the notification and proof that it has been received by the transferee. Upon assuming either ownership or possession of the facility, the transferee shall have the same rights and responsibilities under the discharge plan as were applicable to the transferor.

The OCD has not received a written notification of transfer of the Permian Brine Sales Jal Station and associated discharge plan. However, if P & S Brine has indeed purchased the facility, then they have also inherited the discharge plan, whether they were notified or not. The existing discharge plan is expired and lacks several OCD requirements. If this facility continues to have potential or actual effluent or leachate discharges and you wish to continue operations (assuming P & S now owns the facility), then you are required to renew the discharge plan.

The ground water discharge plan, BW-7, for The Permian Brine Sales Jal Station was approved by the Director of the Environmental Improvement Division (EID) on May 21, 1986. This discharge plan was required and submitted pursuant to Water Quality Control Commission (WQCC) regulations and was approved for a period of five years. The approval expired on May 21, 1991. Authority to administer the brine program was transferred from the EID back to the Oil Conservation Division (OCD) in 1989 with staffing approved in 1990. Please note the new discharge plan number BW-7, formerly DP-324, which will be the permanent designation used in all future correspondence.

Since your discharge plan has expired, please submit your application for renewal of plan approval within sixty (60) days of receipt of this letter. Please indicate whether you have made, or intend to make, any changes in your discharge system, and if so, please include these modifications in your application for renewal. To assist you in preparation of your renewal application, I have enclosed an application form and a copy of the OCD's Guidelines for the Preparation of Ground Water Discharge Plans at Brine Extraction Facilities, revised May 1991, and a copy of the Water Quality Control Commission Regulations.

The OCD visited your operation on February 6, 1991, as part of an extensive multi-facility inspection trip that week. Because of scheduling problems, and the numerous facilities visited, we were unable to notify you of the date and time of arrival in advance. Although not required, our agency generally notifies operators in advance giving time of arrival; in this instance it was not possible to do so.

The following comments are based on observations during the OCD site visit on February 6, 1991, and on additional requirements detailed in the guidelines. Please address these comments in your discharge plan renewal application.

1. <u>Transfer of Commitment</u>

   Notwithstanding the transfer of jurisdiction of brine wells to OCD, all prior commitments to EID concerning reporting and notification remain in effect. Note that all unauthorized discharges (ie. major leaks and spills), need to be reported to the OCD within 48 hours of the event (WQCC Rule 5-208). Commit to report all unauthorized discharges to the OCD within 48 hours.

2. Mechanical Integrity Testing

Pursuant to revised OCD guidelines for discharge plans at brine facilities, all wells must be pressure tested (open-hole) to 500 psi for 4 hours on an annual basis. A pressure test isolating the casing from the formation using either a bridge plug or a packer must be conducted at least once every 5 years or during well workovers.

The results from a current pressure test will be required prior to the approval of any brine facility discharge plan application or renewal. If the immediate test is performed using the open-hole method than a pressure test isolating the casing from the formation is required within the next 1 1/2 years. An OCD representative must be on site to witness all pressure tests and we request 10 days before the test to allow us to make arrangements.

Permian Brine Sales previously committed to annual pressure tests on their brine well. The last pressure test (open-hole) that the OCD has on file for the Arnott Ramsey State No. 4 Well was performed on February 25, 1988. Submit a proposal for testing and ensuring the mechanical integrity of the well. Also, submit information on any buried brine pipelines including age and material of the lines.

3. Volumes of Injection Fluids and Brine

The OCD requires a quarterly report listing, by month, of the volume of fluids injected and produced for comparison to detect underground losses. The OCD has no quarterly volume reports on file for either Permian Brine Sales Jal Station nor P & S Brine Sales. Submit a proposal and schedule for reporting injection fluid and brine production volumes. Also, submit the date of first brine production and the total volume of brine produced to date. This information is necessary to evaluate subsidence potential for your brine station.

4. Brine Storage Pond

The OCD is concerned over the potential for leaks in your single-lined brine storage pond. A letter from Permian Brine Sales to the EID dated August 20, 1984 states that the liner rests on a caliche substrate. Is there any type of protective substance between the caliche and the liner which would prevent the caliche from puncturing a hole in the liner? The OCD is also concerned about the ability of a leak to be detected by the leak detection system. Provide evidence that a leak in your pond would migrate to the leak detection lateral/sump and not travel directly down to groundwater.

If a leak is detected in the future, the pond will be drained to below the level of the leak, the OCD will be notified, and the ability of the pond to be adequately repaired will be evaluated by the OCD. If replacement of the liner is needed, a double liner shall be installed. To adequately detect leaks at present, the OCD requires that the monitor well (sump) be checked bimonthly. Record the date of inspection, results, and inspectors initials in a log. A copy of log entries will be submitted annually to the OCD, at the same time the annual pressure test results are submitted.

The freeboard of your pond in the southeast corner was less than one foot. Because various weather conditions could cause brine to spill over the top of the pond, the OCD requires that you keep a minimum of one and one-half (1-1/2) foot of freeboard in your pond.

Submit the appropriate information and commitments addressing the issues above.

5. **Freshwater Analysis**

The OCD requires a current analysis of your freshwater supply well and produced brine. The last analysis of the freshwater well that the OCD has on file is dated July 25, 1984. Analysis will be for concentrations of major cations/anions and Total Dissolved Solids (see OCD Guidelines for Brine Facilities section VII.C.4.). Include the location and method of sampling. Submit a plan and schedule for analyses of your injection and production fluids.

6. **Maximum Injection Pressure.**

Pursuant to WQCC Regulations Section 5-206, the maximum injection pressure at the wellhead shall not initiate new fractures or propagate existing fractures in the continuing zone. Submit information detailing your average operating pressure, a proposed maximum injection pressure, a measured and/or calculated fracture pressure for the zones being injected into, and a plan to ensure the fracture value will not be exceeded.

7. **Operating Procedures**

During the inspection of your facility on February 6, 1991, the OCD staff observed that your well was valved to inject freshwater down the tubing and produce brine out of the annulus. The OCD requires that all one-well brine extraction operations inject freshwater down the annulus and recover brine up the tubing. Reverse flow will be allowed for up to

once a month for 24 hours for clean-out. If an alternative operating method is desired then a written request must be submitted to the OCD which describes the proposed operating procedures and how the mechanical integrity of the casing will be guaranteed. Submit a plan detailing your operating procedures.

8. Spill Collection/Containment System

The OCD requires additional information concerning your spill collection system presently in use. In a letter dated from Permian Brine Sales dated February 24, 1986, they submitted two drawing detailing their proposed spill containment and collection system (copies enclosed). The OCD has no records on file that these plans were completed as designed. Submit materials detailing the spill containment and collection system currently in operation. Include drawing and diagrams and elaborate on the materials and sizes of the various components of the system. Note that the OCD requires that all new underground tanks (ie.sumps) have positive leak detection. All existing sumps must be cleaned out and visually inspected on an annual basis.

9. Brine Loading Area

The loading area showed evidence of brine discharges to the ground surface specifically around the truck loading valves. Past inspections by both the OCD and EID staff indicate repeated spillage of brine in the loading area. This area must be cleaned-up and have containment to keep spilled brine off of the ground surface. Submit a proposal to contain spills at your brine loading area. Provide an explanation and diagrams detailing how spilled brine is to be contained; include paving and curbing where appropriate and indicate where the spilled brine drains to.

10. Plugging Bond

Your commitment for plugging and abandonment is adequate; however, your $5000 single-well plugging bond is on the old OCD bond form which does not include brine wells. You must either have your plugging bond transferred onto the new form, or obtain a new single well plugging bond. Enclosed is the correct bond form.

Addressing the above items in your application for renewal of your discharge plan will accelerate the review and response time of your application. Note that the completed and signed application form must be submitted with your discharge plan renewal request.

If you no longer have any actual or potential discharges a discharge plan renewal is not needed, please notify this office. If you have any questions, please do not hesitate to contact Kathy Brown at (505) 827-5824.

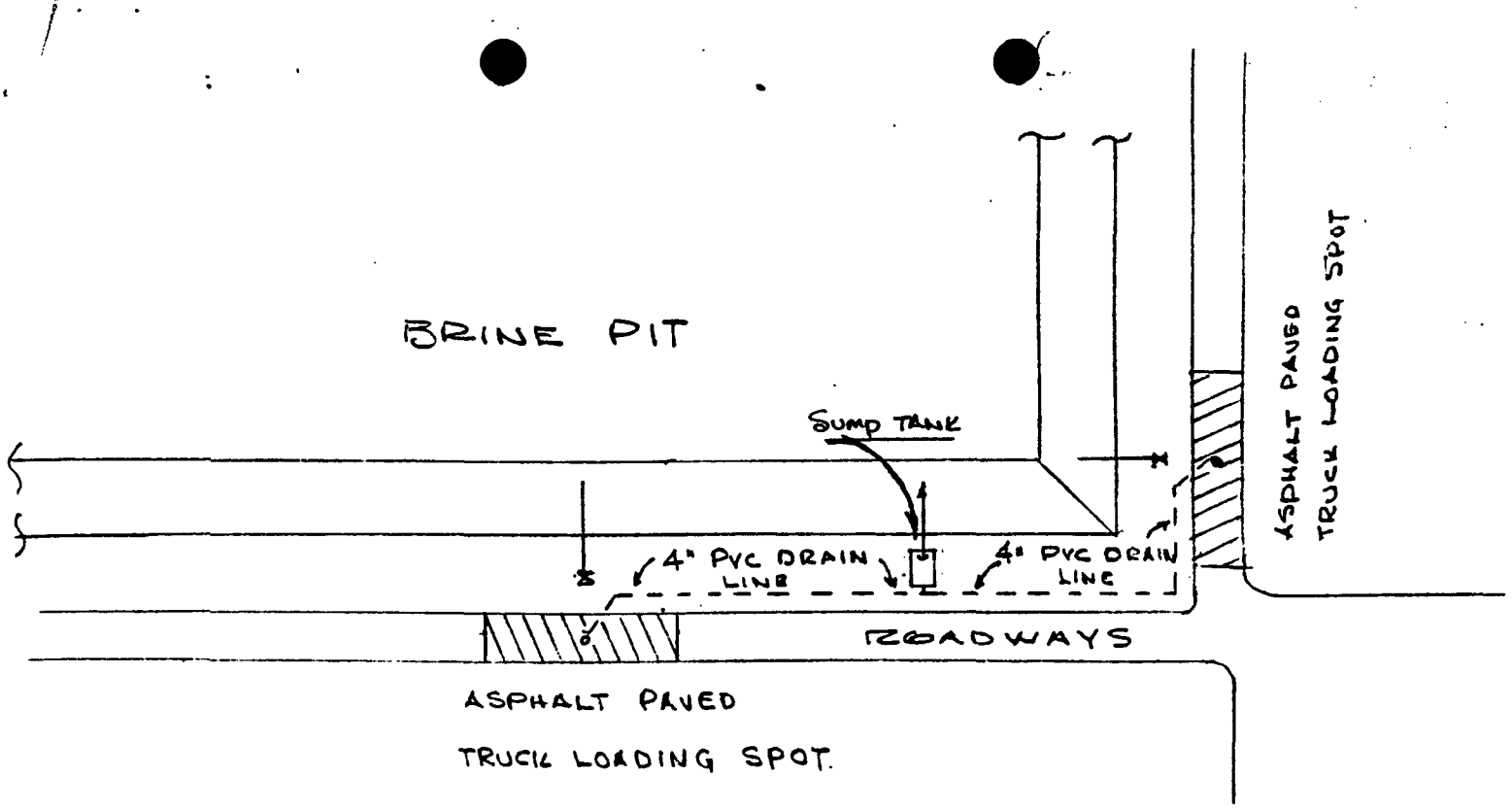
Sincerely,

David G. Boyer, Hydrogeologist
Environmental Bureau Chief

DGB/KMB

Enclosures

xc: OCD Hobbs Office

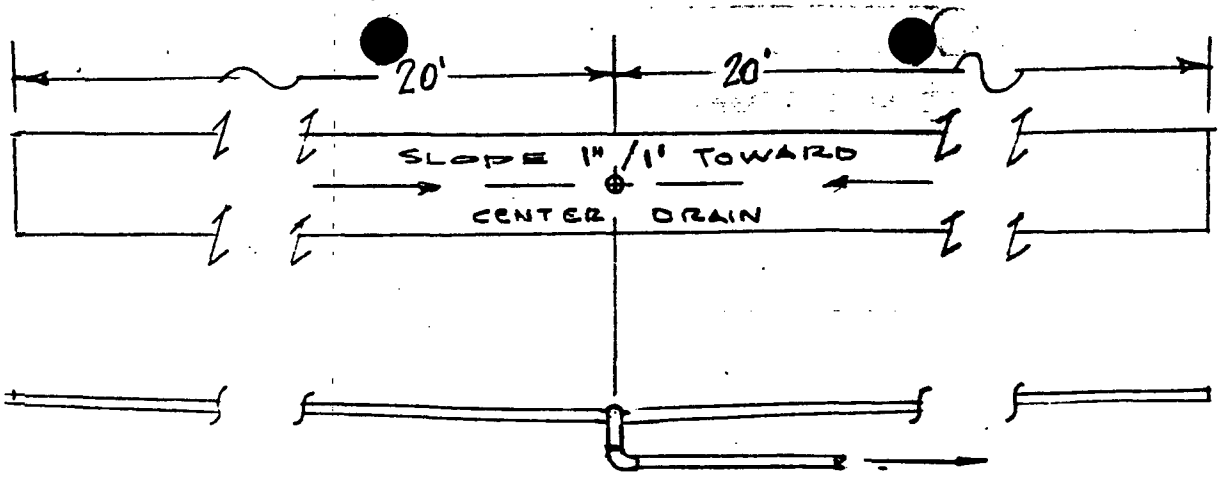


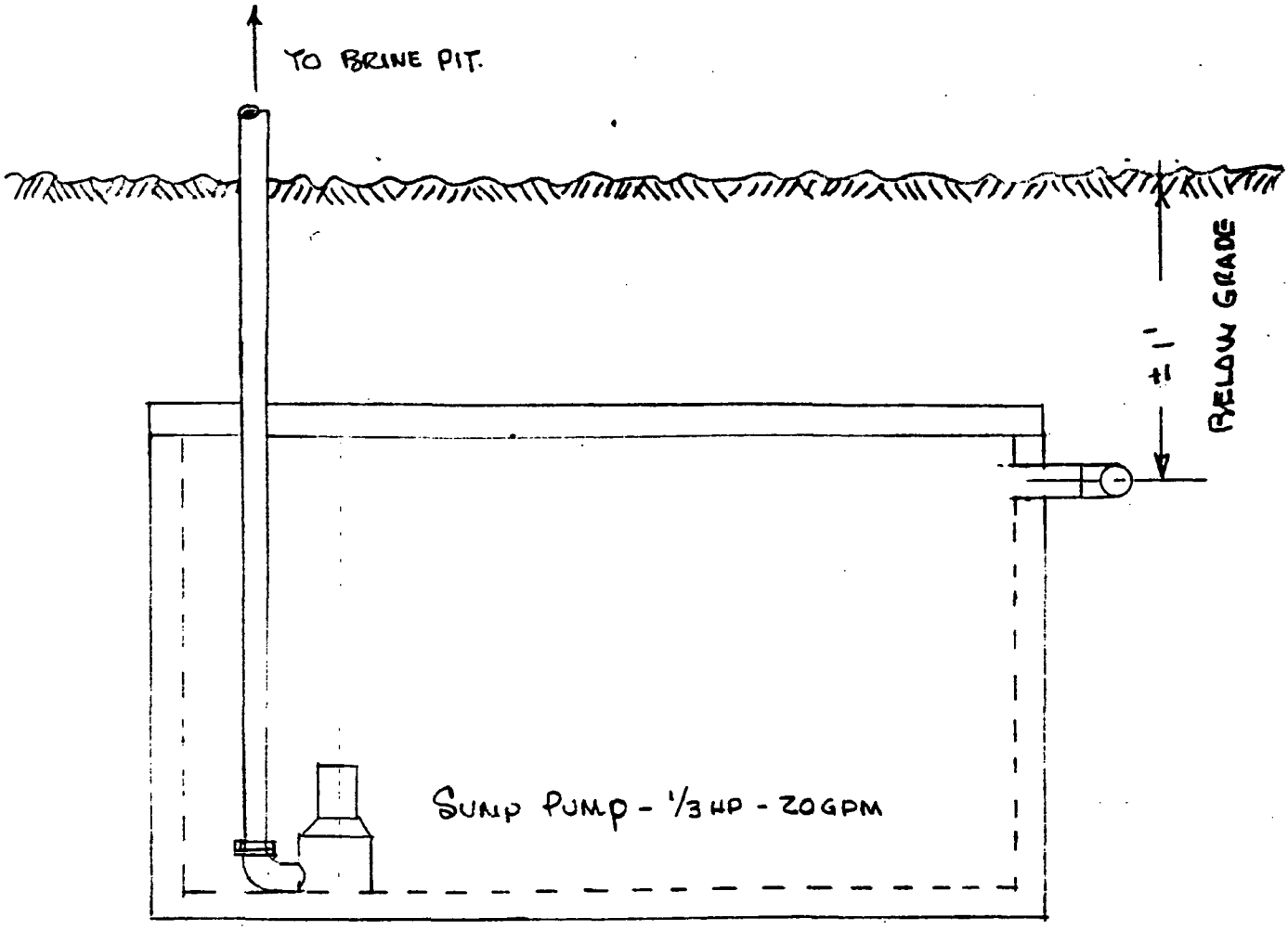

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

PROPOSED TRUCK LOADING & BRINE SPILL RECOVERY FACILITIES

JAL BRINE STATION

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 2-21-86 | R.C. McCUTCHAN Tex. P.E. 9844 | 4 |




4' x 7'-8" x 5'-3" DEEP
PRECAST REENFORCED
CONCRETE SUMP TANK

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

# TYPICAL BRINE LOADING SPOT WITH SPILL DRAIN & SUMP TANK DETAILS JAL BRINE STATION

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 2-21-86 | R.C. McCutchan TEX. P.E. 9844 | 5 |

OIL CONSERVATION DIVISION
RECEIVED
91 AUG 16 AM 9 05

**PERMIAN BRINE SALES, INC.**

24-HOUR SERVICE/TEXAS - OKLAHOMA BRINE - FRESHWATER - DISPOSAL

6067 W. TENTH ST. • ODESSA, TEXAS 79763
(915) 381-0531 (915) 563-4730 FAX (915) 381-9316

August 12, 1991

Mr. David G. Boyer, Hydrogeologist
Environmental Bureau Chief
State of New Mexico
Energy, Minerals and Natural Resources Dept
PO Box 2088
State Land Office Building
Santa Fe, New Mexico 87504

Dear Mr. Boyer:

We sold our Jal Brine Station on September 1, 1989 to Mr. Paul Prather of P & S Brine Sales, PO Drawer 1769, Eunice, New Mexico.

Please direct all further correspondance to them.

If you have any questions, please call me at 915-381-0531.

Sincerely,

PERMIAN BRINE SALES, INC.

R.D. Hickerson
President

RDH/rdw

Enclosure

STATE OF NEW MEXICO

OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

[X] Telephone [ ] Personal | Time | Date 8-13-91

Originating Party: Eddie Seay

Other Parties:

Subject: Permian Brine Sales - Tal Station Change in Ownership

Discussion: No longer owned by Russell D. Hickerson. Now owned by Paul Prather who also owns P&S Brine.

Mr. Paul Prather
P&S Brine Sales Inc. ⇒
P.O. Box 17609
Eunice, NM 88231
505-394-2545.

Need to get Permian Brine Sales DP renewal letter sent to Mr. Prather. Sent to Hickerson on 8-6-91

Conclusions or Agreements

Will send him the renewal letter.
Spoke with secretary on 8-13-91 and told her to inform him letter will be sent.

Distribution

Signed Kathy Brown

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

August 6, 1991

**CERTIFIED MAIL**
**RETURN RECEIPT NO. P-756-666-897**

Mr. Russell D. Hickerson
Permian Brine Sales, Inc.
Route 3, Box 3033
Odessa, Texas 79763

**RE: Discharge Plan BW-7 (formerly DP-324)**
**Permian Brine Sales, Jal Station**

Dear Mr. Hickerson:

On May 21, 1986, the ground water discharge plan, BW-7, for the Permian Brine Sales Jal Station located in Section 16, Township 25 South, Range 37 East, NMPM, Lea County, New Mexico, was approved by the Director of the Environmental Improvement Division (EID). This discharge plan was required and submitted pursuant to Water Quality Control Commission (WQCC) regulations and was approved for a period of five years. The approval expired on May 21, 1991. Authority to administer the brine program was transferred from the EID back to the Oil Conservation Division (OCD) in 1989 with staffing approved in 1990. Please note the new discharge plan number BW-7, formerly DP-324, which will be the permanent designation used in all future correspondence.

If your facility continues to have potential or actual effluent or leachate discharges and you wish to continue operations, you must renew your discharge plan. Since your discharge plan has expired, please submit your application for renewal of plan approval within sixty (60) days of receipt of this letter. Please indicate whether you have made, or intend to make, any changes in your discharge system, and if so, please include these modifications in your application for renewal. To assist you in preparation of your renewal application, I have enclosed an application form and a copy of the OCD's Guidelines for the Preparation of Ground Water Discharge Plans at Brine Extraction Facilities, revised May 1991, and a copy of the Water Quality Control Commission Regulations.

The OCD visited your operation on February 6, 1991, as part of an extensive multi-facility inspection trip that week. Because of scheduling problems, and the numerous facilities visited, we were unable to notify you of the date and time of arrival in advance. Although not required, our agency generally notifies operators in advance giving time of arrival; in this instance it was not possible to do so.

The following comments are based on observations during the OCD site visit on February 6, 1991, and on additional requirements detailed in the guidelines. Please address these comments in your discharge plan renewal application.

1. **Transfer of Commitment**

Notwithstanding the transfer of jurisdiction of brine wells to OCD, all prior commitments to EID concerning reporting and notification remain in effect. Note that all unauthorized discharges (ie. major leaks and spills), need to be reported to the OCD within 48 hours of the event (WQCC Rule 5-208). Commit to report all unauthorized discharges to the OCD within 48 hours.

2. **Mechanical Integrity Testing**

Pursuant to revised OCD guidelines for discharge plans at brine facilities, all wells must be pressure tested (open-hole) to 500 psi for 4 hours on an annual basis. A pressure test isolating the casing from the formation using either a bridge plug or a packer must be conducted at least once every 5 years or during well workovers.

The results from a current pressure test will be required prior to the approval of any brine facility discharge plan application or renewal. If the immediate test is performed using the open-hole method than a pressure test isolating the casing from the formation is required within the next 1 1/2 years. An OCD representative must be on site to witness all pressure tests and we request 10 days before the test to allow us to make arrangements.

Permian Brine Sales previously committed to annual pressure tests on their brine well. The last pressure test (open-hole) that the OCD has on file for Permian's Arnott Ramsey State No. 4 Well was performed on February 25, 1988. Submit a proposal for testing and ensuring the mechanical integrity of the well. Also, submit information on any buried brine pipelines including age and material of the lines.

3. Volumes of Injection Fluids and Brine

The OCD requires a quarterly report listing, by month, of the volume of fluids injected and produced for comparison to detect underground losses. The OCD has no quarterly volume reports on file for Permian Brine Sales Jal Station. Submit a proposal and schedule for reporting injection fluid and brine production volumes. Also, submit the date of first brine production and the total volume of brine produced to date. This information is necessary to evaluate subsidence potential at Permian Brine Sales Jal Station.

4. Brine Storage Pond

The OCD is concerned over the potential for leaks in your single-lined brine storage pond. In your letter to the EID dated August 20, 1984 you stated that your liner rests on a caliche substrate. Is there any type of protective substance between the caliche and the liner which would prevent the caliche from puncturing a hole in your liner? The OCD is also concerned about the ability of a leak to be detected by your leak detection system. Provide evidence that a leak in your pond would migrate to your leak detection lateral/sump and not travel directly down to groundwater.

If a leak is detected in the future, the pond will be drained to below the level of the leak, the OCD will be notified, and the ability of the pond to be adequately repaired will be evaluated by the OCD. If replacement of the liner is needed, a double liner shall be installed. To adequately detect leaks at present, the OCD requires that the monitor well (sump) be checked bimonthly. Record the date of inspection, results, and inspectors initials in a log. A copy of log entries will be submitted annually to the OCD, at the same time the annual pressure test results are submitted.

The freeboard of your pond in the southeast corner was less than one foot. Because various weather conditions could cause brine to spill over the top of the pond, the OCD requires that you keep a minimum of one and one-half (1-1/2) foot of freeboard in your pond.

Submit the appropriate information and commitments addressing the issues above.

5. **Freshwater Analysis**

The OCD requires a current analysis of your freshwater supply well and produced brine. The last analysis of your freshwater well that the OCD has on file is dated July 25, 1984. Analysis will be for concentrations of major cations/anions and Total Dissolved Solids (see OCD Guidelines for Brine Facilities section VII.C.4.). Include the location and method of sampling Submit a plan and schedule for analyses of your injection and production fluids.

6. **Maximum Injection Pressure.**

Pursuant to WQCC Regulations Section 5-206, the maximum injection pressure at the wellhead shall not initiate new fractures or propagate existing fractures in the continuing zone. Submit a proposed maximum injection pressure, a measured and/or calculated fracture pressure for the zones being injected into, and a plan to ensure the fracture value will not be exceeded.

7. **Operating Procedures**

During the inspection of your facility on February 6, 1991, the OCD staff observed that your well was valved to inject freshwater down the tubing and produce brine out of the annulus. The OCD requires that all one-well brine extraction operations inject freshwater down the annulus and recover brine up the tubing. Reverse flow will be allowed for up to once a month for 24 hours for clean-out. If an alternative operating method is desired then a written request must be submitted to the OCD which describes the proposed operating procedures and how the mechanical integrity of the casing will be guaranteed. Submit a plan detailing your operating procedures.

8. **Spill Collection/Containment System**

The OCD requires additional information concerning your spill collection system presently in use. In your letter dated February 24, 1986 you submitted two drawing detailing your proposed spill containment and collection system (copies enclosed). The OCD has no records on file that these plans were completed as designed. Submit materials detailing the spill containment and collection system currently in operation. Include drawing and diagrams and elaborate on the materials and sizes of the various components of the system. Note that the OCD requires that all new underground tanks

(ie.sumps) have positive leak detection. All existing sumps must be cleaned out and visually inspected on an annual basis.

9. **Brine Loading Area**

The loading area showed evidence of brine discharges to the ground surface specifically around the truck loading valves. Past inspections by both the OCD and EID staff indicate repeated spillage of brine in the loading area. This area must be cleaned-up and have containment to keep spilled brine off of the ground surface. Submit a proposal to contain spills at your brine loading area. Provide an explanation and diagrams detailing how spilled brine is to be contained; include paving and curbing where appropriate and indicate where the spilled brine drains to.

10. **Plugging Bond**

Your commitment for plugging and abandonment is adequate; however, your $5000 single-well plugging bond is on the old OCD bond form which does not include brine wells. You must either have your plugging bond transferred onto the new form, or obtain a new single well plugging bond. Enclosed is the correct bond form.

Addressing the above items in your application for renewal of your discharge plan will accelerate the review and response time of your application. Note that the completed and signed application form must be submitted with your discharge plan renewal request.

If you no longer have any actual or potential discharges a discharge plan renewal is not needed, please notify this office. If you have any questions, please do not hesitate to contact Kathy Brown at (505) 827-5824.

Sincerely,

David G. Boyer, Hydrogeologist
Environmental Bureau Chief

DGB/KMB

Enclosures

xc: OCD Hobbs Office

BW-7 (DP-324)

INVENTORY OF SOLUTION MINING WELLS -- OIL CONSERVATION DIVISION, 1991

## I. OPERATOR/LOCATION INFORMATION

Operator: Permian Brine Sales, Inc. Mr. A.L. Hickerson / Mr. Russell D. Hickerson (Pres.) / R.C. McCutchan

Address: Route 3, Box 3033

Odessa, Texas 79763 Phone: 332-0531

Facility Permian Brine Sales Jal Station

T. 25S R. 37E Sec. 16 SE 1/4 of SE 1/4 P

County: Lea (OCD Hobbs District) 2½ mi East of Jal on Highway 128

Purpose of well (brine supply, LPG storage, potash dissolution)

Brine Supply

## II. DRILLING/SITING INFORMATION

Contractor: Arnott Ramsey State No. 4

Date drilling started _____ Date ~~drilling~~ completed March 1981

Drilling method Rotary (120'-1591') Cable (0'-120')

Ground Surface Elevation 3104' KB Elevation _____

Total depth of hole 1591'

Attach schematic of well, include open hole interval, perforations, etc.

Type of drilling fluid _____

Describe all casing tests performed to date 5½" tested March 1981 to 500psi. for 30 min.

July 6, 1983 - 218psi for 1hr 10min., 1.3% fall-off (open-hole).

11-28-84: 325 psi for 2 hours; 1.5% fall off (open-hole).

8-26-86: 218 psi for 2 hours (open hole)

1-28-87: 185 psi for 2 hours (open-hole)

5-21-87: 175 psi for 2 hours (open-hole)

2-25-88: 200psi for 2¼ hours (open hole)

CASING, TUBING AND CEMENTING RECORD

| From | To | Size of Hole | Size of Casing | Weight per Foot | Sacks of Cement | Estimated Top of cmt. |
|---|---|---|---|---|---|---|
| 0' | 1258' | 7 7/8" | 5 1/2" | 17#/ft J-55 | 400 sx Class H w/ 2% CaCl2 (Cement 60' to surface from 1" pipe @ surface) | 60' |
| 0' | 1582' | 4 3/4" | 2 7/8" | | | |

Open Hole from 1258 - 1591'

Is site within ~~1/2~~ 1/4 mile of another well? Is so, explain. Yes; 2 P&A brine wells (Permian - Arnott Ramsey, No. 2 & 3); 2 producing oil wells (Gulf Arnott Ramsey, No. 7 & Mobil Federal No. 2x); 3 resident water wells south of Hwy 128 in NE/4 Sec. 21. Within 1/2 mile also have Burleson-Huff Arco No. 24 & 2 other oil wells.

Type of well-head equipment _____

Comments (include problems encountered while drilling, loss of circulation, deviation of hole from vertical, centralizers, used, tools lost or stuck, fracturing techniques used, etc.)

Completed in 1981 (march). 515' FSL, 100' FEL in Section 16, T25S, R37E.

Bond # 610 057411 2 ⇒ U.S. Fire Insurance Co.

Old form

## III. FORMATION INFORMATION

Formation Record

| From | To | Thickness | Formation (name, description) |
|---|---|---|---|
| 0' | 10' | 10' | Caliche |
| 10' | 60' | 50' | Sand |
| 60' | 1035' | 975' | Red Beds |
| 1035' | 1155' | 120' | Rustler Anhydrite |
| 1155' | 1591' | 436' | Salt with Shale & Anhydrite Stringers |

Logs (specify type) _____

_____

_____

Identify where logs are on file _____

_____

_____

## IV. AQUIFER INFORMATION

Aquifers in Immediate Area

| From | To | Aquifer Description | Amount of Water entering hole | Quality of Water |
|---|---|---|---|---|
| ±50' | —— | Quaternary sands & gravels; Ogallala eroded away @ site (via Hickerson) | | |
| 250' | —— | TR Chinle/Santa Rosa - Red beds, shales (fresh water supply well) | | ~~[illegible] ppm TDS~~ 1000-1200 ppm TDS |

EID Public Notice - Groundwater @ 400' with TDS 1025 mg/l and maybe small pockets of groundwater as shallow as 50' with higher & lower TDS.

Quaternary (Pleistocene & Recent) Alluvial 15'-30' deposits in low areas stripped of Ogallala - interm. & recent dune sands covering it all
Tertiary (Miocene) - Ogallala Fm. Calcareous, unconsolidated sand w/ clay, silt & gravel
Upper Tr ⇒ Chinle & Santa Rosa (400'+) Red beds, highly mineralized

Note: If water quality analysis are available please attach.*

Source of aquifer description FW-Supply Well? Monitor Well - 4/24/84 TDS 1025 ppm, Cl 400 ppm; 8/2/84 TDS 1184 ppm Cl 312 ppm

Source of water level and quality data Monitor Well drilled 1967 (TD 500')

Depth water first encountered during drilling ~400', SWL ~250' prob. Santa Rosa Chinle

Direction of water gradient North

Explain any evidence of water contamination 8/23/84 - Complaint to EID by Cramer, Dakar (neighbor) to south of Highway stating well went bad about 1980; tested in 1982 - TDS 141,312 ppm; Cl 88000 ppm. Other neighbors (Bowington-Mosely) well also went bad. SWL = 50'.

EID Testing 11-84: Mosely Well TDS - 3594 ppm Cl - 1190 ppm
Cramer Well TDS - 74,714 ppm Cl - 43,762 ppm

State Engineer (3-4-86) feels contamination is from N-NW from an abandoned brine disposal pit used prior to 1965

## V. PRODUCTION/BRINE STORAGE INFORMATION

Method of production (describe fully) Freshwater goes to 1000 bbl storage tank & then to brine well via a 10 hp submersible pump (in tank) through 400' of 2 3/8" (OD) fiberglass pipe (rated @ 450 psi) down well bore, back up, through 300' of 2 3/8" (OD) PVC pipe (sch. 40 line), to brine pit (6000 bbl capacity) lined with 30 mil dupont hypalon. Injection pressure 218 #; avg. 175 #-180 #

Was well used previously for some purpose other than brine supply _____

If so, explain _____

Use of brine Drilling fluids - TDS 292,860 ppm

Source of injection water (be specific) Freshwater well at facility, 460' TD TDS 900 ppm. 5 hp 45 GPM submersible pump @ 418'. Static water level = 250'. Santa Rosa or Chinle (R)

Date of first production 1981

Volume of brine produced to date _____

Weight of salt removed to date _____

Calculated size and shape of cavity to date _____

Explain any evidence of subsidence and any subsidence monitoring _____

Brine storage facilities (describe) Brine is stored in a 120'x120'x6' storage pit (6000 bbl capacity) lined with 30 mil dupont hypalon.

Explain how brine storage pit is being monitored for leakage Leak detection sump connected to 3 PVC perforated pipes on a gravel surface.

Explain brine loading procedures _____

Explain fresh water loading procedures Sold on site for industrial purposes. Loaded to ~~tanks~~ trucks through valve on 1000-bbl freshwater storage tank.

## VI. ABANDONMENT/PLUGGING RECORDS

Date well abandoned/plugged N/A

Reason for well abandonment or plugging N/A

Method of plugging or proposed plugging (describe fully, include amounts of cement, etc. top, plug type, depth, etc.) Set cast iron bridge plug at top of casing shoe and filling cased hole with Class C cement slurry & welding a steel plate over the open end of the casing

List all conduits in the area of review. Include completion and plugging records.

PBS- Permian Brine Sales

## VII. CHRONOLOGY OF EVENTS

9-9-82: OCD requires Discharge Plan

11-8-82: PBS submits Discharge Plan.

12-18-82: OCD approves PBS ~~DP~~ GWB-6 Discharge plan.

7-7-83
Commit to perform annual pr. test and notify w/in 48 hours any loss of injection pressure + loss of brine return.

4-17-84: EID requires DP including WQCC Part IV requirements

5-7-84: PBS submits DP

7-9-84: EID responds to DP submittal & requests add'l info.

8-20-84: PBS submits responses to EID's questions

8-29-84: EID notification to PBS of shallow water contamination

8-31-84: EID's response to PBS's (8-20-84) answers to questions

10-31-84: PBS responds to EID's letter 8-31-84.

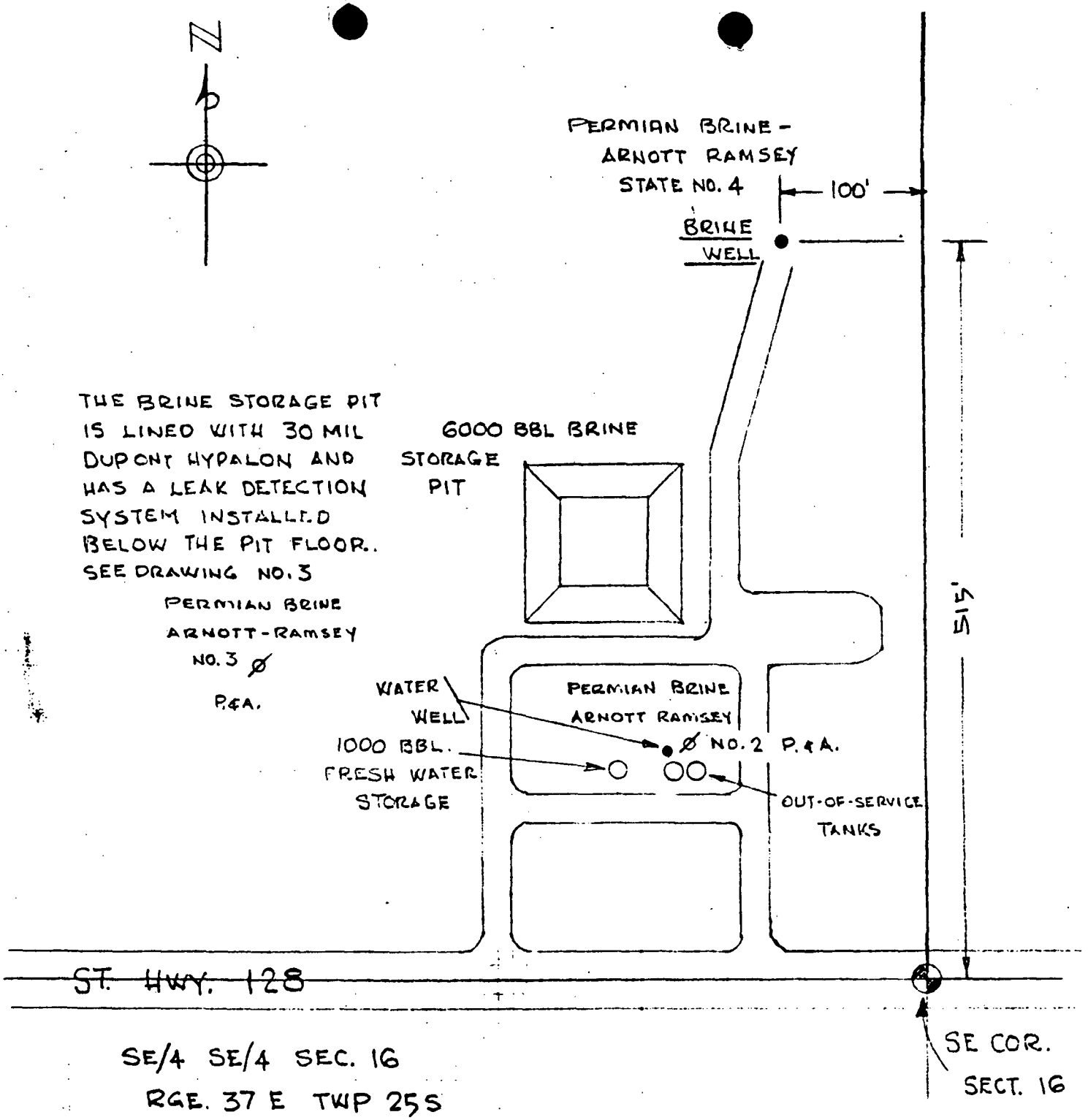
11-6-84: PBS responds to EID's letter 8-29-84

1-2-85: EID responds to PBS 2 letters & various correspondence * during 1985 concerning contamination of 2 water wells to South.

2-24-86: PBS commits to 1/4 ~~ly~~ edly pressure tests & submits spill collection plans.

5-21-86: EID approves DP-324; Expires 5-21-91

8-14-87: EID approves yearly pressure tests




SE/4 SE/4 SEC. 16
RGE. 37 E TWP 25S
LEA CO. NEW MEXICO

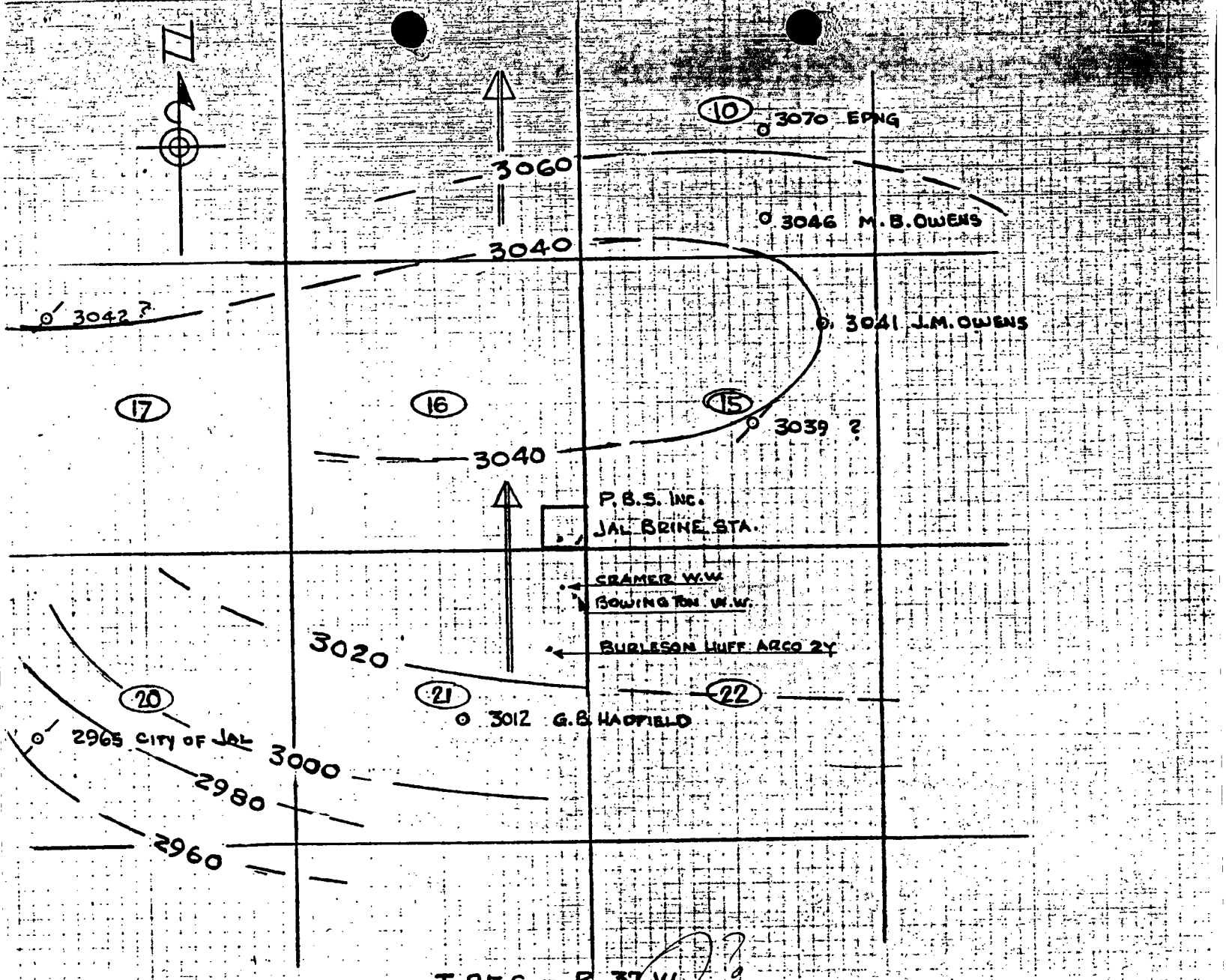
SCALE 1" = 100'

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

LAYOUT OF OPERATING FACILITIES

SAL BRINE STATION

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 4-18-84 | R.C. McCUTCHAN TEX. P.E. 9844 | 1 |




T 25 S - R 37 W

SCALE 1" = 2640'

**AQUIFERS**

o OGALLALA

o QUATERNARY

HYDRAULIC GRADIENT

? UNKNOWN OWNER

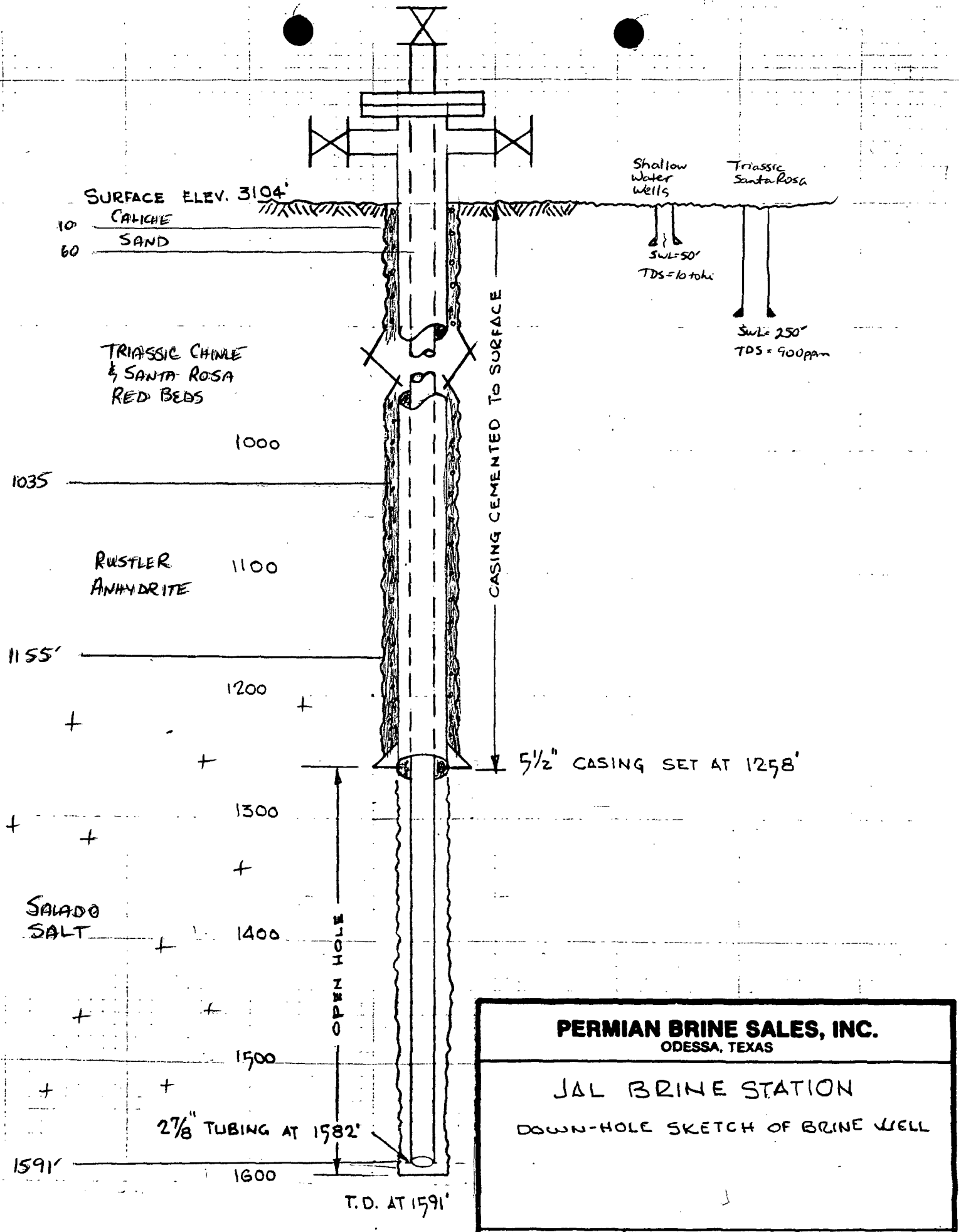
DATA FROM: TABLE 6 RECORDS OF WELLS IN SOUTHERN LEA CO., N. MEX. P. 85. "GEOLOGY AND GROUND-WATER CONDITIONS IN SOUTHERN LEA COUNTY, NEW MEXICO" NICHOLSON & CLEBSCH

RECEIVED
NOV 13 1984
GROUND WATER/HAZARDOUS WASTE BUREAU

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

# HYDRAULIC GRADIENT
## SOUTHERN LEA COUNTY
## NEW MEXICO

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 9-17-84 | R.C. MCCUTCHAN TEX P.E. 9844 | J-1 REV |




**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

# JAL BRINE STATION

DOWN-HOLE SKETCH OF BRINE WELL

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 4-18-84 | R.C. McCUTCHAN TEX. P.E. 9844 | 2 |

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

December 6, 1989

**CERTIFIED MAIL**
**RETURN RECEIPT REQUESTED**

Mr. Russell D. Hickerson
PERMIAN BRINE SALES-JAL
Route 3, Box 3033
Odessa, Texas 79763

***RE: Delegation of Responsibilities Brine Manufacturing Operations***

*Dear Mr. Hickerson:*

On June 13, 1989, the Water Quality Control Commission (WQCC) transferred the responsibility for the administration and enforcement of Commission regulations at brine manufacturing operations, including all brine production wells, holding ponds and tanks, from the Environmental Improvement Division (EID) to the Oil Conservation Division (OCD). The OCD has jurisdiction over all manufactured brine once it is transported, used or disposed of off brine plant premises for use in or directly related to oil and gas operations regulated by OCD. OCD regulates brine injection through its Class II Underground Injection Control (UIC) Program if the brine is used in the drilling for or production of oil and gas. EID shall regulate brine injection through its UIC Program if the brine is used for other purposes.

Brine production facilities that were transferred to OCD's jurisdiction must operate pursuant to an approved and current discharge plan. The discharge plan renewal process will be continued by OCD Environmental Bureau Staff. Approximately eight (8) months before the expiration date of an approved discharge plan, the discharger will be notified of the pending expiration of the plan. The discharge plan review process can, depending on circumstances, take several months. If the holder of an approved discharge plan submits a renewal application at least 180 days before discharge plan expiration, and the discharger is in compliance with his approved plan on the date of expiration, then the existing plan will not expire until the renewal application has been approved or disapproved.

Guidelines to aid you in determining what will be required for the renewal of your discharge plan are bring prepared. When the guidelines are finalized, they will be supplied to each operator of a brine production facility.

The OCD requires that any person, firm corporation or association that is in ownership of an oil, gas, or service well in the State of New Mexico shall furnish the Division with a surety bond in an amount prescribed in the OCD regulations. The current bond for well less than 5000 feet deep in Chaves, Eddy, Lea and Roosevelt Counties is $5000. I am enclosing the OCD bond forms for your use. All surety bonds previously submitted to the OCD did not include brine wells. Those surety bonds submitted to the EID must be changed to the OCD. Once the proper bond form are received and approved, all other sureties and bonds can be cancelled.

If you have any questions, please do not hesitate to contact me at (505) 827-5884.

Sincerely,

Roger C. Anderson
Environmental Engineer

RCA/sl

Enclosures

CC: Artesia District Office
Hobbs District Office

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 8, BOX 3033

ODESSA, TEXAS
79763

PHONE 332-0531



RECEIVED
DEC 27 1988
GROUND WATER BUREAU


December 20, 1988

Kevin Lambert - Hydrologist
Environmental Improvement Division
1190 St. Francis Drive
Santa Fe, NM 87503

RE: Your letter dated December 14, 1988

Dear Mr. Lambert:

Sorry we missed you during the station inspection. It seems as though telephone calls between you and our operator were missed all the way around.

Due to budget constraints, we cannot keep our stations as neat as we would like to, however, we will meet all permit requirements. The spill/drain system will be cleaned up.

The three tanks you mentioned are fresh water tanks and are in service at this time.

If you have any questions or I can be of assistance, please call me at 915-332-0531.

Sincerely,

PERMIAN BRINE SALES, INC.

R.D. Hickerson
President

RDH/rdt

PS. Please note our new mailing address:
Rt 8 Box 3033 Odessa, Tx 79763

NEW MEXICO
HEALTH AND ENVIRONMENT
DEPARTMENT

**ENVIRONMENTAL IMPROVEMENT DIVISION**
**Harold Runnels Bldg.-1190 St. Francis Drive**
**Santa Fe, New Mexico 87503**

Richard Mitzelfelt
Director

GARREY CARRUTHERS
*Governor*
CARLA L. MUTH
Secretary
MICHAEL J. BURKHART
Deputy Secretary

December 14, 1988

Russell D. Hickerson
Operations Manager
Permian Brine Sales
Rt. 3, Box 3033
Odessa, Texas 79763

Dear Mr. Hickerson:

The Underground Injection Control staff of the New Mexico Environmental Improvement Division Ground Water Section would like to thank you for your cooperation during our recent inspection of Permian Brine Sales brine facility. A copy of the inspection form is attached for your reference.

Deficiencies noted during the inspection are as follows:

1. Ponding of brine and produced waters noted. Facility should be free of ponded brine or produced waters, facility should be inspected frequently, and spillage cleaned up when detected.

2. Spill collection systems needs to be cleaned and upgraded. Collection tank not functional, spillage containment inadequate.

Thank you for your continued cooperation. Should you have any questions feel free to contact me (827-2902) or John Parker (827-0027).

Sincerely,

Kevin A Lambert

Kevin Lambert
Hydrologist
Ground Water Section - UIC Program

KL/mw

Enclosure

| No. of Samples | Ion |
|---|---|
| 1 | Na |
| 1 | K |
| 1 | Ca |
| 1 | Mg |
| 1 | Cl |
| 1 | HCO3 |
| 1 | CO3 |
| 1 | SO4 |
| 1 | TDS |
| //// | //// |
| | NO3+ NO2 |
| | NH3 |
| | kjeld N |
| //// | //// |
| | As |
| | Ba |
| | Cd |
| | CN |
| | Cr |
| | F |
| | Pb |
| | Hg |
| | Se |
| | Ag |
| | U |
| | V |
| | Ra 226 |
| | Ra 228 |
| //// | //// |
| | Cu |
| | Fe |
| | Mn |
| | Phenols |
| | Zn |
| //// | //// |
| | Al |
| | B |
| | Co |
| | Mo |
| | Ni |
| //// | //// |
| | pH |
| | Conduct. |
| | |
| | |
| | |
| | |
| | |
| | |

# FIELD TRIP REPORT
## GROUND WATER SECTION

SLD USER CODES

County Eddy/Lea

Ground Water: 59300

$NO_3$, HC & Toxics: 59600

UIC: 59500

FACILITY VISITED

Name of Facility: 20 Brine Facilities & Climax Chemical

Location: Carlsbad/Hobbs in Southeast NM

Discharge Plan Number: DP- See Below

Type of Operation: Brine Production / Chemical Manufacturing

ENVIRONMENTAL IMPROVEMENT DIVISION FIELD VISIT

EID Inspector(s): Lambert

Date of Inspection or Visit: 12/5-8/88

Discharger's Representative Present During EID Visit:

Name:

Title or Position:

Purpose of Visit:

a. Evaluation of Proposed Discharge Plan _____

b. Compliance Inspection of Discharge with Approved Plan _____

c. Other (specify) _____

Inspection Activities During Field Visit:

a. Inspection of Facilities or Construction (specify)

b. Sampling of Effluents (give sampling locations)

c. Sampling of Ground Water (give names or locations of wells)
Sampled M.W. at Marathon

d. Evaluation of geology, soils, water levels or other physical characteristics of the location (specify)

e. Other (specify)

Observations and Information Obtained during the Visit:
The 20 Brine Facilities & Climax are listed below by DP#. See Individual File for specifics

ACTION REQUIRED

| # | # | # | # | # |
|---|---|---|---|---|
| | 323 | 354 | 370 | 298 |
| 318 | 324 | 355 | 371 | 426 |
| 319 | 325 | 360 | 372 | |
| 320 | 326 | 361 | 394 | |
| 321 | 351 | 369 | 401 | |
| 322 | | | | |

# BRINE STATION INSPECTION FORM

DATE 12/7 1988 1530 EID INSPECTOR Lambert
FACILITY Permian Brine Sales LOCATION Jal
FACILITY REP ON SITE _____ COUNTY Lea

WELL OPERATION 1 well valved for reversal to control salt buildup

WELL IS INJECTING: ✓ THROUGH ANNULUS __ THROUGH TUBING
SOURCE OF FRESH WATER _____
TRACE INJECTION/PRODUCTION LINES Underground

WELL HEAD PRESSURE _____ PSIG PUMP PRESSURE _____ PSIG
LEAKS AROUND WELL OR PUMP None Looks OK

STORAGE AREA

FOR PONDS: 1 pond brine storage
GENERAL LINER APPEARANCE Hypalon Lined OK

AMOUNT OF FREEBOARD ± 2 foot
ANY SIGN OF OVERFLOW OR LEAKS yes on southside just above liner
LEAK DETECTION SYSTEM __ FLUIDS __ DRY

FOR TANKS: 3 tanks don't appear to be in use Nothing major
GENERAL APPEARANCE _____
LABLED PLAINLY __ YES __ NO
BERMED TO PREVENT RUNOFF __ YES __ NO
CHECK CONTENTS TO ASSURE PROPER FLUID/LABLE MATCH _____

NUMBER OF TANKS FOR BRINE ____ FRESH WATER ____

LOADING AREA Spill collection system Needs cleaning loops to by Plugged Needs grading

| | | |
|---|---|---|
| PROPERLY GRADED AND BERMED TO CONTAIN SPILLAGE | __ YES | ✓ NO |
| ANY EVIDENCE OF RECENT SPILLAGE | ✓ YES | __ NO |
| DOES FACILITY HAVE A SPILL COLLECTION SYSTEM | ✓ YES | __ NO |
| ANY EVIDENCE OF OIL SPILLING/DUMPING | ✓ YES | __ NO |

Area needs general clean up brine spillage in front of tanks regenerating Source unknown Approx

MONITORING WELLS some produced water spillage

DEPTH _____ FT STATIC WATER LEVEL _____ FT BELOW CASING 150' from pond
SAMPLED THIS VISIT __ YES __ NO TEMP _____ Ec _____

COMMENTS Facility OK Same as last year
Not much activity Need regrading, cleanout collection system, Basic site maintenance and clean up Looks like junkyard

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3. BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531



RECEIVED
MAR 24 1988
GROUND WATER/HAZARDOUS WASTE BUREAU


March 15, 1988

New Mexico Health and Environment
Box 968
Santa Fe, NM 78504-0968

Attn: Kevin Lambert

RE: Pressure Test DP-324

Dear Mr. Lambert:

Attached is the test chart for our annual Mechanical Integrity Test. The well passed.

If you have any questions, please call me at 915-332-0531.

Sincerely,

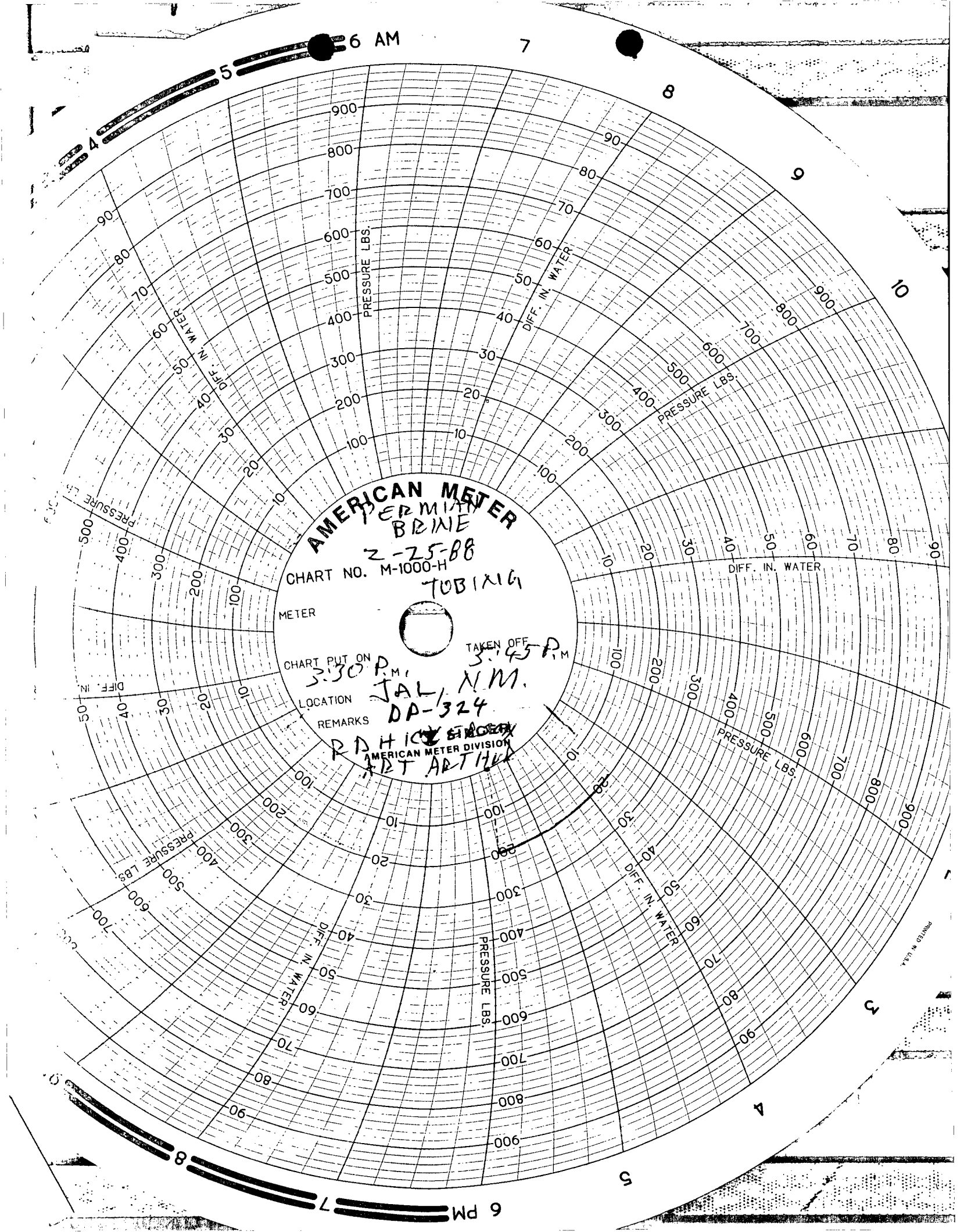
PERMIAN BRINE SALES, INC.

R.D. Hickerson rdt

R.D. Hickerson
President

RDH/rdt

Attachments


6 AM
7
8
9
10
4
5
6 PM
AMERICAN METER
PERMIAN BRINE
2-25-88
CHART NO. M-1000-H
TUBING
METER
CHART PUT ON 3:30 P.M.
TAKEN OFF 3:45 P.M.
LOCATION JAL, N.M.
DP-324
REMARKS
RADIC STROBER
AMERICAN METER DIVISION
ART ARTHUR
PRESSURE LBS.
DIFF. IN. WATER
PRINTED IN U.S.A.

NEW MEXICO
HEALTH AND ENVIRONMENT
DEPARTMENT

Post Office Box 968
Santa Fe, New Mexico 87504-0968

ENVIRONMENTAL IMPROVEMENT DIVISION

Michael J. Burkhart
Director

GARREY CARRUTHERS
Governor

LARRY GORDON
Secretary

CARLA L. MUTH
Deputy Secretary

December 31, 1987

Russell D. Hickerson
Permian Brine Sales
Rt. 3, Box 3033
Odessa, TX 79763

Dear Mr. Hickerson:

The Underground Injection Control staff of the New Mexico Environmental Improvement Division Ground Water Section would like to thank you for your cooperation during our recent inspection of Permian Brine Sales brine facility. A copy of the inspection form is attached for your reference. Deficiencies noted during the inspection are as follows:

1. Ponding of brine and produced waters noted. Facility should be free of ponded brine or produced waters, facility should be inspected frequently, and spillage cleaned up when detected.

2. Spill collection system needs to be upgraded. Collection tank not functional, spillage containment inadequate.

Thank you for your continued cooperation. Should you have any questions feel free to contact me (827-2902) or John Parker (827-0027).

Sincerely,

John W. Parker

for Kevin Lambert
Hydrologist
Ground Water Section

KL:JP:egr

Enclosure

# BRINE STATION INSPECTION FORM

DATE 12/2 1987 EID INSPECTOR Lambert/Parker
FACILITY Permian Brine Sales LOCATION SAL
FACILITY REP ON SITE None COUNTY LEA

## WELL OPERATION

WELL IS INJECTING: ✓ THROUGH ANNULUS __ THROUGH TUBING
SOURCE OF FRESH WATER Well Water
TRACE INJECTION/PRODUCTION LINES

WELL HEAD PRESSURE _____ PSIG PUMP PRESSURE _____ PSIG
LEAKS AROUND WELL OR PUMP None

## STORAGE AREA

FOR PONDS:
GENERAL LINER APPEARANCE Looks Good

AMOUNT OF FREEBOARD 2-3 ft
ANY SIGN OF OVERFLOW OR LEAKS None
LEAK DETECTION SYSTEM ✓ __ FLUIDS __ DRY Remove debris from pond "weeds"

FOR TANKS:
GENERAL APPEARANCE
LABLED PLAINLY __ YES __ NO
BERMED TO PREVENT RUNOFF __ YES __ NO
CHECK CONTENTS TO ASSURE PROPER FLUID/LABLE MATCH

NUMBER OF TANKS FOR BRINE ____ FRESH WATER ____

## LOADING AREA

| | | |
|---|---|---|
| PROPERLY GRADED AND BERMED TO CONTAIN SPILLAGE | __ YES | ✓ NO |
| ANY EVIDENCE OF RECENT SPILLAGE | ✓ YES | __ NO |
| DOES FACILITY HAVE A SPILL COLLECTION SYSTEM | ✓ YES | __ NO |
| ANY EVIDENCE OF OIL SPILLING/DUMPING | ✓ YES | __ NO |

Spill collection system needs to be cleaned & upgraded

## MONITORING WELLS yes

DEPTH _____ FT STATIC WATER LEVEL _____ FT BELOW CASING
SAMPLED THIS VISIT __ YES __ NO TEMP _____ Ec _____

COMMENTS Needs a great deal of housekeeping
Evidence of brine spillage & oil spillage
Facility is in general disrepair

NEW MEXICO
HEALTH AND ENVIRONMENT
DEPARTMENT

Post Office Box 968
Santa Fe, New Mexico 87504-0968

GARREY CARRUTHERS
Governor

LARRY GORDON
Secretary

CARLA L. MUTH
Deputy Secretary

P-573 875 223

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

U.S.G.P.O. 153-506

| | |
|---|---|
| Sent to Russell Hickerson | |
| Street and No. Rt 3, Box 3033 | |
| P.O., State and ZIP Code Odessa, TX | |
| Postage | $ |
| Certified Fee | |
| Special Delivery Fee | |

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

August 14, 1987

Russell D. Hickerson
Operations Manager
Permian Brine Sales, Inc.
Rt. 3, Box 3033
Odessa, TX 79763

Re: Monitoring and Reporting Requirements of DP-324

Dear Mr. Hickerson:

The Environmental Improvement Division (EID) has received your letter dated July 24, 1987, and evaluated your request that future pressure tests be done on a yearly basis instead of quarterly as stated in your approved ground water discharge plan (DP-324).

Based on available information, the EID has no objection to changing your monitoring and reporting requirements to reflect your request. No public notice is necessary since the change does not represent a significant modification to your discharge plan. Consequently, find enclosed an updated monitoring and reporting form showing your new requirements.

Be aware that your next pressure test is due May 1988.

If you have any questions, please do not hesitate to write me at the address listed on the letterhead or call (505) 827-2902.

Sincerely,

John Parker

for Kevin Lambert
Hydrologist
Ground Water Section - UIC Program

KL:egr

Enclosure: M & R Form

cc: Garrison McCaslin, EID District IV Manager, Roswell

# MONITORING AND REPORTING FORM

ALL BLANKS MUST BE COMPLETED.

CHECK ALL APPLICABLE BOXES

ORIGINAL DP: X
ORIG. DP PEND. APPROV: ___
RENEWAL: ___
RENEWAL PEND: ___
MODIFICATION: ___
MODIFICATION PENDING: ___

DISCHARGE PLAN NUMBER: 324

SIC NUMBER: ___

EID DISTRICT: IV

NAME OF FACILITY: Permian Brine Sales, Inc. - Jal Brine Station

LOCATION OF FACILITY: Jal, New Mexico

ALTERNATE OR PAST NAME OF FACILITY: ___

CITY OR CLOSEST TOWN: Jal USGS QUAD: ___

COUNTY: Lea TWP: 25S RGE: 37E SEC: 16

CONTACT PERSON: Hickerson (LAST NAME), Russell D. (FIRST NAME) TITLE: Operations Manager

ADDRESS OF CONTACT PERSON: Rt. 3, Box 3033, Odessa, TX 79763

TELEPHONE: 915-332-0531

TYPE OF FACILITY: Brine extraction

MEANS OF DISCHARGE ( LAGOON, LEACH FIELD, OTHER -SPECIFY ): Lagoon

REVIEWER: ( CURRENT ) Lambert (LAST NAME), Kevin (FIRST NAME)

DATE APPROVED: May 21, 1986 DATE OF EXPIRATION: May 21, 1991

MONITORING REQ: ( COMMENT, IF NECESSARY, ON BACK )

| SAMPLING SITE OR ID | STORET CODE ( SAMP. SITE ) | PARAMETER(S) | DATE DUE |
|---|---|---|---|
| Brine extraction well | | Pressure test | May 31 |
| | | | |
| | | | |

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531


July 24, 1987

New Mexico Health and Environment
Box 968
Santa Fe, New Mexico 78504-0968


RECEIVED
AUG 05 1987
GROUND WATER/HAZARDOUS WASTE
BUREAU


ATTN: Kevin Lambert

RE: Pressure Test on Jal Station

Dear Sirs:

Find enclosed our Jal pressure test chart dated May 21, 1987. We apologize for our tardiness in submitting the chart.

As discussed with you at the January 28, 1987 test, we request that future tests be conducted on a yearly basis.

If you have any questions, please do not hesitate to give me a call.

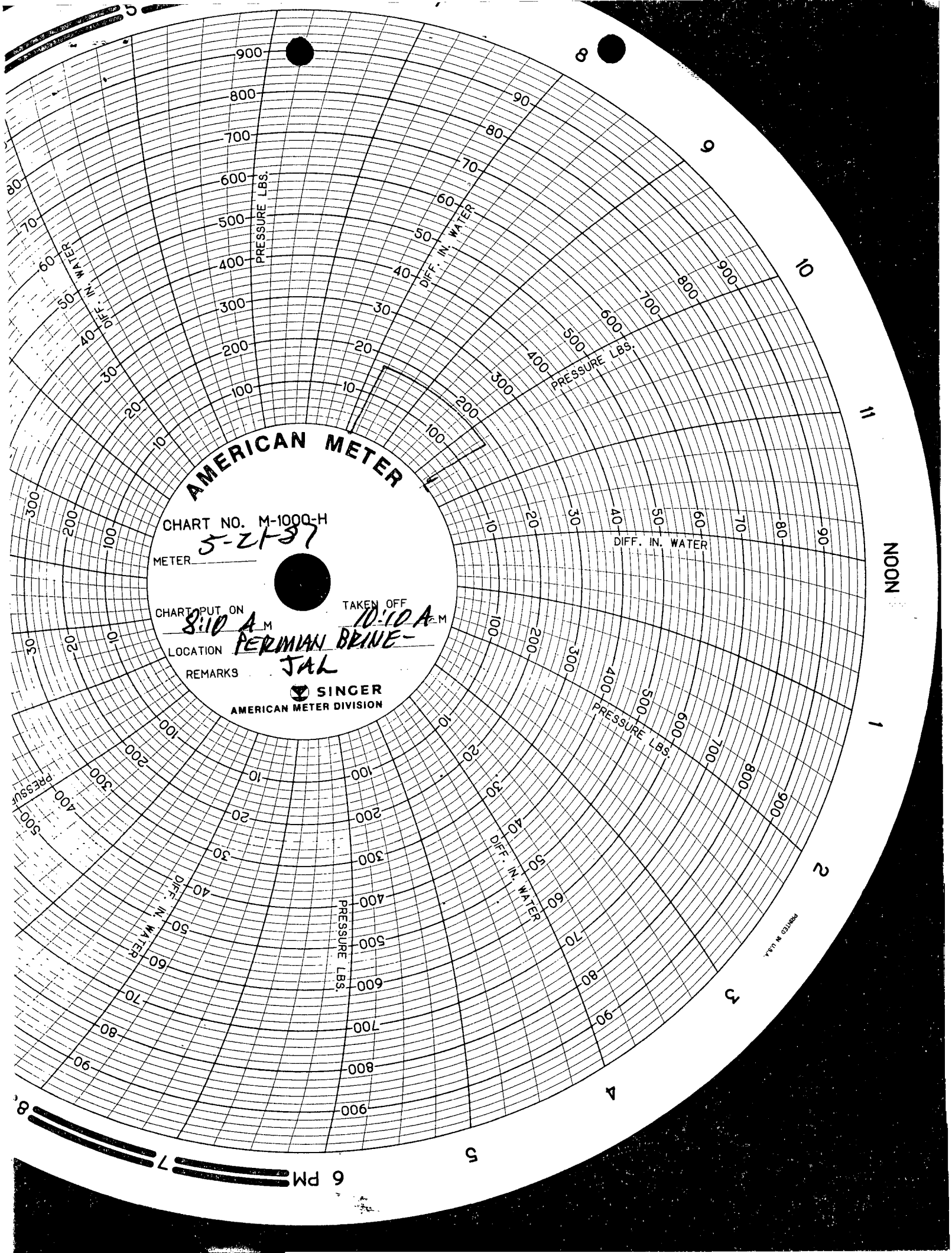
Very Truly Yours,

PERMIAN BRINE SALES, INC.

Russell D. Hickerson
Operations Manager

RDH/scr

Enclosure


AMERICAN METER
CHART NO. M-1000-H
5-21-97
METER
CHART PUT ON
8:10 A M
TAKEN OFF
10:10 A M
LOCATION
PERMIAN BRINE-
JAL
REMARKS
SINGER
AMERICAN METER DIVISION
PRESSURE LBS.
DIFF. IN. WATER
NOON
6 PM
PRINTED IN U.S.A.

NEW MEXICO
HEALTH AND ENVIRONMENT
DEPARTMENT

Post Office Box 968
Santa Fe, New Mexico 87504-0968

GARREY CARRUTHERS
Governor

LARRY GORDON
Secretary

CARLA L. MUTH
Deputy Secretary

February 6, 1987

R.D. Hickerson
Operations Manager
Permian Brine Sales, Inc.
Rt. 3, Box 3033
Odessa, TX 79763

RE: Pressure Test DP-324

Dear Mr. Hickerson:

Please find enclosed a copy of the pressure test chart for January 28, 1987.

Be aware that your next pressure test is due May 1987, according to your monitoring and reporting requirements presented in the EID letter of May 21, 1986.

If you have any questions, please do not hesitate to contact me at the address listed on the letterhead or at telephone number (505) 827-2902.

Sincerely,

Kevin Lambert

Kevin Lambert
Hydrologist
Ground Water Section -
Underground Injection Control

KL:egr

Enclosure

cc: Garrison McCaslin, EID District IV Manager, Roswell

EQUAL OPPORTUNITY EMPLOYER

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531



RECEIVED
FEB 03 1987
GROUND WATER/HAZARDOUS WASTE BUREAU


January 29, 1987

Environmental Improvement Division
P.O. Box 968
Santa Fe, New Mexico 87504-0968

Re: Pressure Test
DP-324
Section 16, T-25-S
R-37-E
Lea County, New Mexico

Dear Sirs:

Jerry Koschal, Kevin Lambert, and I conducted a successful mechanical integrity test on the above captioned well on January 28, 1987.

E.I.D. meters were used and they have the chart. The test pressure was 185#.

Please send me a copy of the chart for our records.

If you have any questions, please contact me and thank you for your cooperation in advance.

Sincerely,
PERMIAN BRINE SALES, INC.

R.D. HICKERSON
OPERATIONS MANAGER

RDH/law

| No. of Samples | Ion |
|---|---|
| | Na |
| | K |
| | Ca |
| | Mg |
| | Cl |
| | HCO3 |
| | CO3 |
| | SO4 |
| | TDS |
| //////// | //////////// |
| | NO3+ NO2 |
| | NH3 |
| | kjeld N |
| //////// | //////////// |
| | As |
| | Ba |
| | Cd |
| | CN |
| | Cr |
| | F |
| | Pb |
| | Hg |
| | Se |
| | Ag |
| | U |
| | V |
| | Ra 226 |
| | Ra 228 |
| //////// | //////////// |
| | Cu |
| | Fe |
| | Mn |
| | Phenols |
| | Zn |
| //////// | //////////// |
| | Al |
| | B |
| | Co |
| | Mo |
| | Ni |
| //////// | //////////// |
| | pH |
| | Conduct. |
| | |
| | |
| | |
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| | |

# FIELD TRIP REPORT
## GROUND WATER SECTION

SLD USER CODES
Ground Water: 59300
$NO_3$, HC, & Toxics: 59600
UIC: 59500

County Eddy. Lea

FACILITY VISITED
Name of Facility: Loco Hills Brine Co., Simco-McCasland, Permian Brine, KTS Brine
Location: Loco Hills, Eunice, Jal, Crossroads

Discharge Plan Number: DP- 394, 326, 324, 355
Type of Operation: Brine Production Facilities

ENVIRONMENTAL IMPROVEMENT DIVISION FIELD VISIT
EID Inspector(s): Lambert and Koschal
Date of Inspection or Visit: 1/26/87 - 1/29/87
Discharger's Representative Present During EID Visit:
Name: Maloney, ~~Patterson, Hickerson-Price, Stern~~
Title or Position: Mgrs/Owners
Purpose of Visit:
a. Evaluation of Proposed Discharge Plan
b. Compliance Inspection of Discharge with Approved Plan
c. Other (specify) Pressure Test Brine Wells
Inspection Activities During Field Visit:
a. Inspection of Facilities or Construction (specify)

Ran Pressure Tests. KTS was not done due to break in fresh water line. Will do next time in area

b. Sampling of Effluents (give sampling locations)

c. Sampling of Ground Water (give names or locations of wells)

d. Evaluation of geology, soils, water levels or other physical characteristics of the location (specify)

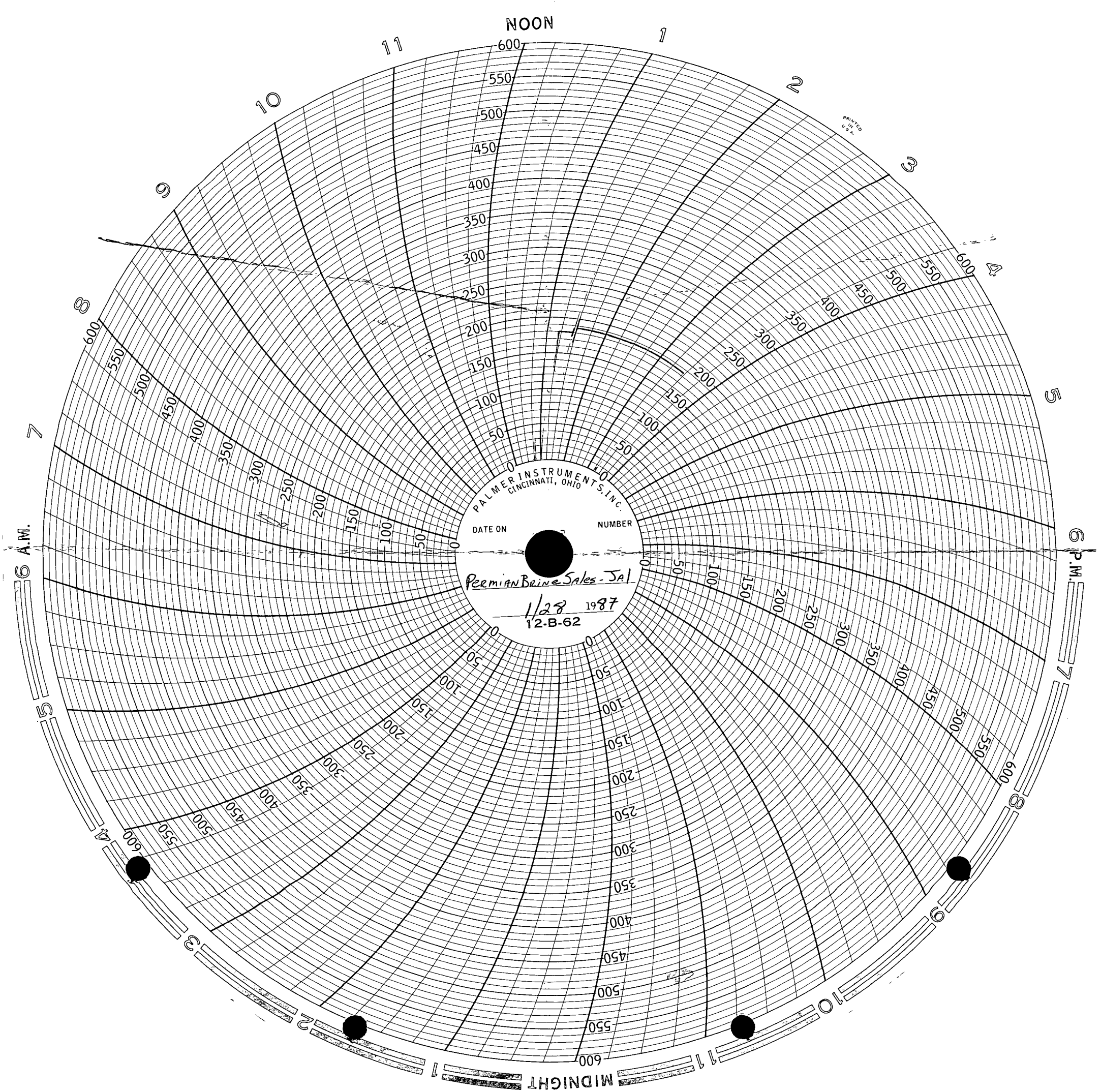
e. Other (specify)

Observations and Information Obtained during the Visit:

Ran 3 of 4 pressure tests. Unable to run 4th due to break in fresh water line which prevents us from pressuring up. Well

ACTION REQUIRED

Also was to able to get in touch w/ a contact of Marathon Road Water Station. Will be able to commun deficiency in '86 M&R Requirements


NOON
MIDNIGHT
6 A.M.
6 P.M.
PRINTED IN U.S.A.
PALMER INSTRUMENTS, INC.
CINCINNATI, OHIO
DATE ON
NUMBER
PERMIAN BRINE SALES - JAL
1/28 1987
12-B-62

# BRINE STATION INSPECTION FORM

DATE 12/10 1986 EID INSPECTOR Lambert, Koschal Baker
FACILITY Permian ~~Corp~~ Brine Sales LOCATION JAL T25S R37E Sec 16
FACILITY REP ON SITE None Available COUNTY LEA
DP-~~324~~ 324 Lease Name Arnott Ramsey phone# 915-332-0531

## WELL OPERATION

WELL IS INJECTING: __ THROUGH ANNULUS __ THROUGH TUBING
SOURCE OF FRESH WATER ? Water Well
TRACE INJECTION/PRODUCTION LINES Buried Lines

WELL HEAD PRESSURE _____ PSIG PUMP PRESSURE _____ PSIG
LEAKS AROUND WELL OR PUMP None
Unable to inspect pump house locked

## STORAGE AREA

FOR PONDS:
GENERAL LINER APPEARANCE Hypalon Liner Fair Condition Need better fence around pond
AMOUNT OF FREEBOARD ~ 2 ft
ANY SIGN OF OVERFLOW OR LEAKS None
LEAK DETECTION SYSTEM __ FLUIDS __ DRY No leak detection system

FOR TANKS:
GENERAL APPEARANCE Fresh Water Tank Only
LABLED PLAINLY __ YES __ NO
BERMED TO PREVENT RUNOFF __ YES X NO
CHECK CONTENTS TO ASSURE PROPER FLUID/LABLE MATCH

NUMBER OF TANKS FOR BRINE ____ FRESH WATER 1

## LOADING AREA

| | | |
|---|---|---|
| PROPERLY GRADED AND BERMED TO CONTAIN SPILLAGE | __ YES | X NO (7' small pad inadequate; bermed) |
| ANY EVIDENCE OF RECENT SPILLAGE | X YES | __ NO (nothing major) |
| DOES FACILITY HAVE A SPILL COLLECTION SYSTEM | __ YES | X NO |
| ANY EVIDENCE OF OIL SPILLING/DUMPING | __ YES | X NO |

## MONITORING WELLS

DEPTH _____ FT STATIC WATER LEVEL _____ FT BELOW CASING
SAMPLED THIS VISIT __ YES __ NO TEMP _____ Ec _____

COMMENTS General Appearance Poor, Need Major Surface Housekeeping
Needs Loading Area - Bermed w/ Collection Sump
Need to upgrade electrical system

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531


8-26-86


RECEIVED
SEP 04 1986
GROUND WATER/HAZARDOUS WASTE BUREAU


Environmental Improvement Division
P.O. Box 968
Santa Fe, New Mexico 87504- 0968

Re: Mechanical Integrety Test

Dear Mr. Lambert:

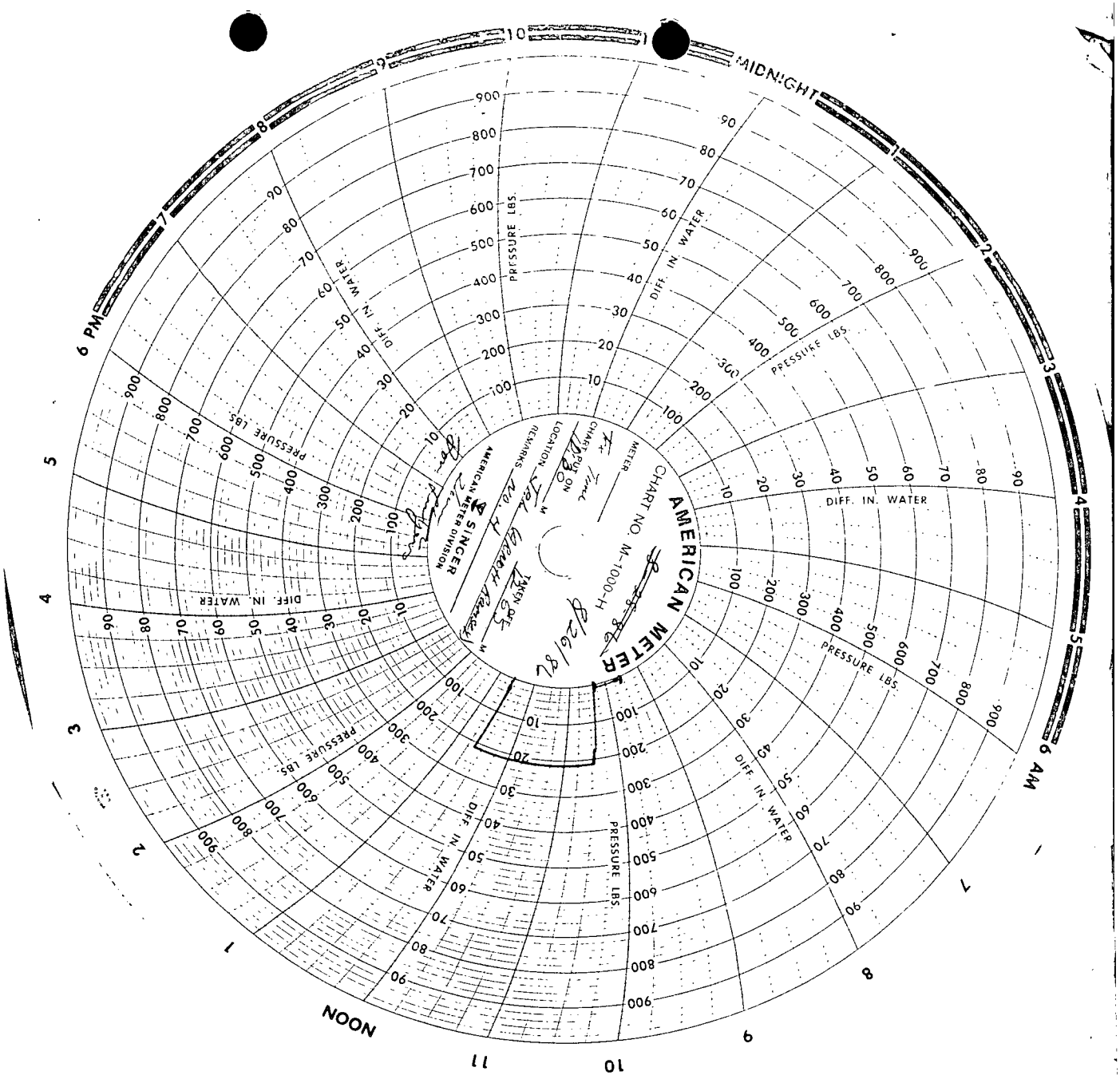
A mechanical integrety test has been run on the brine well at the Jal Brine Station. The test proved that the well has mechanical integrety. Enclosed is the pressure chart from the well test.

If you have any questions, feel free to contact me.

Sincerely,
PERMIAN BRINE SALES, INC.

Rodger Weathers
Field Rep.
915-332-0531

RCS/law
Enc.


AMERICAN METER
CHART NO. M-1000-H
METER
LOCATION
REMARKS
CHART PUT ON
M
AMERICAN METER DIVISION
SINCER
MIDNIGHT
NOON
6 PM
6 AM
PRESSURE LBS.
DIFF. IN WATER
DIFF IN WATER
PRESSURE LBS.

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

P. O. BOX 1591

ODESSA, TEXAS
79760

PHONE 332-0531


## MECHANICAL INTEGRITY TEST REPORT

Station JAL (ARNOTT RAMSEY) Date 8-26-86

Station Number # 4 Witness _____

Run By Rodger Weathers Witness E.I.D SIGNATURE ON CHART.

Normal Operating Pressure 180 PSI

Depth of Well 1591'

Pressure attained in Test 220 PSI

Rate of Injection (approximate) 45 gpm

Pressuring up time 20 min.

Static test time 2 hrs.

Pounds of decline ~~0~~

Percentage of decline ~~0~~

REMARKS 0 percentage of decline Indicates Casing, Cement & Cavern Shows a Sound Mechanical Integrity Test.

STATE OF NEW MEXICO
HEALTH ENVIRONMENT

# MEMORANDUM

DATE: 8-28-86

TO: Kevin Lambert, Ground Water Section

FROM: Don Lutjens, Hobbs Field Office

SUBJECT: PERMIAN BRINE SALES - PRESSURE TEST

RECEIVED
SEP 02 1986
GROUND WATER HAZARDOUS WASTE BUREAU

The normal operating pressure is 180 psi; the test was run at 218 psi. At 2 hrs. the pressure showed no delta so we agreed that it could be discontinued at that time. Rodger Weathers will send you the complete report from Texas.

dl

pc Files - Hobbs EID

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

P. O. BOX 1591 ODESSA, TEXAS 79760 PHONE 332-0531


Chuck Green
Texas Department of Water Resources
Box 13087
Capitol Station
Austin, Texas 78711


RECEIVED
SEP 02 1986
GROUND WATER HAZARDOUS WASTE BUREAU


## MECHANICAL INTEGRITY TEST REPORT

Station Jal (Arnott Ramsy 4#) Date 8-26-86

Station Number #4 Witness Don Luttjens

Run By Rodge Weathers Witness Rodge Weathers

Normal Operating Pressure 180 PSI

Depth of Well 1591' TD

Pressure attained in Test 220 PSI

Rate of Injection (approximate) 45 gpm

Pressuring up time 20 min

Static test time 2 hrs

Pounds of decline 0

Percentage of decline 0

REMARKS Location: East of Jal, NM East of #18 on #128 about 2 miles, On North side of hiway #128 just SW of the Jal airport

MEMORANDUM OF MEETING OR CONVERSATION

| ☒ Telephone ☐ Personal | Time | Date 8/15/86 |
|---|---|---|
| Originating Party | | Other Parties |
| To: Russ Hickerson 915-~~332~~ 332-0531 | | |
| From: Kevin Lambert | | |

Subject
Permian Brine Sales -
Inviting to come out for Pressure Test due Aug 30

Discussion
11:07am Busy
3:07pm Busy
1:40pm Not in left message
3:11pm Looking @ 8/26 ~10am was inviting EID along Told him EID Central Office staff couldn't make it but will ask field office staff if they could send somebody. If no one from EID makes it just send us the pressure chart as required w/ any documentation you feel relevant to the pressure test

Kevin Lambert

Conclusions or Agreements
8/18/86 Hobbs field office
Rolf Ruffner Informed him of the upcoming pressure test and asked if someone from their office could be present If not please notify Permian Brine Sales - Russ H that they would be unable to attend and they should go ahead without E.I.D's presence.

Distribution

Signed Kevin Lambert

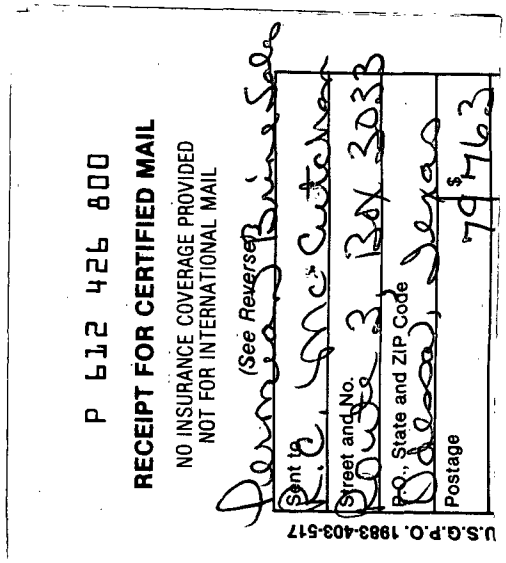
HEALTH ENVIRONMENT department

STATE OF NEW MEXICO

ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020

TONEY ANAYA
GOVERNOR

DENISE D. FOR
DIRECTOR




CERTIFIED MAIL - RETURN RECEIPT REQUESTED

May 21, 1986

R.C. McCutchan, Engineer
Permian Brine Sales, Inc.
Route 3, Box 3033
Odessa, Texas 79763

RE: Discharge Plan (DP-324) Approval

Dear Mr. McCutchan:

The discharge plan (DP-324) for the brine extraction well located in Section 16, T25S, R37E, Lea County, New Mexico is hereby approved. The approved discharge plan consists of the plan dated May 7, 1984, and the materials received August 20, 1984; October 31, 1984; November 6, 1984; November 30, 1984; February 24, 1986; and May 12, 1986 submitted as supplements to the discharge plan.

The discharge plan was submitted pursuant to Section 3-106 and 5-101 of the N.M. Water Quality Control Commission Regulations. It is approved pursuant to Section 3-109. Please note subsections 3-109.E. and 3-109.F., which provide for possible future amendment of the plan. Please be advised that the approval of this plan does not relieve you of liability should your operation result in actual pollution of surface or ground waters which may be actionable under other laws and/or regulations.

The monitoring and reporting shall be as specified in the discharge plan and supplements thereto. These requirements are summarized on the attached sheet(s). Any inadvertent omissions from this summary of a discharge plan monitoring or reporting requirement shall not relieve you of responsibility for compliance with that requirement.

Please note that Section 3-104 of the regulations requires that "When a plan has been approved, discharges must be consistent with the terms and conditions of the plan."

Pursuant to subsections 3-109.G.4., this plan approval is for a period of five (5) years. This approval will expire May 21, 1991, and you should submit an application for new approval in ample time before that date.

On behalf of the staff of the Ground Water Section, I wish to thank you (and your staff and/or consultants) for your cooperation during this discharge plan review.

Sincerely,

Karl Soxa

for/ Ernest Rebuck
Bureau Chief
Ground Water/Hazardous Waste Bureau

ER/DJ/mp

cc: Gary McCaslin, Manager, EID District IV, Roswell
Roelf Ruffner, EID Field Office, Hobbs

MONITORING AND REPORTING FORM

ALL BLANKS MUST BE COMPLETED.

CHECK ALL APPLICABLE BOXES

ORIGINAL DP: X
ORIG. DP PEND. APPROV: ___
RENEWAL: ___
RENEWAL PEND: ___
MODIFICATION: ___
MODIFICATION PENDING: ___

DISCHARGE PLAN NUMBER: 324

SIC NUMBER: ___

EID DISTRICT: IV

NAME OF FACILITY: Permian Brine Sales, Inc. - Jal Brine Station

LOCATION OF FACILITY: Jal, New Mexico

ALTERNATE OR PAST NAME OF FACILITY: ___

CITY OR CLOSEST TOWN: Jal USGS QUAD: ___

COUNTY: Lea TWP: 25S RGE: 37E SEC: 16

CONTACT PERSON: McCutchan (LAST NAME), R.C. (FIRST NAME) TITLE: Engineer

ADDRESS OF CONTACT PERSON: Route 3, Box 3033; Odessa, Texas 79763

TELEPHONE: 915-332-0531

TYPE OF FACILITY: Brine extraction

MEANS OF DISCHARGE ( LAGOON, LEACH FIELD, OTHER -SPECIFY ): Lagoon

REVIEWER: ( CURRENT ) Jones (LAST NAME), Doug (FIRST NAME)

DATE APPROVED: May 21, 1986 DATE OF EXPIRATION: May 21, 1991

MONITORING REQ: ( COMMENT, IF NECESSARY, ON BACK )

| SAMPLING SITE OR ID | STORET CODE ( SAMP. SITE ) | PARAMETER(S) | DATE DUE |
|---|---|---|---|
| Brine extraction | well | Pressure test | Feb. 28; May 31; Aug. 30; Nov. 30 |
| | | | |
| | | | |

| SAMPLING SITE OR ID | STORET CODE ( SAMP. SITE ) | PARAMETER(S) | DATE DUE |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

COMMENTS:

| | YES | NO |
|---|---|---|
| PRE - 1977 DISCHARGER | ___ | X |

| OTHER APPLICABLE PERMITS: | YES | NO |
|---|---|---|
| RCRA | ___ | ___ |
| RADIOACTIVE MAT. | ___ | ___ |
| NPDES | ___ | ___ |
| UST | ___ | ___ |

FOR EID USE ONLY

STATUS OF DP:

| | |
|---|---|
| ACTIVE: | X |
| WITHDRAWN: | ___ |
| EXPIRED, NOT RENEWED: | ___ |
| INACTIVE: | ___ |
| NOT YET APPROVED: | ___ |

SEND REPORTS TO:

GROUND WATER SECTION
EID: GROUND WATER/HAZARDOUS WASTE BUREAU
P.O. BOX 968
SANTA FE, NM 87504-0968

REVISED: 4/4/86

# E I D  B U C K S L I P

CHECK ONE:

/XX/ LETTER TO R.C. McCutchan, Engineer
for Ernest Rebuck's signature

/ / MEMO TO _____

/ / PRESS RELEASE

/ / OTHER

SUBJECT: Permian Brine Sales, Inc.

DRAFTED BY: Doug Jones DJ 5/20/86 (Date)

CONCURRENCES:

| NAME: | | INITIAL | DATE REC'D | DATE APPROVED |
|---|---|---|---|---|
| Karl Souder | Sect. Mgr. | KQS | 5/20 | 5/20 |
| Ernest Rebuck | Bur. Chief | KQS | 5/20 | 5/20 |
| Richard Holland | Dep. Dir. | | | |
| Denise Fort | Director | | | |

FINAL DECISION NEEDED BY _____ (date) BECAUSE _____

COMMENTS BY DRAFTER OR REVIEWER(S):

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531



RECEIVED
MAY 19 1986
GROUND WATER/HAZARDOUS WASTE BUREAU


May 12, 1986

Mr. Doug Jones
Environmental Improvement Division
P.O. Box 968
Santa Fe, N.M. 87504-0968

Dear Mr. Jones:

In response to your letter of April 25, 1986, we wish to advise that the following plans have been made:

We shall construct the brine spill facility as described and shown by the drawings,in our letter of February 24, 1986. It is planned to complete this construction project by July 2, 1986.

To advise you further, we plan to conduct the first quarterly pressure test on the brine well at the Jal Brine Station on this date also.

If this date is not compatible with your schedule, please advise.

Very truly yours,
PERMIAN BRINE SALES, INC.

R.C. MCCUTCHAN
ENGINEER


RECEIVED
MAY 16 1986
E.I.D. PROGRAM SUPPORT BUREAU


RCM/law

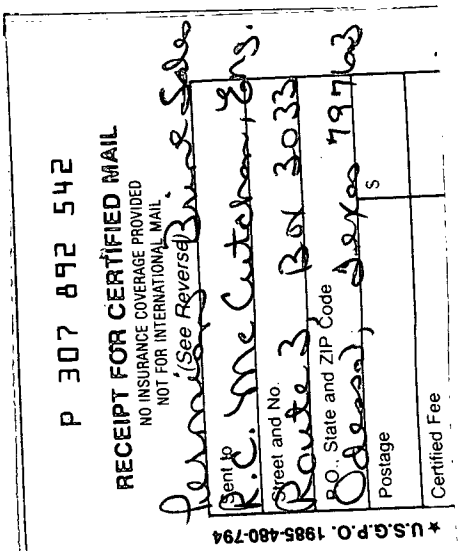
TONEY ANAYA
GOVERNOR

DENISE D. FOR
DIRECTOR

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO

ENVIRONMENTAL IMPROVEMENT DIVISIO
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020




CERTIFIED MAIL - RETURN RECEIPT REQUESTED

April 25, 1986

R.C. McCutchan, Engineer
Permian Brine Sales, Inc.
Route 3, Box 3033
Odessa, Texas 79763

RE: Jal Brine Station Discharge Plan (DP-324)

Dear Mr. McCutchan:

I have assumed responsibility for Discharge Plan No. 324 while Paige Morgan is on maternity leave. In accord with her suggestions, I have the following comments and questions regarding your letter dated February 24, 1986:

1) Pursuant to your letter, you have opted to perform quarterly pressure tests on the brine well rather than install a monitor well. Please submit a schedule indicating months when the tests will be conducted and when reports will be submitted to EID. I suggest testing in January, April, July, and October with reports due the end of the following month. Also, please commit to providing EID with at least 5 days notice prior to testing and to allow EID the opportunity to be present during testing.

2) The plans and specifications for the brine spill catchment facility indicate that it will be suitable for that purpose. On what date do you expect the construction of the facility to be completed?

If you have any questions, please contact me at the above address or telephone number 827-2903.

Sincerely,

Doug Jones

Doug Jones
Water Resource Specialist
Ground Water Section

DJ/mp

cc: Garrison A. McCaslin, Manager, EID District IV, Roswell
Roelf Ruffner, EID Field Office, Hobbs

STATE OF NEW MEXICO

STATE ENGINEER OFFICE

ROSWELL

S. E. REYNOLDS
STATE ENGINEER

RECEIVED
MAR 5 1986
GROUND WATER/HAZARDOUS WASTE
BUREAU

DISTRICT II
909 E. 2nd STREET
P.O.BOX 1717
ROSWELL, NEW MEXICO 88201

March 4, 1986

Paige Morgan
Environmental Improvement Division
Box 968
Santa Fe, New Mexico 87501

Dear Paige:

I am sending you a copy of a water table map which was prepared in the Doom-Mathis salt water contamination case. This area is located northeast of Section 21, Township 25 South, Range 37 East, where your contaminated wells are located.

I am also submitting a map of our basic data collection showing the elevation of the top of the Triassic Formation. The area you are interested in has not been contoured by this office. Also submitted are copies of our Chemical Quality data for Township 25 South, Range 37 East. We do not have data on the quality of the produced brine.

Based on my experience with similar problems in the same general area, I am reasonably certain that the source of contamination for the Cramer-Boyington wells lies to the north and is probably North-Northwest. This opinion is based on the fact that the water table and the bed rock both slope South-Southeast. The most likely source is an old abandoned brine disposal pit which was in use prior to 1965. Other possible sources are improperly plugged oil or gas wells, migration of salt water behind oil well casing strings or through oil well casing leaks of producing wells or with similar problems in salt water disposal wells.

I am sorry to have been so slow in replying to your letter of February 11, 1986. I would also like to thank you for the information that you sent me. I doubt that the method described by Mast will be of much help in the Lea County area but I would not rule it out completely.

Yours truly,

James I. Wright
Field Engineer

JIW/tmg
Encls.
cc Brad Compton

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 915 PHONE 332-0531



RECEIVED
MAR 3 1986
GROUND WATER HAZARDOUS WASTE BUREAU


February 24, 1986

Mrs. Paige Morgan
Water Resources Specialist
Environmental Improvement Division
P.O. Box 968
Santa Fe, New Mexico 87504-0968

Dear Mrs. Morgan:

This will acknowledge your letter of February 12, 1986 and our subsequent phone conversation on February 20, 1986, regarding supplemental information requested for Permian Brine's discharge plan at our Jal Brine Station.

Your suggestion that we either drill a monitor well to the shallow aquifer near the brine well or conduct quarterly pressure tests on the brine well has been considered in the light of our present day to day operations. As you know, oil well drilling activities in the West Texas - Eastern New Mexico areas are rapidly declining and consequently our brine sales are also adversely affected. Therefore, we are curtailing all capital expenditures except those that are absolutely required to comply with the environmental edicts. Faced with these economic realities, at this time, we prefer the alternative of quarterly pressure testing. However, if, at some future date, drilling activities increase, we would be agreeable to drilling the monitor well.

We discussed the shallow aquifer water well pumping capacities in this area with Jim Wright of the Roswell State Engineer's office. He predicted 15 to 20 gpm capacities. Since these volumes are marginal for our operations, this has further influenced our decision to use the pressure testing.

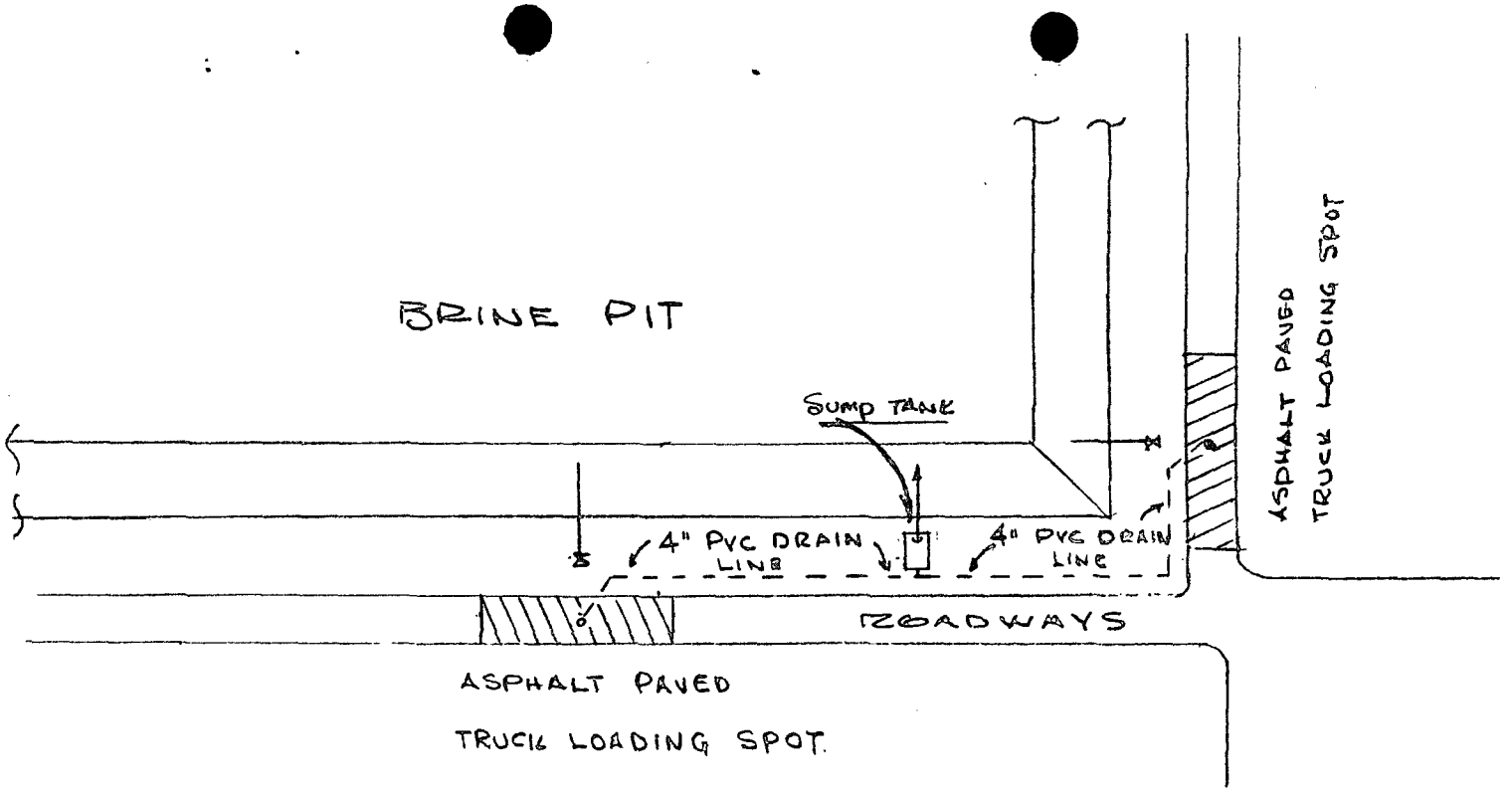
Attached are Permian Brine drawing's No. 4 and No. 5 showing the proposed brine spill facilities for the Jal Brine Station. To prevent the pumping of oil saturated truck bottoms in the surface spill basins, we have elected to use a buried pre-cast, re-enforced concrete sump tank. This tank will be equipped with an electric motor driven sump pump with high and low level float switches.

We sincerely hope these proposals will meet with your approval. However, if further information is required please let us hear from you.

Yours very truly,
PERMIAN BRINE SALES, INC.

R.C. MC CUTCHAN
ENGINEER

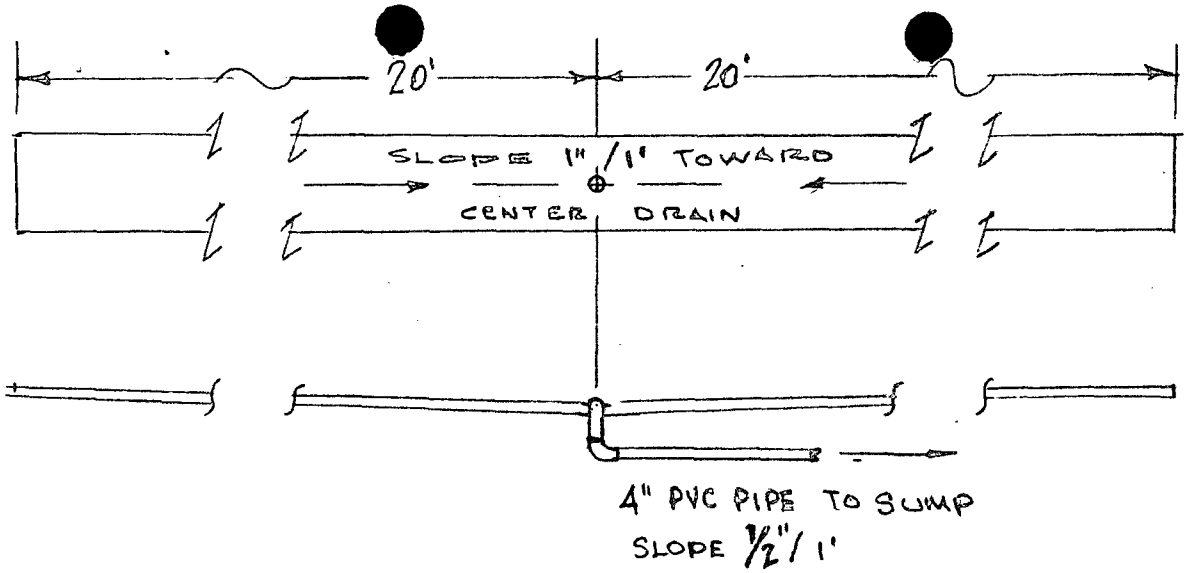
RCM/law
Enc.

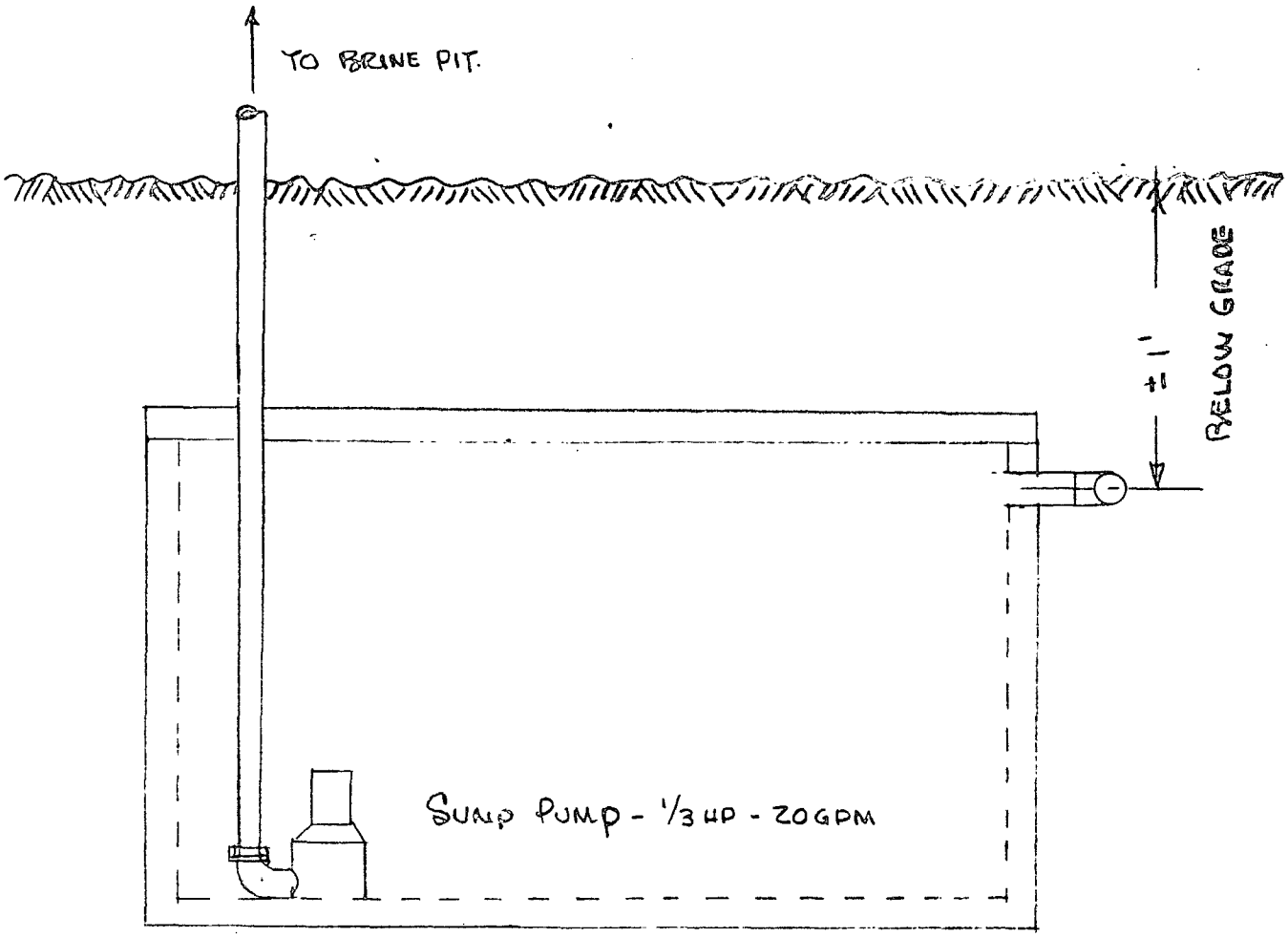



**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

PROPOSED TRUCK LOADING & BRINE SPILL RECOVERY FACILITIES
JAL BRINE STATION

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 2-21-86 | R.C. McCUTCHAN TEX. P.E. 9844 | 4 |




4' x 7'-8" x 5'-3" DEEP
PRECAST REENFORCED
CONCRETE SUMP TANK

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

# TYPICAL BRINE LOADING SPOT WITH SPILL DRAIN & SUMP TANK DETAILS JAL BRINE STATION

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 2-21-86 | R.C. McCutchan, Tex. P.E. 9844 | 5 |

TONEY ANAYA
GOVERNOR

DENISE D. FORT
DIRECTOR

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO

ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020

February 12, 1986

R.C. McCutchan, Geologist
Permian Brine Sales, Inc.
Route 3 Box 3033
Odessa, TX 79763

Dear Mr. McCutchan:

The enclosed letter will inform you of efforts on the part of this and other agencies to determine the source of contamination of the water wells immediately south of the Permian Brine Sales' Jal brine station. It is clear that there will be no rapid answer to this question, but we intend to pursue all leads.

In the meantime, it has been over a year since our last communication on finalizing the discharge plan for the Jal station, and I would like to complete these negotiations. My letter to you of January 2, 1985 stands unchanged, with the following exceptions:

> 6.a (1) Since your water supply well in the Santa Rosa Formation is pumped on a regular basis and would therefore induce any leakage from the brine well at that depth to move relatively rapidly in its direction, it may serve as a monitor well for deeper leaks. If the monitor well option is used, a shallow well should still be installed at close proximity to (within fifty feet of) the brine well.
>
> conditions of aproval: a) no longer applies.

I look forward to your early reply.

Sincerely,

Paige Grant Morgan
Water Resource Specialist

PGM:pgm

cc: Garrison McCaslin, EID District IV Manager

TONEY ANAYA
GOVERNOR

DENISE D. FORT
DIRECTOR

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO

ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020

February 11, 1986

Jim Wright
State Engineer's Office
Box 1717
Roswell, NM 88201

Dear Mr. Wright:

Thank you for your interest and the information you have provided regarding the brine contamination of the Bowington/Mosley and Cramer/Dakan wells in Section 21, T25S R37E, east of Jal. I enclose the article on determining the source of an incident of brine contamination that I referred to during our phone conversation last Friday. A summary of efforts to date to track the source of contamination of the above-named wells appears below.

The Hobbs Office of OCD was contacted about the contamination problem early in 1983. Jerry Sexton of OCD reports that the contamination had occurred at least six years previously. In order to search for a likely source of the contamination, OCD ran 84 "bradenhead" pressure tests on oil/gas wells and produced water injection wells in Sections 15, 16, 21 and 22. All received a clean bill of health except Union Texas Harrison #2-I22-24(sic)-37, which had a "very small" waterflow. Based chiefly on these pressure tests and the plugging records for wells in Section 21, Mr. Sexton concluded that the problem did not originate in the oilfield.

The EID received the complaint of contamination of the Mosely and Cramer wells in late August, 1984. Mosley reported that his well had started "going bad" around 1980, and they had it analysed in 1982: TDS was reported then as 14,312 mg/L and chloride as 8300 mg/L. Subsequent interviews with Mosley indicated that the problem began in 1978 or 1979. By 1980, the water had started killing fruit trees at the Bowington residence. Cramer thought he recalled the former owner of his place (Dakan) saying that the problem with his well came on very suddenly - one morning there were salt deposits in the vegetable garden he had irrigated the night before. Cramer believed this may have taken place in 1979.

Judging by the analyses conducted by Mosley, by the OCD, EID and Permian Brine (required by EID), the trend since 1982 has been toward a decrease in dissolved solids, including chloride, in the Mosley well, and an increase in contamination of the Cramer well. The most recent analyses of samples from both wells are enclosed. See also the enclosed location map, prepared by Permian Brine under a requirement by this office to research the problem.

In November, 1984, EID conducted an electromagnetic terrain conductivity survey over an area approximately 2000 feet south from Hwy. 128 by 1500 feet east-west, centered on the contaminated wells, searching for a "bull's eye" of high conductivity that would identify the source of contamination of the Mosley and Cramer

wells. Results were inconclusive, due in part perhaps to scanning at too shallow a depth, in part to the complex nature of the alluvial aquifer in that locale, and in part to interference from the numerous pipelines, powerlines and other sources of cultural interference in the area. Subsequently, I was stumped on what other approach to take to track the source of contamination until the enclosed article by Vernon Mast appeared in last summer's Ground Water Monitoring Review.

I have followed the method described by Mast to the extent of determining sodium-to-chloride (Na/Cl) ratios in the contaminated wells, the brine produced at Permian Brine Co.'s Jal Brine Station, brine produced at other brine stations in Lea and Eddy Counties, and brine originating as "produced water" in oil/gas wells in the vicinity of the contaminated wells. All information except that for produced water was taken from EID files; the analysis for Permian Brine Co.'s brine and for brine at several other brine stations is slightly suspect, due to an imbalance between the millequivalents of anions and cations reported in the analysis. The produced water data was published in Table 9, Part B of Nicholson and Clebsch, Geology and Ground-Water Conditions in Southern Lea County. The information is summarized below:

| Source | Date | Na/Cl |
|---|---|---|
| Mosely well, NE/4 NE/4 NE/4 Section 21, T25S R37E | 9/17/84 | 0.21 |
| as above | 11/28/84 | 0.30 |
| Cramer well, NE/4 NE/4 NE/4 Section 21, T25S R37E | 11/28/84 | 0.54 |
| Permian Brine Co. brine storage lagoon, SE/4 SE/4 SE/4 Section 16, T25S R37E | 11/28/84 | 0.51 |
| Permian Brine Co. fresh water supply well, SE/4 SE/4 SE/4 Section 16, T25S R37E | 7/25/84 | 1.14 |
| 16 brine stations | approx. 1978-1985 | 0.62 - 0.65 in 11 samples; other 5 values 0.31, 0.36, 0.47, 0.52, 0.54 |
| Produced water from Crosby Pool, T25S R37E (pay zone: Devonian) | ca. 1956 | 0.48 |
| Produced water from Jalmat Pool, T21 thru 26S, R35 thru 37E (pay zone: Yates-Seven Rivers) | ca. 1956 | 0.86 |
| Produced water from Langlie-Mattix Pool, T22 thru 26S, R36, 37E (pay zone: Yates, Seven Rivers Queen) | ca. 1956 | 0.55 |

Clearly, the Na/Cl ratio alone does not provide a sufficient "fingerprint" to identify the contamination source by that means. It would be necessary to get into comparisons of ion "factor pairs" using Mast's matrix algebra to determine the probable source of contamination of the Cramer and Mosley wells using Mast's method. To do so, I will need major-ions analysis for produced water that has been generated and/or disposed of upgradient of the contaminated wells. This information may be hard to come by for wells no longer in operation - I am under the impression that complete major-ions analyses have rarely been conducted for produced water. If you have such data for the disposal pits in Section 15 and 16 which you mentioned during our phone conversation of February 10th as having been identified as the source in a fresh water contamination case some five years ago, I would be interested in receiving that and any other information related to that case.

I look forward to conferring with you further on this matter.

Sincerely,

Paige Morgan

Paige Grant Morgan
Water Resource Specialist
Ground Water Section

PGM:pgm

cc: Richard Perkins, Program Manager, EID Ground Water Surveillance Section
Jami Bailey, OCD Environmental Bureau
R.C. McCutchan, Permian Brine Sales Inc.
Ken Mosely
Billy Wayne Cramer

note: copy also sent to EID District III Manager, Harrison McCaslin.

2/10/86: Jim Wright, SEO Roswell called in response to our 2/6 conversation about chloride contamination east of Jal. He reported that he had located a log that was probably for one of the contaminated wells:

owned by White (at time of filing)
located NE¼NE¼NE¼ Sec 21 T25S R37E
indicates water located in sand & gravel at 120 feet
log was from White's memory, not drilling log

The SEO worked on a case of brine contamination in a shallow aquifer in same township, Sec 15 & 16 about five years ago. Problem was traced to produced water disposal pits. I asked for details - he will send.

He pointed out that shallow aquifer contains channels of high permeability, ridges blocking flow, valleys collecting it - not a homogeneous, isotropic medium! Explanation for very different levels of contamination between

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

TONEY ANAYA
GOVERNOR

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88240
(505) 393-6161

February 3, 1986

MEMO TO: Jamie Bailey

FROM: Jerry Sexton

SUBJECT: WATER CONTAMINATION SECTION 21, T25S, R37E
Lea County

Attached are the following records from our files on the above case.

1) Chloride map of area from State Engineers
2) Water samples we collected or anayzed
3) Results of bradenhead test
4) How the wells were plugged and abandoned in Sec. 21, T25S, R37E
5) Letters of correspondence from myself on the situation

It was my opinion that the contamination came from the brine wells or from the brine pit at the well. We saw no evidence that it was an oil related problem.

In a meeting with Mr. Bowington at which Eddie Seay and I explained our thoughts and offered any technical help he wanted if he wished to determine additional liability.

The contamination had occurred at least 6 years before we were contacted and I felt contamination was not occurring at the time we were brought into the case.

In a similar case with Triassic water at Jal in the 1970's we attempted to trace where the contamination came from with no success.

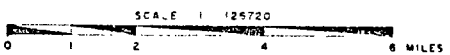
## LEGEND

● = Alluvium or Ogallala well

◆ = Triassic well

■ = Rustler well

ORIDE CONTENT OF GROUNDWATER IN SELECTED WELLS IN SOUTHEASTERN NEW MEXICO - 1965.

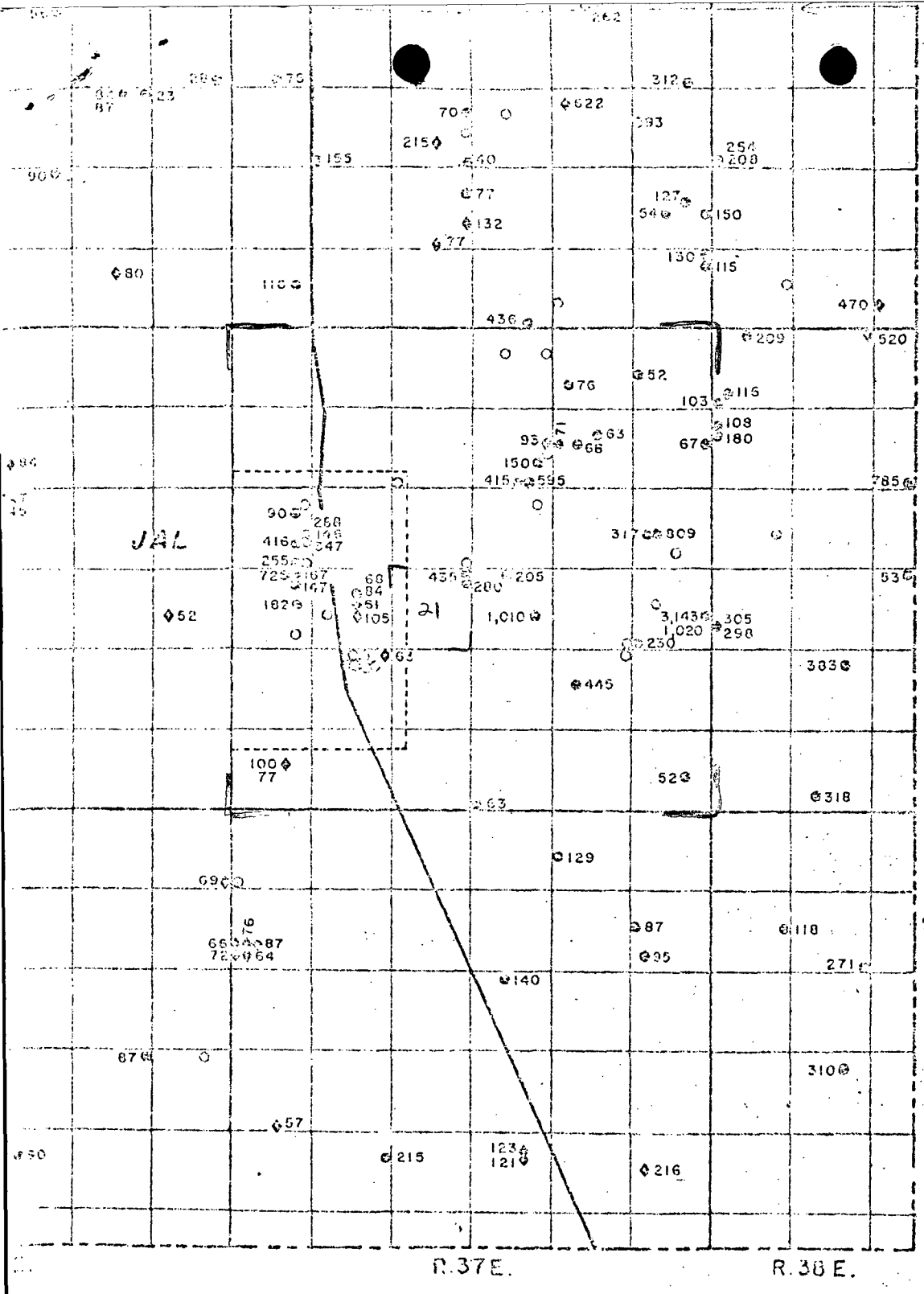



Mexico State Engineer Office

February 27, 1979

Sheet 6 of 6

QW - 95 - D


T. 24 S.
T. 25 S.
T. 26 S.
R. 37 E.
R. 38 E.
JAL
21

STATE OF NEW MEXICO
# ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

TONEY ANAYA
GOVERNOR

March 7, 1984

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88240
(505) 393-6161

Mr. Ralph Bowington
Box 95
Jal, NM 88252

Dear Sir:

Since our meeting in early February concerning your contaminated water well, we have obtained some information about cost of drilling monitor wells. Also, some material from the State Engineers concerning water tables and redbed formations were obtained as well as our well file. At your request and convenience, we will meet and talk about helping you.

If you have any questions, please contact Eddie W. Seay at 393-6161.

Very truly yours,

OIL CONSERVATION DIVISION

Jerry Sexton
Supervisor, District I

JS/ES/ed

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

TONEY ANAYA
GOVERNOR

March 13, 1984

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88240
(505) 393-6161

Permian Brine Sales
Route 3, Box 3033
Odessa, Texas 79763

SUBJECT: Final Inspection Plugged Brine Wells
Arnott Ramsey #2-P 16-25-37
Arnott Ramsey #3-P 16-25-37

Gentlemen:

In response to your notice that the above-listed brine wells were ready for final inspection, our Field Inspector checked the surface location on March 9, 1984. It was observed that you did not have the regulation dry-hole marker installed. This should be corrected.

The regulation of brine wells has been transferred from the Oil Conservation Division to the EID. When the above has been corrected you should notify Mr. Dave Boyer with the EID in Santa Fe at: P.O. Box 968, Santa Fe, NM 87504 (Phone 505-984-0020)

Very truly yours,

OIL CONSERVATION DIVISION

Jerry Sexton
Supervisor, District I

ed

cc: File

RESULTS OF BRADENHEAD SURVEY RUN
JUNE 1983 -- Sec 15,16,21 & 22 T25, R37

As a result of a contaminated water well in Unit H of Sec 21, T25S, R37E, *(see below) the OCD ran bradenhead tests on all wells located in Sections 15,16,21 & 22, T25S, R37E to determine if possible problem could be identified.

57 producing wells were tested -- Union Texas Harrison #2-I 22-25-37 was only well that had any waterflow and it was very small.

27 injection wells were tested -- No waterflows or tubing/packer leaks indicated.

4 brine wells checked -- Brinninstool Langlie Fed Brine well P-14-25-37 was injecting down casing & producing brine out tubing -- pit & location looked good

Permian Brine Sales & Service
Arnott Ramsay St Brine Well #4-P 16-25-37 -- well has been operated by injecting fresh water down tbg and brine out casing -- improper method Liner in pit OK and monitor hole dry.

Arnott Ramsay Brine #2-P 16-25-37
Well not in use -- Company claimed well was plugged, but not plugged properly -- had wooden plug at 400 ft. Drilled out and no other plug found -- Set CIBP @ 1140 (7-7-83)

Arnott Ramsay Brine Well #3-P 16-25-37
This well was not in use and is being plugged. Set CIPB at 1145 (7-7-83)

* Sonny Dakan Well water analyzed 39.760 ppm cl.

* Bowington well water analyzed 7,100 ppm cl.

| NO. OF COPIES RECEIVED | | |
|---|---|---|
| DISTRIBUTION | | |
| SANTA FE | | |
| FILE | | |
| U.S.G.S. | | |
| LAND OFFICE | | |
| OPERATOR | | |

Form C-105
Revised 1-1-65

# NEW MEXICO OIL CONSERVATION COMMISSION
# WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5a. Indicate Type of Lease: State ☐ Fee ☒

5. State Oil & Gas Lease No.

1a. TYPE OF WELL: OIL WELL ☐ GAS WELL ☐ DRY ☒ OTHER

b. TYPE OF COMPLETION: NEW WELL ☐ WORK OVER ☐ DEEPEN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ OTHER

7. Unit Agreement Name

8. Farm or Lease Name: Arco

2. Name of Operator: Burleson and Huff

9. Well No.: No. 2

3. Address of Operator: P.O. Box 1579 Midland, Texas 79701

10. Field and Pool, or Wildcat: Langlie=Mattix

4. Location of Well

UNIT LETTER H LOCATED 1980 FEET FROM THE North LINE AND 330 FEET FROM THE East LINE OF SEC. 21 TWP. 25 RGE. 37 NMPM

12. County: Lea

| 15. Date Spudded | 16. Date T.D. Reached | 17. Date Compl. (Ready to Prod.) | 18. Elevations (DF, RKB, RT, GR, etc.) | 19. Elev. Casinghead |
|---|---|---|---|---|
| 11-4-'75 | 11-10-'75 | 11-10-75 Dry | 3077 Gr. | |

| 20. Total Depth | 21. Plug Back T.D. | 22. If Multiple Compl., How Many | 23. Intervals Drilled By | Rotary Tools | Cable Tools |
|---|---|---|---|---|---|
| 1200 | - | - | → | X | |

24. Producing Interval(s), of this completion — Top, Bottom, Name

None Dry Hole

25. Was Directional Survey Made: No

26. Type Electric and Other Logs Run: None

27. Was Well Cored: No

28. CASING RECORD (Report all strings set in well)

| CASING SIZE | WEIGHT LB./FT. | DEPTH SET | HOLE SIZE | CEMENTING RECORD | AMOUNT PULLED |
|---|---|---|---|---|---|
| 8 5/8 | 30 # | 937 ' | 10 3/4 | 350 sx circulated | none |
| | | | | | |
| | | | | | |
| | | | | | |

29. LINER RECORD

| SIZE | TOP | BOTTOM | SACKS CEMENT | SCREEN |
|---|---|---|---|---|
| None | | | | |
| | | | | |

30. TUBING RECORD

| SIZE | DEPTH SET | PACKER SET |
|---|---|---|
| None | | |
| | | |

31. Perforation Record (Interval, size and number)

None

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

| DEPTH INTERVAL | AMOUNT AND KIND MATERIAL USED |
|---|---|
| | |
| | |
| | |
| | |

33. PRODUCTION

| Date First Production | Production Method (Flowing, gas lift, pumping — Size and type pump) | Well Status (Prod. or Shut-in) |
|---|---|---|
| | | |

| Date of Test | Hours Tested | Choke Size | Prod'n. For Test Period → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Gas—Oil Ratio |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| Flow Tubing Press. | Casing Pressure | Calculated 24-Hour Rate → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Oil Gravity — API (Corr.) |
|---|---|---|---|---|---|---|
| | | | | | | |

34. Disposition of Gas (Sold, used for fuel, vented, etc.)

Test Witnessed By

35. List of Attachments: Inclination Report

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED [signature] TITLE Co- Owner DATE June 10, 1976

## INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Commission not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

## INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

| Southeastern New Mexico | | | | Northwestern New Mexico | | | |
|---|---|---|---|---|---|---|---|
| T. Anhy | 954' | T. Canyon | | T. Ojo Alamo | | T. Penn. "B" | |
| T. Salt | 1020 | T. Strawn | | T. Kirtland-Fruitland | | T. Penn. "C" | |
| B. Salt | | T. Atoka | | T. Pictured Cliffs | | T. Penn. "D" | |
| T. Yates | | T. Miss | | T. Cliff House | | T. Leadville | |
| T. 7 Rivers | | T. Devonian | | T. Menefee | | T. Madison | |
| T. Queen | | T. Silurian | | T. Point Lookout | | T. Elbert | |
| T. Grayburg | | T. Montoya | | T. Mancos | | T. McCracken | |
| T. San Andres | | T. Simpson | | T. Gallup | | T. Ignacio Qtzte | |
| T. Glorieta | | T. McKee | | Base Greenhorn | | T. Granite | |
| T. Paddock | | T. Ellenburger | | T. Dakota | | T. | |
| T. Blinebry | | T. Gr. Wash | | T. Morrison | | T. | |
| T. Tubb | | T. Granite | | T. Todilto | | T. | |
| T. Drinkard | | T. Delaware Sand | | T. Entrada | | T. | |
| T. Abo | | T. Bone Springs | | T. Wingate | | T. | |
| T. Wolfcamp | | T. | | T. Chinle | | T. | |
| T. Penn. | | T. | | T. Permian | | T. | |
| T Cisco (Bough C) | | T. | | T. Penn. "A" | | T. | |

FORMATION RECORD (Attach additional sheets if necessary)

| From | To | Thickness in Feet | Formation | From | To | Thickness in Feet | Formation |
|---|---|---|---|---|---|---|---|
| 0 | 954 | 954 | Red Beds, sand, and line | | | | |
| 954 | 1020 | 66' | Anhydrite | | | | |
| 1020 | 1200 | 180 | Salt | | | | |

| | | |
|---|---|---|
| E | | |
| .G.S. | | |
| NG. OFFICE | | |
| E ATOR | | |

5a. Indicate Type of Lease
State ☐ Fee ☒

5. State Oil & Gas Lease No.

# 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.)

7. Unit Agreement Name

OIL WELL ☐ GAS WELL ☐ OTHER- Dry Hole

Name of Operator
Lewis B. Burleson, Inc.

8. Farm or Lease Name
Arco

Address of Operator
P.O. Box 2479 Midland, TX 79702

9. Well No.
2

Location of Well
UNIT LETTER H , 1980 FEET FROM THE North LINE AND 330 FEET FROM THE East LINE, SECTION 21 TOWNSHIP 25 RANGE 37 NMPM.

10. Field and Pool, or Wildcat
Langlie-Mattix

15. Elevation (Show whether DF, RT, GR, etc.)
3077GR

12. County
Lea

## Check Appropriate Box To Indicate Nature of Notice, Report or Other Data

| NOTICE OF INTENTION TO: | | | | SUBSEQUENT REPORT OF: | | | |
|---|---|---|---|---|---|---|---|
| FORM REMEDIAL WORK | ☐ | PLUG AND ABANDON | ☐ | REMEDIAL WORK | ☐ | ALTERING CASING | ☐ |
| TEMPORARILY ABANDON | ☐ | | | COMMENCE DRILLING OPNS. | ☐ | PLUG AND ABANDONMENT | ☐ |
| PULL OR ALTER CASING | ☐ | CHANGE PLANS | ☐ | CASING TEST AND CEMENT JOB | ☐ | | |
| OTHER | ☐ | | | OTHER | ☐ | | |

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.

1) Set 8 5/8" CIBP at 930' with cement cap.
2) Set 8 5/8" CIBP at 300' with cement cap.
3) Set 10 sack cement plug at surface.
4) Install marker and return location to original contour.
5) This well has already been inspected.

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

SIGNED _____ TITLE President DATE 7-15-83

APPROVED BY Ronald M Gatlin TITLE OIL & GAS INSPECTOR DATE AUG 31 1983

CONDITIONS OF APPROVAL, IF ANY:

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| LAND OFFICE | | |
| OPERATOR | | |

Form C-105
Revised 1-1-65

# NEW MEXICO OIL CONSERVATION COMMISSION
# WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5a. Indicate Type of Lease: State ☐ Fee XX

5. State Oil & Gas Lease No.

1a. TYPE OF WELL: OIL WELL X ☐ GAS WELL ☐ DRY ☐ OTHER

b. TYPE OF COMPLETION: NEW WELL X ☐ WORK OVER ☐ DEEPEN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ OTHER

7. Unit Agreement Name

8. Farm or Lease Name: Arco

2. Name of Operator: Burleson & Huff

9. Well No.: 2-Y

3. Address of Operator: P. O. Box 935, Midland, Texas 79701

10. Field and Pool, or Wildcat: Langlie-Mattix

4. Location of Well

UNIT LETTER H LOCATED 660 FEET FROM THE East LINE AND 1770 FEET FROM

North LINE OF SEC. 21 TWP. 25-S RGE. 37-E NMPM

12. County: Lea

| 15. Date Spudded | 16. Date T.D. Reached | 17. Date Compl. (Ready to Prod.) | 18. Elevations (DF, RKB, RT, GR, etc.) | 19. Elev. Casinghead |
|---|---|---|---|---|
| 11-20-75 | 12-1-75 | 12-19-75 | 3075.6 GR | 3075.6 |

| 20. Total Depth | 21. Plug Back T.D. | 22. If Multiple Compl., How Many | 23. Intervals Drilled By → | Rotary Tools | Cable Tools |
|---|---|---|---|---|---|
| 3500' | 3480' | 1 | | X | |

24. Producing Interval(s), of this completion — Top, Bottom, Name: 3365-3375 Queen

25. Was Directional Survey Made: No

26. Type Electric and Other Logs Run: Dual Laterolog and Compensated Neutron-Formation Density

27. Was Well Cored: No

28. CASING RECORD (Report all strings set in well)

| CASING SIZE | WEIGHT LB./FT. | DEPTH SET | HOLE SIZE | CEMENTING RECORD | AMOUNT PULLED |
|---|---|---|---|---|---|
| 8-5/8" | 28 | 807 | 11 | 375 sx - circulated | |
| 4-1/2" | 9.5 | 3500 | 7-7/8 | 250 sx - top of salt | |
| | | | | | |
| | | | | | |

29. LINER RECORD

| SIZE | TOP | BOTTOM | SACKS CEMENT | SCREEN |
|---|---|---|---|---|
| | | | | |
| | | | | |

30. TUBING RECORD

| SIZE | DEPTH SET | PACKER SET |
|---|---|---|
| 2 | 3295 | 3296 |
| | | |

31. Perforation Record (Interval, size and number)

1 shot per foot, 3365 - 3375' , 11 holes

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

| DEPTH INTERVAL | AMOUNT AND KIND MATERIAL USED |
|---|---|
| 3365 - 3375 | 1000 gal acid |
| 3365- 3375 | 20,000 gal gel water & 22,500 # sand |
| | |

33. PRODUCTION

| Date First Production | Production Method (Flowing, gas lift, pumping — Size and type pump) | Well Status (Prod. or Shut-in) |
|---|---|---|
| 12-19-75 | flowing | Prod. |

| Date of Test | Hours Tested | Choke Size | Prod'n. For Test Period → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Gas — Oil Ratio |
|---|---|---|---|---|---|---|---|
| 12-22-75 | 24 | 3/4 | | 12 | 45.31 | 5 | 3776:1 |

| Flow Tubing Press. | Casing Pressure | Calculated 24-Hour Rate → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Oil Gravity — API (Corr.) |
|---|---|---|---|---|---|---|
| 25# to 50# | packer | | 12 | 45.31 | 5 | 36° |

34. Disposition of Gas (Sold, used for fuel, vented, etc.): To be sold to El Paso, possibly, no contract

Test Witnessed By: Lewis B. Burleson

35. List of Attachments: Logs and Direction Survey

36. *I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.*

SIGNED [signature] TITLE Co-Owner DATE 12-23-75

## INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Commission not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

## INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

| Southeastern New Mexico | | | | Northwestern New Mexico | | | |
|---|---|---|---|---|---|---|---|
| T. Anhy | 920 | T. Canyon | | T. Ojo Alamo | | T. Penn. "B" | |
| T. Salt | 1050 | T. Strawn | | T. Kirtland-Fruitland | | T. Penn. "C" | |
| B. Salt | 2585 | T. Atoka | | T. Pictured Cliffs | | T. Penn. "D" | |
| T. Yates | 2745 | T. Miss | | T. Cliff House | | T. Leadville | |
| T. 7 Rivers | 3052 | T. Devonian | | T. Menefee | | T. Madison | |
| T. Queen | 3310 | T. Silurian | | T. Point Lookout | | T. Elbert | |
| T. Grayburg | | T. Montoya | | T. Mancos | | T. McCracken | |
| T. San Andres | | T. Simpson | | T. Gallup | | T. Ignacio Qtzte | |
| T. Glorieta | | T. McKee | | Base Greenhorn | | T. Granite | |
| T. Paddock | | T. Ellenburger | | T. Dakota | | T. | |
| T. Blinebry | | T. Gr. Wash | | T. Morrison | | T. | |
| T. Tubb | | T. Granite | | T. Todilto | | T. | |
| T. Drinkard | | T. Delaware Sand | | T. Entrada | | T. | |
| T. Abo | | T. Bone Springs | | T. Wingate | | T. | |
| T. Wolfcamp | | T. | | T. Chinle | | T. | |
| T. Penn. | | T. | | T. Permian | | T. | |
| T Cisco (Bough C) | | T. | | T. Penn. "A" | | T. | |

## FORMATION RECORD (Attach additional sheets if necessary)

| From | To | Thickness in Feet | Formation | From | To | Thickness in Feet | Formation |
|---|---|---|---|---|---|---|---|
| 0 | to | 970 | Red beds | | | | |
| 970 | to | 1050 | Anhydrite | | | | |
| 1050 | to | 2745 | Salt & Anhydrite | | | | |
| 2745 | to | 3052 | Dolomite, Anhydrite & sand | | | | |
| 3052 | to | 3310 | Dolomite & Anhydrite | | | | |
| 3310 | to | 3500 | sand, dolomite & anhydrite | | | | |

| NO. OF COPIES RECEIVED | | |
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NEW MEXICO OIL CONSERVATION COMMISSION

Form C-103
*Supersedes Old C-102 and C-103*
Effective 1-1-65

5a. Indicate Type of Lease
State ☐ Fee ☒

5. State Oil & Gas Lease No.

## 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. OIL WELL ☐ GAS WELL ☐ OTHER- P & A

7. Unit Agreement Name

2. Name of Operator
Atlantic Richfield Company

8. Farm or Lease Name
B.T. Lanehart

3. Address of Operator
P. O. Box 1978, Roswell, New Mexico 88201

9. Well No.
1

4. Location of Well
UNIT LETTER H . 2310 FEET FROM THE North LINE AND 990 FEET FROM THE East LINE, SECTION 21 TOWNSHIP 25-S RANGE 37-E NMPM.

10. Field and Pool, or Wildcat
Jalmat-Yates

15. Elevation *(Show whether DF, RT, GR, etc.)*
3071' GR

12. County
Lea

16. 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 ☐ | | COMMENCE DRILLING OPNS. ☐ | PLUG AND ABANDONMENT ☒ |
| PULL OR ALTER CASING ☐ | CHANGE PLANS ☐ | CASING TEST AND CEMENT JOB ☐ | |
| OTHER ☐ | | OTHER ☐ | |

17. 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.

This well has been plugged and abandoned as follows:

Set 8-5/8" CIBP @ 2650'. Loaded hole w/170 bbls of fresh water gel mud. Spotted 35 sk cement plug 2650-2540'; 35 sk cement plug 1200-1090'. Placed 10 sk cement plug in top of well and erected dry hole marker. All casing strings remain intact. All gel mud contained 25 sx gal/100 bbls of water.

Your office will be notified when location is ready for inspection.

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

SIGNED A D Gutches TITLE Dist. Drlg. Supervisor DATE 2/21/73

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

FORMATION RECORD

| FROM | TO | THICKNESS IN FEET | FORMATION |
|---|---|---|---|
| 0 | 35 | 35 | Caliche |
| 35 | 55 | 20 | Sand |
| 55 | 125 | 70 | R R W 70-75 |
| 125 | 150 | 25 | Blue shale |
| 150 | 220 | 70 | R R |
| 220 | 230 | 10 | Limy sand |
| 230 | 320 | 90 | R R, caving badly |
| 320 | 350 | 30 | Sandy lime |
| 350 | 385 | 35 | Sand 10 BWPH |
| 385 | 400 | 15 | Gray sandy lime |
| 400 | 500 | 100 | Sand, gradual increase to HFW |
| 500 | 530 | 30 | Sharp sand |
| 530 | 565 | 35 | Sand |
| 565 | 570 | 5 | R R |
| 570 | 605 | 35 | Sand & RR |
| 605 | 615 | 10 | R sand |
| 615 | 700 | 85 | RR |
| 700 | 710 | 10 | Sand & RR |
| 710 | 720 | 10 | RR |
| 720 | 730 | 10 | Hard sand |
| 730 | 750 | 20 | Red sand |
| 750 | 770 | 20 | RR |
| 770 | 810 | 40 | Hard red shale |
| 810 | 835 | 25 | Hard red sand |
| 835 | 840 | 5 | Red shale |
| 840 | 920 | 80 | RR |
| 920 | 1035 | 115 | Anhydrite |
| 1035 | 1038 | 3 | White shale |
| 1038 | 1043 | 5 | Sand HFW 1040 |
| 1043 | 1050 | 7 | Lime |
| 1050 | 1060 | 10 | Red shale |
| 1060 | 1065 | 5 | RR |
| 1065 | 1070 | 5 | Anhydrite |
| 1070 | 1145 | 75 | RR |
| 1145 | 1175 | 30 | Anhydrite |
| 1175 | 1190 | 15 | Anhydrite & RR |
| 1190 | 1205 | 15 | RR |
| 1205 | 1225 | 20 | Anhydrite 1225-1218 Sd LM |
| 1218 | 1223 | 5 | Anhydrite & salt |
| 1223 | 1227 | 4 | Potash |
| 1227 | 1234 | 7 | Anhydrite & xxix RR |
| 1234 | 1265 | 31 | Anhydrite |
| 1265 | 1285 | 20 | Salt |
| 1285 | 1300 | 15 | Salt & RR |
| 1300 | 1445 | 145 | Salt |
| 1445 | 1460 | 15 | Potash |
| 1460 | 1465 | 5 | Salt |
| 1465 | 1480 | 15 | Anhydrite |
| 1480 | 1565 | 85 | Salt |
| 1565 | 1635 | 70 | Salt & potash |
| 1635 | 1690 | 55 | Salt |
| 1690 | 1700 | 10 | Anhydrite |
| 1700 | 1720 | 20 | Salt |
| 1720 | 1733 | 13 | Anhydrite |
| 1733 | 1770 | 37 | Anhydrite & salt |
| 1770 | 1995 | 225 | Salt |
| 1995 | 2015 | 20 | Anhydrite & salt |
| 2015 | 2060 | 45 | Anhydrite |
| 2060 | 2087 | 27 | Salt |
| 2087 | 2195 | 108 | Anhydrite |
| 2195 | 2235 | 40 | Salt |
| 2235 | 2320 | 85 | Anhydrite & salt |
| 2320 | 2358 | 38 | Salt |
| 2358 | 2415 | 57 | Anhydrite |
| 2415 | 2590 | 175 | Salt |
| 2590 | 2605 | 15 | Anhydrite 2605 - 2610 Sd LM |
| 2610 | 2620 | 10 | Anhydrite & lime |
| 2620 | 2650 | 30 | Lime |
| 2650 | 2691 | 41 | Lime & Anhydrite |
| 2691 | 2751 | 60 | Lime |
| 2751 | 2804 | 53 | Gray shale 2804-2801 Halliburton Measurment |
| 2801 | 2802 | 1 | Gray shale |
| 2802 | 2814 | 12 | Sandy shale, slight show gas 2810-14 |
| 2814 | 2823 | 9 | Chaly sand |
| 2823 | 2878 | 55 | Sandy shale |
| 2878 | 2885 | 7 | Shale & lime shells |
| 2885 | 2910 | 25 | Lime |
| 2910 | 2917 | 7 | Lime & shale |
| 2917 | 2927 | 10 | Broken lime |
| 2927 | 2936 | 9 | Lime & shale |
| 2936 | 2944 | 8 | Soft sand, show oil & gas 2936-44 |
| 2944 | 2957 | 13 | shale |
| 2957 | 2974 | 17 | Sandy shale, show gas 2960-69 |
| 2974 | 3004 | 30 | Shale |
| 3004 | 3025 | 21 | Lime |
| 3025 | 3035 | 10 | Sand, gas 3025-32, perhaps 1 million cu.ft. |
| 3035 | 3049 | 14 | Lime |
| 3049 | 3053 | 4 | Gas sand |
| 3053 | 3065 | 12 | Sand |
| 3065 | 3070 | 5 | Oil sand |
| 3070 | 3075 | 5 | Sand more gas 3073-75 |
| 3075 | 3080 | 5 | Lime |

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88240
(505) 393-6161

April 15, 1983

Mr. Ralph Bowington
Box 95
Jal, NM 88252

Dear Mr. Bowington:

Attached is a copy of the chloride analysis run on the sample obtained from your domestic water well on April 11, 1983.

We plan to do some further testing in the area and will keep you advised of our findings.

Very truly yours,

OIL CONSERVATION DIVISION

Jerry Sexton
Supervisor, District I

ed

Attachment

ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
HOBBS, NEW MEXICO

# WATER ANALYSIS

Well Ownership: RALPH BOWINGTON  Well No. water well

Land Status: State ____  Federal ____  Fee X

Well Location: Unit Letter A, Section 21, T 25 S, R 37 E

Type Well: Domestic water well sub.  Depth 110 feet.

Well Use: Domestic

Sample Number: 1  Date Taken: 4-11-83

Taken By: Eddie Seay

*Specific Conductance: ____ m/ɷ

Total dissolved Solids: ____ PPM.

Chlorides: 7,100 PPM.

Sulfates: ____ PPM.

Ortho-phosphates: ☐ V.Low ☐ Low ☐ Medium ☐ High

Sulfides: ☐ None ☐ Low ☐ Medium ☐ High

____ : ____

Date Analyzed: 4-12-83  By: Eddie W Seay
Oil Conservation Division

Water Level: 56 feet

REMARKS:

1 ml 3550 x 2.0 = 7100 ppm Chlorides

All well information obtained from Mr. Bowington, Box 95, Jal, NM 88252

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

April 15, 1983

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88240
(505) 393-6161

Mr. Sonny Dakan
Box 670
Jal, NM 88252

Dear Mr. Dakan:

Attached is a copy of the chloride analysis run on the sample obtained from your domestic water well on April 13, 1983.

We plan to do some further testing in the area and will keep you advised of our findings.

Very truly yours,

OIL CONSERVATION DIVISION

Jerry Sexton
Supervisor, District I

ed

Attachment

OCD COMPLAINT FORM

UIC ____
OTHER ____

COMPLAINT TAKEN BY: JERRY SEXTON DATE: 4-7-83 TIME: _____

PERSON COMPLAINING: IN PERSON: ____ PHONE: X

Name: Red Regan, Jal City Manager ~~Ralph Bowington~~

Address: Box 95, Jal, NM

Phone: _____

Complaint: water well east of Jal had gone bad -- (salty)

## INVESTIGATION

INVESTIGATOR: Eddie Seay DATE: 4-12-83 TIME: 8 am

DESCRIBE INVESTIGATION AND FINDINGS: Met with Mr. Regan to get details about water problem of Mr. Bowington. Met with Mr. Bowington and obtained water sample from his well and another well in the area. Will collect more samples later.

Bowington well 7100 ppm cl // 9/17/84: 5,975 ; 11/2[illegible]: 1190

Sonny Dakan well 39,760 ppm cl. [illegible] 43,762

ACTION TAKEN: DATE: 4-15-83 TIME: _____

Sent copy of analysis and letter to Ralph Bowington and Sonny Dakan. Plan to run bradenhead survey in the immediate area.

USE ADDITIONAL SHEET IF NECESSARY

# The Use of Ionic Mixing Curves in Differentiating Oil Field Brine from Natural Brine in a Fresh Water Aquifer

by Vernon A. Mast

## Introduction

The encroachment of salt water brine into fresh water aquifers is receiving increasing attention as water use by industries, muncipalities and irrigation increases. Where natural subsurface salt deposits exist in the vicinity of a producing oil field, the question of the source of the brine becomes important, especially when the activities of man are blamed for the presence of salinity in an aquifer.

The presence of ground water pollution in the south Wichita, Kansas, vicinity has received considerable attention over the past few years from both the news media and the Kansas State Department of Health and Environment. The pollution threatens municipal water supplies, residential water wells and irrigation usage. The pollution has been attributed to past and present oil field brine disposal practices and to the dissolution of underlying natural halite and gypsum evaporite beds. For litigation purposes, it became important to determine the percentage contribution of each of these sources to the total pollution.

A series of test wells was drilled, both into the fresh water aquifer and into the underlying evaporite beds. Static water levels were measured and water samples were taken on a weekly basis for about 12 months. The water samples were chemically analyzed for primary ions, ionic concentration ratios were calculated using varying combinations of ions, and computer plots were generated to analyze the results.

Chemical fingerprinting techniques to identify brine sources are in their infancy. Several investigators (Whittamore and Pollock 1978; Gogel 1981) used ionic ratios to identify salt water brines. The most widely used technique is the sodium-to-chloride ratio. Whittamore and Pollock have shown that the oil field brines in Kansas have a sodium-to-chloride ratio equal to 0.5 ± 0.1 and natural saline formation waters have a sodium-to-chloride ratio equal to 0.65 ± 0.03.

This article describes the study and the analytical technique used to determine the relative contribution of each pollution source to the increased salinity of the fresh water aquifer in the south Wichita, Kansas, area.

## Site Geology and Drilling Program

This study was conducted on a fresh water aquifer in a producing oil field located in Section 29-T28S-R1E, Sedgwick County, Kansas. The site is located within the Arkansas River floodplain. Unconsolidated Pleistocene sand and gravel deposits, about 50 feet thick, comprise the floodplain. The underlying Wellington Formation is Permian shale with alternating thin layers of gypsum to a depth of about 85 feet, where a thick layer of gypsum is encountered. Halite beds are common in the formation but are not identified in drillers' logs. The water table in the fresh water aquifer is approximately 15 feet below the ground surface. Thus the fresh water aquifer has a thickness of about 35 feet. Highly mineralized water was encountered within the gypsum layers in the bedrock.

Irrigation well water used in the area reportedly caused leaf kill in an orchard operation because of high concentrations of certain ionic species. A drilling program was developed to study this problem. It was determined that the chemical differences exist with depth within the formation from which the water used for irrigation was pumped. Four clusters of monitoring wells surrounded a centrally located irrigation well. The clusters were positioned at distances from the irrigation well equal to increments of one-half the fresh water aquifer thickness. Each cluster contained three wells: one at 30 foot depth near the center of the aquifer, one at 50 foot depth at the bottom of the aquifer, and one at 100 foot depth cemented into the Wellington Formation and sealed from the fresh water aquifer. The site geology, along with the general configuration of the well clusters, is shown in Figure 1.

Water samples were taken and static water levels were measured weekly for about nine months. The water levels of those wells within the fresh water aquifer remained relatively constant at about 15 feet beneath the ground surface. The wells drilled into bedrock showed water levels at nine feet from the

ground surface. This six feet of potentiometric head difference may be sufficient to force highly mineralized water upward through cracks and fissures in the bedrock and be partially responsible for the pollution problem.

## Chemical Analysis

The water sampling was performed using a Wildco 250ml Model 1280-A10 sampler. Approximately 350 water samples, along with locally produced oil field brine samples, were analyzed for the primary ions sodium, calcium, magnesium, sulfate, chloride and for total dissolved soilds. Sodium, calcium and magnesium determinations employed the Perkin-Elmer 5000 atomic absorption spectrophotometric system. Sulfate levels were determined using a Hach DR/3 spectrophotometer. The total dissolved solids content was determined by drying a sample at 90 C. The chloride ion was tested using mercuric nitrate titrant and diphenylcarbazone reagent.

Background chemical levels were determined for the three major types of water, which upon mixing, constituted the ground water at the study site. Fresh water samples from local water wells, oil field production salt water brine samples from local tank batteries and samples of natural brine from the underlying halite and gypsum beds were obtained and analyzed. Additional chemical data were obtained from the Kansas State Geological Survey and the Kansas State Department of Health and Environment.

All of the data generated in the study were examined using the Gauss Error Function. The data with small probability were rejected according to Chauvenet's Criteria as described by Young (1962). The baseline data by which the fresh water aquifer was characterized, along with the analytical results are given in Table 1. The sodium-to-chloride ratio of 0.53 for the aquifer at the 50-foot level is close to that given for produced water, indicating an oil field brine source. It is also noted that the sodium-to-chloride ratio of 0.57 at the 30-foot level is between that found for an oil field brine and the naturally mineralized water at 100 feet. It is readily apparent from the data that the pollution concentration increased with aquifer depth, but the contribution of each pollution source to the overall problem is not readily apparent.

Table 1
Medn Values for Chemical Analyses (mg/L)

| Ion | Fresh water | Oil field brine | Natural brine | Aquifer (30 ft) | Aquifer (50 ft) |
|---|---|---|---|---|---|
| $Ca^{++}$ | 110 | 8,990 | 2,550 | 550 | 4,550 |
| $Mg^{++}$ | 21 | 2,480 | 1,690 | 270 | 1,100 |
| $Na^{+}$ | 148 | 49,000 | 5,170 | 770 | 8,280 |
| $Cl^{-}$ | 100 | 95,500 | 7,600 | 1,340 | 15,640 |
| $SO_4^{--}$ | 60 | 500 | 7,110 | 510 | 220 |
| TDS | 575 | 157,000 | 24,200 | 6,390 | 29,900 |
| $Na^{+}/Cl^{-}$ | 1.48 | 0.51 | 0.68 | 0.57 | 0.53 |

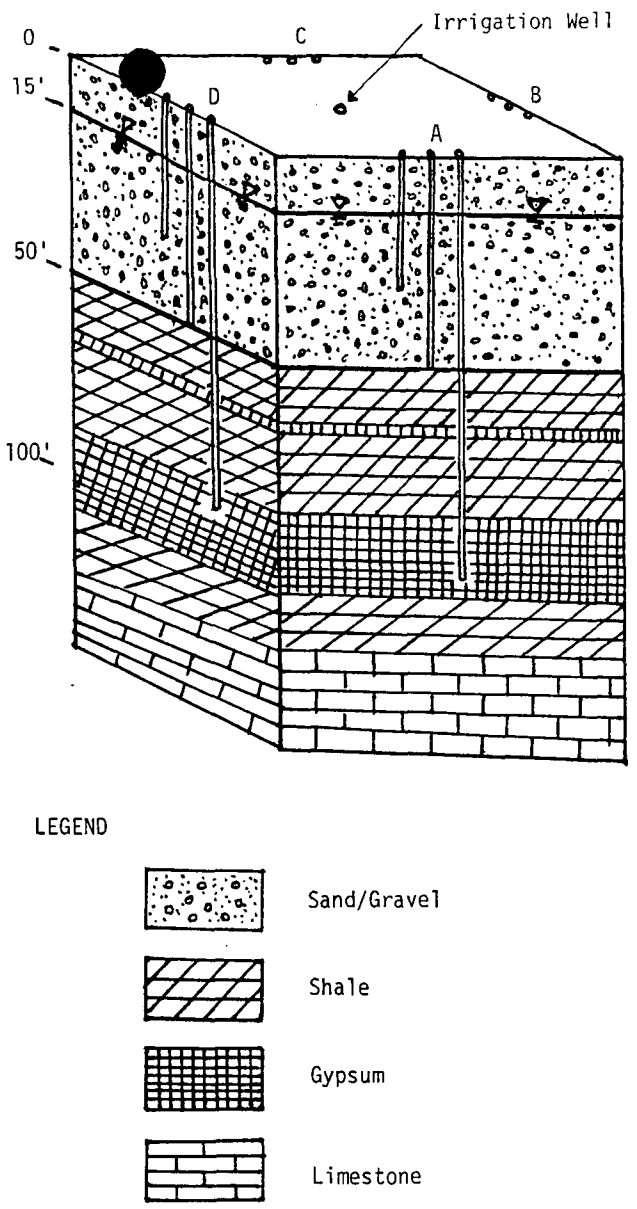


Figure 1. Site geology and position of well clusters A, B, C and D within the fresh water aquifer and the Wellington Formation bedrock

## Computer Analysis

In the computer data analysis, factor pairs of calcium, magnesium, chloride and total dissolved solids vs. sulfate were used. The sulfate was chosen to represent the distinct characteristics of the natural brine in the underlying Wellington Formation. Likewise, the chloride ion was used as the main factor representing the influence from oil field brine. Furthermore, the total dissolved solids factor was used to provide an overall view of pollutants in the brine. Finally, the calcium and magnesium were used for comparison in the analysis.

After the factor pairs were chosen, the percent volume of those three sources of water were calculated from the three simultaneous linear equations as shown below.

$$C_{lf} \cdot P_f + C_{lo} \cdot P_o + C_{lw} \cdot P_w = C_{la} \quad (1\text{-a})$$

$$C_{2f} \cdot P_f + C_{2o} \cdot P_o + C_{2w} \cdot P_w = C_{2a} \quad (1\text{-b})$$

$$P_f + P_o + P_w = 1 \quad (1\text{-c})$$

higher than for the middle of the aquifer. This fact coincides with the characteristics of a chemically unsaturated static water system. Since the mass density of the pollutant ions make them heavier, the pollution is expected to accumulate at the bottom of the system.

**Table 2**
**Mean Volumetric Contribution Percentages from the Computer Analysis**

| Ion | Middle of aquifer | | | Bottom of aquifer | | |
|---|---|---|---|---|---|---|
| | F | O | W | F | O | W |
| $Ca^{++}$ | 95.4 | 1.3 | 3.3 | 79.3 | 14.9 | 5.8 |
| $Mg^{++}$ | 95.5 | 1.2 | 3.3 | 83.3 | 6.5 | 10.2 |
| $Cl^{-}$ | 96.0 | 0.6 | 3.4 | 84.7 | 8.5 | 6.8 |
| TDS | 95.9 | 0.7 | 3.4 | 85.2 | 7.9 | 6.9 |

F = fresh water aquifer water; O = oil field brine; W = Wellington Formation water

## Summary and Conclusions

A statistical analysis model has been presented and has proven to be a valuable tool in determining the percentage contribution of pollution from sources of contaminants in a fresh water aquifer. For the most reliable factors, chloride and total dissolved solids, the volumetric percentage contribution of oil field brine and Wellington Formation natural brine at the bottom of the aquifer ranged from 6.5 percent to 8.5 percent and 6.8 percent to 7.1 percent, respectively. The results were used in expert testimony and relied upon in the final decision.

For the analytical model itself, two drawbacks are pointed out. First, the water system in the model is highly simplified. For a system with more than two potential pollutant sources, this analysis will not serve a proper function. Second, the choice of factor pairs is site-dependent. With different geological environments, as well as different pollutant types, the factor pairs used must be chosen accordingly.

With respect to these two drawbacks, three suggestions are made for future analysis in multisource pollution systems:

1. For an unsteady-state system, a time factor should be included in the analysis
2. For a system of N number of pollutant sources, factor groups of N items should be used for analysis
3. Every item in the factor group selected should represent the characteristics of the respective pollutant sources.

## References


Gogel, Tony. 1901. Discharge of Saltwater from Permian Rocks to Major Stream-Aquifer Systems in Central Kansas. Chemical Quality Series 9. Kansas Geological Survey, The University of Kansas, Lawrence, Kansas.

Whittemore, Donald O. and Livia M. Pollock. 1978. Determination of Salinity Sources in Water Resources of Kansas by Minor Alkali Metal and Halide Chemistry. Contribution No. 208. Kansas Water Resources Research Institute, Manhattan, Kansas.

Whittemore, Donald O., C.L. Basel, O.K. Galle and T.C. Waugh. 1981. Geochemical Identification of Saltwater Sources in the Smoky Hill River Valley, McPherson, Saline, and Dickinson Counties, Kansas. Kansas Geological Survey, The University of Kansas, Lawrence, Kansas.

Young, Hugh D. 1962. Statistical Treatment of Experimental Data. McGraw-Hill Book Company Inc., New York, New York.


## Biographical Sketch


*Vernon A. Mast is associate professor of civil engineering at Oklahoma State University. His responsibilities include teaching undergraduate and graduate courses, and supervising graduate research. His primary research interest is ion migration and attenuation through soils. He has served as a consultant in more than 100 cases involving contamination of ground water by oilfield operations. Dr. Mast received his graduate degrees from the University of Pennsylvania and The Ohio State University. He is a registered professional engineer.*

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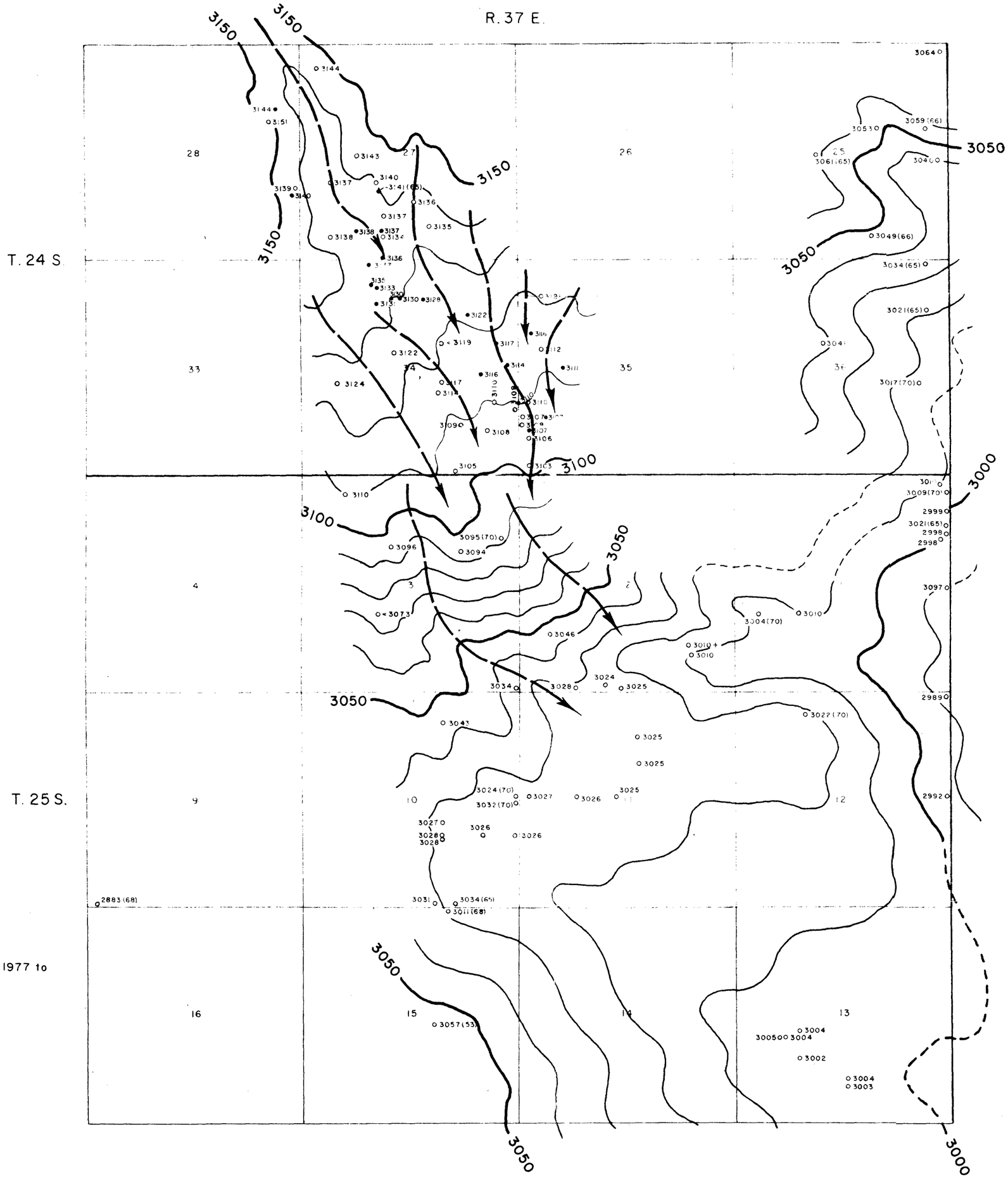


● = Added and corrected Nov. 1977 to Oct. 19, 1979

# ALTITUDE AND CONFIGURATION OF WATER TABLE IN PART OF TOWNSHIPS 24S AND 25S RANGE 37E N.M.P.M. - 1979

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Revised: Oct. 19, 1979

S.E. Galloway, New Mexico State Engineer Office, November - 1977

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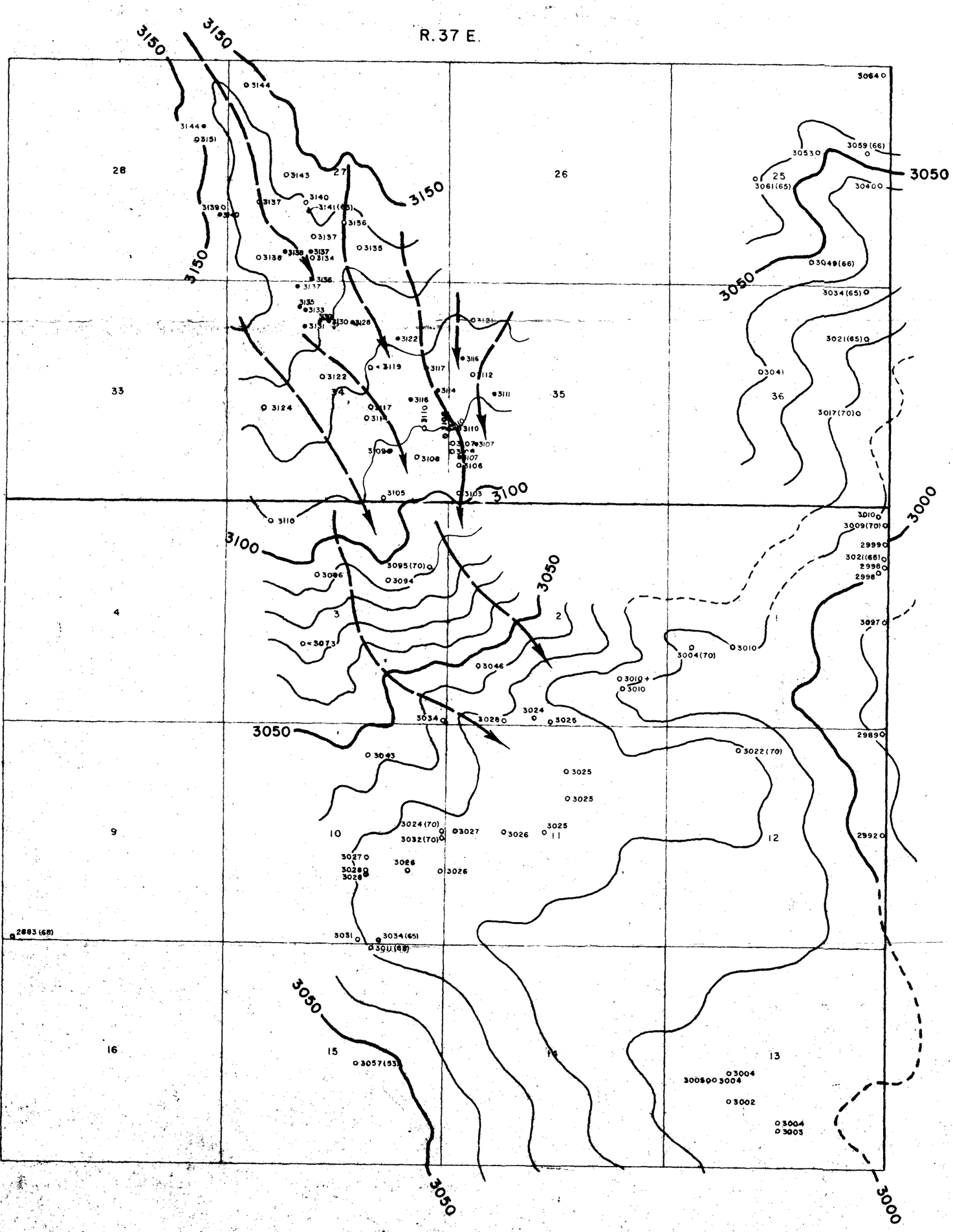


● = Added and corrected, Nov. 1977 to Oct. 19, 1979

# ALTITUDE AND CONFIGURATION OF WATER TABLE IN PART OF TOWNSHIPS 24S AND 25S RANGE 37E N.M.P.M. - 1979

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Revised Oct. 19, 1979

N.E. Gallegos, New Mexico State Engineer Office

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Updated in 1972 on the basis of the Shallow aquifer

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HOBBS, NEW MEXICO 88240
(505) 392-2236
FAX (505) 392-6949

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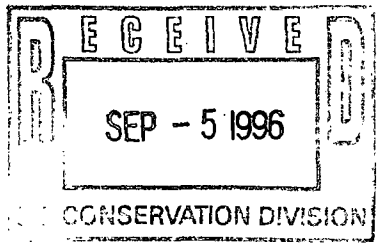



September 3, 1996

New Mexico Oil Conservation Division
Environmental Bureau
ATTN: Mark Ashley
2040 South Pacheco
Santa Fe, NM 87505

RE: Jal Brine Station BW-007

Mr. Ashley:

Pursuant to your letter dated August 16 concerning the testing of Mr. Prather's brine wells. The Eunice well BW-002 will be and is ready to test at time designated.

The Jal brine BW-007 well is not in operation and not equipped to be tested. a permit for disposal was filed for this well several months earlier and the State is still studying the permit and/or process. If the permit is denied, the well will be P & A according to OCD rules and regulations. If it is approved, then testing will be required again.

It is our wish to wait until some decision has been made on the application to dispose into this well before additional expense is incurred in testing.

Please call at your convenience to discuss our options.

Your attention in this matter is greatly appreciated.

Sincerely,

Eddie W. Seay, Agent

cc: Dink Prather

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

August 16, 1996

Certified Mail
Return Receipt No. P-288-258-827

Mr. Paul Prather
P&S Brine Sales
P.O. Box 7169
Eunice, New Mexico 88231

**RE: Mechanical Integrity Testing of Brine Supply Wells**

**Annual Test**
**Jal Brine Station BW-007**
**Lea County, New Mexico**

**Annual Test**
**Eunice Brine Station BW-002**
**Lea County, New Mexico**

Dear Mr. Prather:

The Underground Injection Control Program of the Federal Safe Drinking Water Act requires that operators demonstrate mechanical integrity of all injection wells by ensuring that there are no leaks in the tubing, casing, or packer, and that the injected fluid is confined within the injection zone through proper cementing.

All brine wells that operate without a packer will be required to have an annual open hole pressure test equal to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for four hours with a maximum of 10 percent bleed-off allowed. Every five years or at the time of discharge plan renewals they will be required to have an open hole pressure test equal to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for four hours with zero bleed-off.

All brine wells that operate with a packer will be required to have an annual casing/tubing annulus pressure test equal to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for four hours.

Operators will be responsible for providing equipment and shall bear all costs incurred. The date and time of all tests will be scheduled and witnessed by the New Mexico Oil Conservation Division.

Please have the Eunice Brine Station ready for testing on September 19, 1996 at 8:00 AM, and the Jal Brine Station ready for testing on September 19, 1996 at 9:00 AM as outlined below.

For brine wells operating without a packer:

1) The cavern must be pressured up and stabilized for a period of at least 24 hours prior to testing.

2) The system shall be tested to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for a period of four hours. A maximum of 10 percent bleed-off will be allowed for annual tests. Testing conducted every five years or at the time of discharge plan renewal will have zero bleed-off.

3) A continuous recording pressure chart with an 8 hour clock shall be installed on both the casing/tubing annulus and tubing. The pressure range shall not be greater than 1,000 psig.

4) Have well head prepared for test. All valves should be in good working order. All casing/tubing annulus and tubing valves shall be open.

5) All gauges shall be in good working order.

6) Have manpower and equipment available for pressure test.

For brine wells operating with a packer:

1) Have the casing/tubing annulus and tubing loaded with inert fluid prior to testing.

2) The casing/tubing annulus shall be tested to 1.5 times the normal operating pressure or 300 psig, whichever is greater, for four hours.

3) A continuous recording pressure chart with an 8 hour clock shall be installed on the casing/tubing annulus. The pressure range shall not be greater than 1,000 psig.

4) Have well head prepared for test. All valves should be in good working order.

5) All gauges shall be in good working order.

6) Have manpower and equipment available for pressure test.

If you have any questions regarding this matter, please feel free to contact me at (505) 827-7155.

Sincerely,

Mark Ashley
Geologist

$\frac{Na}{Cl}$ : 0.51 for Permian Brine's Brine - however, analysis suspect

EM meter at Fremont.

Brunton Pole:

made adjustment and adjustment battery ok

coil separation check:

Receiver placed approx 3 m. toward transmitter to deflect needle fully.

First point 90 feet south of Moseley water well. Line A set due north/south at 50 ft intervals.

| Distance From point O on line A | Coil Sep. | Vertical/ Horiz. | Sens. Range | READING | NOTES |
|---|---|---|---|---|---|
| | | | | | coil sep. needle wobbles |
| 0 | 20m | V | 30 | 2.56 ✓ | |
| | " | H | 100 | 2.5 ✓ | |
| 50 ft | " | V | 30 | 2.45 ✓ | |
| 100 | " | V | 100 | 2.1 ✓ | |
| 150 | " | V | 100 | 2.2 ✓ | |
| Line jogs east 50 ft to avoid pipeline | | | | | |
| 150 | 20m | V | 30 | 2.4 ✓ | |
| Line jogs another 50 ft east - total 100 ft east. | | | | | |
| 150 | 20m | V | 30 | 2.35 ✓ | |
| 200 | " | V | 30 | 2.3 | |
| 250 | " | V | 30 | 2.1 | |
| 300 | " | V | 30 | 2.3 | |
| 350 | " | V | 30 | 2.2 | |
| 400 | " | V | 30 | 2.1 | |
| 450 | " | V | 30 | 2.1 | |
| 500 | " | V | 30 | 2.1 | |
| 550 | " | V | 30 | 2.2 | |

| Dist | Coil Sep | V/H | Sens. | Peak | Notes |
|---|---|---|---|---|---|
| 600 | 20m | V | 30 | 2.1 | |
| 650 | " | " | 30 | 2.19 | |
| 700 | " | " | 30 | 2.1 | |
| 750 | " | " | 30 | 2.12 | |
| 800 | " | " | 100 | 0.95 | |
| 850 | " | " | 100 | 0.85 | |
| 900 | " | " | 30 | 2.1 | |
| | | | (100 | 0.6) | |
| 950 | " | " | 30 | 2.15 | |
| 1000 | " | " | 30 | 2.32 | |
| 1050 | " | " | 30 | 2.4 | |
| 1100 | " | " | 30 | 2.73 | |
| 1150 | " | " | 100 | 1.15 | receiver coil 50' from transmitter pipeline |
| 1200 | " | " | 100 | 0.75 | |
| 1250 | " | " | 100 | 1.2 | transmitter at edge of old drilling pit on pipeline |
| 1300 | " | " | 30 | 2.7 | |
| 1350 | " | " | 30 | 2.26 | |
| 1400 | " | " | 30 | 2.23 | |
| 1400 | | H | 100 | 0.95 | coil on ground |
| 1350 | | H | 100 | 1.0 | |

| | | | | |
|---|---|---|---|---|
| 1300 | 20m | H | 100 | 1.35 |
| 1250 | " | H | 100 | 0.9 |
| 1000 | 20 | H | 100 | 1.0 |
| 750 | " | H | 100 | 1.65 |

East - west line B crossing A 750' spot X next up well cross drilling pit of Bachman; Nuff Ranch No. 2-Y Unit 14 Sec 21 T25S R37E - Robert Smith (Mountain Bird Salvage) requested copy of schlumberger resistivity from data collected today)

| | | | | |
|---|---|---|---|---|
| B.0 | 20m | V | 30 | 2.1 |
| | | H | 100 | 0.90 |
| B.50'w | | V | 30 | 2.2 |
| | | H | 100 | 0.9 |
| 100'w | | V | 30 | 2.22 |
| | | H | 100 | 1.18 |
| 150'w | | V | 30 | 2.22 |
| | | H | 30 | 1.5 |

| DIST | COIL SEP | V/H | Sens. | READ | NOTES |
|---|---|---|---|---|---|
| 200'w | 20 m | V | 30 | 2.25 | |
| | | H | 100 | 1.75 | |
| 250'w | | V | 50 | 2.2 | |
| | | H | 30 | 2.15 | |
| 300w | | V | 30 | 2.2 | |
| | | H | 100 | 1.1 | |
| 350w | | V | 30 | 2.2 | 'n of center of abandoned BH pit |
| | | H | 100 | 1.0 | |
| 400 | | V | 30 | 2.31 | |
| | | H | 100 | 1.05 | |
| 450 | | V | 30 | 2.28 | |
| | | H | 100 | 1.1 | |
| 500 | | V | 30 | 2.23 | reading on edge of pipeline |
| | | H | no reading - 2x. | | tried |
| 550 | | V | 30 | 2.31 | |
| | | H | 30 | 1.0 | |
| 600 | | V | 30 | 2.35 | |
| | | H | 100 | 1.03 | |
| 650 | | V | 30 | 2.12 | |
| | | H | 100 | 1.0 | |

| East of 250N's Line | | | | | |
|---|---|---|---|---|---|
| DIST | COIL SEP | V/H | Sens. | READ | NOTES |
| 0 | | V | 30 | 1.8 | |
| | | H | no reading | | |
| 50e | | V | 30 | 1.7 | |
| | | H | 100 | 0.95 | |
| 100e | | V | 30 | 2.1 | |
| | | H | 100 | 1 | |
| 150e | | V | 30 | 2.1 | |
| | | H | 100 | .8 | |
| 200 | | V | 30 | 1.98 | |
| | | H | 100 | 0.85 | |
| 250 | | V | 30 | 2.0 | |
| | | H | 100 | .75 | |
| 300e | | V | 30 | 1.9 | |
| | | H | 100 | .8 | |
| 350 | | V | 30 | 1.9 | |
| | | H | 100 | .8 | |
| 400 | | V | 30 | 1.9 | |
| | | H | 100 | .75 | |
| 450 | | V | 30 | 2 | |
| | | H | 100 | .7 | |

Taking ℄ readings from 100' east of point 0 on A line:

| DIST | COIL SEP | V/H | SENS | READ | NOTES |
|---|---|---|---|---|---|
| 0 | 20m | V | 30 | 2.64 | |
| | \| | H | 100 | 1.55 | |
| 50 | \| | V | 30 | 2.4 | |
| | \| | " | no reading. | | |
| 100 | \| | V | 100 | 95 | |
| | V | H | 100 | 2.7 | |
| 150 | | V | 100 | 1.5 | |
| | | H | 100 | 1.7 | |
| 200 | | V | 100 | 98 | |
| | | H | 100 | 1.25 | |
| 250 | | V | 100 | 1.1 | |
| | | H | 100 | 1.25 | |
| 300 | | V | 100 | 1.08 | |
| | | H | 100 | 1.42 | |
| 350 | | V | 100 | 0.9 | power line (2-wires) between 350 & 400 |
| | | H | 100 | 0.75 | |
| 400 | | V | 100 | 1.4 | |
| | | H | 100 | 1.45 | |
| 450 | 20m | V | 100 | 1.52 | |
| | ↓ | H | 100 | 1.4 | |
| 500 | ↓ | V | 100 | 1.7 | |
| | ↓ | H | 100 | 1.3 | |
| 550 | ↓ | V | 100 | 1.8 | |
| | ↓ | H | 100 | 1.25 | |
| 600 | | V | 100 | 1.95 | |
| | | H | 100 | 1.08 | |
| 650 | | V | 100 | 1.78 | |
| | | H | 100 | 1.1 | |
| 700 | | V | 100 | 1.6 | |
| | | H | 100 | 1.09 | |
| 750 | | V | 100 | 1.5 | |
| | | H | " | 1.3 | |
| 800 | | V | " | 1.18 | |
| | | H | " | 1.1 | |

~~Est~~ Took e-w line across pt 100 on the south ℄.

within 15' para- llel to a-w line

receiver mounted on fence post

transmit on underground wire with this line

| DIST | COIL SEP | V/H | SENS | READING | NOTE |
|---|---|---|---|---|---|
| 0 | 20m | V | 30 | 2.5 | |
| | | H | 100 | 1.35 | |
| 50 | 20m | V | 30 | 2.75 | |
| | | H | 100 | 1.08 | |
| 100 | | V | 100 | 0.9 | |
| | | H | 100 | 1.1 | |
| 150 | | V | 30 | 2.95 | |
| | | H | 100 | 1.23 | |
| 200 | | V | 30 | 2.9 | |
| | | H | 100 | 1.33 | |
| 250 | | V | 30 | 2.95 | |
| | | H | 100 | 1.3 | |
| 300 | | V | 30 | 2.95 | |
| | | H | 100 | 1.31 | |
| 350 | | V | 100 | 0.9 | |
| | | H | 100 | 1.31 | |
| 400 | | V | 100 | 0.95 | |
| | | H | 100 | 1.15 | |
| 450 | | V | 100 | 0.95 | |
| | | H | " | 1.1 | |

| | | | | | |
|---|---|---|---|---|---|
| 500 | 20m | V | 30 | 2.8 | |
| | | H | 100 | 1.1 | |
| Going east on same line | | | | | |
| 50 | 20m | V | 30 | 2.5 | |
| | | H | 100 | 1.35 | |
| 100 | | V | 30 | 1.5? | Great variability trans. at bank wireface |
| | | H | no reading | | |
| 150 | | V | no reading | | |
| 50ft south of point 200 (line deflected to avoid pipeline) | | | | | |
| 200 | | V | 30 | 2.4 | |
| | | H | 100 | 1.1 | |
| 250 | | V | 30 | 2.4 | |
| | | H | 100 | .92 | |
| 300 | | V | 30 | 2.3 | |
| | | H | 100 | 0.95 | |
| 350 | | V | 30 | 2.2 | |
| | | H | 100 | 1.2 | |
| 400 | | V | 30 | 1.45 | |
| | | H | 100 | 1.1 | |

| No. of Samples | Ion |
|---|---|
| | Na |
| | K |
| | Ca |
| | Mg |
| | Cl |
| | HCO3 |
| | CO3 |
| | SO4 |
| | TDS |
| | |
| | NO3+ NO2 |
| | NH3 |
| | Kjeld N |
| | |
| | As |
| | Ba |
| | Cd |
| | CN |
| | Cr |
| | F |
| | Pb |
| | Hg |
| | Se |
| | Ag |
| | U |
| | 226 |
| | Ra 228 |
| | |
| | Cu |
| | Fe |
| | Mn |
| | Phenols |
| | Zn |
| | |
| | Al |
| | B |
| | Co |
| | Mo |
| | Ni |
| | |
| | pH |
| | Conduct. |

NONE

# FIELD TRIP REPORT
## GROUND WATER SECTION

SLD USER CODES
Ground Water: 59300
$NO_3$, HC, & Toxics: 59600
UIC: 59500

County Lea

FACILITY VISITED
Name of Facility: Permian Brine Sales, Jal Station
Location: ≈ 1 mi. east of Jal

Discharge Plan Number: DP- 324
Type of Operation: brine extraction and sales

ENVIRONMENTAL IMPROVEMENT DIVISION FIELD VISIT
EID Inspector(s): Patsy Morgan, Steve Sanes, Tom Bunt, Rolf Rubffner (for part of time)
Date of Inspection or Visit: 11/28/84
Discharger's Representative Present During EID Visit:
Name: Mac McCutchan - Robert Smith - Ken Moseley
Title or Position: consultant for Permian - Permian geologist - water well owner
Purpose of Visit:
a. Evaluation of Proposed Discharge Plan _____
b. Compliance Inspection of Discharge with Approved Plan _____
c. Other (specify) investigation of gross brine contamination of water wells
Inspection Activities During Field Visit:
a. Inspection of Facilities or Construction (specify) near Permian Brine facility

b. Sampling of Effluents (give sampling locations)

c. Sampling of Ground Water (give names or locations of wells)

d. Evaluation of geology, soils, water levels or other physical characteristics of the location (specify)

e. Other (specify) Carried out 7-hour electromagnetic terrain conductivity survey in attempt to define contaminant plume affecting 2 water wells.

Observations and Information Obtained during the Visit:

inconclusive

ACTION REQUIRED

need more EM survey work at site.

UIC CLASS V INVENTORY

Thirty five additional Class V injection wells have been located to date bringing the total of Class V wells to 158. Staff are finalizing the assessment of groundwater quality impacts from subsidence control (backfill) wells. Staff are also creating a priority list of cities within the state to focus the search for industrial disposal wells.

Climax Chemical

The states first Hazardous Waste injection well has been completed to a depth of 5000'. The well is currently undergoing development to increase its injection capacity. Climax is on schedule with their assurance and Injection operations should begin by October 1.

| | | |
|---|---|---|
| (200) | 15 m | 29.5 |
| | 30 m | 43 |
| (300) | 15 | 29.5 |
| | 30 | 44 |
| (200) | 15 | 9 |
| | 30 | 44 |
| (400) | 15 | 9.5 |
| | 30 | 38 |
| (450) | 15 | 9.5 |
| | 30 | 36 |
| (500) | 15 | 28 |
| | 30 | 36 |

only in Edmonton:

| | | |
|---|---|---|
| (50) | 15 | 25 |
| | 30 | 45 |
| (100) | 15 | 50 **** |
| (200) | 15 | 24 |
| | 30 | 36 |
| (250) | 15 | 24 |
| | 30 | 15 |
| (300) | 15 | 32 |
| | 30 | 32 |
| (350) | 15 | 22 |
| | 30 | 40 |
| (400) | 15 | 14.5 |
| | 30 | 30 |

11. If there is a leak, spill or other unanticipated discharge of a significant amount of water contaminants on the surface or underground at your facility, will you commit to notifying the EID Ground Water Section within 48 hours **(1-203.A.1., 5-208.B.1)**?

B. Post-operational commitments required prior to plan approval

1. Plugging and abandonment

a. Plug and cap wells. Procedure must conform to that specified in 5-209, and be approved in advance.

b. Demonstrate financial ability **(5-210.B.17)** to:

i. plug well and prepare for proper abandonment;

ii. restore protected ground water if contaminated by your ~~brine extraction~~ activities; ~~and~~

iii. undertake measures necessary to prevent contamination of groundwater having 10,000 mg/l or less TDS, after cessation of operations.

2. Pond closure

a. Remove liner, if any, from pit **(3-107.A)**

b. ~~Remove salt crust from unlined pit and surrounding area (3-107.A.4, 11)~~

c. Restore area to original contours or take other appropriate measures to prevent post-operational contamination (3-107.A.11).

V. SIGN-OFF REQUIREMENT

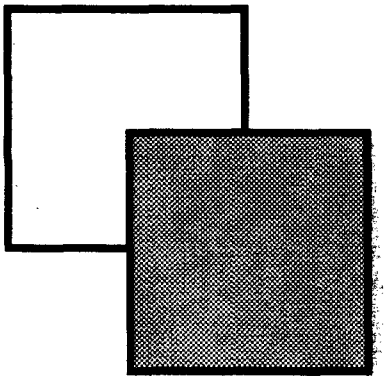
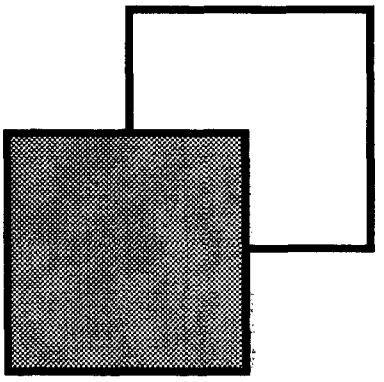
Responsible official must certify as follows:

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment **(5-101.H.2)**.

| | | |
|---|---|---|
| (450) | 15m | 51 * |
| | 30 m | 47 |
| (500) | 15 m | 57 |
| | 30 | 43 |
| (550) | 15 | 60 |
| | 30 | 42 |
| (600) | 15 | 32 * |
| | 30 | 36 * |
| (650) | 15 | 60 |
| | 30 | 37 |
| (700) | 15 | 53 |
| | 30 | 36 |
| (750) | 15 | 50 |
| | 30 | 43 |
| (800) | 15 | 39 |
| | 30 | 37 |

E-W line across north ℄:

| | | |
|---|---|---|
| (0) | 15m | 25 |
| | 30 m | 45 |
| (50) | 15m | 27.5 |
| | 30 | 36 |
| (100) | 15 | 9 |
| | 30 | 36 |
| (150) | 15 | 29.5 |
| | 30 | 41 |
| (200) | 15 | 29 |
| | 30 | 46 |

Xerox Print Service 7.0.1 on EID Laser

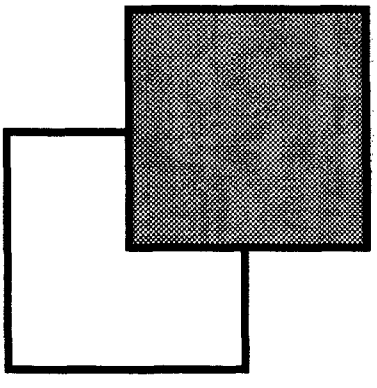
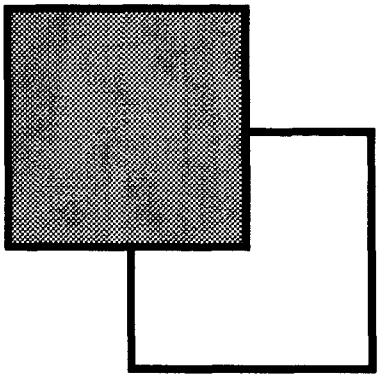
Document Paige Morgan

Created 27-May-85 5:12:27

Printed 27-May-85 5:12:55

For Patsy Sandoval:Santa Fe:NM HED

1 Sheets, 1 Copy.

| | | |
|---|---|---|
| (350e) | 15 m | 19 |
| | 30 | 27 |
| (400) | 15 m | 19 |
| | 30 | 25 |
| (450)e | 15m | 20 |
| | 30 | 22 |

℄ north:

| | | |
|---|---|---|
| (0) | 15m | 26.4 |
| | 30 m | 59 |
| (50) | 15 | 24 |
| (100) | 15 | 9.5 |
| | 30 | 89 |

| | | |
|---|---|---|
| (150) | 15 m | 35 |
| | 30 m | 57 |
| (200) | 15m | 33 |
| | 30 m | 42 |
| (250) | 15 m | 37 |
| | 30 m | 42 |
| (300) | 15 m | 36 |
| | 30 m | 48 |
| (350) | 15 | 30 * |
| | 30 | 26 |
| (400) | 15 | 47 |
| | 30 | 48 |

4. Under "Concept Paper for Reporting Requirements", page 2, Para. 1: "The Agency is moving toward quarterly reporting of detailed data for all facilities."-- This is absurd. I read some very pithy remarks by a congressman recently (unfortunately can't lay hands on the articles now) who pointed out that the gargantuan paper chase of RCRA, with manifests of hazardous wastes from cradle to grave, has not resulted in a single identification of violation - instead, violations have been pointed out by disgruntled employees, observant inspectors and such resources. It is the height of futility to send UIC the same route.

| | | |
|---|---|---|
| (300)w | 15 m | 22 |
| | 30 m | 35 |
| (350)w | 15 m | 22* |
| | 30 m | 33 |
| (400)w | 15 m | 23.2 |
| | 30 | 35 |
| (450)w | 15 | 22.8 |
| | 30 | 37 |
| (500) | 15 | 22.3 |
| (550) | 15 | 23.1 |
| | 30 | 33 |
| (600) | 15 | 23.5 |
| | 30 | 34 |
| (650)w | 15 | 24.2 |
| | 30 | 33 |

| | | |
|---|---|---|
| (B.O.e) | 15 | 18 |
| (50e) | 15 | 17 |
| | 30 | 32 |
| (100) | 15 | 21 |
| | 30 | 33 |
| (150)e | 15 | 21 |
| | 30 | 27 |
| (200) | 15 | 19.8 |
| | 30 | 29 |
| (250) | 15 | 20 |
| | 30 | 25 |
| (300)e | 15 | 19 |
| | 30 | 27 |

TO: Richard Stamets, Director
Oil Conservation Division

FROM: Paige Morgan, WRS III
EID Ground Water Section

DATE: May 24, 1985

RE: Proposed Additional Reporting Requirements
For UIC Programs

~~I'm sure~~ we can count on you to fight of additional reporting requirements to the extent humanly possible. ~~That's~~ my general reaction to The Concept Paper on the above-referenced topic. I think that the paper in large part states the obvious, ~~as far as~~ responses to violations ~~goes~~, of course, those are the responses we would have to the stated violations. To have to count such responses is another story. The big ones are easy - you can do those from memory on a quarterly basis; but to have to count every discharge plan required letter you send out, every phone call in which you point out that a certain discharge is illegal - would be a terrible time-waster. ~~And speaking of wasting time, everyone's heard this before but it's nonetheless perfectly true that~~ time spent counting beans is time stolen from doing compliance inspections and otherwise tracking down what's really going on ~~in the big wide world.~~

Some Specific Comments:

1. This whole business would be A Lot less painful if it were up to the Program Managers to compile these statistics during their oversight trips. We have to allocate some time to do a little show-and-tell for them every time they show up, anyway- why not make it a little cooperative project to have the PM put together our quarterly reports by interviewing us and letting us point them to appropriate files?

2. Page 5: Inspections. ~~This~~ wouldn't be too overous ~~to you guys at OCD~~, because of your well-established inspection program. But it's virtually impossible for us at EID with ~~are~~ little two-man ~~circus~~. Our priorities are redefined for us just about daily - we rarely know 2 weeks in advance that we will be making an inspection trip, let alone 3 months in advance.

3. Although realistically speaking, I think we should define "major" facilities as those which pose a substantial threat to ground water quality, and not just as Class I and IV facilities as "majors" just because it cuts down our reporting requirements.

| | | |
|---|---|---|
| (1000) | 15 m | 23.2 |
| (1050) | " | 24 |
| (1100) | " | 27.3 |
| (1150) | 15m | 36 * |
| | 30m | 55 |
| (1200) | 15m | 26 * |
| | 30m | 33.5 |
| (1250) | 15m | 40 * |
| | 30m | 30 |
| (1300) | 15m | 27 |
| | 30m | 45 |
| (1350) | 15m | 22.8 |
| | 30m | 33.5 |
| (1400) | 15m | 22.3 |
| | 30m | 33 |

E-W line B:

| | | |
|---|---|---|
| (B.0) | 15m | 21 |
| | 30m | 31 |
| (50)W. | 15m | 22 |
| | 30m | 30 |
| (100) | 15m | 22.2 |
| | 30m | 39 |
| (150)W | 15m | 22.2 |
| | 30m | 50 |
| (200) | 15m | 20.5 |
| | 30 | 58 |
| (250)W | 15m | 22 |
| | 30 | 21.5 |

TONEY ANAYA
GOVERNOR

DENISE D. FORT
DIRECTOR

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020

May 15, 1985

Dan Becker
Environmental Action
1346 Connecticut Ave., NW - Suite 731
Washington, D.C. 20036

Dear Mr. Becker:

Enclosed is a personal check for $25.00 to cover the cost of copying and mailing to me one copy of your Deep Well Injection Fact Packet. Also, if possible, I would appreciate receiving a receipt so that I can be reimbursed.

Thank you.

Sincerely,

Paige Grant Morgan

Paige Grant
Water Resource Specialist
Ground Water Section.

PG/ps

| Station | Depth (coil sep. × .75 if V, 1.5 if H) | Corrected reading (mmhos?) | |
|---|---|---|---|
| N-S line (0) | 15 m | ~~7.68~~ | 25.6 |
| | 30 m | ~~25~~ | 83 |
| (50) | 15 m | ~~7.35~~ | 24.5 |
| (100) | 15 m | ~~21~~ | 70 |
| (150) | 15 m | ~~22~~ | 73 |
| (150 E) | 15 m | ~~7.2~~ | 24 |
| (150 EE) | 15 m | ~~7.05~~ | 23.5 |
| (200) | " | ~~6.9~~ | 23 |
| (250) | " | 21 | |
| (300) | " | 23 | |
| (350) | " | 22 | |
| (400) | 15 m | 22 | |
| (450) | " | 21 | |
| (500) | " | 21 | |
| (550) | " | 22 | |
| (600) | " | 21 | |
| (650) | " | 21.9 | |
| (700) | " | 21 | |
| (750) | " | 21.2 | |
| (800) | " | 32 | |
| (850) | " | 29 | |
| (900) | " | 21 | |
| (950) | " | 21.5 | |

ODUCTION OF
THE
LLOWING
UMENT (S)
T BE IMPROVED
DUE TO
CONDITION OF
E ORIGINAL

4-wire pipeline

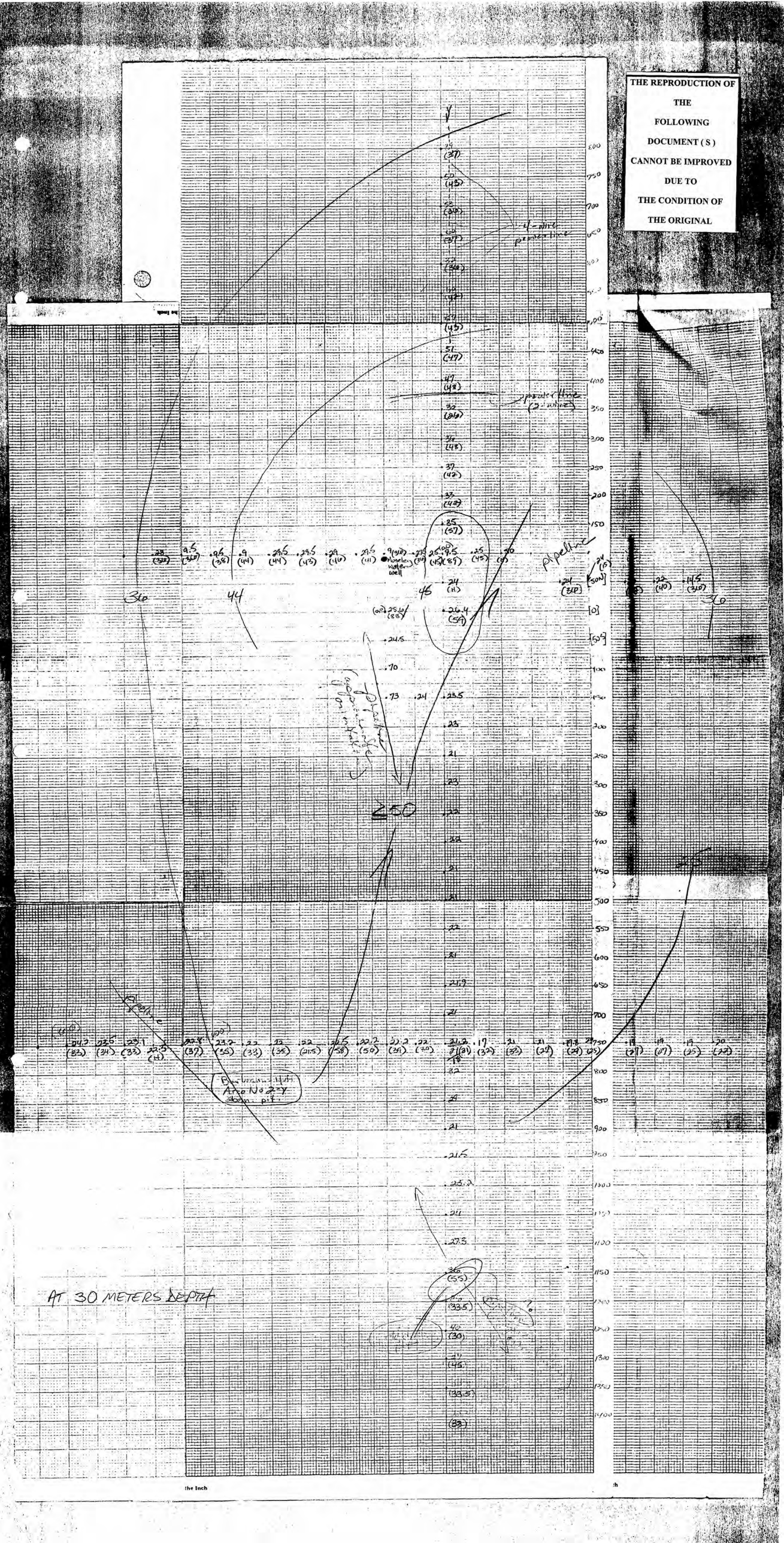
Pipeline

Burlington-Hunt
Arco No 2-Y

Top number at 15 m depth
(lower number at 30 m depth)

BASE MAP

THE REPRODUCTION OF THE FOLLOWING DOCUMENT (S) CANNOT BE IMPROVED DUE TO THE CONDITION OF THE ORIGINAL



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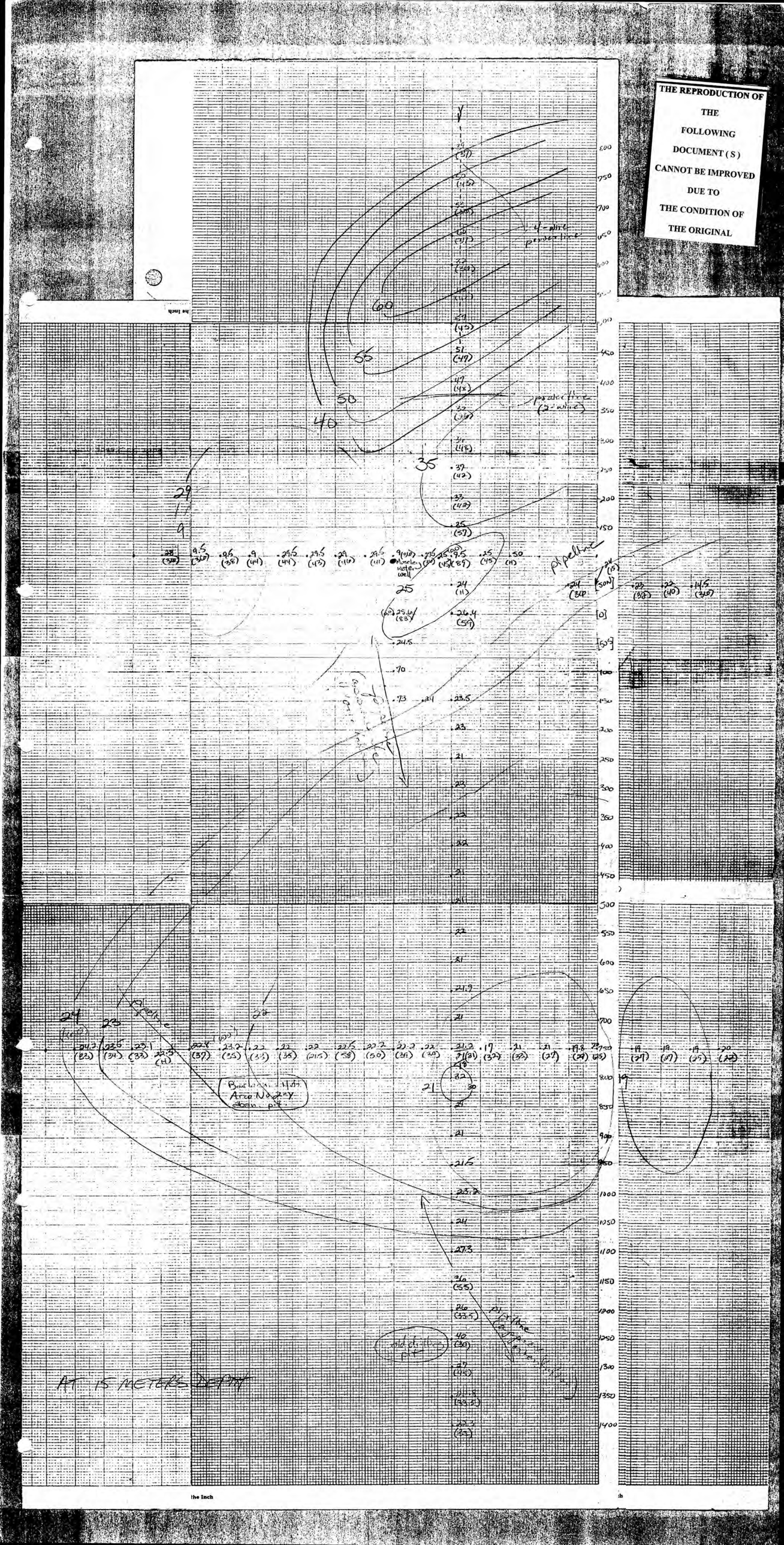


REPORT TO: Morgan/Sares
Ground Water & Hazardous Waste Bureau
Environmental Improvement Division
Health & Environment Department
P.O. Box 968 - Crown Building
Santa Fe, NM 87504-0968

LAB NUMBER WC 5654
DATE RECEIVED 11/30/84
DATE REPORTED 12/29/85 (Initials)
SLD USER CODE NUMBER 59500

Well Location Address ~~B~~ Permian Brine Sales Inc, Jal NM

Point of Collection ~~In~~ Brine Pond

Well Owner/User Permian Brine

Number of People Drinking Water from Well 0

Collected 11/28/84 (Date) 1130 (Time) By Morgan/Sares (Name) EID (Agency)

Well Depth —

Water Level —

pH 7.12

Conductivity (Uncorrected) _____ umho/cm

Taste? Odor? Color? Collectors Remarks

Brine Sample

Temperature 10°C °C

Conductivity at 25°C _____ umho/cm

PROJECT:

Ca 51.4

From ____, A-$H_2SO_4$ Sample:

- ☐ Nitrate-$N^+$ Nitrite-N _____ mg/l _____
- ☐ Ammonia-N _____ mg/l _____
- ☐ Chemical oxygen demand _____ mg/l _____
- ☐ _____ _____ _____

From ____, A-$HNO_3$ Sample:

- ☐ ICAP Scan
- ☐ Metals by AA (Specify)

From F, NA Sample:

| | | | Date Analyzed |
|---|---|---|---|
| ☑ Calcium | 1027 | mg/l | 1/16 |
| ☑ Potassium | 663 | mg/l | 12/17 |
| ☑ Magnesium | 582 | mg/l | 1/21 |
| ☑ Sodium | 96370 | mg/l | 12/17 |
| ☑ Bicarbonate | 91.2 | mg/l | 1/29 |
| ☑ Chloride | 189647 | mg/l | 1/17 |
| ☑ Sulfate | 4380 | mg/l | 1/4 |
| ☑ Total Solids | 253080 | mg/l | 1/2 |
| ☐ _____ | _____ | _____ | _____ |

RECEIVED
FEB 06 1985
GROUND WATER/HAZARDOUS WASTE BUREAU

charge balance off by -11.0%

This form accompanies 1 sample(s) marked as follows to indicate field treatment:

NF: Whole sample (no filtration).
F: Filtered in field with 0.45u membrane filter
A-$H_2SO_4$: Acidified with 2 ml conc $H_2SO_4$/l
A-$HNO_3$: Acidified with 5ml conc $HNO_3$/l
NA: No acid added

8411281138

REPORT TO: Morgan/Sares
Ground Water & Hazardous Waste Bureau
Environmental Improvement Division
Health & Environment Department
P.O. Box 968 - Crown Building
Santa Fe, NM 87504-0968

LAB NUMBER HM 1540
DATE RECEIVED 11/30/84
DATE REPORTED 1/9/85 mf
Initials
SLD USER CODE NUMBER 59500

RECEIVED
JAN 14 1985
GROUND WATER/HAZARDOUS WASTE BUREAU

Well Location Address Permian Brine Sales Inc, Jal NM

Point of Collection ~~Jal, NM~~ Brine Pit Pond

Well Owner/User Permian Brine

Number of People Drinking Water from Well 0

Collected 11/28/84 (Date) 1137 (Time) By Morgan/Sares (Name) EID (Agency)

Well Depth —

Water Level —

Taste? Odor? Color? Collectors Remarks

Brine Sample

pH 7.12

Conductivity (Uncorrected) _____ umho/cm

Temperature 10°C °C

Conductivity at 25°C _____ umho/cm

PROJECT:

From ____, A-$H_2SO_4$ Sample:

- ☐ Nitrate-N+ Nitrite-N _____ mg/l _____
- ☐ Ammonia-N _____ mg/l _____
- ☐ Chemical oxygen demand _____ mg/l _____
- ☐ _____ _____ _____

From F, A-$HNO_3$ Sample:

- ☑ ICAP Scan
- ☐ Metals by AA (Specify)

From ____, NA Sample: Date Analyzed

- ☐ Calcium _____ mg/l _____
- ☐ Potassium _____ mg/l _____
- ☐ Magnesium _____ mg/l _____
- ☐ Sodium _____ mg/l _____
- ☐ Bicarbonate _____ mg/l _____
- ☐ Chloride _____ mg/l _____
- ☐ Sulfate _____ mg/l _____
- ☐ Total Solids _____ mg/l _____
- ☐ _____ _____

This form accompanies 1 sample(s) marked as follows to indicate field treatment:

NF: Whole sample (no filtration).
F: Filtered in field with 0.45u membrane filter 841128 1137
A-$H_2SO_4$: Acidified with 2 ml conc $H_2SO_4$/l
A-$HNO_3$: Acidified with 5ml conc $HNO_3$/l
NA: No acid added

ICAP -SCREEN

Jal, N.M

Lab Number: HM # 1540

Sample Code: Permian Brine Sales Inc.

Date Submitted: 11/30/84

Date Reported: 1/9/85

By: Morgan / Sares

By:

| Determination | Concentration (µg/ml) |
|---|---|
| Aluminum | <0.10 |
| Barium | <0.10 |
| Beryllium | <0.10 |
| Boron | 8.7 |
| Cadmium | <0.10 |
| Calcium | 950. |
| Chromium | <0.10 |
| Cobalt | <0.10 |
| Copper | <0.10 |
| Iron | <0.10 |
| Lead | <0.10 |
| Magnesium | 640. |
| Manganese | 0.25 |
| Molybdenum | <0.10 |
| Nickel | <0.10 |
| Silicon | 0.93 |
| Silver | <0.10 |
| Strontium | 15. |
| Tin | <0.10 |
| Vanadium | <0.10 |
| Yttrium | <0.10 |
| Zinc | <0.10 |

# ATOMIC ABSORPTION ANALYSES

Arsenic _____µg/ml

Selenium _____µg/ml

Mercury _____µg/ml

84-1071 -C

R[illegible]ronmental Improvement Division
[illegible]alth & Environment Department
P.O. Box 968 - Crown Building
Santa Fe, New Mexico 87504-0968
ATTENTION: PAIGE MORGAN
BUREAU: Ground Water/Haz Waste

LABORATORY 11/30/84
LAB NUMBER OR 1071 A,B.
SLD Users Code No. 59500

ALL CONTAINERS WHICH THIS FORM ACCOMPANIES ARE COLLECTIVELY REFERRED TO AS "SAMPLE".

CERTIFICATE OF FIELD PERSONNEL

Sample Type: Water ☒ Soil ☐ Other _____

Water Supply and/or Code No. _____

City & County near Jal, Lea County

Collected (date & time) 11/28/84 10:44 a.m. By (name) Paige Grant Morgan

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____

Dissolved Oxygen=_____mg/l; Alkalinity=_____; Flow Rate=_____

Sampling Location, Methods & Remarks (i.e. odors etc.)

bailed from near SWL at ≈ 50 feet below surface.
Well casing rusty. PVC bailer used.

I certify that the statements in this block accurately reflect the results of my field analyses, observations and activities. Signed Paige Grant Morgan

I certify that I witnessed these field analyses, observations and activities and concur with the statements in this block. Signed _____

Method of Shipment to Laboratory Hand-carried.

THIS FORM ACCOMPANIES 2 septum vials with teflon-lined discs identified as:
specimen 841128 1044; duplicate _____; triplicate _____; blank(s) _____,
and _____ amber glass jug(s) with teflon-lined cap(s) identified as _____,
and _____ other container(s) (describe) _____ identified as _____.

Containers are marked as follows to indicate preservation (circle):

NP: No preservation; sample stored at ~~room~~ temperature ~~(~20°C)~~. ambient air < 50°F
P-ICE: Sample stored in an ice bath.
P-$Na_2O_3S_2$: Sample preserved with 3 mg $Na_2O_3S_2$/40 ml and stored at room temperature.

CERTIFICATE(S) OF SAMPLE RECEIPT

I (we) certify that this sample was transferred from _____ to _____ at (location) _____ on (date & time) _____ and that the statements in this block are correct.

Disposition of Sample _____. Seal(s) Intact: Yes ☐ No ☐ .

Signature(s) _____ _____

---

I (we) certify that this sample was transferred from _____ to _____ at (location) _____ on (date & time) _____ and that the statements in this block are correct.

Disposition of Sample _____. Seal(s) Intact: Yes ☐ No ☐ .

Signature(s) _____ _____

RECEIVED
JAN 02 1985
GROUND WATER HAZARDOUS WASTE BUREAU

ANALYSES REQUESTED LAB. NO. 1071

PLEASE CHECK THE APPROPRIATE BOXES BELOW TO INDICATE THE TYPE OF ANALYTICAL SCREENS REQUIRED. WHENEVER POSSIBLE LIST SPECIFIC COMPOUNDS SUSPECTED OR REQUIRED.

| QUALITATIVE | QUANTATIVE | PURGEABLE SCREEN |
|---|---|---|
| X | | ALIPHATIC HYDROCARBON SCREEN * |
| | X | AROMATIC HYDROCARBON SCREEN |
| | | HALOGENATED HYDROCARBON SCREEN |
| | | GAS CHROMATOGRAPH/MASS SPECTROMETER |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | SPECIFIC COMPOUNDS |
| | | search for contamination by oil/natural gas ✓ |
| | | |
| | | |

| QUALITATIVE | QUANTATIVE | EXTRACTABLES SCREEN |
|---|---|---|
| | | ALIPHATIC HYDROCARBONS |
| | | CHLORINATED HYDROCARBON PESTICIDES |
| | | CHLOROPHENOXY ACID HERBICIDES |
| | | HYDROCARBON FUEL SCREEN |
| | | ORGANOPHOSPHATE PESTICIDES |
| | | POLYCHLORINATED BIPHENYLS (PCB's) |
| | | POLYNUCLEAR AROMATIC HYDROCARBONS |
| | | |
| | | |
| | | |
| | | SPECIFIC COMPOUNDS |
| | | |
| | | |
| | | |
| | | |

REMARKS:

## ANALYTICAL RESULTS

| COMPOUND | CONC-ENTRATION | COMPOUND | CONC-ENTRATION |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | * DETECTION LIMIT | 1 ug/l |

REMARKS: No GC/MS purgeables detected other than a few aliphatics at low concentration (<5 ug/l).

CETRIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes No . Seal(s) Broken by _____ date _____.

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements in this block and the analytical data on this page accurately reflect the analytical results for this sample.

Date(s) of analysis 12/3/84. Analysts signature J. Ashby

Icertify that I have reviewed and concur with the analytical results for this sample and with the statements in this block. Reviewers Signature: R Meyerhein

REPORT TO: Morgan/Saves
Ground Water & Hazardous Waste Bureau
Environmental Improvement Division
Health & Environment Department
P.O. Box 968 - Crown Building
Santa Fe, NM 87504-0968

LAB NUMBER GC 5644
DATE RECEIVED 11/30/84
DATE REPORTED CJ 1/22/85
Initials
SLD USER CODE NUMBER 59500

Well Location Address Box 223, Jal, NM 88525
Point of Collection Moseley Well
Well Owner/User Ken Moseley
Number of People Drinking Water from Well 0
Collected 11/28/84 Date 1043 Time
By Morgan/Saves Name EID Agency
Well Depth —
Water Level ~50'
Taste? Odor? Color? Collectors Remarks

pH —
Conductivity (Uncorrected) — umho/cm
Temperature — °C
Conductivity at 25°C — umho/cm

PROJECT: Ca 21.5

From ____, A-$H_2SO_4$ Sample:

- ☐ Nitrate-$N^+$ Nitrite-N ____ mg/l ____
- ☐ Ammonia-N ____ mg/l ____
- ☐ Chemical oxygen demand ____ mg/l ____
- ☐ ____ ____ ____

From ____, A-$HNO_3$ Sample:

- ☐ ICAP Scan
- ☐ Metals by AA (Specify)

From F, NA Sample:

| | | | Date Analyzed |
|---|---|---|---|
| ☑ Calcium | 430.0 | mg/l | 1/16 |
| ☑ Potassium | 8.58 | mg/l | 12/17 |
| ☑ Magnesium | 174 | mg/l | 1/21 |
| ☑ Sodium | 352 | mg/l | 12/17 |
| ☑ Bicarbonate | 189.6 | mg/l | 1/14 |
| ☑ Chloride | 1190 | mg/l | 1/17 |
| ☑ Sulfate | 629.9 | mg/l | 1/4 |
| ☑ Total Solids | 3594 | mg/l | 1/2 |
| ☐ ____ | | | |

charge balance checks out

This form accompanies 1 sample(s) marked as follows to indicate field treatment:

- NF: Whole sample (no filtration)
- F: Filtered in field with 0.45u membrane filter
- A-$H_2SO_4$: Acidified with 2 ml conc $H_2SO_4$/l
- A-$HNO_3$: Acidified with 5ml conc $HNO_3$/l
- NA: No acid added

84/11/28/1043

RECEIVED
JAN 24 1985
GROUND WATER/HAZARDOUS WASTE BUREAU

REPORT TO: Morgan/Saves
Ground Water & Hazardous Waste Bureau
Environmental Improvement Division
Health & Environment Department
P.O. Box 968 - Crown Building
Santa Fe, NM 87504-0968

LAB NUMBER HM-1522
DATE RECEIVED 11/30/84
DATE REPORTED 1/8/85 MJ
Initials
SLD USER CODE NUMBER 59506

Well Location Address Ken Moseley Well, Box 223, Jal, NM 88525

RECEIVED
JAN 14 1985
GROUND WATER/HAZARDOUS WASTE BUREAU

Point of Collection Moseley Well

Well Owner/User Ken Moseley

Number of People Drinking Water from Well 0

Collected 11/28/84 (Date) 1042 (Time)

By Morgan/Saves (Name) EID (Agency)

Well Depth —

Water Level ~50'

Taste? Odor? Color? Collectors Remarks

pH —

Conductivity (Uncorrected) — umho/cm

Temperature — °C

Conductivity at 25°C — umho/cm

PROJECT:

From ____, A-$H_2SO_4$ Sample:

- ☐ Nitrate-$N^+$ Nitrite-N ____ mg/l ____
- ☐ Ammonia-N ____ mg/l ____
- ☐ Chemical oxygen demand ____ mg/l ____
- ☐ ____ ____ ____

From F, A-$HNO_3$ Sample:

- ☑ ICAP Scan
- ☐ Metals by AA (Specify)

From ____, NA Sample:

Date Analyzed

- ☐ Calcium ____ mg/l ____
- ☐ Potassium ____ mg/l ____
- ☐ Magnesium ____ mg/l ____
- ☐ Sodium ____ mg/l ____
- ☐ Bicarbonate ____ mg/l ____
- ☐ Chloride ____ mg/l ____
- ☐ Sulfate ____ mg/l ____
- ☐ Total Solids ____ mg/l ____
- ☐ ____ ____

*This form accompanies 1 sample(s) marked as follows to indicate field treatment:*

- NF: Whole sample (no filtration).
- F: Filtered in field with 0.45u membrane filter
- A-$H_2SO_4$: Acidified with 2 ml conc $H_2SO_4$/l
- A-$HNO_3$: Acidified with 5ml conc $HNO_3$/l
- NA: No acid added

8411281042

ICAP -SCREEN

Lab Number: HM # 1532

Sample Code: Ken Moseley Well, Jal

Date Submitted: 11/30/84

Date Reported: 1/8/85 mJ

By: Morgan/Sares

By:

| Determination | Concentration (µg/ml) |
|---|---|
| Aluminum | <0.10 |
| Barium | <0.10 |
| Beryllium | <0.10 |
| Boron | 0.82 |
| Cadmium | <0.10 |
| Calcium | 370. |
| Chromium | <0.10 |
| Cobalt | <0.10 |
| Copper | <0.10 |
| Iron | 0.49 |
| Lead | <0.10 |
| Magnesium | 130. |
| Manganese | 0.47 |
| Molybdenum | <0.10 |
| Nickel | <0.10 |
| Silicon | 22. |
| Silver | <0.10 |
| Strontium | 7.1 |
| Tin | <0.10 |
| Vanadium | <0.10 |
| Yttrium | <0.10 |
| Zinc | <0.10 |

# ATOMIC ABSORPTION ANALYSES

Arsenic _____ µg/ml

Selenium _____ µg/ml

Mercury _____ µg/ml

REPORT TO: Morgan/Saves
Ground Water & Hazardous Waste Bureau
Environmental Improvement Division
Health & Environment Department
P.O. Box 968 - Crown Building
Santa Fe, NM 87504-0968

LAB NUMBER WC 5651
DATE RECEIVED 11/30/84
DATE REPORTED CW 12/28/85
Initials
SLD USER CODE NUMBER 59560

Well Location Address Cramer Well PO Box 49, Jal, NM 88252

Point of Collection Cramer well

Well Owner/User Billy Wayne Cramer

Number of People Drinking Water from Well 0

Collected 11/28/84 Date 1006 Time

By Morgan/Saves Name EID Agency

Well Depth —

Water Level — ~50'

Taste? Odor? Color? Collectors Remarks

pH —

Conductivity (Uncorrected) — umho/cm

Temperature — °C

Conductivity at 25°C — umho/cm

PROJECT: Ca 158.2

From ____, A-$H_2SO_4$ Sample:

- ☐ Nitrate-$N^+$ Nitrite-N ____ mg/l ____
- ☐ Ammonia-N ____ mg/l ____
- ☐ Chemical oxygen demand ____ mg/l ____
- ☐ ____ ____ ____

From ____, A-$HNO_3$ Sample:

- ☐ ICAP Scan
- ☐ Metals by AA (Specify)

From F, NA Sample:

| | | | Date Analyzed |
|---|---|---|---|
| ☑ Calcium | 3164 | mg/l | 1/16 |
| ☑ Potassium | 78.0 | mg/l | 12/17 |
| ☑ Magnesium | 1025 | mg/l | 1/21 |
| ☑ Sodium | 23862 | mg/l | 12/17 |
| ☑ Bicarbonate | 130.2 | mg/l | 1/28 |
| ☑ Chloride | 43762 | mg/l | 1/17 |
| ☑ Sulfate | 2483 | mg/l | 1/4 |
| ☑ Total Solids | 74,714 | mg/l | |
| ☑ ____ | | | |

RECEIVED
FEB 06 1985
GROUND WATER/HAZARDOUS WASTE BUREAU

*This form accompanies* 1 *sample(s) marked as follows to indicate field treatment:*

- NF: Whole sample (no filtration).
- F: Filtered in field with 0.45u membrane filter 841128 1006
- A-$H_2SO_4$: Acidified with 2 ml conc $H_2SO_4$/l
- A-$HNO_3$: Acidified with 5ml conc $HNO_3$/l
- NA: No acid added

REPORT TO: Morgan/Saves

Ground Water & Hazardous Waste Bureau
Environmental Improvement Division
Health & Environment Department
P.O. Box 968 - Crown Building
Santa Fe, NM 87504-0968

LAB NUMBER HM 1538
DATE RECEIVED 11/30/84
DATE REPORTED 1/9/85 mS
Initials
SLD USER CODE NUMBER 59500

Well Location Address Cramer Well, P.O Box 49, Jal, NM 88252 RECEIVED

Point of Collection Cramer residence well JAN 14 1985

Well Owner/User Billy Wayne Cramer

GROUND WATER/HAZARDOUS WASTE BUREAU

Number of People Drinking Water from Well 0

Collected 11/28/84 (Date) 1005 (Time)

By Morgan/Saves (Name) EID (Agency)

Well Depth —

Water Level —

pH —

Conductivity (Uncorrected) — umho/cm

Taste? Odor? Color? Collectors Remarks

Sample from Abandon well

Temperature — °C

Conductivity at 25°C — umho/cm

PROJECT:

From ____, A-$H_2SO_4$ Sample:

- ☐ Nitrate-N+ Nitrite-N ____ mg/l ____
- ☐ Ammonia-N ____ mg/l ____
- ☐ Chemical oxygen demand ____ mg/l ____
- ☐ ____ ____ ____

From F, A-$HNO_3$ Sample:

- ☒ ICAP Scan
- ☐ Metals by AA (Specify)

From ____, NA Sample: (Date Analyzed)

- ☐ Calcium ____ mg/l ____
- ☐ Potassium ____ mg/l ____
- ☐ Magnesium ____ mg/l ____
- ☐ Sodium ____ mg/l ____
- ☐ Bicarbonate ____ mg/l ____
- ☐ Chloride ____ mg/l ____
- ☐ Sulfate ____ mg/l ____
- ☐ Total Solids ____ mg/l ____
- ☐ ____ ____

This form accompanies 1 sample(s) marked as follows to indicate field treatment:

NF: Whole sample (no filtration).
F: Filtered in field with 0.45u membrane filter 841128 1005
A-$H_2SO_4$: Acidified with 2 ml conc $H_2SO_4$/l
A-$HNO_3$: Acidified with 5ml conc $HNO_3$/l
NA: No acid added

ICAP -SCREEN

Lab Number: NM 1538

Sample Code: Cramer Well, Jal NM

Date Submitted: 11-30-84

Date Reported: 1/9/85

By: Morgan / Saren

By: MF

| Determination | Concentration (µg/ml) |
|---|---|
| Aluminum | <0.10 |
| Barium | <0.10 |
| Beryllium | <0.10 |
| Boron | 1.3 |
| Cadmium | <0.10 |
| Calcium | 2900. |
| Chromium | <0.10 |
| Cobalt | <0.10 |
| Copper | <0.10 |
| Iron | 0.10 |
| Lead | <0.10 |
| Magnesium | 1100. |
| Manganese | 0.30 |
| Molybdenum | <0.10 |
| Nickel | <0.10 |
| Silicon | 11. |
| Silver | <0.10 |
| Strontium | 58. |
| Tin | <0.10 |
| Vanadium | <0.10 |
| Yttrium | <0.10 |
| Zinc | 2.3 |

84-1068 -C

REP... ...onmental Improvement Division
Health & Environment Department
P.O. Box 968 - Crown Building
Santa Fe, New Mexico 87504-0968
ATTENTION: PAIGE MORGAN
BUREAU: Ground Water / Haz Waste

LABORATORY 11/30/84

LAB NUMBER OR 1068 A, B.

SLD Users Code No. 59300

ALL CONTAINERS WHICH THIS FORM ACCOMPANIES ARE COLLECTIVELY REFERRED TO AS "SAMPLE".

CERTIFICATE OF FIELD PERSONNEL

Sample Type: Water ☒ Soil ☐ Other _____

Water Supply and/or Code No. _____

City & County near Jal, Lea County

Collected (date & time) 11/28/84 - 10:07 a.m. By (name) Paige Grant Morgan

pH=_____; Conductivity=_____umho/cm at_____°C; Chlorine Residual=_____

Dissolved Oxygen=_____mg/l; Alkalinity=_____; Flow Rate=_____

Sampling Location, Methods & Remarks (i.e. odors etc.)

pumped for ≈ 2 minutes before collecting sample

I certify that the statements in this block accurately reflect the results of my field analyses, observations and activities. Signed Paige Grant Morgan

I certify that I witnessed these field analyses, observations and activities and concur with the statements in this block. Signed _____

Method of Shipment to Laboratory hand-carried.

THIS FORM ACCOMPANIES 2 septum vials with teflon-lined discs identified as:
specimen 84/11/28/007; duplicate_____; triplicate_____; blank(s)_____,
and_____ amber glass jug(s) with teflon-lined cap(s) identified as_____,
and_____ other container(s) (describe)_____ identified as_____.

Containers are marked as follows to indicate preservation (circle):

(NP): No preservation; sample stored ~~at room temperature (~20°C)~~. in vehicle - air temp < 50° F

P-ICE: Sample stored in an ice bath.

P-$Na_2O_3S_2$: Sample preserved with 3 mg $Na_2O_3S_2$/40 ml and stored at room temperature.

CERTIFICATE(S) OF SAMPLE RECEIPT

I (we) certify that this sample was transferred from _____ to _____ at (location)_____ on (date & time)_____ and that the statements in this block are correct.

Disposition of Sample_____. Seal(s) Intact: Yes ☐ No ☐ .

Signature(s)_____ _____

---

I (we) certify that this sample was transferred from _____ to _____ at (location)_____ on (date & time)_____ and that the statements in this block are correct.

Disposition of Sample_____. Seal(s) Intact: Yes ☐ No ☐ .

Signature(s)_____ _____

RECEIVED
JAN 02 1985
GROUND WATER/HAZARDOUS WASTE BUREAU

## ANALYSES REQUESTED LAB. NO. 1068

PLEASE CHECK THE APPROPRIATE BOXES BELOW TO INDICATE THE TYPE OF ANALYTICAL SCREENS REQUIRED. WHENEVER POSSIBLE LIST SPECIFIC COMPOUNDS SUSPECTED OR REQUIRED.

| QUALITATIVE | QUANTATIVE | PURGEABLE SCREEN | QUALITATIVE | QUANTATIVE | EXTRACTABLES SCREEN |
|---|---|---|---|---|---|
| X | | ALIPHATIC HYDROCARBON SCREEN * | | | ALIPHATIC HYDROCARBONS |
| | X | AROMATIC HYDROCARBON SCREEN | | | CHLORINATED HYDROCARBON PESTICIDES |
| | | HALOGENATED HYDROCARBON SCREEN | | | CHLOROPHENOXY ACID HERBICIDES |
| | | GAS CHROMATOGRAPH/MASS SPECTROMETER | | | HYDROCARBON FUEL SCREEN |
| | | | | | ORGANOPHOSPHATE PESTICIDES |
| | | | | | POLYCHLORINATED BIPHENYLS (PCB's) |
| | | | | | POLYNUCLEAR AROMATIC HYDROCARBONS |
| | | | | | |
| | | | | | |
| | | | | | |
| | | SPECIFIC COMPOUNDS | | | SPECIFIC COMPOUNDS |
| | | *search for natural gas constituents (oil) | | | |
| | | | | | |
| | | | | | |

REMARKS:

## ANALYTICAL RESULTS

| COMPOUND | CONC-ENTRATION | COMPOUND | CONC-ENTRATION |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | * DETECTION LIMIT | 1 µg/l |

REMARKS: No GC/MS purgeables detected.

CETRIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes No . Seal(s) Broken by _____ date _____ .

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements in this block and the analytical data on this page accurately reflect the analytical results for this sample.

Date(s) of analysis 12/4/84. Analysts signature J. Ashley

Icertify that I have reviewed and concur with the analytical results for this sample and with the statements in this block. Reviewers Signature: L Meyerhen

TONEY ANAYA
GOVERNOR

DENISE D. FORT
DIRECTOR

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020

October 10, 1985

Robert Smith
Permian Brine
Route 3 Box 3033
Odessa, TX 79763

Dear Mr. Smith:

Enclosed, per your request by telephone on October 7th, is a list of the brine wells in New Mexico with, on one page, their location by township, range and section, and on the other page, their county of location and "well status". This latter category is one used by EPA on their computerized injection well inventory, and so we incorporated it into our own nascent computer inventory system. The codes under "well status" are translated as follows:

| | |
|---|---|
| PA | Permanently abandoned. |
| AC | Active. |
| TA | Temporarily abandoned. |
| UC | Under construction. This category is broadly interpreted and may also mean that a well is permitted but has not commenced construction. |
| AN | Abandoned without approval. |

I hope that this is of use to you.

Sincerely,

Paige Grant Morgan
Water Resource Specialist

PG:pgm

PERMIAN BRINE SALES, INC.
ROUTE 3, BOX 3033
ODESSA, TEXAS 79763

MIDLAND, TX 797
PM
8 JAN
1985

RECEIVED
JAN 14 1985
GROUND WATER/HAZARDOUS WASTE
BUREAU

New Mex. EID
Box 968
Santa Fe, NM 87508

Attn: Paige Morgan

JAL - 6.601

ENTERED

v/n 3025

State of New Mexico
Commission of Public Lands
P.O. Box 1148
Santa Fe, New Mexico 87501
#M-14474

8030 bbls x $.35 ÷ 10 = 281.05

$ 281.05
CK# 23335

ALWAYS type on check stub:

BBL AMT. 8030
SALE VALUE 2810.50 (bbls x $.35)
ROYALTY DUE 281.05

ENTERED

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO

ENVIRONMENTAL IMPROVEMENT DIVISION

P.O. Box 968, Santa Fe, New Mexico 87504-0968

(505) 984-0020

TONEY ANAYA
GOVERNOR

DENISE D. FORT
DIRECTOR

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

P 612 423 469

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

(See Reverse)

| | |
|---|---|
| Sent to R.C. McCutchan | |
| Street and No. Rt. 3, Box 3033 | |
| P.O. State and ZIP Code Odessa, TX 79763 | |
| Postage | $ |

U.S.G.P.O. 1983-403-517

January 2, 1985

R.C. McCutchan, Geologist
Permian Brine Sales, Inc.
Rt. 3, Box 3033
Odessa, TX 79763

RE: Discharge plan DP-324 for Permian Brine Sales' Jal brine facility, SE¼ SE¼ SE¼ Section 16, T25S, R37E.

Dear Mr. McCutchan:

Thank you for making the trip to meet us for the pressure test at Permian Brine's Jal facility on November 28th, and for sending me the chart from the test recorder on November 30. We appreciate the efforts of Permian Brine to bring this facility into compliance with New Mexico state regulations governing ground water quality. I hope that this letter and your reply will constitute the final phase of developing an approvable discharge plan.

The numbered paragraphs below correspond to those used in our previous correspondence.

2.b. I am waiting for results of the analyses of samples we collected from your brine pit and the two adjacent water wells whose owners have complained of chloride contamination. Until I have received those reports, I cannot arrive at a conclusion regarding the source of chloride contamination in the area.

Whether or not activities at Permian Brine's Jal station are judged responsible for the contamination of the above-mentioned wells, I find no plugging records for the Arnott-Ramsay No. 2 and No. 3 wells previously used for brine production at your site. Pursuant to Section 5-203 of the Water Quality Control Commission regulations, these wells must be plugged in accordance with the plugging plan submitted as part of your discharge plan. Please let me know when you make arrangements for these wells to be plugged, so that we can have a representative on site to witness the plugging job.

3.a. As we discussed during our meeting at your Jal facility, I do not share your view that the potential for corrosion of the casing in your brine well is low. Consequently, I place considerable importance on the aspect

of your discharge plan discussed in Section 5-210.B.15 of the WQCC regulations, related to contingency plans in the event of a well failure to ensure that ground water containing less than 10,000 mg/l TDS will not be contaminated by leaking brine. Further, please note the requirement under Section 1-203.A.2 to "take appropriate and necessary steps to contain and remove or mitigate the damage caused by the discharge". Please discuss the approach you would take to mitigate any damage to ground water caused by brine leaking from a damaged casing or moving through channels in the cement around your casing.

4.a. It seems questionable that brine spilled during truck loading will spill directly into a six-inch wide drain. I recommend that you slope the entire loading area toward the spill collection pit and pave the ramps with asphalt or caliche. The Aqua-flex liner you plan to use for the pit itself appears adequate.

I agree that oil well drilling activities pose a considerable threat of brine contamination of aquifers. The Oil Conservation Division recently established an environmental unit in an attempt to address this and other ground water contamination problems related to oil and gas production. Meanwhile, the EID intends to enforce the ground water quality protection regulations for those facilities for which we have author[illegible] If you have evidence of discrepancies in the amount of protection afforded to ground water by the regulatory actions of EID compared with OCD you are invited to bring such evidence to the attention of the Water Quality Control Commission through its chairman, Ms. Denise Fort.

4.b. The Soil Conservation Service mapped the soil at your site as the Simona-Upton association (Soil Survey, Lea County, New Mexico, USDA Soil Conservation Service in cooperation with New Mexico Agricultural Experiment Station. January 1974). There is caliche, both indurated and as gravel, in the soil profile, but the soil is not equated with caliche. This information with the rest of the information you have provided on the leak detection system beneath the brine storage pit, indicates to me that the leak detection system could have been better designed for the purpose. Any leak at the storage pit will be considered significant and you have already committed in your letter to me of October 31, 1984, to notify this Bureau in the event of a significant leak and to proceed to mitigate any damage that may have been caused by the leak. Please outline briefly what those mitigation procedures would be.

5.b. Noted.

6.a Since you so often find your guages to be faulty and you indicated during our conversation in Jal that you would not expect an operator to keep records of annular pressure with any accuracy, I can see only two ways that we could get a reading on the mechanical integrity of this well between EID-witnessed pressure tests:

(1) install a monitor well at close proximity to your brine well, perforated in the relatively shallow formation tapped by the Bowington well (static water level roughly 50 feet below ground surface) and in the deeper formation (probably Santa Rosa or Chinle) tapped by your supply well, with a plug to separate the two and sufficient access to the deeper formation to permit a sample to be bailed periodically. Two separate monitor wells, one to each water-bearing formation, would also be acceptable. An analysis of each formation fluid for major cations and anions would subsequently be required, and each formation would then be monitored for chlorides on a quarterly basis. or

(2) Conduct a pressure test in the brine well on a quarterly basis, and submit the chart from the recorder used to record the test with your quarterly report. This test may be conducted at normal operating pressure, so that you need not import a pump to the site. It occurs to me that you might combine the periodic pressure test requirement with your regular reversal of flow in the well (3.b.), and let the recorder run overnight. A pressure test at normal operating pressure should be run for at least six hours, to pick up any slight, steady decline in pressure that may not be detected in a shorter test.

It is acceptable, as you proposed, that your quarterly chemistry reports consist only of chlorides from your injected water and produced brine, and from your monitor well(s), if you choose that option for monitoring mechanical integrity. You indicated that you would send me copies of the brine production reports that go to the State Lands Commission. If you choose to conduct a quarterly pressure test rather then putting in monitor wells, the chart from a pressure test should also be submitted on a quarterly basis.

When the following points are satisfactorily addressed, I plan to recommend that the EID Director approve this discharge plan:

a) if results of the analyses of samples from the Cramer and Bowington wells confirm that Permian Brine's operation is not the cause of contamination in those wells; and

b) when Arnott-Ramsay No. 2 and No. 3 wells are satisfactorily plugged; and

c) when a contingency plan is prepared for response in the event of a significant leak or spill of brine on the surface or from the brine well; and

d) on receipt of an approvable plan for monitoring mechnical integrity in the brine well.

Thank you for preparing this discharge plan for Permian Brine's Jal facility.

Sincerely,

Paige Grant Morgan

Paige Grant Morgan
Water Resource Specialist
Ground Water Section

PGM:jba

cc: John Guinn, EID District IV, Roswell
Rolf Ruffner, EID Field Office, Hobbs

MSB

# PERMIAN BRINE SALES, INC.

**24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN**

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531



RECEIVED
DEC 05 1984
GROUND WATER/HAZARDOUS WASTE BUREAU


November 30, 1984

Environmental Improvement Division
P.O. Box 968
Santa Fe, New Mexico 87504- 0968

Re: Mechanical Integrety Test

Dear Ms. Morgan:

A mechanical integrety test has been run on the brine well at the Jal Brine Station. The test proved that the well has mechanical integrety. Enclosed is the pressure chart from the well test.

If you have any questions, feel free to contact me.

Sincerely,
PERMIAN BRINE SALES, INC.

Robert C. Smith

ROBERT C. SMITH
PETROLEUM GEOLOGIST

RCS/law
Enc.

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

P. O. BOX 1591

ODESSA, TEXAS
79760

PHONE 332-0531



RECEIVED
DEC 05 1984
GROUND WATER/HAZARDOUS WASTE
BUREAU


## MECHANICAL INTEGRITY TEST REPORT

Station Jal — Date 11-28-84

Station Number _____ — Witness Paige Morgan

Run By Robert C. Smith — Witness _____

Normal Operating Pressure 175 psi

Depth of Well 1591'

Pressure attained in Test 325 psi

Rate of Injection (approximate) 60 gpm

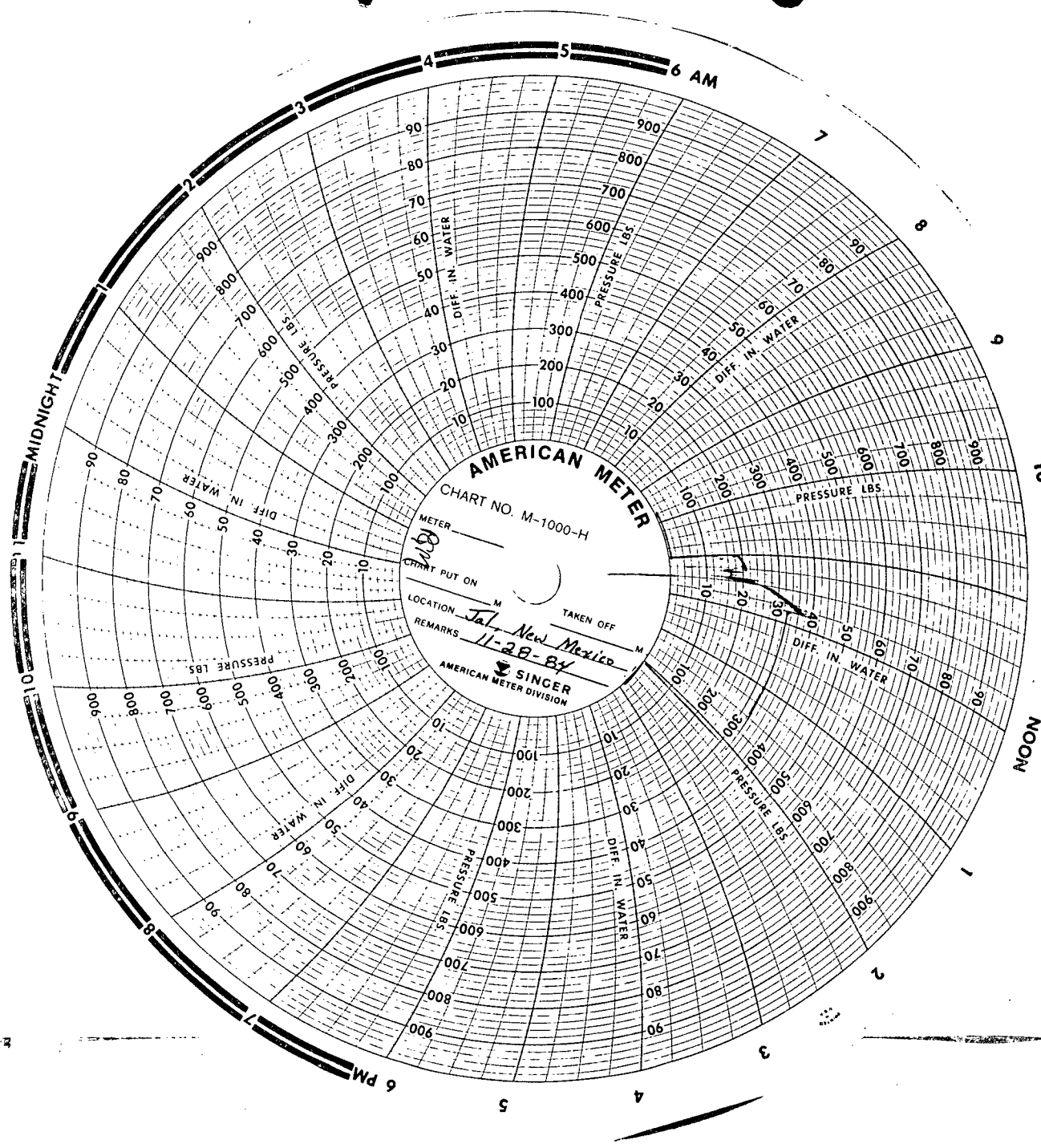
Pressuring up time 45 min

Static test time 2 Hrs

Pounds of decline 5 psi

Percentage of decline 1.5%

REMARKS _____


AMERICAN METER
CHART NO. M-1000-H
METER
CHART PUT ON
M
TAKEN OFF
M
LOCATION Jal, New Mexico
REMARKS 11-28-84
SINGER
AMERICAN METER DIVISION
MIDNIGHT
6 AM
NOON
6 PM
PRESSURE LBS.
DIFF. IN. WATER
DIFF IN WATER
PRESSURE LBS

| moles | Ion |
|---|---|
| 3✓ | Na |
| 3✓ | K |
| 3✓ | Ca |
| 3✓ | Mg |
| 3✓ | Cl |
| 3✓ | HCO3 |
| | CO3 |
| 3✓ | SO4 |
| 3✓ | TDS |
| | NO3+ NO2 |
| | NH3 |
| | kield N |
| | As |
| (N) | Ba |
| | Cd |
| | CN |
| | Cr |
| | F |
| | Pb |
| | Hg |
| | Se |
| | Ag |
| | U |
| | V |
| | Ra 226 |
| | Ra 228 |
| | Cu |
| | Fe |
| | Mn |
| | Phenols |
| | Zn |
| | Al |
| | B |
| | Co |
| | Mo |
| | Ni |
| 3✓ | pH |
| 3✓ | Conduct. |

# FIELD TRIP REPORT
## GROUND WATER SECTION

SLD USER CODES
Ground Water: 59300
$NO_3$, HC, & Toxics: 59600
UIC; (59500)

County Lea

FACILITY VISITED
Name of Facility: Permian Brine
Location: Jal

Discharge Plan Number: DP-324
Type of Operation: Brine extraction well

ENVIRONMENTAL IMPROVEMENT DIVISION FIELD VISIT
EID Inspector(s): Paige Morgan + Steve Sanco
Date of Inspection or Visit: 11/28/84
Discharger's Representative Present During EID Visit:
Name: Russ Hickerson - Mac McCutcheon - Robert Smith
Title or Position: Vice-pres - Geologist - Geologist
Purpose of Visit:
a. Evaluation of Proposed Discharge Plan ✓
b. Compliance Inspection of Discharge with Approved Plan
c. Other (specify) investigate complaints of chloride contamination in adjacent water wells.
Inspection Activities During Field Visit:
a. Inspection of Facilities or Construction (specify)
Brine pond + water storage tanks

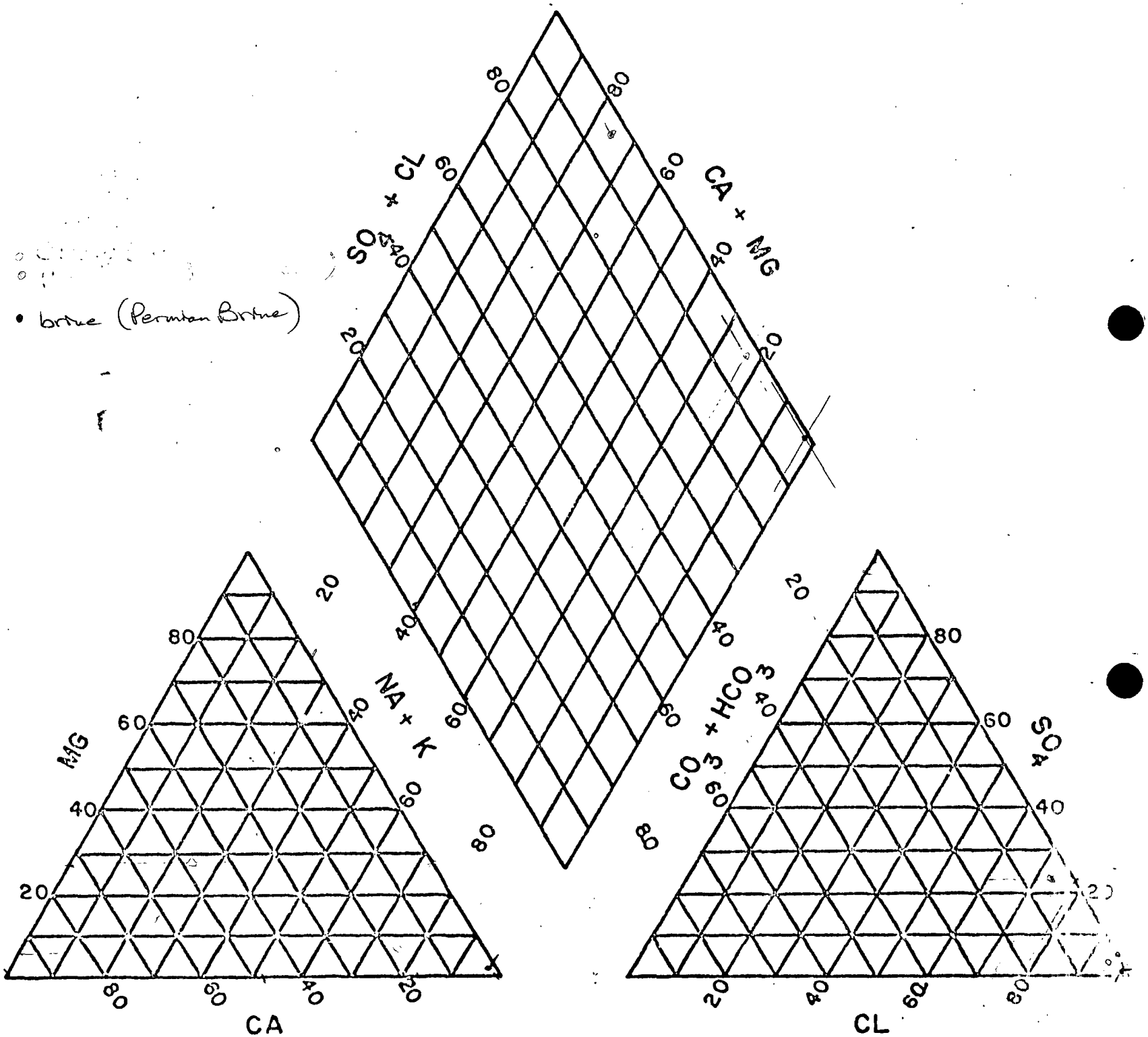
b. Sampling of Effluents (give sampling locations)
Brine pond 8411281137-38

c. Sampling of Ground Water (give names or locations of wells)
Cramer well ≈ 1000 ft south of brine well 8411281005-06-07
Boultinghouse/Moseley well ≈ 1200 ft south of " " 8411281042-43-44

d. Evaluation of geology, soils, water levels or other physical characteristics of the location (specify)
Moseley well SWL ≈ 50 ft. Three oil wells, active and abandoned, w/ accompanying "reclaimed" mud/brine pits, located within 1200 ft of contaminated water wells, to south.
e. Other (specify) Signs at these sites: Arco 2-H S21 T25 R37 7-13-83 Lewis B. Burleson Inc; Burleson & Huff Arco No. 2-Y Unit H T25S R37E Sec 21; Burleson & Huff Arco No. 1 Unit A Sec 21 T25 R37.
Observations and Information Obtained during the Visit:
The first two pits listed above were devoid of vegetation, indicating probable severe chloride concentrations. The third better.

organics (2) → Pressure test at Permian brine well conducted at 30-35 psi - chart from recorder will be forwarded to us. DAT indicated no substantial drop in pressure.

ACTION REQUIRED




• brine (Permian Brine)

# PERMIAN BRINE SALES, INC.

**24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN**

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531



RECEIVED
NOV 19 1984
GROUND WATER/HAZARDOUS WASTE BUREAU


November 6, 1984

Paige Grant
Water Resource Specialist
Environmental Improvement Division
P.O. Box 968
Santa Fe, New Mexico 87504-0968

Re: Chloride contamination of shallow aquifer in the vicinity of Permian Brine's Jal Brine Station

Dear Miss Grant:

This will acknowledge your letter of August 29, 1984, regarding the subject water well contamination.

At your suggestion, we obtained samples of the Bowington and Cramer water wells analyses attached. An analysis of the Permian Brine water well is also attached. The analyses obtained September 17, 1984, indicates the Cramer well is indeed severely contaminated with chlorides. However, the Bowington well (the resident with the orchard) does not exhibit unusually high chlorides.

The statement in your letter that the brine station could "possible cause...this chloride contamination due to its close proximity UPGRADIENT of the wells...". Please refer to Drawing J-1 Rev. of the plotted hydraulic gradient, in the shallow 100-150' aquifer in this area. Although this sketch was prepared from 1953 data, it is possible this gradient still prevails due to the substantial withdrawals to the north from water wells of El Paso Natural Gas Company plants. Consequently, even if there had been significant surface brine spillage or underground migration of brine, it would move in a northerly direction from Permian Brine's site.

An on the ground search for a possible source of this contamination indicated a "reclaimed" surface drilling reserve pit at the Burleson Huff-ARCO 2Y well. This well was completed December 30, 1975. As exhibited in the pictures of this pit area. The total lack of vegetation, indicates this pit was a collection of drilling mud and saturated brine. As shown on Drawing J-2 REV. the contaminated wells are 1030 and 1160 feet from this site, and down-gradient. The

five years intervening between this well completion and the observed contamination in 1980 would provide ample time for the movement of the contaminants, even in this semi-arid area.

The loss of circulation in the two earlier brine wells was caused by fracturing into the Rustler zone overlying the salt. The workover records of the previous operator detail exactly what happened. The brine well had plugged up - probably by failure to backflush the well at monthly intervals - so the well operator hired a pump truck to remove the plug. The operator thus mistakenly exceeded the salt fracture pressure, fracture occurred and pressure was lost immediately.

We do not deny the fracturing of the salt section can lead to contamination of near-surface aquifers. The vertical migration of the brine solution usually occurs in or near well bores close to the fractured areas. In the case of this area, the close proximity of Permian Brine's water well - 30' - to the No. 2 abandoned brine well, and bottomed at 450' it would seem reasonable that any contamination as a result of this fracturing would be observed in this water well. As indicated from the water analyses of this water well the chlorides concentration barely exceeds the standards for public water supplies and the sulfates are below the standard requirements.

We hope this report answers most of the questions in your letter. From our experiences in this area, the occurance, productivity and movement of underground water must be classified as an art rather than a science. There are no consistent data or hydraulic equations that will predict and/or satisfy the actual field conditions we have encountered in the drilling and operation of water wells.

If you require further information or have additional questions, please let up hear from you.

Very truly yours,
PERMIAN BRINE SALES, INC.

R.C. MC CUTCHAN
ENGINEER

RCM/law

exas Department of Water Resources – Underground Injection Control Section

it No. _____

## GROUND WATER ANALYSIS REPORT- IN SITU MINING

Well No. _____ Sample No. _____

Submitted By A. L. Hickerson Date Collected: 9-17-84 ; By _____

Company Permian Brine Sales, Inc. Mine Billy W. Carmer

**FIELD MEASUREMENTS:**

Spec. Conductance at Well: _____
Sample Temperature: _____
pH: _____

**WELL DATA:**

Normal Water Level: _____ msl
Pump: Set at _____ feet; _____ gpm.
Bottom of: Casing _____ feet; Completion Interval _____ feet
Land Surface Datum: _____ msl

SAMPLE METHODS: Calibrate Electrical Conductance Meter (1) Page 71; Pump Well Until Electrical Conductance is Approx. Constant.
CONTAINER: 1 Liter Plastic
ANALYSIS: Lab Name Martin Water Labs., Inc. Date Received 9-17-84 Date Reported 9-24-84
Martin Water Labs., Inc. #984246

**MAJOR AND SECONDARY CONSTITUENTS**

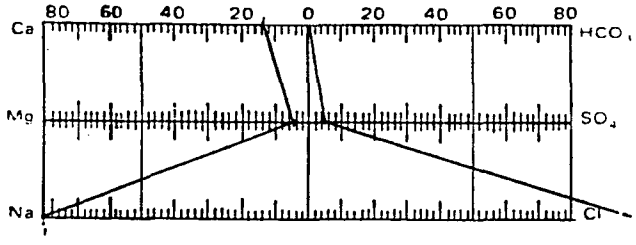
| | ITEM | STORET | mg/l (a) | F (b) | | epm (c) | Ecf (d) | | (c) x (d) | % epm |
|---|---|---|---|---|---|---|---|---|---|---|
| A. | Calcium (Ca) | 00915 | 3,840 | = 20.04 x | | 191.62 | x 52.0 = | | 3.7 | 14.4 |
| B. | Magnesium (Mg) | 00925 | 923 | = 12.16 x | | 75.90 | x 46.6 = | | 1.6 | 5.7 |
| C. | Sodium (Na) | 00929 | 17,400 | = 22.99 x | | 756.85 | x 48.9 = | | 37,009.9 | 79.9 |
| D. | | | Total Cation | .... | | 1,024.37 | | | | |
| E. | Carbonate ($CO_3$) | 00445 | 0 | = 30.00 x | | 0.00 | x 84.6 = | | 0.0 | 0.0 |
| F. | Bicarbonate ($HCO_3$) | 00440 | 142 | = 61.02 x | | 2,32 | x 43.6 = | | 101.2 | 0.2 |
| G. | Sulfate ($SO_4$) | 00945 | 3,183 | = 48.03 x | | 66.27 | x 73.9 = | | 4,897.4 | 5.0 |
| H. | Chloride (Cl) | 00940 | 44,742 | = 35.45 x | | 1,262.11 | x 75.9 = | | 95,794.1 | 94.8 |
| I. | Nitrate ($NO_3$-N) | 71851 | 3.4 | | | | Total | | 137,807.9 | = T. (1) page 31 |
| J. | | | Total Anion | ... | | 1,330.70 | | | | |
| K. | Total Ion | | 70,230 | | | | | | | |
| L. | TDS (180 °C) | 70300 | 74,384 | | | | | | | |
| M. | TDS = K - (.5F) | | = 70,159 | | | | | | | |
| N. | Ec (25 °C) | 00095 | 82.5 x $10^3$ | µmhos | | | | | | |
| P. | Ec (Dilute) = 118 x 1,666 | | = 196,588 | µmhos | | | | | | |
| Q. | Alk. as $CaCO_3$ | 00410 | 116 | | | | | | | |
| R. | pH | 00403 | 7.30 | | | | | | | |

Accuracy Check

| | | Range |
|---|---|---|
| Ion (D/J) | 0.77 | .96 to 1.04 |
| TDS (L/M) | 1.06 | .90 to 1.10 |
| Ec (P/T) | 1.43 | .95 to 1.05 |

Average bal. Doesn't check

DIAGRAM % CATION % ANION




(1) See STD Methods - 15th Edition

Analyst
Remarks _____ Checked By _____

RECEIVED
NOV 13 1984
GROUND WATER/HAZARDOUS WASTE BUREAU

TDWR-0361

Texas Department of Water Resources – Underground Injection Control Section

Permit No. _____

## GROUND WATER ANALYSIS REPORT- IN SITU MINING

Well No. _____ Sample No. _____

Submitted By A. L. Hickerson Date Collected: 9-17-84 ; By _____

Company Permian Brine Sales, Inc. Mine Ralph Bowington's water well

**FIELD MEASUREMENTS:**

Spec. Conductance at Well: _____

Sample Temperature: _____

pH: _____

**WELL DATA:**

Normal Water Level: _____ msl

Pump: Set at _____ feet; _____ gpm.

Bottom of: Casing _____ feet; Completion Interval _____ feet

Land Surface Datum: _____ msl

SAMPLE METHODS: Calibrate Electrical Conductance Meter (1) Page 71; Pump Well Until Electrical Conductance is Approx. Constant.

CONTAINER: 1 Liter Plastic

ANALYSIS: Lab Name Martin Water Labs., Inc. Date Received 9-17-84 Date Reported 9-24-84

Martin Water Labs., Inc. #984245

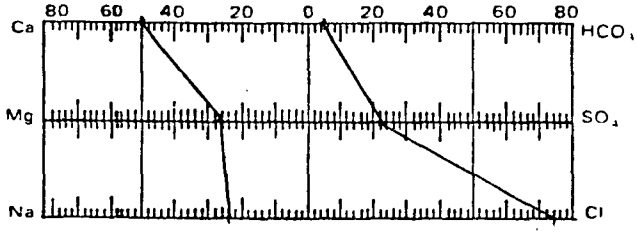
**MAJOR AND SECONDARY CONSTITUENTS**

| | ITEM | STORET | mg/l (a) | F (b) | epm (c) | Ecf (d) | (c) x (d) | % epm |
|---|---|---|---|---|---|---|---|---|
| A. | Calcium (Ca) | 00915 | 660 | = 20.04 x | 32.93 | x 52.0 = | 1,712.4 | 48.9 |
| B. | Magnesium (Mg) | 00925 | 219 | = 12.16 x | 18.00 | x 46.6 = | 838.8 | 26.8 |
| C. | Sodium (Na) | 00929 | 375 | = 22.99 x | 16.31 | x 48.9 = | 797.6 | 24.3 |
| D. | | | Total Cation | .... | ~~67.24~~ | | | |
| E. | Carbonate ($CO_3$) | 00445 | 0 | = 30.00 x | 0.00 | x 84.6 = | 0.0 | 0.0 |
| F. | Bicarbonate ($HCO_3$) | 00440 | 205 | = 61.02 x | 3.36 | x 43.6 = | 146.5 | 4.9 |
| G. | Sulfate ($SO_4$) | 00945 | 707 | = 48.03 x | 14.72 | x 73.9 = | 1,087.9 | 21.6 |
| H. | Chloride (Cl) | 00940 | 1,775 | = 35.45 x | 50.07 | x 75.9 = | 3,800.3 | 73.5 |
| I. | Nitrate ($NO_3$-N) | 71851 | 3.4 | | | Total | 8,383.5 | = T. (1) page 31 |
| J. | | | Total Anion | ... | 68.15 | | | |
| K. | Total Ion | | 3,942 | | | | | |
| L. | TDS (180 °C) | 70300 | 4,906 | | | | | |
| M. | TDS = K - (.5F) | | = 3,839 | | | | | |
| N. | Ec (25 °C) | 00095 | $5.78 \times 10^3$ | µmhos | | | | |
| P. | Ec (Dilute) = 114 x 83 | | = 9,462 | µmhos | | | | |
| Q. | Alk. as $CaCO_3$ | 00410 | 168 | | | | | |
| R. | pH | 00403 | 7.10 | | | | | |

Accuracy Check

| | | Range |
|---|---|---|
| Ion (D/J) | 0.99 | .96 to 1.04 |
| TDS (L/M) | 1.28 | .90 to 1.10 |
| Ec (P/T) | 1.13 | .95 to 1.05 |

DIAGRAM % CATION % ANION




Charge bal. checks

(1) See STD Methods - 15th Edition

Analyst Remarks _____ Checked By _____

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NOV 13 1984
GROUND WATER/HAZARDOUS WASTE BUREAU

ent No. 3319000

Permit No. _____

GROUND WATER ANALYSIS REPORT-IN SITU MINING

Well No. 1 Sample No. 1

Production Area No. _____

Submitted By Permian Brine Sales Date Collected: 7-25-84 ; By R.C. McCutchan

Company Jal Brine Station Mine Jal, New Mexico Sta. Fresh Water

SAMPLE METHODS: Calibrate Ec Meter (1)Page 71; Pump Well Until Ec is Approx. Constant.

| Sample | Date | Temp (C) | pH | Spec. Cond. (umhos) |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |

| | | | |
|---|---|---|---|
| Spec. Cond. at Well: | 2000 | | µmhos |
| Normal Water Level: | 2835 | | msl |
| Pump: Set at | 2667 msl | 45 | gpm. |
| Bottom of: Casing | n.a. msl; screen | d.a. | msl |
| Land Surface Datum: | 3085 msl | | |

CONTAINER: 1 Gal. Plastic for *Items; 1 Gal. Plastic for all other items.; One quart plastic (full) for Specific Conductivity

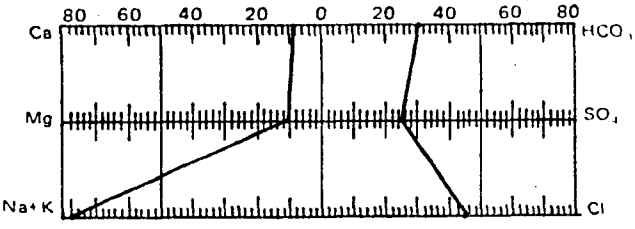
PRESERVATION METHODS: Acidify * Item to <2 pH ($HNO_3$); Cool all other items to 4 °C.

ANALYSIS: Lab Name Southwestern Laboratories Date Received 8-2-84 Date Reported 8-6-84

MAJOR AND SECONDARY CONSTITUENTS (Group No. 1)

| | ITEM | STORET | mg/l (a) | F (b) | epm (c) | Ecf (d) | (c) x (d) | % epm |
|---|---|---|---|---|---|---|---|---|
| A. | Calcium (Ca) | 00915 | 33 | = 20.04 x | 1.65 | x 52.0 = | 86 | 8.4 |
| B. | Magnesium (Mg) | 00925 | 27 | = 12.16 x | 2.22 | x 46.6 = | 103 | 11.3 |
| C. | Sodium (Na) | 00929 | 357 | = 22.99 x | 15.53 | x 48.9 = | 759 | 79.3 |
| D. | Potassium (K) | 00937 | 8 | = 39.10 x | 0.20 | x 72.0 = | 14 | 1.0 |
| E. | | | Total Cation | .... | 19.60 | | | |
| F. | Carbonate ($CO_3$) | 00445 | None | = 30.00 x | --- | x 84.6 = | --- | --- |
| G. | Bicarbonate ($HCO_3$) | 00440 | 376 | = 61.02 x | 6.16 | x 43.6 = | 269 | 30.9 |
| H. | Sulfate ($SO_4$) | 00945 | 239 | = 48.03 x | 4.98 | x 73.9 = | 368 | 25.0 |
| I. | Chloride (Cl) | 00940 | 312 | = 35.45 x | 8.80 | x 75.9 = | 668 | 44.1 |
| J. | Nitrate ($NO_3$-N) | 71851 | | | | Total | 2267 | = T (1) page 35 |
| K. | Fluoride (F) | 00951 | | | | | | |
| L. | Silica ($SiO_2$) | 00955 | | | | | Accuracy Check | |
| M. | | | Total Anion | ... | 19.94 | | | Range |
| N. | Total Ion | .... | | | | Ion (E:M) | 0.98 | .96 to 1.04 |
| P. | TDS (180 °C) | 70300 | 1184 | | | TDS (P:Q) | 1.01 | .90 to 1.10 |
| Q. | TDS = N - .5G | | = 1168 | | | Ec (S:T) | 1.01 | .95 to 1.05 |
| R. | Ec (25 °C) | 00095 | 2100 | | | | | |
| S. | Ec (Dilute) = 115 x 20 | | = 2300 µmhos | | | | | |
| U. | Alk. as $CaCO_3$ | 00410 | 308 | | | | | |
| V. | pH | 00403 | 7.49 | | | | | |

DIAGRAM % CATION % ANION




(1) See STD Methods - 14th Edition

MINOR AND TRACE CONSTITUENTS (Group No. 2)

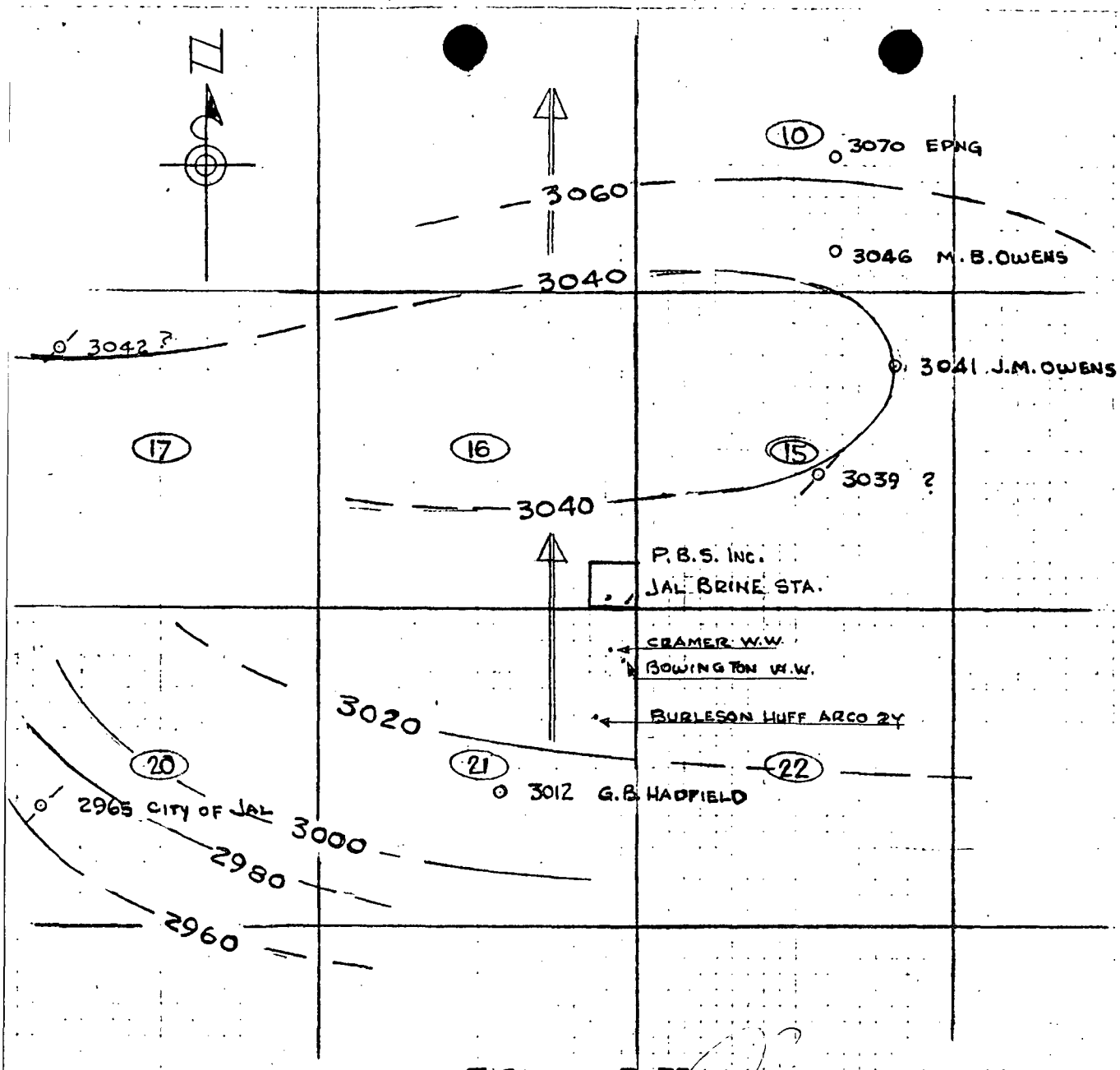
| ITEM | mg/l | ITEM | mg/l | ITEM | mg/l |
|---|---|---|---|---|---|
| * Arsenic (As) | | * Manganese (Mn) | | * Uranium (U) | |
| * Cadmium (Cd) | | * Mercury (Hg) | | Ammonia-N | |
| * Iron (Fe) | | * Moly. (Mo) | | Radium 226 | (pci/1) |
| * Lead (Pb) | | * Selenium (Se) | | | |

Analyst Remarks Report No. 35697

Checked By Gary M. Burtel

received 8-7-84

RECEIVED NOV 13 1984 GROUND WATER/HAZARDOUS WASTE BUREAU




T 25 S - R 37 W

SCALE 1" = 2640'

AQUIFERS

- o OGALLALA
- o/ QUATERNARY

HYDRAULIC GRADIENT

? UNKNOWN OWNER

DATA FROM: TABLE 6 RECORDS OF WELLS IN SOUTHERN LEA CO. N. MEX. P. 85.

"GEOLOGY AND GROUND-WATER CONDITIONS IN SOUTHERN LEA COUNTY, NEW MEXICO"

NICHOLSON & CLEBSCH

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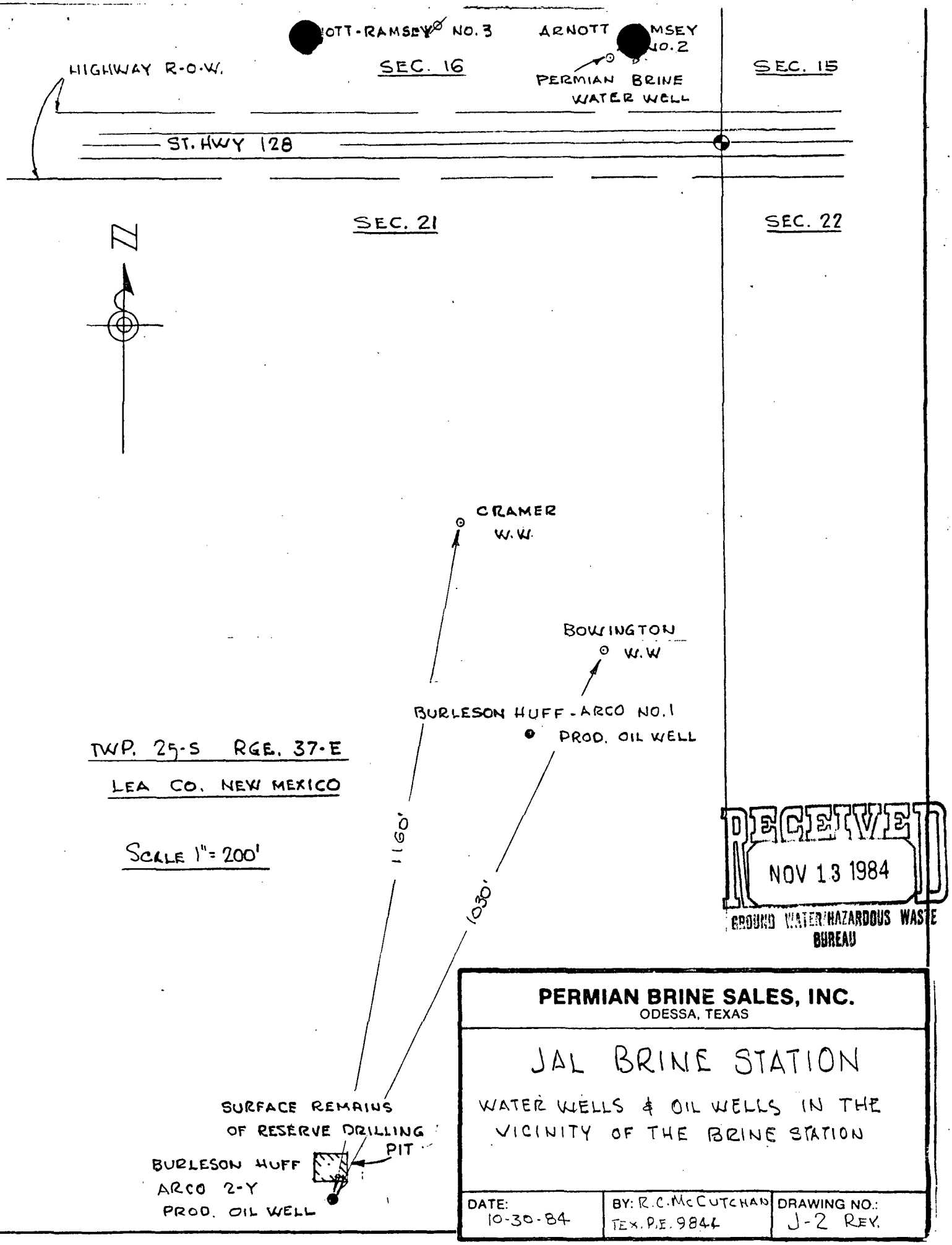
NOV 13 1984
GROUND WATER/HAZARDOUS WASTE BUREAU

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

# HYDRAULIC GRADIENT
## SOUTHERN LEA COUNTY
## NEW MEXICO

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 9-17-84 | R.C. MCCUTCHAN Tex P.E. 9844 | J-1 Rev |

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NOV 13 1984
GROUND WATER/HAZARDOUS WASTE BUREAU

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

# JAL BRINE STATION

WATER WELLS & OIL WELLS IN THE VICINITY OF THE BRINE STATION

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 10-30-84 | R.C. McCUTCHAN TEX. P.E. 9844 | J-2 REV. |

RESERVE MUD PIT AT
BURLESON HUFF ARCO 24

CRAMER WELL

RESERVE PIT & OIL WELL IN FOREGROUND

BOWINGTON WELL

| Permian Brine Mixture 11/28/84 | | | | |
|---|---|---|---|---|
| K | 663 mg/l | 16.95 meq/l | | .5% |
| Ca | 1027 " | 51.25 " | | 1.5% |
| Mg | 582 | 47.88 | | 1% |
| Na | 96370 | 4192.10 | 97% | 4308.18 total |
| $SO_4$ | 4380 | 91.24 | | 1.7 |
| Cl | 189647 | 5349.94 | | 98 |
| $HCO_3$ | 191.2 | 3.13 | | ~.3 |
| [TDS (calc.) | 292860] | | | 5444.31 total |

Mosely 11/28/84

| | | | |
|---|---|---|---|
| K | 8.58 mg/l | 0.219 meq/l | |
| Ca | 430 | 21.457 | |
| Mg | 174 | 14.313 | |
| Na | 352 | 15.312 | ~~0.2~~ |
| $SO_4$ | 629.9 | 13.121 | $\frac{Na}{Cl}$: 0.30 |
| Cl | 1190 | 33.570 | |
| $HCO_3$ | 189.6 | 3.108 | |

Cramer 11/28/84

| | | | |
|---|---|---|---|
| K | 78 | 1.994 | |
| Ca | 3164 | 157.885 | |
| Mg | 1025 | 84.317 | |
| Na | 23862 | 1037.997 | $\frac{Na}{Cl}$: 0.54 |
| $SO_4$ | 2483 | 51.721 | |
| Cl | 43762 | 1234.526 | |
| $HCO_3$ | 130.2 | 2.134 | |

Mosely 9/17/84

| | | | |
|---|---|---|---|
| K | — | — | |
| Ca | 660 | 32.934 | |
| Mg | 219 | 18.015 | |
| Na | 375 | 16.313 | |
| $SO_4$ | 707 | 14.727 | $\frac{Na}{Cl}$: 0.21 |
| Cl | 1775 | 50.073 | |
| $HCO_3$ | 205 | 3.360 | |

Permian water

| | | | |
|---|---|---|---|
| K | 8 mg/L | 0.205 meq/L | |
| Ca | 33 " | 1.648 | |
| Mg | 27 | 2.221 | |
| Na | 357 | 15.530 | $\frac{Na}{Cl}$ : 1.14 |
| $SO_4$ | 239 | 4.978 | |
| Cl | 312 | 8.802 | |
| $HCO_3$ | 376 | 6.163 | |

"#1 Monitor"

| | | | |
|---|---|---|---|
| K | - | - | |
| Ca | 4 | 0.200 | |
| Mg | 12.2 | 1.004 | |
| Na | 483 | 21.011 | |
| $SO_4$ | 212.5 | 4.426 | $\frac{Na}{Cl}$ : 1.21 |
| Cl | 400 | 11.284 | |
| $HCO_3$ | 396.5 | 6.499 | |

Conoco: $\frac{Na}{Cl}$ : 0.62 T20S R38E Sec. 2.

P&S: $\frac{Na}{Cl}$ : 0.62 T21S R37E Sec. 34

Salado: $\frac{Na}{Cl}$ : 0.65 T25S R37E Sec. 14

Sims-McC: $\frac{Na}{Cl}$ : 0.64 T21S R37E Sec. 32

Unichem-Eunice: $\frac{Na}{Cl}$ : 0.54 T21S R37E Sec. 34.

529 Brine: $\frac{Na}{Cl}$ : 0.36 T17S R32E Sec 30

KTS: 0.47 T9S R35E Sec 27

Marathon Rd: 0.64 T19S ~~R35E~~ R34E

Permian Corp: 0.63 T18S R37E Sec 36

Quality: 0.31 T12S R36E Sec. 20

Salty Dog, Inc: 0.65 T19S R36E Sec 5

Tracy: 0.52 T22S R7E Sec 3

Inichem Carlsbad: 0.64 T22S R26E Sec. 36

Wasserbund: 0.63 T16S R35E Sec 31

Inichem Truckers #1: 0.64 T19S R35E Sec 1

Inichem Truckers #2: 0.64 T18S R38E Sec 33

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531



RECEIVED
NOV 05 1984
WATER/HAZARDOUS WASTE BUREAU


October 31, 1984

Paige Grant
Water Resource Specialist
Environmental Improvement Division
Box 968
Santa Fe, New Mexico 87504-0968

Dear Miss Grant:

To continue our correspondence and in reply to your letter of August 31, 1984, the attached report is submitted for your information. We have attempted to answer your queries based on our experiences, technical data and a sincere desire to comply with all regulations of EID.

With regard to the pressure test, we have, on this date, contacted Mr. Rolf Rufner in the Hobbs office of EID to set a date for the test. He advised that he would call back to set a firm date later.

To better facilitate the approval of this permit application, we would like to suggest a meeting, in Santa Fe, with you and your staff at a date convenient for your participation. There are several specific regulatory proposals that we would like to discuss that, in our opinion, cannot adequantely be resolved by correspondence. Normally, we shall be able to arrange our schedule for the meeting on the briefest notice. Please call us at (915) 332-0531 regarding this proposal.

Very truly yours,
PERMIAN BRINE SALES, INC.

R.C. MC CUTCHAN
ENGINEER

RCM/law

1.b. Noted

2.b. Two samples of water wells at the residences south of the brine station were obtained September 12, 1984. The analyses are attached.

Drawing No. J-2, attached, shows the location of the two water wells south of the brine station in relation to the plugged and abandoned Arnott-Ramsey No. 2 and 3. Also, Permian Brine's water well.

The close proximity of Permian's water well, 30' to the abandoned brine well should be noted. The comparatively low chlorides concentration and TDS of this water well as compared to the Bowington and Cramer wells, 800 to 1000 feet south, would indicate the chloride contamination of these latter wells is coming from some other source. See tabulation below:

| SAMPLE DATE | 9/12/84 | 9/12/84 | 7/25/84 |
|---|---|---|---|
| DISTANCE FROM ABANDONED BRINE WELL | 1000' | 800' | 30' |
| | Bowington | Cramer | Permian Brine |
| CL | 1,775 | 44,742 | 312 |
| TDS | 4,906 | 74,384 | 1,184 |
| COND | 5,780 | 82,500 | 2,100 |

Additionally, we believe the brine station is down-hydraulic gradient from the wells to the south. See Drawing J-1. Although this gradient sketch was prepared from 1953 data, we believe it is still in a northerly direction. The substantial water well withdrawals to the north, primarily by El Paso Natural Gas Plants over the past forty years, would account for this subsurface flow.

3.a. When water dissolves the rock salt in a brine well, all air is displaced from the water. This released air is trapped under the sloping anhydrite and shale ledges along the side of the cavern as well as above the casing shoe. This causes the brine well to have a "cushion" in it, so that when the circulating pump on a brine well is shut down the well continues to flow until the pressure in the "cushion" declines sufficiently to offset the decline in pressure by removal of tubing and casing annulus pressure drop.

The brine is thus oxygen free and corrosion is minimized.

The loss of circulation in the two earlier brine wells was caused by fracturing into the Rustler zone overlying the salt. The workover records of the previous operator detail exactly what happened. The brine well had plugged

up - probably by failure to backflush the well at monthly intervals - so the well operator hired a pump truck to remove the plug. The operator thus mistakenly exceeded the salt fracture pressure, fracture occurred and pressure was lost immediately.

3.b. We reverse the well each month long enough to fill the casing annulus with fresh water and then let it set overnight before resuming normal direct circulation.

3.c. Cavern size calculation -

Our assumption is that cavern development is cylindrical in shape rather than spherical. We believe this to be a more reasonable and perhaps, a more accurate configuration based on our method of INSITU mining; i.e. the injection of fresh water at the base of the cavern through the tubing and circulating the brine out the top through the tubing - casing annulus.

Our condensed formula is expanded here;

We work with diameters rather than radii in calculating areas and volumes of circular shapes, such as pipe, drilled holes, tanks, etc. Therefore, the formula we use is an follows:

a. area of a circle = $\pi d^2/4$

(derived from - area = $\pi r^2$
$r = d/2$ $r^2 = d^2/4$)

b. To obtain total cubic feet from bbls of brine:

cu.ft. = bbls brine x 5.61 cu.ft./bbl

= 30,600 x 5.61

= 171,666 cu.ft.

c. To obtain the area of cylinder of the above volume, divide by the vertical dimension, thickness of the salt section = 324 feet

d. Area of cylinder circle = 171,666/324

= 529.8 sq.ft.

e. To solve for the diameter of the cylinder from the known area, substitute in the formula, in "a" above:

$529.8 = \pi d^2/4$

$d = [4 \times 529.8/\pi]^{1/2}$

= 25.97 feet

Q.E.D.

4.a. Drawing J-3 is a sketch of the proposed spill catch basin; attached are specifications for the "aquaflex" liner material.

There is no such thing as an "average load". Loads vary from 5 barrels to 130 barrels, depending on what they want the brine for, distance and terrain to be hauled, etc. In the winter time, water trucks may load only a few barrels to prevent their pump mainfolds from freezing. On a "kill" job, an operator may specify a brine weighing 9.2#/gallon in order to properly balance the bottomhole pressure of the well being worked on. Thus the truck driver would load 62 barrels of brine and 58 barrels of fresh water to make 120 barrels of 9.2# brine. See attached chart used by all truckers on "kill" jobs.

The amount of spills at the station is insignificant. We do not spill as much brine in a year as the brine left in the pits of one oil well after drilling with fresh water through the rock salt layer underlying this country.

4.b. Native "soil" at this station site is caliche. It is very porous compacted or otherwise.

b.c. Noted

4.d. Noted

4.e. Noted

5.b. Cost estimate and supporting bids for plugging the brine well is attached.

6.a. The pumping conditions are observed daily, consequently any pressure variations are noted and reported. The calibration of pressure gauges are rarely performed as it is more efficient to replace a faulty instrument with a new one. However, we do dead weight test gauges occasionally only to find most of them are worn out.

6.b. Noted

Texas Department of Water Resources – Underground Injection Control Section

Permit No. _____

## GROUND WATER ANALYSIS REPORT- IN SITU MINING

Well No. _____ Sample No. _____

Submitted By A. L. Hickerson Date Collected: 9-17-84 ; By _____

Company Permian Brine Sales, Inc . Mine Ralph Bowington's water well

**FIELD MEASUREMENTS:**

Spec. Conductance at Well: _____

Sample Temperature: _____

pH: _____

**WELL DATA:**

Normal Water Level: _____ msl

Pump: Set at _____ feet; _____ gpm.

Bottom of: Casing _____ feet; Completion Interval _____ feet

Land Surface Datum: _____ msl

SAMPLE METHODS: Calibrate Electrical Conductance Meter (1) Page 71; Pump Well Until Electrical Conductance is Approx. Constant.

CONTAINER: 1 Liter Plastic

ANALYSIS: Lab Name Martin Water Labs., Inc. Date Received 9-17-84 Date Reported 9-24-84

Martin Water Labs., Inc. #984245

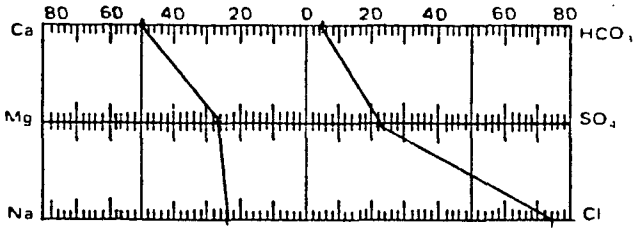
**MAJOR AND SECONDARY CONSTITUENTS**

| | ITEM | STORET | mg/l (a) | F (b) | | epm (c) | Ecf (d) | | (c) x (d) | % epm |
|---|---|---|---|---|---|---|---|---|---|---|
| A. | Calcium (Ca) | 00915 | 660 | = 20.04 x | | 32.93 | x 52.0 = | | 1,712.4 | 48.9 |
| B. | Magnesium (Mg) | 00925 | 219 | = 12.16 x | | 18.00 | x 46.6 = | | 838.8 | 26.8 |
| C. | Sodium (Na) | 00929 | 375 | = 22.99 x | | 16.31 | x 48.9 = | | 797.6 | 24.3 |
| D. | | | Total Cation | .... | | ~~67.24~~ | | | | |
| E. | Carbonate ($CO_3$) | 00445 | 0 | = 30.00 x | | 0.00 | x 84.6 = | | 0.0 | 0.0 |
| F. | Bicarbonate ($HCO_3$) | 00440 | 205 | = 61.02 x | | 3.36 | x 43.6 = | | 146.5 | 4.9 |
| G. | Sulfate ($SO_4$) | 00945 | 707 | = 48.03 x | | 14.72 | x 73.9 = | | 1,087.9 | 21.6 |
| H. | Chloride (Cl) | 00940 | 1,775 | = 35.45 x | | 50.07 | x 75.9 = | | 3,800.3 | 73.5 |
| I. | Nitrate ($NO_3$-N) | 71851 | 3.4 | | | | Total | | 8,383.5 | = T. (1) page 31 |
| J. | | | Total Anion | .... | | 68.15 | | | | |
| K. | Total Ion | | 3,942 | | | | | | | |
| L. | TDS (180 °C) | 70300 | 4,906 | | | | | | | |
| M. | TDS = K - (.5F) | | = 3,839 | | | | | | | |
| N. | Ec (25 °C) | 00095 | $5.78 \times 10^3$ | μmhos | | | | | | |
| P. | Ec (Dilute) = 114 x 83 | | = 9,462 | μmhos | | | | | | |
| Q. | Alk. as $CaCO_3$ | 00410 | 168 | | | | | | | |
| R. | pH | 00403 | 7.10 | | | | | | | |

Accuracy Check

| | | Range |
|---|---|---|
| Ion (D/J) | 0.99 | .96 to 1.04 |
| TDS (L/M) | 1.28 | .90 to 1.10 |
| Ec (P/T) | 1.13 | .95 to 1.05 |

DIAGRAM % CATION % ANION




(1) See STD Methods - 15th Edition

Analyst

Remarks _____ Checked By _____

Client No. 3319000

Permit No. _____

# GROUND WATER ANALYSIS REPORT-IN SITU MINING

Well No. 1 Sample No. 1

Production Area No. _____

Submitted By Permian Brine Sales Date Collected: 7-25-84 ; By R.C. McCutchan

Company Jal Brine Station Mine Jal, New Mexico Sta. Fresh Water

SAMPLE METHODS: Calibrate Ec Meter (1)Page 71; Pump Well Until Ec is Approx. Constant.

| Sample | Date | Temp (C) | pH | Spec. Cond. (umhos) |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |

| | | | | |
|---|---|---|---|---|
| Spec. Cond. at Well: | 2000 | | | μmhos |
| Normal Water Level: | 2835 | | | msl |
| Pump: Set at | 2667 | msl | 45 | gpm. |
| Bottom of: Casing | n.a. | msl; screen | d.a. | msl |
| Land Surface Datum: | 3085 | msl | | |

CONTAINER: 1 Gal. Plastic for *Items; 1 Gal. Plastic for all other items.; One quart plastic (full) for Specific Conductivity

PRESERVATION METHODS: Acidify * Item to <2 pH ($HNO_3$); Cool all other items to 4 °C.

ANALYSIS: Lab Name Southwestern Laboratories Date Received 8-2-84 Date Reported 8-6-84

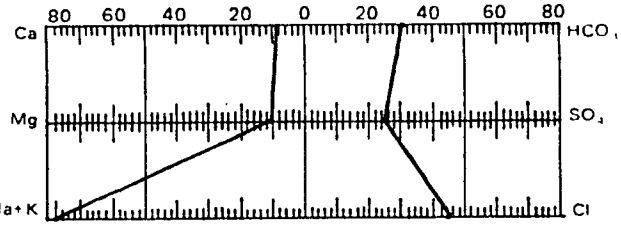
MAJOR AND SECONDARY CONSTITUENTS (Group No. 1)

| | ITEM | STORET | mg/l (a) | F (b) | epm (c) | Ecf (d) | (c) x (d) | % epm |
|---|---|---|---|---|---|---|---|---|
| A. | Calcium (Ca) | 00915 | 33 | = 20.04 x | 1.65 | x 52.0 = | 86 | 8.4 |
| B. | Magnesium (Mg) | 00925 | 27 | = 12.16 x | 2.22 | x 46.6 = | 103 | 11.3 |
| C. | Sodium (Na) | 00929 | 357 | = 22.99 x | 15.53 | x 48.9 = | 759 | 79.3 |
| D. | Potassium (K) | 00937 | 8 | = 39.10 x | 0.20 | x 72.0 = | 14 | 1.0 |
| E. | | | Total Cation | .... | 19.60 | | | |
| F. | Carbonate ($CO_3$) | 00445 | None | = 30.00 x | --- | x 84.6 = | --- | --- |
| G. | Bicarbonate ($HCO_3$) | 00440 | 376 | = 61.02 x | 6.16 | x 43.6 = | 269 | 30.9 |
| H. | Sulfate ($SO_4$) | 00945 | 239 | = 48.03 x | 4.98 | x 73.9 = | 368 | 25.0 |
| I. | Chloride (Cl) | 00940 | 312 | = 35.45 x | 8.80 | x 75.9 = | 668 | 44.1 |
| J. | Nitrate ($NO_3$-N) | 71851 | | | | Total | 2267 | = T (1) page 35 |
| K. | Fluoride (F) | 00951 | | | | | | |
| L. | Silica ($SiO_2$) | 00955 | | | | | | |
| M. | | | Total Anion | ... | 19.94 | | | |
| N. | Total Ion | .... | | | | | | |
| P. | TDS (180 °C) | 70300 | 1184 | | | | | |
| Q. | TDS = N - .5G | = | 1168 | | | | | |
| R. | Ec (25 °C) | 00095 | 2100 | | | | | |
| S. | Ec (Dilute) = 115 x 20 | = | 2300 | μmhos | | | | |
| U. | Alk. as $CaCO_3$ | 00410 | 308 | | | | | |
| V. | pH | 00403 | 7.49 | | | | | |

Accuracy Check

| | | Range |
|---|---|---|
| Ion (E:M) | 0.98 | .96 to 1.04 |
| TDS (P:Q) | 1.01 | .90 to 1.10 |
| Ec (S:T) | 1.01 | .95 to 1.05 |

DIAGRAM % CATION % ANION



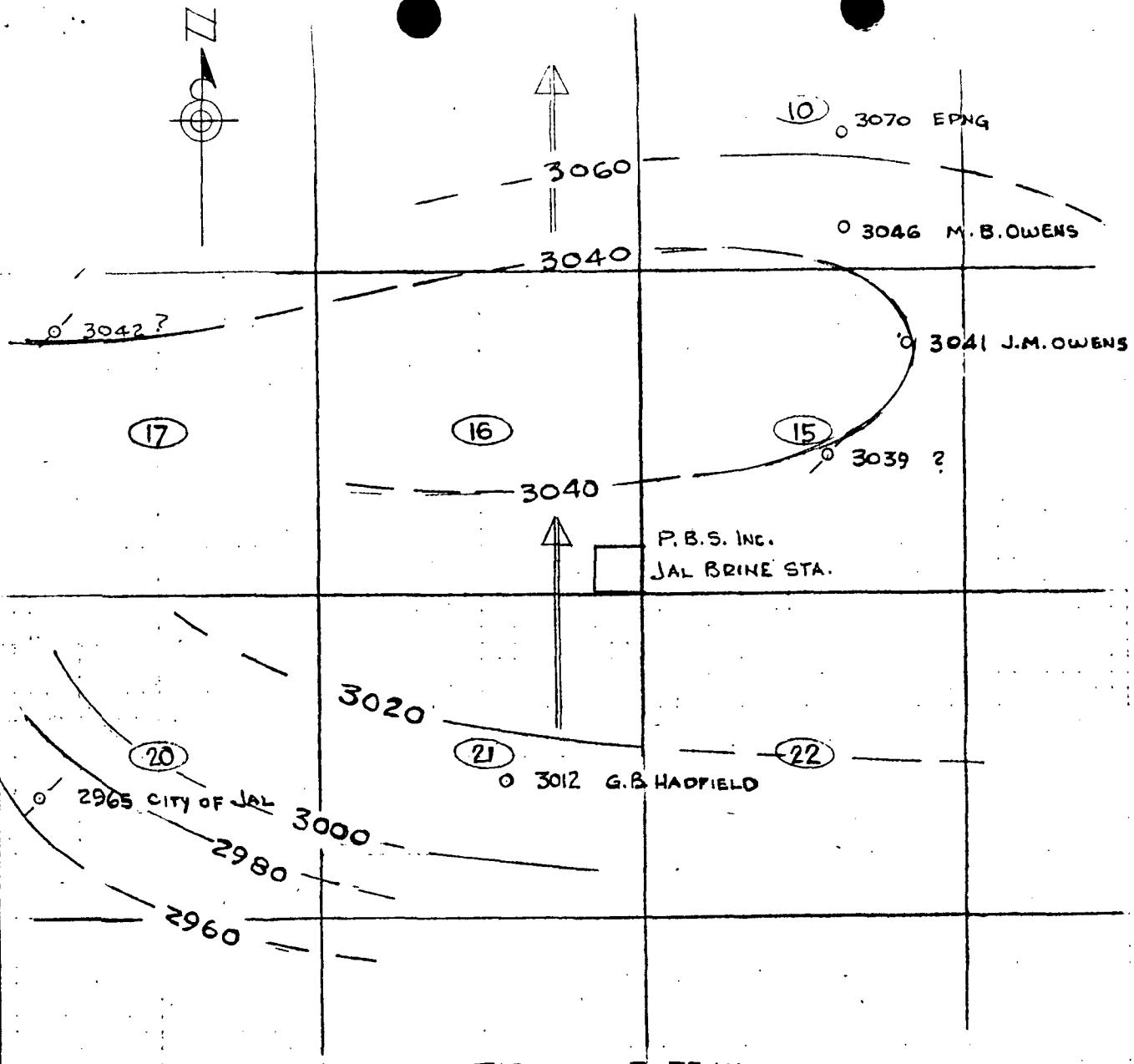

(1) See STD Methods - 14th Edition

MINOR AND TRACE CONSTITUENTS (Group No. 2)

| ITEM | mg/l | ITEM | mg/l | ITEM | mg/l |
|---|---|---|---|---|---|
| * Arsenic (As) | | * Manganese (Mn) | | * Uranium (U) | |
| * Cadmium (Cd) | | * Mercury (Hg) | | Ammonia-N | |
| * Iron (Fe) | | * Moly. (Mo) | | Radium 226 | (pci/1) |
| * Lead (Pb) | | * Selenium (Se) | | | |

Analyst Remarks Report No. 35697 Checked By Gary M. Bunch

received 8-7-84




T. 25 S - R. 37 W

SCALE 1" = 2640'

AQUIFERS

o OGALLALA

o' QUATERNARY

HYDRAULIC GRADIENT

? UNKNOWN OWNER

DATA FROM: TABLE 6 RECORDS OF WELLS IN SOUTHERN LEA CO. N. MEX. P. 85. "GEOLOGY AND GROUND-WATER CONDITIONS IN SOUTHERN LEA COUNTY, NEW MEXICO" NICHOLSON & CLEBSCH

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

HYDRAULIC GRADIENT
SOUTHERN LEA COUNTY
NEW MEXICO

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| SEPT. 17, 1984 | R.C. McCUTCHAN TEX. P.E. 9844 | J-1 |

DIETZGEN 1000 R.C. Tracing Vellum

ARNOTT-RAMSEY NO. 2

ARNOTT RAMSEY NO. 2

HIGHWAY R-O-W.

SEC. 16

PERMIAN BRINE WATER WELL

SEC. 15

ST. HWY 128

SEC. 21

SEC. 22

N

CRAMER W.W.

BOWINGTON W.W

BURLESON HUFF - ARCO NO. 1 PROD. OIL WELL

TWP. 25-S RGE. 37-E

LEA CO. NEW MEXICO

SCALE 1" = 200'

SURFACE REMAINS OF RESERVE DRILLING PIT

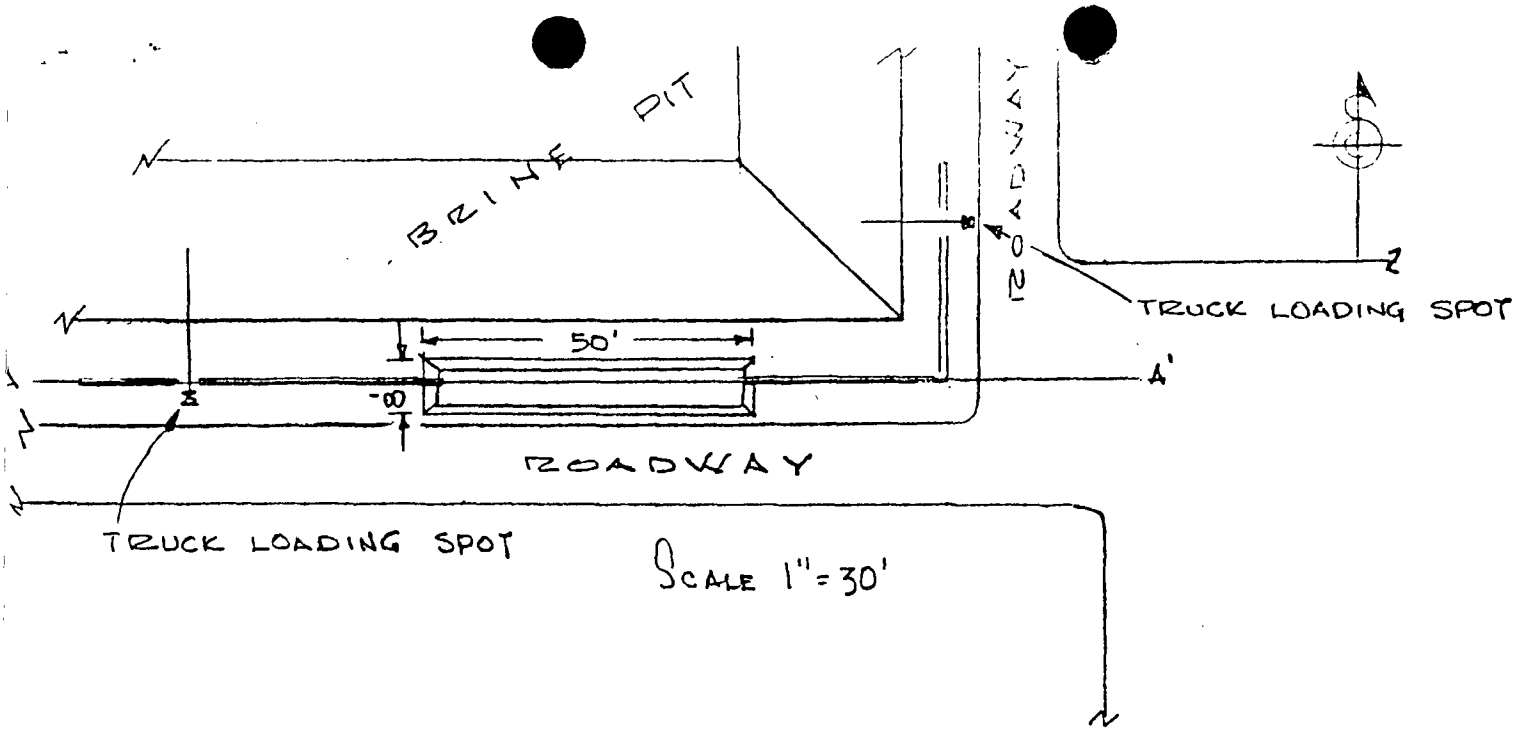
BURLESON HUFF ARCO 2-Y PROD. OIL WELL

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

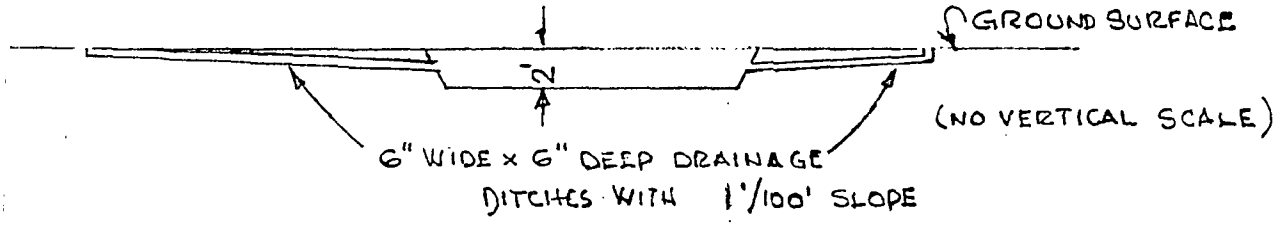
# JAL BRINE STATION

WATER WELLS & OIL WELLS IN THE VICINITY OF THE BRINE STATION

| DATE: 10-30-84 | BY: R.C. McCOTCHAN TEX. P.E. 9844 | DRAWING NO.: J-2 |
|---|---|---|




A-A' CROSS-SECTION



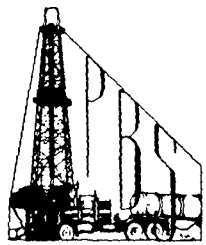

PIT & DITCHES LINED WITH 20 MIL 'AQUAFLEX'

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

PROPOSED BRINE SPILL
CATCH BASIN
JAL BRINE STATION

| DATE: | BY: R.C. McCUTCHAN | DRAWING NO.: |
|---|---|---|
| 9-18-84 | TEX. P.E. 9844 | J-3 |

# USE 10 LB. BRINE



- Drill A Gauge Hole
- Prevent Key Seats
- Eliminate Hydration of Shales
- Increase Drilling Rate
- Reduce Cost of Cementing
- Control High Pressures
- Jel Easily for Frac Jobs
- Prevent Crystallized Drill Pipe

**To Reduce Your Hauling Costs**
**Brine Stations Located At:**

| | | |
|---|---|---|
| Amarillo | Ft. Stockton | Odessa |
| Andrews | Grandfalls | Orla |
| Artesia | Imperial | Ozona |
| Barstow | Jal | N. Pecos |
| Big Spring | Kermit | Pyote |
| Carlsbad | West Kermit | Sayre, Okla. |
| Coyanosa | Mobeetie | Sandhills |
| South Crane - S.W.D. | East Mentone | Snyder |
| West Crockett | North Mentone | |

## PERMIAN BRINE SALES, INC.

BRINE — FRESHWATER — DISPOSAL

TEXAS — NEW MEXICO — OKLAHOMA

**ODESSA, TEXAS**
**79763**

**Rt. 3, Box 3033** **PHONE (915) 332-0531**

**5711 W. 10th.**

**A. L. Hickerson** **Russell Hickerson**

| Final Desired Weight Pounds Per Gallon | Hydrostatic Pressure PSI Per 100 Feet | Degrees Salometer | FOR WEIGHTING UP FRESH WATER WITH 10# BRINE<br>SIZE OF TRANSPORT LOAD | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 100 | | 110 | | 120 | | 130 | | 135 | | 140 | |
| | | | BARRELS | | BARRELS | | BARRELS | | BARRELS | | BARRELS | | BARRELS | |
| | | | BRINE | WATER | BRINE | WATER | BRINE | WATER | BRINE | WATER | BRINE | WATER | BRINE | WATER |
| 8.33 | 43.3 | 0 | 0 | 100 | 0 | 110 | 0 | 120 | 0 | 130 | 0 | 135 | 0 | 140 |
| 8.5 | 44.2 | 11 | 10 | 90 | 11 | 99 | 12 | 108 | 13 | 117 | 14 | 121 | 14 | 126 |
| 8.6 | 44.7 | 18 | 16 | 84 | 18 | 92 | 19 | 101 | 21 | 109 | 22 | 113 | 22 | 118 |
| 8.7 | 45.3 | 24 | 22 | 78 | 24 | 86 | 26 | 94 | 29 | 101 | 30 | 105 | 31 | 109 |
| 8.8 | 45.8 | 30 | 28 | 72 | 31 | 79 | 34 | 86 | 36 | 94 | 38 | 97 | 39 | 101 |
| 8.9 | 46.3 | 36 | 34 | 66 | 37 | 73 | 41 | 79 | 44 | 86 | 46 | 89 | 48 | 92 |
| 9.0 | 46.8 | 42 | 40 | 60 | 44 | 66 | 48 | 72 | 52 | 78 | 54 | 81 | 56 | 84 |
| 9.1 | 47.4 | 48 | 46 | 54 | 51 | 59 | 55 | 65 | 60 | 70 | 62 | 73 | 64 | 76 |
| 9.2 | 47.9 | 54 | 52 | 48 | 57 | 53 | 62 | 58 | 68 | 62 | 70 | 65 | 73 | 67 |
| 9.3 | 48.4 | 60 | 58 | 42 | 64 | 46 | 70 | 50 | 75 | 55 | 78 | 57 | 81 | 59 |
| 9.4 | 48.9 | 66 | 64 | 36 | 70 | 40 | 77 | 43 | 83 | 47 | 86 | 49 | 90 | 50 |
| 9.5 | 49.4 | 71 | 70 | 30 | 77 | 33 | 84 | 36 | 91 | 39 | 95 | 40 | 98 | 42 |
| 9.6 | 49.9 | 77 | 76 | 24 | 84 | 26 | 91 | 29 | 99 | 31 | 103 | 32 | 106 | 34 |
| 9.7 | 50.5 | 83 | 82 | 18 | 90 | 20 | 98 | 22 | 107 | 23 | 111 | 24 | 115 | 25 |
| 9.8 | 51.0 | 88 | 88 | 12 | 97 | 13 | 106 | 14 | 114 | 16 | 119 | 16 | 123 | 17 |
| 9.9 | 51.5 | 94 | 94 | 6 | 103 | 7 | 113 | 7 | 122 | 8 | 127 | 8 | 132 | 8 |
| 10.0 | 52.0 | 99 | 100 | 0 | 110 | 0 | 120 | 0 | 130 | 0 | 135 | 0 | 140 | 0 |

**Permian Brine Sales, Inc.**

915 - 332-0531 ODESSA, TEXAS

4.a.

# AQUAFLEX®

## 20 GAUGE PVC MEMBRANE LINER

AQUAFLEX ® 20 gauge vinyl membrane is available in widths up to 92 inches. It is specifically formulated as a barrier membrane to satisfy the containment requirements of individual pond, canal, landfill, reservoir, tank, and pit liner applications.

AQUAFLEX membranes are available in thicknesses up to 45 gauge. Liners fabricated from AQUAFLEX have a long history of successful performance. They offer good chemical resistance, sealability, and serviceability in unexposed installations.

All AQUAFLEX membranes are manufactured from virgin domestic resins.

---

**CHEMICAL RESISTANCE:**

| | |
|---|---|
| ACIDS: | good to excellent |
| BASES: | fair to good |
| METALLIC SALTS: | excellent |
| OILS: | fair to poor |
| SOLVENTS: | poor |
| GLYCOLS: | good |
| WATER: | excellent |

**MILDEW AND FUNGUS RESISTANCE:**

Excellent

**BONDABILITY:**

Heat, solvent and dielectric sealable

Consult with Pantasote for specific applications.

---

### TYPICAL PHYSICAL PROPERTIES

| Property | Value | Test Method |
|---|---|---|
| Thickness, mils | 20 ± 5% | ASTM D 1593 |
| Tensile Strength, min. (psi) | (2600) | ASTM D 882 |
| lbs./in. width, min. | 52 | Method A |
| Modulus @ 100% Elongation | | |
| min. (psi) | (1000) | Method A |
| lbs./in. width, min. | 20 | Method A |
| Ultimate Elongation, % min. | 300 | Method A |
| Oven Aging, wt. loss, % max. | 0.5 | 2" x 4" sample 16 hrs. in a circulating forced air oven @ 212°F |
| Tear Resistance | | |
| A) Elmendorf, grams, min. | 4000 | ASTM D 1922 |
| (gms/mil, min.) | (200) | |
| B) Graves Tear, lbs. min. | 6 | ASTM D 1004 |
| (lbs/in., min.) | (300) | |
| Low Temperature Impact, ° F. | – 20 | ASTM D 1790 |
| Volatility (Activated Carbon Method) % loss, max. | 1.0 | ASTM D 1203 Method A |
| Water Extraction, % loss max. | 0.3 | ASTM D 1239 104° F., 24 hrs. |
| Specific Gravity, min. | 1.20 | ASTM D 792 Method A |
| Dimensional Stability | | ASTM D 1204 |
| % change, max. | 5 | 212° F, 15 mins. |
| Resistance to Soil Burial | | ASTM D 3083 |
| Tensile Strength Loss, % max. | 5.0 | 120 day |
| Elongation Loss, % max. | 20.0 | Soil Burial |
| * Bonded Seam Strength | | ASTM D 3083 |
| % of orig. Tensile Strength, min. | 80 | Para. 9.3 1 inch width |
| Color | As Required | |

* Attainable by fabricator and/or contractor.

---

8/80

Pantasote

PANTASOTE INC FILM/COMPOUND DIVISION
26 JEFFERSON STREET, PASSAIC, NEW JERSEY 07055
AREA CODE 201 – 777-8500 • TWX 710-989-7108

PLUG JAL

| | |
|---|---|
| CAST IRON BRIDGE PLUG | $ 985.00 |
| CEMENTING | 1,830.48 |
| WELL SERVICE UNIT<br>6 hrs @ $100 | 600.00 |
| WELDER<br>3 hrs @ $30 | 90.00 |
| DIRT WORK (DOZER)<br>3 hrs @ $60 | 180.00 |
| | 3,685.48 |
| CONTINGENCY 10% | 368.55 |
| | $4,054.03 |

P. O. Box 12125 • Odessa, TX 79768 • 915/561-8128

# ACE PERFORATORS, INC.

September 17, 1984

Permian Brine Sales
Rt. 3 Box 3033
Odessa, TX 79763

ATTN: Russ Hickerson

Dear Russ,

As per our conversation on Monday, 9-17-84, Ace Perforators submits the price quote of $ 985.00. The quote is to set a Baker Cast Iron Bridge Plug in 5 1/2" casing on your Jal, NM brine well.

Sincerely,

Weldon L Watkins

Weldon Watkins
Ace Perforators, Inc.

WW/slm

HALLIBURTON SERVICES
DRAWER 3746, ODESSA, TEXAS 79760

September 18, 1984

PROCEDURE ANALYSIS
CEMENTING

FOR: Russ Hickerson
Permian Brine Sales
Rt. 3, Box 3033
Odessa, TX 79763

RE: Plugging Brine Wells (5-1/2" casing) - JAL

PURPOSE: To determine the equipment and materials necessary to plug the above referenced wells from 0 to 1,200 feet.

All materials and equipment will be coordinated through our Odessa, Texas District Office. Mr. Dennis E. Page is the District Manager, phone area code (915) 381-2040.

We are pleased to have this opportunity to present this proposal for your consideration. If you accept our proposal, all materials and equipment furnished and services performed will be under our General Terms and Conditions and pursuant to our Applicable Work Order Contract (whether or not executed by you). Copies of the General Terms and Conditions and Applicable Work Order Contract will be furnished on request.

Respectfully prepared by,

Eddy Martch (HT)
Eddy Martch,
Field Engineer

EM/ht

cc: Mr. D.E. Page
Mr. D.A. Daugherty
Mr. J.N. Culbertson
Field Supervisors
File

COST ESTIMATE

| | |
|---|---|
| 130 sacks Class "C" Neat | $ 790.40 |
| Drayage 40 Miles | 171.08 |
| Pump Service (1,200 ft. plus 40 miles) | 869.00 |
| | $ 1,830.48 |

The prices in this report are estimates only, are based on current published prices, do not include applicable taxes, and are subject to change due to field operations.

STATE OF NEW MEXICO
HEALTH ENVIRONMENT

Date 9/7/84

To Paige

Building/Room

- ☐ For Your Attention
- ☐ For Your Information
- ☐ Please Comment
- ☐ Please See Me
- ☐ Please Handle
- ☐ Approved
- ☐ For Your Recommendation
- ☐ For Your Approval
- ☒ Please Return
- ☐ Please File
- ☐ Please Mail
- ☐ As Requested

☐ **Telephone Call:** Number _____ Time Called _____

MESSAGE

Gary McCaslin

393-2333

From EID - Hobbs

Building/Room Ref- letter to Al Hickerson dated 8/29/84

**ADM 030** Issued 5/78

September 6
9:41

Paige

Garrison McCaslin from Hobbs Field office wants talk Permian mine subs.

393-2533

Ident

9/10: Wanted to know if he should follow up letter to Permian and contact them about doing a pressure test – I said to hold off until we hear back from them.

At ≈400 ft depth, ~~Odessa~~ just south of Eunice near Texas line – well-drillers report encountering caverns when drilling for water

3-6" wide
under first caliche, find fissures – concern in loose sand – SS

with regard to problem of septic systems. Gave to Walking to Steve Anderson (CSSB) about trying to write regs to recognize potential problems of direct effect of leach field on ground water through fissures.

TONEY ANAYA
GOVERNOR

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
DENISE FORT, DIRECTOR

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

P 612 423 338

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

| | |
|---|---|
| Sent to R. C. McCutchan | |
| Street and No. Rt. 3 Box 3033 | |
| P.O. State and ZIP Code Odessa, Tx 79763 | |
| Postage | $ |
| Certified Fee | |

U.S.G.P.O. 1983-403-517

August 31, 1984

R.C. McCutchan, Geologist
Permian Brine Sales, Inc.
Rt. 3, Box 3033
Odessa, TX 79763

Dear Mr. McCutchan:

Thank you for your letter of August 20, 1984, responding to a number of questions I raised with regard to the discharge plan you submitted on May 10, 1984, for the Permian Brine Sales brine extraction well and associated surface facilities, located about 2 miles east of Jal, New Mexico. My comments follow, in the same format as was used in my July 9th letter and your August 20th response.

1.a. Noted.

1.b. The lack of a surface casing remains a source of concern. I recognize that it cannot be corrected without an extensive workover of the well. This will not be required unless some evidence in the future indicates that the well is causing ground water contamination.

2.a. Noted.

2.b. Perhaps you could try leaving letters at these residences. However, this may be a moot point: we have received complaints from two well-owners at this location (across the road to the south of the subject brine station) of severe chloride contamination, and EID is investigating the situation. Please see the attached letter to A.L. Hickerson, president of Permian Brine Sales, on this subject.

2.c. Noted.

2.d. Noted.

2.e. Noted. This information is of interest and will be provided to EID scientists investigating aquifer contamination in the southeast of the state.

3.a. I cannot agree with you that production of saturated brine in down-hole piping does not result in corrosion. Corrosion does indeed take place in the presence of oxygen; a brine well is not an anaerobic environment, as you suggest. In a report entitled "UIC Evaluation of Salt Extraction Wells in New Mexico" (Lee Wilson and Associates, Inc., June 1982, prepared for the Oil Conservation Division), Dr. Wilson

writes: "Withdrawal of the brine through the annulus greatly increases the risk of casing corrosion and leakage." He goes on to acknowledge that this pattern of withdrawal does lessen the threat of formation collapse, as you pointed out in your recent letter. Later in the report, he suggests that if the well is cased to allow 40 to 50 feet of salt to remain undissolved in the roof of the cavity, the threat of subsidence is much reduced. In short, it is possible to protect against both corrosion and formation collapse. If you plan to continue the pattern of injecting water down the tubing and withdrawing brine through the annulus, we will assume that the potential for corrosion is greater than if the injection pattern were the reverse, and we will schedule more frequent pressure tests of the well than will be required of facilities that inject down the annulus.

With regard to your comment that Permian Brine has never experienced tubing or casing corrosion in 25 years of operating brine extraction wells: has the company ever mounted an effort to check for corrosion? Is it not possible that corroded casing may have played a role in the loss of circulation at two earlier brine wells at your Jal location?

3.b. How high do allow the pressure to climb before reversing flow in the well to dissolve encrustation?

3.c. I still don't follow your calculation: I don't recognize the function of $4/\pi$, nor do I see why you take the square root of the whole expression. I propose the follow means of calculating cavity size: Each barrel of fresh water dissolves 122.6 pounds of salt, creating a cavity of 0.9157 cubic feet (less if the brine contains less than 350,000 mg/l TDS). Hence your cavity could be as much as 37.68 feet in diameter (average, assuming a sphercial shape):

(30,600 bbl brine produced) x (0.9157 $ft^3$) = 28020.42 $ft^3$

Volume of sphere = $(4/3)\pi r^3$

$$\frac{(3/4)\,28020.42}{\pi} = \frac{(3/4)\,(4/3)\pi r^3}{\pi}$$

$$6689.38^{1/3} = (r^3)^{1/3}$$

$$r = 18.84$$

$$d = 18.84 \times 2 = 37.68$$

The diameter of the cavity calculated by this method still presents no source of concern. (For your reference, I have attached a portion of the above-mentioned report by Lee Wilson and Associates which discusses the calculation of cavity size for a brine extraction well.)

4.a. Please provide a sketch to demonstrate that spills from trucks would all flow to the collection pit. How would the fluid in the pit be disposed of? Please provide manufacturer's specifications for the Aquaflex liner - will it tolerate exposure to sunlight while the emergency pit is empty (which is presumably most of the time)?

As a means of stopping spills at their source, have you explored the alternative of installing an automatic shutoff switch so that the pump delivering brine to the trucks would deliver no more than an average truckload, requiring manual reactivation to top off the larger-capacity trucks?

4.b. ". . . Compacted with soil, caliche. . .": do you mean soil and caliche or are you saying that the soil is caliche? Since you subsequently refer to the soil being highly permeable (4.d.), please clarify this point. This soils information will help to determine whether a small, persistent leak occurring in the 24-foot interval between drains is likely to be detected.

4.c. A small point: the name of the Bureau has been changed to "Ground Water/Hazardous Waste Bureau". I agree: the sooner the cleanup, the better, so long as this bureau is kept informed so that we have some idea of the proportions of the leak/spill.

4.d. Noted. However, please note that desert rainfall is frequently characterized by short-duration, high intensity storm events accompanied by rapid runoff.

4.e. Noted. Perhaps the flushing liquid could be injected into the well, since the cavity shall be left full of brine.

5.a. Noted.

5.b. The purpose of a plugging bond is to provide the State with sufficient funds to properly plug the well and close out the facility in the event that a well-owner decamps without taking these precautions against ground water contamination. Your plugging plan looks like a good one: please demonstrate that $5000 would be sufficient to execute it.

6.a. The pump pressure monitoring approach is acceptable if you commit to keeping records of your daily pressure readings and submit proof that your gauge has been calibrated (lab invoice, other?) on an annual basis.

6.b. Noted. Please contact Mr. Garrison McCaslin at the EID Hobbs field office (393-2333 or 397-1291) to arrange for him to witness a pressure test of your brine well using a pressure of at least 350 psi and a chart with a large enough scale to show results clearly.

Please respond to the above remarks at your earliest convenience. At the same time, please propose a schedule for making quarterly reports to this bureau of the following information: TDS, chloride and specific conductance of your well which supplies injection fluid, and of your produced brine; maximum and average injection pressure; monthly totals of brine sales for the quarter; and, annually, an invoice from a calibration lab, or other proof of the accuracy of the gauge used to monitor the pressure of the brine discharge line.

will not to
will tell me
how to get that
reports from
State Land Commission
Office

It would be mutually advantageous for Permian Brine Sales and the EID to agree on a discharge plan for your present brine facility at the Jal site, so that we can turn our attention to investigation of the chloride contamination at that locale. Again, I appreciate your voluntary submittal of a Part 5 discharge plan for this facility.

Sincerely,

Paige Grant

Paige Grant
Water Resource Specialist
Ground Water Section

PG:jba

cc: John Guinn, EID District IV, Roswell
Gary McCaslin, EID Field Office, Hobbs
Dennis McQuillan, EID Surveillance Section, Santa Fe
Richard Perkins, EID Surveillance Section, Santa Fe

TONEY ANAYA
GOVERNOR

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
DENISE FORT, DIRECTOR

P 612 423 328

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

*(See Reverse)*

| | |
|---|---|
| Sent to A.L. Hickerson | |
| Street and No. Rt. 39, Box 3033 | |
| P.O., State and ZIP Code Odessa, TX 79763 | |
| Postage | $ |

U.S.G.P.O. 1983-403-517

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

August 29, 1984

A.L. Hickerson, President
Permian Brine Sales, Inc.
Route 39, Box 3033
Odessa, TX 79763

RE: Chloride contamination of a shallow aquifer in the vicinity of Permian Brine Sales brine in situ extraction well and associated surface facilities in the SE¼ SE¼ of Section 16, T25S, R27E, approximately two miles east of Jal, New Mexico.

Dear Mr. Hickerson:

The Surveillance Section, Ground Water/Hazardous Waste Bureau, EID, has recently received complaints from two well-owners immediately south of your Jal brine facility, who report that there has been a deterioration of their well water quality due to chloride contamination, beginning no later than 1980. One of these wells was tested in 1982, and was reported at that time to have a total dissolved solids (TDS) content of 14,312 milligrams per liter (mg/l) and chlorides of 8,800 mg/l. The chloride content of this well, which is used to irrigate an orchard, has resulted in the death of a number of fruit trees. This well had produced water of good quality since the early 1960s.

Your brine facility cannot be eliminated as a possible cause of this chloride contamination due to its close proximity upgradient of the wells that have shown such a sharp rise in chlorides. The EID field office in Hobbs will soon begin collecting samples in the area in order to document the extent of the problem and to determine the source(s). You may wish to have the same analyses performed for your injection water and brine and as are being performed by EID, in order to assure yourself of the validity of our results. At least the following parameters will be analyzed:

Specific Conductance (on-site measurement)

Calcium
Potassium
Magnesium
Sodium
Bicarbonate
Chloride
Sulfate
Nitrate as N
Total Dissolved Solids

EQUAL OPPORTUNITY EMPLOYER

Purgeable aromatic hydrocarbons

| | |
|---|---|
| Strontium | as well as the other heavy metals |
| Boron | and trace elements that are detected |
| Silicon | by means of an ICAP scan. |

In addition, please research and submit information about any operation that may have occupied your facility site in the past, and any spills, leaks, brine storage or disposal practices that Permian Brine Sales or your precursor at the site may have used/experienced, that could have resulted in the chloride contamination problem that appears to be surfacing. In particular, please discuss the loss of circulation in two earlier brine extraction wells at the site (Arnott-Ramsay State #2 and #3). There is a brief mention in a 1982 report on brine wells (Lee Wilson and Associates, June 1982: "UIC Evaluation of Salt Extraction Wells in New Mexico", prepared for the Oil Conservation Division), that in the case of one of these wells, ". . . the lost water caused fracturing of the Rustler Formation." (page 12). Please discuss this point thoroughly.

We hope to achieve your voluntary compliance in obtaining the information necessary to investigate the problem discussed above. If you have any questions regarding the contents of this letter, please contact me at the above address and telephone number, extension 285.

Sincerely,

Paige Grant

Paige Grant
Water Resource Specialist
Ground Water Section

PG:jba

cc: John Guinn, EID District IV, Roswell
Gary McCaslin, EID Field Office, Hobbs
Dennis McQuillan, EID Surveillance Section, Santa Fe
through: Richard Perkins, Program Manager, EID Surveillance Section

STATE OF NEW MEXICO
HEALTH & ENVIRONMENT department

# MEMORANDUM

DATE: 8/28/84

TO: file

FROM: Patsy Grant

SUBJECT: Report from Dennis McQuillan (Surveillance Section) of complaints of chloride contamination near Permian Brine Sales' Jal brine facility — 8/23/84.

Ken Mosley - grandson? / caretaker of property owned by Lovington just south across the road from brine station. Their well started going bad around 1980, had it tested in 1982: TDS 14,312 mg/l, Cl 8800 mg/l. Killed his orchard. Neighbor's well also gone bad: former owner Deacon, now Cramer.

I wrote letter requesting quick response to my critique of their d.p. and addressing them of complaints. Dennis reviewed ltr. While that letter was still in draft, rec'd Permian Brine's response to my earlier letter. Responded with one letter to geologist to critique d.p., another to president to point out contamination.

# PERMIAN BRINE SALES, INC.

**24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN**

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531


August 20, 1984


RECEIVED
AUG 24 1984
GROUND WATER HAZARDOUS WASTE BUREAU


Environmental Improvement Division
P.O Box 968
Santa Fe, New Mexico 87504-0968

Attn: Miss Paige Grant

Re: Permian Brine Sales, Inc.
Jal Brine Station

Dear Miss Grant:

This will acknowledge your letter of July 9, 1984, requesting additional information and data on the subject discharge plan.

Enclosed is the report we have prepared in response to your questions and remarks. We have listed them with the same outline headings as used in your letter.

If you need any additional clarification, please advise us at your convenience.

Very truly yours,
PERMIAN BRINE SALES, INC.

R.C. MC CUTCHAN
GEOLOGIST

RCM/law
Enc.

PERMIAN BRINE SALES, INC. JAL, NEW MEXICO
BRINE STATION - DISCHARGE PLAN
SUPPLEMENTAL INFORMATION REQUESTED BY EID, JULY 1984

1. a. The 5½" casing string is J-55, 17#/ft.

   b. At the time this well was drilled there were no regulations specifing the installation of surface casing for brine wells. Consequently, the cementing circulated to within 60' of the surface was supplemented by circulating cement from the surface to the 60' depth to protect the shallow aquifers.

   The Ogallala Aquifer has been extensively eroded away throughout this area. It is possible, this will account for the absence of the formation and lack of identification in the driller's log.

2. a. Attached is an analysis of a water sample, recently obtained from Permian Brine's water well.

   b. The statement in our original discharge plan that there are five residential water wells, across the road - south from the brine station is erroneous. An on-the-ground inspection and in conversation with Permian Brine's local station operator, indicates there are only three residences at this location. All of occupants work and are not at home during the daytime hours. We know two of the residences are connected to the Jal city 10" water line, from the city well in NW/4, SE/4, Sec 13, TWP 25 S, RGE 37 E. The line is approximately 50' North and parallels state highway 128.

   We are reasonably sure the third residence is connected and that they might also have a water well that may or may not be in use. In the absence of the residents and after three weeks trying to catch them at home, we are reluctant to enter their property to locate a water well and obtain samples. The property is labelled with "no trespassing" signs and an unfriendly watchdog occupies the entrance. However, we shall, in the future continue to attempt to make contact with this resident to obtain a water well sample if available, and forward the analysis to you.

   c. See attached Map No. 1, Rev.

   d. The New Mexico State Engineers office in Roswell was contacted. Mr. Nelson, in that office after referring to his card files, located only two water wells within the vicinity of Permian Brine's property. The records show these wells to be the property of J.M. Owen, and one located in Sec. 21 and one in

Sec. 22. I called Mr. Owen and discussed these sites. He advised that he had a well in Sec. 21, that had been abandoned several years. He did not have a well in Sec. 22 and, to his knowledge, there are no water wells in that section.

e. The two water wells indicated on Figure 2 were searched for on the ground from the location description in Figure 6, "Records of wells in Southern Lea County". The well in Sec. 21, in my opinion and from my on-the-ground inspection and Mr. Owen's description, is the well shown in Figure 2. It was produced with an oilfield type pump jack according to Mr. Owen. I found the pump jack in place, the polished rod still connected and inserted in the well casing packing gland. However, the pump jack had been knocked over, the polished rod bent 90° from the vertical and the entire installation pretty well destroyed. Mr. Owen said he abandoned the well several years ago due to the water contamination from natural gas. He assumed the gas was coming from nearby abandoned oil wells with casing leaks.

The other site, shown in Figure 2, in Sec. 15, was thoroughly searched by on-the-ground inspection. There was no current surface evidence of a water well at this site and the State Engineer's office had no record of it. I would speculate a well was drilled here in the early 1950's to provide water for the drilling of oil wells at that time and the water well abandoned after the drilling activities ceased.

3. a. The production of saturated brine in down-hole piping does not result in corrosion. Corrosion of steel occurs only when the brine and steel are present in ambient air (oxygen) association. In twenty-five years of operation of brine installations Permian Brine has never experienced any tubing or casing corrosion.

The circulation of fresh water through the annulus creates a hazardous conditions in the down-hole (cavern) operations. The constant solution of the salt, at the top of the cavern tends to enlarge the roof area and ultimately results in cave-ins of the overlying shale stringers. These cave-ins usually result in the loss of the brine well and allows the percolation of the brine upward and outward to the shallower formations.

b. The average injection pressure is 175 PSI.

c. Brine production at the Jal Station totalled 30,600 barrels. (At the time of my original calculations.)

$$\text{Average Dia} = [(30{,}600 \times 5.61 \text{ CF/bbl} / 324' \text{ salt section}) \times (4/\pi)]^{\frac{1}{2}}$$
$$= 26.97'$$

I used the term"maximum" diameter and it should have been "average" diameter. The diameter at the bottom, tubing outlet, will be larger than at the casing seat. This provides a tear drop shape and, as stated in 3-a, maintains a minimum diameter at the roof of the cavern to protect it from cave-ins.

4. a. With approval of EID, Permain Brine will provide spill containment facilities, as described below. This type of spill collection has been installed at most of Permian's brine stations, and has proven an effective and safe method of handling this problem.

A ditch is trenched adjacent to the truck-loading spots and is graded to drain to an isolated 100 barrel capacity pit. The ditch and collection pit is lined with 20 mil "Aquaflex" liner.

b. The inside portion of the brine pit is constructed of compacted native soil, caliche at the Jal station. The gravel pack is installed only around the sub-surface leak detection piping. The piping is sloped to the leak detection sump. For operational purposes, the pit bottoms are constructed level. The leak detection sump is checked several times each month by both the station operator and the maintenance crews when they are at the station for repair or maintenance services. The cover of the sump is kept locked to prevent vandalism and the pumping of fluids.

c. Permian Brine's contingency plan shall comply with EID's directions by calling the Chief, Water Pollution Control Bureau. However, in the event of a significant leak, it is Permian's policy to dispatch maintenance crews immediately to contain and repair the damage. It has not been satisfactory to wait for inspections and directions from the state control agencies before starting clean-up procedures.

d. Map No. 2, showing the surface contours in the Jal station area, is a reporudction of two USGS 7½' Quads since the site is approximately 500' from the north limits of the Jal and the south limits or the Jal NW quads. The contour interval on the Jal quad is 5' and 10' on the Jal NW qaud. There is no well defined drainage in the immediate station area. The only indicated drainage, is approximately 2000' east, about 10' lower than the station site. The US Weather Bureau indicated an annual average rainfall in this area between 9 and 10 inches. In this desert environment, an unusually heavy rainfall is practically unheard of and what rain that does occur is usually absorbed into the dune soil and a runoff of any magnitude is highly unlikely.

e. The normal procedure for the closure of brine pits is the flushing of the lined pit with fresh water. This is done to dissolve all salt that might have precipated, due to evaporation. This flushing liquid is transported to a legally established disposal well. The Hypalon liner is then salvaged, for future use, and the pit berms are graded to fill the pit and return the surface to its original configuration.

5. a. The plugging of an abandoned brine well will always leave the solution cavern filled with saturated brine. The wording of the original plugging plans was unfortunately vague regarding the cementing procedure. The cement slurry is always pumped down the tubing and circulated to the surface upon well abandonment.

b. Attached is a copy of the one well plugging bond submitted to the Oil Conservation Division in August 1980. Also, subsequent correspondence regarding the legal well location.

6. a. The circulating system operates with a 70 GPM, constant speed, electric motor driven pump. This volume of fresh water produced is metered and reported weekly. The quantity of saturated brine returned to the pit is visually observed, there is no meter on this return line. However, the most accurate method of determining leaks is variations in the pump discharge pressures. Under normal operating conditions the discharge pressure remains constant. Daily monitoring of this pressure provides a quantative method of evaluating both down hole and surface conditions of the circulating system. e.g. A drop in the normal operating pressure (and a visual sighting of the brine return rate from the return line at the pit) would indicate a leak. An increase in normal operating pressure will indicate, usually, down hole problems: tubing or annulus plugging, cave-ins, etc.

b. We regret the quality of the re-produced pressure chart submitted. The original of this chart was claimed by the Oil Conservation Commission, the governing authority at the time of the test. In the future, we will provide the original chart to you or a more readable copy. The original chart recorded a constant pressure line at 210 PSI. The note on the chart that was interepted as "injection began at 4:56 PM" is acutally the pump injection rate "45 GPM". It is agreeable that a test pressure of 1½ times normal operating pressure should be the test condition on future tests.

Client No. 3319000

Permit No. _____

GROUND WATER ANALYSIS REPORT-IN SITU MINING

Well No. 1 Sample No. 1

Production Area No. _____

Submitted By Permian Brine Sales Date Collected: 7-25-84 ; By R.C. Mc Cutchan

Company Jal Brine Station Mine Jal, New Mexico Sta. Fresh Water

SAMPLE METHODS: Calibrate Ec Meter (1)Page 71; Pump Well Until Ec is Approx. Constant.

| Sample | Date | Temp (C) | pH | Spec. Cond. (umhos) |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |

| | | | |
|---|---|---|---|
| Spec. Cond. at Well: | 2000 | | µmhos |
| Normal Water Level: | 2835 | | msl |
| Pump: Set at | 2667 msl | 45 | gpm. |
| Bottom of: Casing | N.A. msl; screen | D.A. | msl |
| Land Surface Datum: | 3085 msl | | |

CONTAINER: 1 Gal. Plastic for *Items; 1 Gal. Plastic for all other items.; One quart plastic (full) for Specific Conductivity

PRESERVATION METHODS: Acidify * Item to <2 pH ($HNO_3$); Cool all other items to 4 °C.

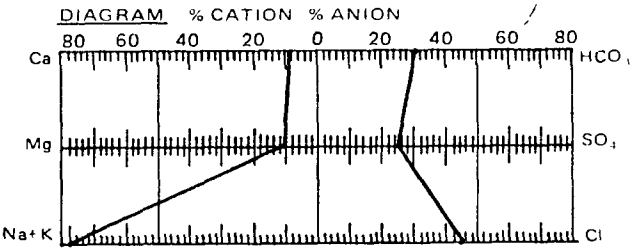
ANALYSIS: Lab Name Southwestern Laboratories Date Received 8-2-84 Date Reported 8-6-84

MAJOR AND SECONDARY CONSTITUENTS (Group No. 1)

| | ITEM | STORET | mg/l (a) | F (b) | epm (c) | Ecf (d) | (c) x (d) | % epm |
|---|---|---|---|---|---|---|---|---|
| A. | Calcium (Ca) | 00915 | 33 | = 20.04 x | 1.65 | x 52.0 = | 86 | 8.4 |
| B. | Magnesium (Mg) | 00925 | 27 | = 12.16 x | 2.22 | x 46.6 = | 103 | 11.3 |
| C. | Sodium (Na) | 00929 | 357 | = 22.99 x | 15.53 | x 48.9 = | 759 | 79.3 |
| D. | Potassium (K) | 00937 | 8 | = 39.10 x | 0.20 | x 72.0 = | 14 | 1.0 |
| E. | | | Total Cation | .... | 19.60 | | | |
| F. | Carbonate ($CO_3$) | 00445 | None | = 30.00 x | --- | x 84.6 = | --- | --- |
| G. | Bicarbonate ($HCO_3$) | 00440 | 376 | = 61.02 x | 6.16 | x 43.6 = | 269 | 30.9 |
| H. | Sulfate ($SO_4$) | 00945 | 239 | = 48.03 x | 4.98 | x 73.9 = | 368 | 25.0 |
| I. | Chloride (Cl) | 00940 | 312 | = 35.45 x | 8.80 | x 75.9 = | 668 | 44.1 |
| J. | Nitrate ($NO_3$-N) | 71851 | | | | Total | 2267 | = T (1) page 35 |
| K. | Fluoride (F) | 00951 | | | | | | |
| L. | Silica ($SiO_2$) | 00955 | | | | | | |
| M. | | | Total Anion | ... | 19.94 | | | |
| N. | Total Ion | .... | | | | | | |
| P. | TDS (180 °C) | 70300 | 1184 | | | | | |
| Q. | TDS = N · .5G | | = 1168 | | | | | |
| R. | Ec (25 °C) | 00095 | 2100 | | | | | |
| S. | Ec (Dilute) = 115 x 20 | | = 2300 µmhos | | | | | |
| U. | Alk. as $CaCO_3$ | 00410 | 308 | | | | | |
| V. | pH | 00403 | 7.49 | | | | | |

Accuracy Check

| | | Range |
|---|---|---|
| Ion (E:M) | 0.98 | .96 to 1.04 |
| TDS (P:Q) | 1.01 | .90 to 1.10 |
| Ec (S:T) | 1.01 | .95 to 1.05 |




(1) See STD Methods - 14th Edition

MINOR AND TRACE CONSTITUENTS (Group No. 2)

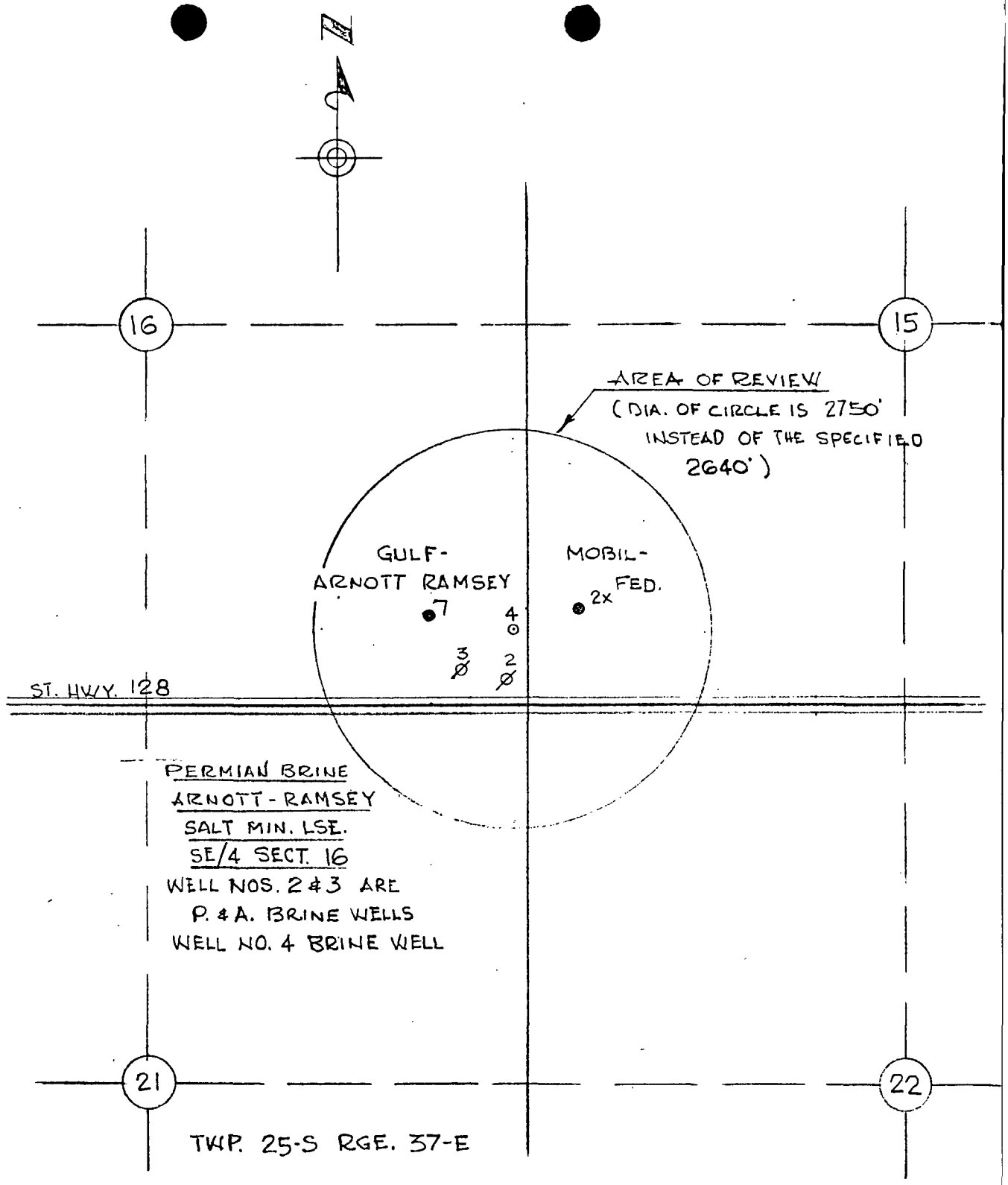
| ITEM | mg/l | ITEM | mg/l | ITEM | mg/l |
|---|---|---|---|---|---|
| * Arsenic (As) | | * Manganese (Mn) | | * Uranium (U) | |
| * Cadmium (Cd) | | * Mercury (Hg) | | Ammonia-N | |
| * Iron (Fe) | | * Moly. (Mo) | | Radium 226 | (pci/1) |
| * Lead (Pb) | | * Selenium (Se) | | | |

Analyst Remarks Report No. 35697

Checked By Gary M. Bunch

received 8-7-84

2-a.




SCALE 1" = 1000'

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

JAL BRINE STATION
LEA CO. NEW MEXICO

| DATE: | BY: | ~~DRAWING NO.~~: |
|---|---|---|
| 7-23-84 | R.C. McCUTCHAN TEX. P.E. 9844 | MAP NO. 1-REV. |

5-6.

Form O & G B-1
Adopted 6-17-77

# STATE OF NEW MEXICO

## ONE-WELL PLUGGING BOND

### FOR CHAVES, EDDY, LEA, McKINLEY, RIO ARRIBA, ROOSEVELT, SANDOVAL, AND SAN JUAN COUNTIES ONLY

BOND NO. 610 057411 2
(For Use of Surety Company)

AMOUNT OF BOND 5,000.00

COUNTY Lea

NOTE: For wells less than 5,000 feet deep, the minimum bond is $5,000.00*
For wells 5,000 feet to 10,000 feet deep, the minimum bond is $7,500.00*
For wells more than 10,000 feet deep, the minimum bond is $10,000.00

* Under certain conditions, a well being drilled under a $5,000.00 or $7,500.00 bond may be permitted to be drilled as much as 500 feet deeper than the normal maximum depth; i.e., a well being drilled under a $5,000.00 bond may be permitted to go to 5,499 feet, and a well being drilled under a $7,500.00 bond may be permitted to go to 10,500 feet. (See Rule 101)

File with Oil Conservation Commission, P. O. Box 2088, Santa Fe 87501

KNOW ALL MEN BY THESE PRESENTS:

That Permian Brine Sales & Service, Inc., (~~An individual~~)(~~a partnership~~)(a corporation organized in the State of Texas, with its principal office in the city of Odessa, State of Texas, and authorized to do business in the State of New Mexico), as PRINCIPAL, and United States Fire Insurance Company, a corporation organized and existing under the laws of the State of New York, and authorized to do business in the State of New Mexico, as SURETY, are held firmly bound unto the State of New Mexico, for the use and benefit of the Oil Conservation Commission of New Mexico pursuant to Section 65-3-11, New Mexico Statutes Annotated, 1953 Compilation, as amended, in the sum of Five Thousand & No/100---------- Dollars lawful money of the United States, for the payment of which, well and truly to be made, said PRINCIPAL and SURETY hereby bind themselves, their successors and assigns, jointly and severally, firmly by these presents.

The conditions of this obligation are such that:

WHEREAS, The above principal has heretofore or may hereafter enter into oil and gas leases, or carbon dioxide ($CO_2$) gas leases, or helium gas leases with the State of New Mexico; and

WHEREAS, The above principal has heretofore or may hereafter enter into oil and gas leases, or carbon dioxide ($CO_2$) gas leases, or helium gas leases on lands patented by the United States of America to private individuals, and on lands otherwise owned by private individuals; and

WHEREAS, The above principal, individually, or in association with one or more other parties, has commenced or may commence the drilling of one well not to exceed a depth of 5,000 feet, to prospect for and produce oil or gas, or carbon dioxide ($CO_2$) gas or helium gas, or does own or may acquire, own or operate such well, or such well started by others on land embraced in said State oil and gas leases, or carbon dioxide ($CO_2$) leases, or helium gas leases, and on land patented by the United States of America to private individuals, and on land otherwise owned by private individuals, the identification and location of said well being the South quarter of the Southeast quarter
(Here state exact legal subdivision by 40-acre tract or lot)
of Section 16, Township 25 ~~North~~ (South), Range 37 (East)(~~West~~), N.M.P.M.
Lea County, New Mexico.

NOW, THEREFORE, If the above bounden principal and surety or either of them or their successors or assigns, or any of them, shall plug said well when dry or when abandoned in accordance with the rules, regulations, and orders of the Oil Conservation Commission of New Mexico in such way as to confine the oil, gas, and water in the strata in which they are found, and to prevent them from escaping into other strata;

THEN, THEREFORE, This obligation shall be null and void; otherwise and in default of complete compliance with any and all of said obligations, the same shall remain in full force and effect.

PERMIAN BRINE SALES & SERVICE, INC.
PRINCIPAL

P. O. Box 1591, Odessa, Texas 79760
Address

By _____
Signature

President
Title

(Note: Principal, if corporation, affix corporate seal here.)

UNITED STATES FIRE INSURANCE COMPANY
SURETY

P. O. Box 2639, Dallas, Texas 75221
Address

By _____
Attorney-in Fact
Wilford H. Elmore

(Note: Corporate surety affix corporate seal here.)

---

ACKNOWLEDGEMENT FORM FOR NATURAL PERSONS

STATE OF _____)
COUNTY OF _____) ss.

On this _____ day of _____, 19____, before me personally appeared _____, to me known to be the person (persons) described in and who executed the foregoing instrument and acknowledged that he (they) executed the same as his (their) free act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and seal on the day and year in this certificate first above written.

_____
Notary Public

_____
My Commission expires

---

ACKNOWLEDGEMENT FORM FOR CORPORATION

STATE OF Texas)
COUNTY OF Ector) ss.

On this 15th day of August, 19 80, before me personally appeared A. L. Hickerson, to me personally known who, being by me duly sworn, did say that he is President of Permian Brine Sales & Service, Inc. and that the foregoing instrument was signed and sealed on behalf of said corporation by authority of its board of directors, and acknowledged said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and seal on the day and year in this certificate first above written.

Norma Fernandez
Notary Public

9/30/80
My Commission expires

---

ACKNOWLEDGEMENT FORM FOR CORPORATE SURETY

STATE OF Texas)
COUNTY OF Ector) ss.

On this 15th day of August, 19 80, before me appeared Wilford H. Elmore, to me personally known, who, being by me duly sworn, did say that he is attorney-in-fact of United States Fire Insurance Company and that the foregoing instrument was signed and sealed on behalf of said corporation by authority of its board of directors, and acknowledged said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and seal on the day and year in this certificate first above written.

Norma Fernandez
Notary Public

9/30/80
My Commission expires
(Note: Corporate surety attach power of attorney.)

---

APPROVED BY:

OIL CONSERVATION COMMISSION OF NEW MEXICO

By _____

Date _____

STATE OF NEW MEXICO
# ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

November 6, 1980

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

Jalt well File
NMOCC File
PLUGGING BOND

Permian Brine Sales &
Service, Inc.
P. O. Box 1591
Odessa, Texas 79760

Re: $5,000 One-Well Plugging Bond
Permian Brine Sales & Service, Inc., Principal, United States Fire Insurance Company, Surety
SE/4 SE/4 of Sec. 16, T-25-S, R-37-E, Lea County
Depth: 5,000 feet
Bond No. 610 057411 2

Gentlemen:

The Oil Conservation Division acknowledges receipt of and approves the rider giving the exact well description as follows:

515 feet from the South line and 100 feet from the East line of Section 16.

Sincerely,

JOE D. RAMEY,
Director

dr/

cc: Oil Conservation Division
Hobbs, New Mexico

United States Fire Insurance Co.
P. O. Box 2639
Dallas, Texas 75221

STATE OF NEW MEXICO
# ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

P.O. Box 2088

August 20, 1980

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

mailed copy to Maddox & Blanch

Permian Brine Sales &
Service, Inc.
P. O. Box 1591
Odessa, Texas 79760

Re: $5,000 One-Well Plugging Bond
Permian Brine Sales & Service, Inc., Principal, United States Fire Insurance Company, Surety
SE/4 SE/4 of Sec. 16, T-25-S, R-37-E, Lea County. Depth: 5,000 ft.
Bond No. 610 057411 2

Gentlemen:

The Oil Conservation Division hereby approves the above-captioned plugging bond effective August 19, 1980.

Because of the great amount of infill drilling in the State, the Division now requires all bonds give the exact location of the well by the footage description; example: 660 feet from the South line and 660 feet from the East line. Therefore, please have your insurance company send us a rider for the above-described bond with the exact well description.

Sincerely,

JOE D. RAMEY
Director

JDR/dr

cc: Oil Conservation Division
Hobbs, New Mexico

United States Fire Insurance Co.
P. O. Box 2639
Dallas, Texas 75221

515' FSL & 100' FEL
Sec 16 T-25-S
R-37-E

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

Joseph Goldberg
SECRETARY

Ted Guambana
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

July 9, 1984

R.C. McCutchan, Geologist
Permian Brine Sales, Inc.
Route 3, Box 3033
Odessa, TX 79763

Dear Mr. McCutchan:

Thank you for submitting a discharge plan for Permian Brine Sales' brine in situ extraction well and associated surface facilities in the SE¼SE¼ of Section 16, T25S, R37E, approximately two miles east of Jal, New Mexico. We appreciate your preparing a discharge plan addressing Part 5 as well as Part 3 of the Water Quality Control Commission (WQCC) Regulations before the period of approval for your present discharge plan expires.

The following comments on your submittal need to be satisfactorily addressed by you before your proposed discharge plan can be approved. Although the comments appear numerous and critical, I feel that you did an excellent job of interpreting the WQCC Regulations as to what information is required in a discharge plan for a brine extraction well.

1. Well Specs

   (a) What series is your 5½" casing (J or N)?

   (b) I note that there is no surface casing in the well. This inclines me to scrutinize the facility more carefully than I would if there were that added protection for nearer-surface formations, particularly since your brine well probably intercepts the Ogalalla (reference Figure 1 of your discharge plan), although the driller's log makes no direct mention of it.

2. Background Data

   (a) There are problems with the water quality analysis; the sum of reported anions and cations is greater than the reported TDS, and the specific conductance reported is inconsistent with the TDS. (I assume the conductance is 11,000 mmhos as indicated in the text, and not 11.000 mmhos as reported on the analysis form.) 11,000 mmhos indicates a very high concentration of dissolved solids, and if it

is correct, it needs to be followed up with additional studies to explain the reason for the apparent contamination of ground water in the area.

Please recheck the conductance of the well water. If your reading of ± 11,000 mmhos is repeated, please propose a monitoring program for specific conductance in water wells within a quarter-mile radius of your brine facility, to indicate background water quality conditions in the area. Also, please submit another analysis for the major anions and cations from your water well; and please provide me with any past water quality analyses that have been carried out for this well.

If a recheck of the water quality of this well shows no present contamination, please submit a plan for reporting analyses for chloride, TDS and specific conductance in this well to EID on a quarterly basis.

(b) With reference to the five residential water wells immediately south of the brine station: please submit information on the depth of completion, depth to water and aquifer(s) encountered and/or a driller's log for these wells. This information should be available from the State Engineer's Office. If the well-owners will grant access to their wells, please sample for chlorides, TDS and specific conductance in each and provide the results of the analyses to EID.

(c) The scale of Map No. 1 is too small to be useful. Please enlarge the four-section area containing the area of review, without sacrificing legibility.

(d) None of the wells listed in Table 6 from Nicholson and Clebsch are in or adjacent to the area of review of Permian Brine's Arnott Ramsey State No. 4 brine well. You are likely to find more pertinent information in the files of the State Engineer and the Oil Conservation Division.

(e) It would be useful to search for futher information on the two closest wells to the area of review indicated on Figure 2.

3. Brine Production Procedures

(a) Given the potential for corrosion of the casing by saturated brine, we prefer that you inject water down the annulus and bring the brine back up the tubing, except for an occasional reversal to flush any encrusted salt out of the tubing. When the EID injection well inspection program gets underway, those brine well operators found to be injecting down the tubing more often than down the casing will be required to carry out a pressure test more frequently than other brine facilities.

(b) Please give a maximum as well as an average injection pressure. At what pressure do you reverse the flow to flush out encrustation?

(c) Please submit the records and calculations by which you arrived at the figure of 26 feet maximum diameter of the solution cavern from which you have been extracting brine.

4. Surface Facilities

(a) Please discuss your spill prevention and containment procedures with regard to truck loading.

(b) Leak detection system: what material underlies the Hypalon liner? Is there a gravel pack under the entire pond or just around the individual drains? Is the entire pond bottom sloped toward the collection drain, or just the individual drains? How often is the leak detection sump checked?

(c) Please prepare a contingency plan for response should any significant leak or spill be detected. Include a reference to the reporting requirements under Section 1-203.

(d) Please discuss the flooding potential of the site. A statement that the site is not located in a swale such that it would receive occasional storm runoff, and a brief discussion of the generally flat topography of the area, will suffice.

(e) Please propose a method for closure of the pond after cessation of activities at the site.

5. Plugging and Abandoment

(a) Your plugging plan is generally adequate. However, prior to plugging the wellbore itself, it is recommended that the cavity be filled with saturated brine. After placement of the plug just above the casing shoe, tubing should be run and cement circulated from the bottom of the casing rather than pumped down from the top.

(b) Do you have a plugging bond for your brine well? If so, please provide us with a copy. If not, please propose an amount for a plugging bond, or submit some other acceptable proof of financial responsibility. Please bear in mind that the bond must be for an amount sufficient to prepare both the well and surface facilities for proper abandonment.

6. Monitoring

(a) With regard to your pressure test proposal (letter from R.D. Hickerson to Jerry Sexton, July 7, 1983, incorporated into your proposed discharge plan): How would you recognize a loss of brine return? Do you monitor flow into and out of the well? How do you check the gauges for accuracy?

(b) In the future, please submit a clearer chart as a record of your pressure test, and be sure the information on it is internally consistent. The handful of points on the chart you submitted is not as indicative as a continuous line would be. The note on the chart says that injection began at 4:56 p.m., but the recorder pen recorded the test occurring between 11:00 a.m. and 2:00 p.m.

The test would also be more conclusive of mechanical integrity if it were conducted at higher pressure. If your pump is incapable of generating approximately 350 psi (roughly 1½ times normal operating pressure), you will be required to use a tank truck capable of generating such a pressure for purposes of demonstrating mechanical integrity for an EID inspection.

You have no time constraint on responding to the above comments, except that you must have an approved discharge plan under Part 5 plus Part 3 of the regulations by the time your present discharge plan approval expires. The period of approval of your Part 5 discharge plan will be for five years from the date of its approval; if your Part 5 discharge plan is approved a year in advance of the expiration date of your present approved discharge plan, the final year of approval of your Part 3 discharge plan will not apply.

Again, I appreciate your voluntary submittal of a Part 5 discharge plan for this facility. Please let me know if I can clarify any of the above remarks or any other point of the regulations.

Sincerely,

Paige Grant

Paige Grant
Water Resource Specialist
Ground Water Section

PG:egr

cc: John Guinn, EID District IV, Manager

mcb

DRAFT

**SUGGESTED OUTLINE FOR DISCHARGE PLAN SUBMITTAL:**

Brine Extraction Facilities

I. GENERAL DESCRIPTION

A. Name of facility **and name and address of responsible party**

B. Location: county, township, range **and ¼¼¼ Section or latitude/longitude coordinates (3-106.C.2)**
-indicate on USGS topo map, 7½' or 15' quad

C. Schematic of facility
-include ~~short verbal description~~ of process, including transportation elements (e.g., loading trucks) ?

D. **Operational** history of **injection and production at** facility **(5-203.C.4)**
**-include dates of well construction and beginning of injection**

II. DESCRIPTION OF FACILITY

A. Surface Facilities

1. Dimension of pond(s)/tank(s)
**-include side slope angle for ponds**

2. Length and type of pipe(s) carrying brine **from well to pond(s)/tank(s)**

3. Average daily discharge and withdrawal from pond/tank **(3-106.C.1)**

4. Type of pond liner, if any
-include manufacturer's specs, technique used to seal seams

B. Underground Facilities

1. Depth, diameter, **production and protection** casing and tubing specs of well(s)
-include schematic drawings **(5-210.B.13; 5-205.A.3.d.)**

2. Construction procedures, including cementing and casing program, logging procedures, deviation checks **(5-205.A.4.a)**, and a drilling, testing and coring program **(5-210.B.14; 5-204.B.2.b; 5-205.A.3.d,e)**. Include logs and results of tests for all new and worked-over wells **(5-205.A.4)**.

lacking (don't need)

3. Stimulation program **(5-210.B.11)**. Note: 5-206 limitations.

lacking (don't need?)

4. Maximum and average injection pressures, injection volume, and other injection procedures **(5-210.B.12; 5-203.B.1; 5-205.A.3.b,f)**.

point out our concerns w/ this

If one well is to be used for injection and extraction, is brine to be pumped up annulus or central tubing? Give rationale for method used (5-210.B.12).

NA 5. Notification prior to drilling, casing etc. (5-205.A.5).

III. SITE CHARACTERISTICS

NA A. Soils (This section need only be submitted if unlined surface impoundments are proposed or in use. Additional ground water monitoring may be required for facilities using unlined surface impoundments. If impoundments do not adequately protect ground water, they will not be approved for use.)

1. Texture class

2. Soil Conservation Service (SCS) assessment of capability/limitations

3. Percolation test

B. Geology (5-203.C.3)

1. Stratigraphic section (drilling log) of well(s) on the site, indicating depth, thickness and chemical characteristics of water-bearing strata and lithology 3-106.C.3,6; 5-205.A.3.j), and stressing permeability of the strata immediately above and below the salt beds. Also give the lithology, stratigraphy, and fracture pressure of salt beds and confining zones (5-205.A.3.i).

such low pressure of injection - do we need?

2. Maps and cross-sections detailing the geology and geologic structures of the local area, including faults (known or suspected) (5-210.B.6 & 7). Are the faults known conduits or barriers to ground water flow?

marginal

C. Hydrology (5-203.C.3)

1. Maps and cross-sections indicating the general vertical and lateral limits of all ground water having 10,000 mg/l or less TDS within one mile of the site, the position of such ground water within this area relative to the injection formation, and the direction of water movement, where known, in each zone of ground water which may be affected by the proposed injection operation (5-210.B.5).

neither map shows info that follows on Penn's well data

2. A map showing the brine well(s) which are to be constructed and the number, name, and location of all producing wells, injection wells, abandoned wells, dry holes, surface bodies of water, springs, mines, quarries, residences and roads, and any other pertinent surface features that are within a quarter-mile radius

need larger scale

of the brine well or well field (5-202.B.3; 5-210.B.2.)

3. Flooding potential of the site (3-106.C.4).

4. Depth to and quality of ground water most likely to be affected by spills/leaks (3-106.C.3). Analysis should include **sodium ($Na^+$), potassium ($K^+$), calcium ($Ca^{++}$), magnesium ($Mg^{++}$), bicarbonate ($HCO_3^-$), carbonate ($CO_3^=$), chloride ($Cl^-$), sulfate ($SO_4^=$), and nitrate ($NO_3^-$).**

5. Analysis **or description** of water used for injection (if different from III.C.4, above) (3-106.C.1; 5-203.C.1). Include density, corrosiveness and temperature (5-205.A.3.g), as well as above constituents. Analyses to be submitted at least quarterly (5-207.C.1), **unless the source is such that a change in makeup is very unlikely (e.g. a city water system).**

6. Chemical analysis of brine (if facility is presently in operation) (3-106.C.1,3). Analysis should include those constituents indicated in III.C.4. Once in operation, reports to be submitted quarterly (5-207.C.1), **unless there is no change in the analysis.**

IV. PROCEDURES TO PROTECT GROUND WATER QUALITY

A. During Operation

1. Identify those abandoned wells/shafts or other conduits in the area of review which penetrate the injection zone and which, through being improperly sealed, completed or abandoned, provide a pathway for migration of contaminants. Detail what corrective action (e.g. plugging open holes) will be taken to prevent any movement of contaminants into ground water of less than/equal to 10,000 mg/l TDS through such conduits due to the proposed injection activity (5-203.A, B.1). Include completion and plugging records of **such wells/shafts** (5-203.C.5.).

2. In the event that operations have begun before information comes to light regarding such a conduit that will require plugging, injection pressure will be **required to be** limited to avoid movement of contaminants through such a conduit into protected ground water (5-203.B.2).

3. Mechanical integrity testing, such as:

   a. pressure test prior to start of operation (5-204.B.1.a);

   b. monitoring of annulus pressure (5-204.B.1.b; 5-204.C.)

4. Means and locations for measuring inflow to and outflow from the pond/tank (locations may be indicated on the schematic required under I.C) **(3-106.C.2, 5).**

5. Compare volumes of fresh water injected to volume of brine extracted to detect underground losses **(3-107.A.1).** May be done by recording injection pressure and either flow rate or volume every two weeks, or by metering and daily recording of fluid volumes **(5-207.C.2).**

6. Location and design of site(s) and method(s) for sampling for quality of fresh water and brine at facility **(3-106.C.5).**

7. Leak detection system under pond: drains, lysimeters, other? **(3-107.A.1,3,9).**

8. Monitoring **to detect any** deterioration of ground water quality in area-do you have access to water well(s) within _____ (distance) down-gradient from the facility, in order to do quality analyses? If not, may need to put in observation wells **(3-107.A.2,9; 5-205.C);** and make periodic quality reports **(5-207.C.2.b,c). Also, identify wells in the area for which the potential contamination from your brine operation is very low, which can serve to indicate "background" levels of water quality parameters in the area.**

9. How will spillage/leakage be prevented during truck loading or at transfer points within the facility?

10. Contingency plans in the event of:

    a. leak/spill from surface facilities;

    b. loss of mechanical integrity of injection well. How will ground water be protected from contamination or treated if contamination has occurred?

B. Post-operational **commitments required prior to plan approval**

**1. Plugging and abandonment**

a. Plug and cap wells. Procedure must conform to that specified in 5-209, **and be approved in advance.**

b. Demonstrate financial ability **(5-210.B.17)** to:

i. plug well and prepare for proper abandonment;

ii. restore protected ground water if contaminated by your brine extraction activities.

2. **Pond closure**

   a. Remove liner, if any, from pit **(3-107.A)**

   b. Remove salt crust from unlined pit and surrounding area **(3-107.A.4, 11)**

   c. **Restore area to original contours** or otherwise - - -

V. SIGN-OFF REQUIREMENT

Responsible official must certify as follows:

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibilitv of fine and imprisonment. (5-101.H.2).

PG:egr

STATE OF NEW MEXICO
# ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

TONEY ANAYA
GOVERNOR

June 14, 1984

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88240
(505) 393-6161

RECEIVED

JUN 15 1984

GROUND WATER/HAZARDOUS WASTE
BUREAU

Paige Grant
Water Resource Specialist
Ground Water Section
Environmental Improvement Division
P.O. Box 968
Santa Fe, NM 87504

Dear Paige:

In response to your inquiry concerning the Permian Brine discharge plan, the only thing we might add to the proposed plugging procedure for the Arnott Ramsay State #4 well in SE/4 SE/4 of Sec. 16, T25S, R37E, is that tubing be run and cement be circulated from the bottom. This will prevent cement going out any possible holes in casing and leaving voids inside the pipe.

Your question concerning information on casing, you might want to know whether the casing is N-80 or J-55 as well as weight/ft. The casing in this well is probably J-55 and the main difference in the two is chemical analysis. The pipe used for wellbore casing is threaded and coupled, they only weld on pull nipples, etc.

We see no need for more stringent mechanical integrity tests unless you plan to allow them to produce out the casing, then you might want to require a casing inspection log be run yearly.

We do still have a plugging bond on file covering this well but on all new brine wells this process will need to be handled by EID.

Under separate cover we are forwarding you a copy of the Halliburton Cementing Tables.

If this does not cover all your questions, please let us hear from you.

Very truly truly yours,

OIL CONSERVATION DIVISION

Jerry Sexton
Supervisor, District I

ED

P.S. you might want to investigate getting the plugging bond transferred over to EID since we are out of the brine well program. Also, the outline for preparation of discharge plan looks OK to us.

Marie:

Apparently the problem was with loading a comma after each "SE¼". The description

SE¼ SE¼ SE¼ Section 16, T25S R37E

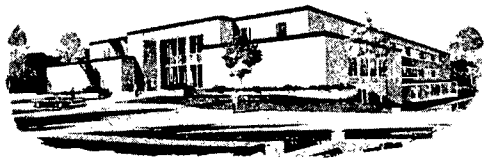
is correct.

Do you think that's a critical enough error to reissue the notice?

(answer: no.)

Sabre

# State of New Mexico



## Commissioner of Public Lands

JIM BACA
COMMISSIONER

P.O. BOX 1148
SANTA FE, NEW MEXICO 87504-1148

June 11, 1984

Director,
N.M. Environmental Improvement Division
P.O. Box 968, Crown Building
Santa Fe, New Mexico 87504-0968

Dear Sir:

We have received your public notice concerning (DP-324) Permian Brine Sales, Inc., A. L. Hickerson, President for a discharge plan.

Please clarify the legal description of this land, which presently reads:

SE¼, SE¼, SE¼, Section 16, T25S, R37E

Since there is an obvious typegraphical error, we would appreciate a description. The State Land Office does have concern in the SE¼ of Section 16 and is concerned for proper discharge in this area.

Thank you for your help.

Sincerely,

Evelyn D. Jeys
Commercial Leasing

cc: Pleas Glenn
Date File

RECEIVED

JUN 13 1984

GROUND WATER/HAZARDOUS WASTE
BUREAU

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

Joseph Goldberg
SECRETARY

Ted Guambana
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

June 9, 1984

Evelyn Downs
Oil Conservation Division
District Office No. 1
P.O. Box 1980
Hobbs, NM 88240

Dear Evelyn:

Let me know if it is an imposition to ask your and Jerry's opinions on the following questions:

I enlcose the plugging plan from Permian Brine's discharge plan for their brine well near Jal, SE¼SE¼ Section 16, T25S, R37E (Arnott Ramsey State No. 4). I also enclose the completion report for this well. On the basis of this information and your background knowledge of the hydrology and well construction practices in the Jal area, do you think this plugging is satisfactory?

The only specifications given for the production casing in this well were diameter, length and "17#/ft". Would this be sufficient information for you to judge the corrosivity of the casing? Would it not also be useful to know if the casing was welded or threaded-and-coupled? Also, note: there is no surface casing on this well. What is your reaction to that? Should they be required to make more stringent tests of mechanical integrity than we might otherwise require? Finally: do you have a plugging bond for this well? Are you going to continue to require plugging bonds for new brine wells, or is that something EID is going to have to take over?

Please give me a call with your answers, to save yourself the trouble of a written response. Also, could we have a copy of the pamphlet you mentioned which has such useful conversions as sacks to cubic feet and barrels to gallons?

Thank you in advance for your help - I'll try to keep this sort of thing to a minimum.

Sincerely,

Paige Grant

Paige Grant
Water Resource Specialist
Ground Water Section

PG:egr

EQUAL OPPORTUNITY EMPLOYER

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

Joseph Goldberg
SECRETARY

Ted Guambana
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

P 612 423 202

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

(See Reverse)

| | |
|---|---|
| Sent to | A.L. Hickerson President |
| Street and No. | Rt. 3, Box 3033 |
| P.O., State and ZIP Code | Odessa, Texas 79763 |
| Postage | $ |

U.S.G.P.O. 1983-403-517

May 29, 1984

A.L. Hickerson, President
PERMIAN BRINE SALES, Inc.
Rt. 3, Box 3033
Odessa, TX 79763

Dear Mr. Hickerson:

Enclosed is a copy of the public notice pertaining to your proposed discharge which was issued by this division pursuant to New Mexico Water Quality Control Commission Regulations, Section 3-108.

If you have any questions, please do not hesitate to contact me at the above address and telephone number (ext. 279).

Sincerely,

Maxine S. Goad

Maxine S. Goad
Program Manager
Ground Water Section

MSG:jba

Enclosure

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

Joseph Goldberg
SECRETARY

Ted Guambana
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

P 612 423 200

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

*(See Reverse)*

U.S.G.P.O. 1983-403-517

| | |
|---|---|
| Sent to Morris Whitmore, Mayor | |
| Street and No. Drawer 340 | |
| P.O., State and ZIP Code Jal, N.M. 88252 | |
| Postage | $ |

May 29, 1984

The Honorable Morris Whitworth
MAYOR, CITY OF JAL
Drawer 340
Jal, New Mexico 88252

Dear Mayor Whitworth:

Enclosed is a public notice which includes notice of a proposed discharge plan(s) for one or more operations in or near your city.

If you have any questions, please do not hesitate to contact me at the above address and telephone number (ext. 279).

Sincerely,

Maxine S. Goad

Maxine S. Goad
Program Manager
Ground Water Section

MSG:jba

Enclosure

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

Joseph Goldberg
SECRETARY

Ted Guambana
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

P 612 423 207

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

(See Reverse)

U.S.G.P.O. 1983-403-517

Sent to Lea Cnty Comm.
Street and No. Lea Cnty Courthouse
P.O., State and ZIP Code Lovington, NM 88260
Postage $

May 29, 1984

Lea County Commissioners
Lea County Courthouse
Lovington, New Mexico 88260

Board of County Commissioners:

Enclosed is a public notice which includes notice of proposed discharge plan(s) for one or more operations located in your county.

If you have any questions, please do not hesitate to contact me at the address and telephone number given above.

Sincerely,

Maxine S. Goad

MAXINE S. GOAD
Program Manager
Ground Water Section

MSG:jba

Enclosure

May 29, 1984
TO BE PUBLISHED ON OR BEFORE JUNE 6, 1984

**PUBLIC NOTICE**
NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION
HEALTH AND ENVIRONMENT DEPARTMENT

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission Regulations, the following proposed discharge plans have been submitted for approval to the Director of the New Mexico Environmental Improvement Division, P.O. Box 968, Crown Bldg., Santa Fe, New Mexico 87504-0968; telephone (505) 984-0020.

(DP-42) BJZ AND BERT ZWAAGSTRA DAIRIES, P.O. Drawer E, Mesquite, New Mexico 88048 has submitted a revised renewal application for the disposal of milking center wastewater from two dairies with 1800 cows located in Section 8, T25S, R3E, Dona Ana County. An estimated 72,000 gallons per day of effluent will be discharged to 196 acres of cropland. The water most likely to be affected is at a depth of 15 to 90 feet with a total dissolved solid content of approximately 2500 to 4000 mg/1.

(DP-344) LOS VILLEGAS BROTHER'S CHILE PROCESSING PLANT, Roger Villegas, President, P.O. Box 99, Hatch, New Mexico 87937 proposes to discharge approximately 8000 gallons per day of effluent from the chile processing plant located in Section 14, T19S, R3W in Dona Ana County, New Mexico. The plant will wash, roast, peel and package both red and green chile, and the effluent will be discharged into a holding pond and subsequently used to irrigate 19 acres. The ground water most likely to be affected is at a depth of 5 to 12 ft. below land surface with a total dissolved solids content of approximately 1000 mg/1.

(DP-324) PERMIAN BRINE SALES, INC., A.L. Hickerson, President, Rt. 3 Box 3033, Odessa, Texas 79763 has submitted a discharge plan addressing both Part 3 and Part 5 of the New Mexico Water Quality Control Commission regulations for an existing brine in situ extraction well and associated surface facilities located in the SE¼, SE¼, SE¼, Section 16, T25S, R37E near the town of Jal, Lea County, New Mexico. This facility is presently covered by an approved discharge plan addressing Part 3 of the regulations alone. The brine is produced by injecting fresh water (total dissolved solids (TDS) concentration approximately 1025 mg/1) into dry salt beds at a depth of about 1550 feet, dissolving the salt and bringing it to the surface in solution. Production of brine (mean density greater than 10 lbs/gal) averaged 8800 barrels per month in 1983. The brine is stored in a lined pit, from which it is pumped to tank trucks on demand. The ground water most likely to be affected by the operation is at a depth of 400 feet with a TDS concentration of 1025 mg/1. However, pockets of ground water may exist in the area at depths as shallow as 50 feet, with higher or lower concentrations of TDS.

(DP-327) VALLEY VIEW SUBDIVISION, Roger Simmons, Owner, 213 12th St., Alamogordo, New Mexico 88310 proposes to reamend the original discharge plan DP-327 by installing a septic tank to replace the aeroebic treatment plant and

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

Joseph Goldberg
SECRETARY

Ted Guambana
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

P 456 371 354
RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL
(See Reverse)

| | |
|---|---|
| Sent to A.L. Hickerson | |
| Street and No. Rt 3 Box 3033 | |
| P.O. State and ZIP Code Odessa, TX | |
| Postage | $ |

May 26, 1984

A.L. Hickerson, President
Permian Brine Sales, Inc.
Rt. 3, Box 3033
Odessa, TX 79763

Dear Mr. Hickerson:

On May 10, 1984, the Environmental Improvement Division received from your geologist, Mr. R.C. McCutchan, a discharge plan (DP-324) for your brine in situ extraction well located in the SE¼SE¼SE¼, Section 16, T25S, R37E near the town of Jal in Lea County, New Mexico. A discharge plan for this facility is required pursuant to Sections 3-104, 3-106, and 5-101.B. of the Water Quality Control Commission regulations. If additional information is needed to complete review of the discharge plan you have submitted, you will be notified.

Public notice of receipt of the plan has been issued by EID as required by Section 3-108 of the regulations.

If you have any questions about the regulations or about the handling of your discharge plan, please do not hesitate to contact Paige Grant of the EID staff at the address and telephone number listed above (ext. 285).

Sincerely,

for Steven Asher
DIRECTOR

SA:PG:egr

cc: John Guinn, EID District IV, Manager
EID Field Office, Hobbs

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

Joseph Goldberg
SECRETARY

Ted Guambana
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

May 26, 1984

Drafted by Paige Grant Paige Grant 5/23/84
CONCURRENCES
Goad
Drypolcher MSS2 5/24/84
Holland HQ 5/25/84

A.L. Hickerson, President
Permian Brine Sales, Inc.
Rt. 3, Box 3033
Odessa, TX 79763

Dear Mr. Hickerson:

On May 10, 1984, the Environmental Improvement Division received from your geologist, Mr. R.C. McCutchan, a discharge plan (DP-324) for your brine in situ extraction well located in the SE¼SE¼SE¼, Section 16, T25S, R37E near the town of Jal in Lea County, New Mexico. A discharge plan for this facility is required pursuant to Sections 3-104, 3-106, and 5-101.B. of the Water Quality Control Commission regulations. If additional information is needed to complete review of the discharge plan you have submitted, you will be notified.

Public notice of receipt of the plan has been issued by EID as required by Section 3-108 of the regulations.

If you have any questions about the regulations or about the handling of your discharge plan, please do not hesitate to contact Paige Grant of the EID staff at the address and telephone number listed above (ext. 285).

Sincerely,

HQ

Steven Asher
DIRECTOR

SA:PG:egr

cc: John Guinn, EID District
EID Field Office, Hobbs

Permian Brine Sales 5/24/84

The discharge plan was already submitted and this letter confirms that it was needed. This letter falls into Category III.C. of the Asher delegation memo & so can be signed by the Bureau Chief.

MSS

EQUAL OPPORTUNITY EMPLOYER

5/21/84: spoke with State Engineer Office at Roswell to ascertain where water would have been struck in the Santa Rosa/Chinle Fms. if SWL rose to ≈250 ft. The spokesman said water was encountered at ≈ 400 feet. Went on to say well was drilled in 1967 by O.R. Musselwhite to TD 500 ft. Said there is shallow (± 50 ft. deep) ground water in Jal area, but in pockets - locating it is hit or miss. Wrote public notice accordingly.

Paige Grant

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531


RECEIVED

MAY 10 1984

GROUND WATER/HAZARDOUS WASTE BUREAU

May 7, 1984

Environmental Improvement Division
Box 968
Santa Fe, New Mexico 87504-0968

Attn: Paige Grant

Dear Ms. Grant:

DP-324

Enclosed is Permian Brine's discharge plan for the Jal Brine Station, in compliance with the recent changes as outlined in Section 5 of the New Mexico Water Quality Control Commission.

This report was completed prior to the reception of your letter and outline of April 17, 1984. (Incidentally, your letter, postmarked in Santa Fe, April 18, 1984 was received at our offices on May 1, 1984.) In reviewing the outline, I believe this report covers all of the pertinent data required in Section 5. However, if additional information is required please cll or write at your convenience.

Very truly yours,
PERMIAN BRINE SALES, INC.

R.C. MC CUTCHAN
GEOLOGIST

RCM/law
enc.

RECEIVED

MAY 10 1984

GROUND WATER/HAZARDOUS WASTE
BUREAU

# JAL BRINE STATION

A.L. HICKERSON, PRESIDENT
PERMIAN BRINE SALES, INC.
RT. 3 BOX 3033
ODESSA, TEXAS 79763
915/332-0531

JAL BRINE STATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

A.L. HICKERSON, PRESIDENT
PERMIAN BRINE SALES, INC.

## INTRODUCTION

Permian Brine Sales, Inc. operates an insitu brine mining well in southeastern Lea County, approximately two miles east of Jal on state highway no. 128. The legal description of this site is: SE/4 SE/4, Section 16, Range 37-E, Township 25-S, (see map No. 1). The well is designated as Permian Brine Sales, Inc. - Arnott Ramsey State No. 4. The well was completed in 1981 and has been in continuous operation since that date.

The produced brine is used primarily in oil field operations as a drilling fluid and as a "kill" fluid. (To neutralize well bore pressures in producing wells for workover maintenance.) Smaller amounts of brine are sold to industry for the regeneration of zeolite water softeners. Fresh water is also sold at this site for industrial purposes. Drawing No. 1, is a sketch of the operations area.

## DEVELOPMENT OF THE BRINE WELL

The brine well was completed in March 1981. It was drilled to 1269' with a 7-7/8" bit. 5½" = 17#/ft casing was set at 1258' in an anhydrite stringer in the Salado salt section. The casing was cemented with 400 sacks of Class H cement with 2% $CACL_2$. The cement was circulated to 60' and was cemented from the surface to this depth through 1" pipe. The cement plug was drilled out at 1271' and the casing string tested to 500 PSI.

The well was drilled to a T.D. of 1591' with a 4-3/4" bit. 2-7/8" tubing was run to 1582' in the open hole. See New Mexico Oil Conservation Division, well reports form C-103, well completion report and log, form C-105 and drawing No. 2, attached.

A mechanical integrity test on this brine well was performed on July 6, 1983 and reported to the Oil Conservation Commission. A copy of this test is attached.

## WATER WELL

The water well located on the site, furnishes fresh water for the solution mining of the brine. See Drawing No. 1. This well was drilled several years ago by the pervious owner and no records are available

of the original drilling. However, Permian Brine has established the depth as 459'. A 5 hp 45 GPM submersible pump is landed at 418'. The static water level stands at 250'.

This water well is used for monitoring purposes. A recent analysis of the water is attached. At this depth, it would indicate the well producing water from either the Santa Rosa or Chinle formations of the Triassic. Conductance tests of the well water are periodically observed to check for any contamination. The most recent April 24, 1984 indicated 11,000 M MHOS.

## BRINE PRODUCTION PROCEDURES

The fresh water from the water well is produced into the 1,000 bbl fresh water storage tank. A 10hp submersible pump with capacity of 60 GPM is submerged in the fresh water storage tank and discharges at 200 PSI to either the tubing or casing of the brine well through approximately 400' of 2-3/8" O.D. fiberglass line pipe (rated at 450 PSI). This flow pattern indicates the flow is reversible in the well. The produced brine discharges from the well to the brine storage pit through approximately 300' of 2-3/8" O.D. PVC, Sch. 40 line pipe. Truck loading is accomodated at both the brine pit for brine and at the 1,000 bbl storage tank for fresh water. From the volume of brine produced and sold since initial operations began, a calculated maximum diameter of the cavern is 26'. Brine production for 1983 averaged 8800 bbl/month.

## BRINE WELL PLUGGING AND ABANDONMENT

Plugging will be accomplished by using one Baker Model S cast iron bridge plug. This plug is set by lowering it down the casing on an electric wire line to the predetermined depth, just above the casing shoe. This plug is made with two sets of slips, one above and one below the plug body, and a solid steel guide shoe at the base of the plug. The plug is disengaged from the wire line setting tool and the slips actuated by firing a power charge within the setting tool. This plug then provides a pressure seal. After the plug has been set the casing will be evacuated of mud and/or other fluids by air displacement. Then a calculated volume of Class C cement slurry will be pumped down the casing until it is completely filled. The exposed casing, at the surface, will be sealed by welding a steel plate over the open end of the casing.

The salt formations in West Texas and New Mexico are always overlain with a relatively thick section (20' to 50') of anhydrite. This impervious and insoluable formation material provides an excellent casing seat and after cementing a perfect seal that prevents the circulation of fluids from the salt cavern to the upper formations behind the casing. Consequently, setting the bridge plug at this point in the casing (opposite an anhydrite lens) and filling with cement protects the overlying formations from contamination should a casing failure occur at some future time.

AREA OF REVIEW

Applying the critera, as stated in the Water Control Commission Regulations, Section 5-202-B-2; the regulations state "...where the well field production at all times exceeds injection to produce a net withdrawal;" then a one-quarter mile area of review shall prevail. Since the production of saturated brine by fresh water solution mining results in a 7.14% increase in produced fluid over injection fluid these conditions provide compliance with the above regulations.

Below is a listing of all wells within the area of review.

1. Permian Brine - Arnott Ramsey No. 2 P & A Brine Well
2. Permian Brine - Arnott Ramsey No. 3 P & A Brine Well

The plugging and abandonment reports of these wells, as reported to the oil conservation division are attached. Also, please refer to the recent letter dated March 30, 1984 from Permian Brine Sales, Inc. by Mr. R.D. Hickerson to Paige Grant.

3. Gulf - Arnott Ramsey No. 7; 610' FSL, 660' FEL, Sec 16 8-5/8" csg @ 376' - 230 sx cement; producing oil well. 4½" csg @ 3700' - 1580 sx cement
4. Mobil - Federal No. 2X; 660' FSL, 330 FWL, Sec 15 8-5/8" csg @ 1060' - 500 sx cement; 5½" csg @ 3700' - 1,000 sx cement; producing oil well.

There are five residences, across state highway No. 128 to the south of the brine station, in the NE/4 of Sec 21, see Map 2; all have water wells.

A trailer house has been recently located immediately east of the brine station in the SE/4 of Sec 15. However, this residence obtains water from the city of Jal's water line, parallelling the state highway on the north, producing water from the city well in the SW/4 of Sec 13, R-37-E, TWP 25 S.

NOTE

The following descriptions, figures and maps have been liberally abstracted and reproduced from "Ground Water Report 6 - Geology and Ground Water Conditions or Southern Lea County, New Mexico", by Alexander Nicholson, Jr. and Alfred Clebsch, Jr.

## GEOLOGY AND HYDROLOGY

Southern Lea County overlies a large subsurface structural feature known as the Permian Basin. Oil exploration have revealed highly complex subsurface geology involving rocks ranging from the Precambrian and Early Paleozoic to the Permian Age. However, the early Paleozoic has little significance relating to potable and industrially usable ground waters in this area. The oldest formations exposed in this area are Triassic in age; the only other rocks to be seen at the surface are Tertiary and Quaternary in age. Only the Mesozic and younger formations yield potable water. See Table No. 3.

Figure No. 1 shows the distribution of geologic units exposed in the Jal area. The contacts between the Ogallala and Quaternary Alluvium formations are generalized because of poor exposures, due to the large areas covered by drift sand.

### STRATIGRAPHY

The southwestern part of the county overlies the Delaware Basin and the eastern part overlies the Central Basin platform. Between these two areas is the back-reef or shelf area. See Table No. 3. These general areas are defined on the basis of sedimentary depositional environments that existed during Permian time. The boundary between the basin and shelf areas is fairly sharp being marked by a complex of reef deposits; the boundary between the shelf area and the platform is transitional.

Since the earlier Palezoic formations are not revelant to this report, the description of these older formations will be omitted and this outline shall begin with the upper Permian.

The salt section, being mined at the Jal site, is the Salado formation and is assigned to the middle section of the Ochoa series of the upper Permian. This series is chiefly evaporite deposits. The lower most formation of this series is the Castile formation, which is chiefly

anhydrite with some halite beds. Overlying the Castile is the Salado formation, which extends across both the Deleware and Midland Basins and across the Central Basin platform; it ranges in thickness from zero to 2,000 feet. The formation is mainly halite containing some anhydrite stringers. The Rustler formation overlies the Salado and usually has a massive anhydrite bed at its base but also includes red beds and salt.

A sequence of red beds overlie the Rustler, consisting of micaeous red silt stone, shale and sandstone and are commonly cemented with gypsum. The age of these beds have been assigned to both the Permian and Triassic by various geologists based on localities of study. The lower section is called the Dewey Lake and is differeniated from the upper section by a zone of coarse, frosted quartz grains in the lower ten feet. The upper section is referred to as the Tecovas formation.

The hydrologic significance of these red beds is not completely understood, however, it is doubtful that any wells in Lea County produce water from them.

The Mesozic is represented in the area only by the Upper Triassic rocks of the Dockum group. This group is divisible into the Santa Rosa sandstone and the Chinle formation. The Santa Rosa is the principal aquifer in the western part of the county. The Chinle also provides an underground source of water both of these formations are at depths of 400+ feet and are highly mineralized.

The Cenozoic period is represented by the Ogallala formation of the Tertiary of Plicoene age. It underlies most of the county and ranges in thickness from a few inches to 300 feet. It is chiefly a calcareous, unconsolidated sand but contains clay, silt and gravel. The Ogallala is one of the major aquifers in this area.

The Quaternary age sediments are present in southern Lea County in the form of alluvial deposits, probably of both Pleistocene and recent age and dune sands of recent age. The alluvium was deposited in topographically low areas where the Ogallala formation had been stripped away. The dune sands mantle the older alluvium and the Ogallala over most of the area. These Quaternary alluvial deposits vary in thickness from 15 to 30 feet and are an important source of ground water in the eastern part of the county, especially along the major drainages.

Figure No. 2 shows the water table elevations in Tertiary and Quaternary formations and the areal boundaries of these aquifers. The figure also indicates the Piezometric countours and areal extent of the Triassic formations.

Figure No. ~~18~~ 13 shows a typical cross-section of an area immediately north of the Jal brine station site. These type of depressions, an erosional feature, are found throughout this area. These features are formed both by subsidence and sub-surface collapse resulting from solution of the evaporites.

DRAINAGE

There is no integrated drainage in southern Lea County, hence there is no through-going drainage to the Pecos River to the west and south. All stream courses are ephemeral and only one, Monument Draw has significant length; it traverses the eastern part of the county from north to south for approximately 35 miles and extends into Texas. See Figure No. 3.

# PERMIAN BRINE SALES, INC.

JAL BRINE STATION

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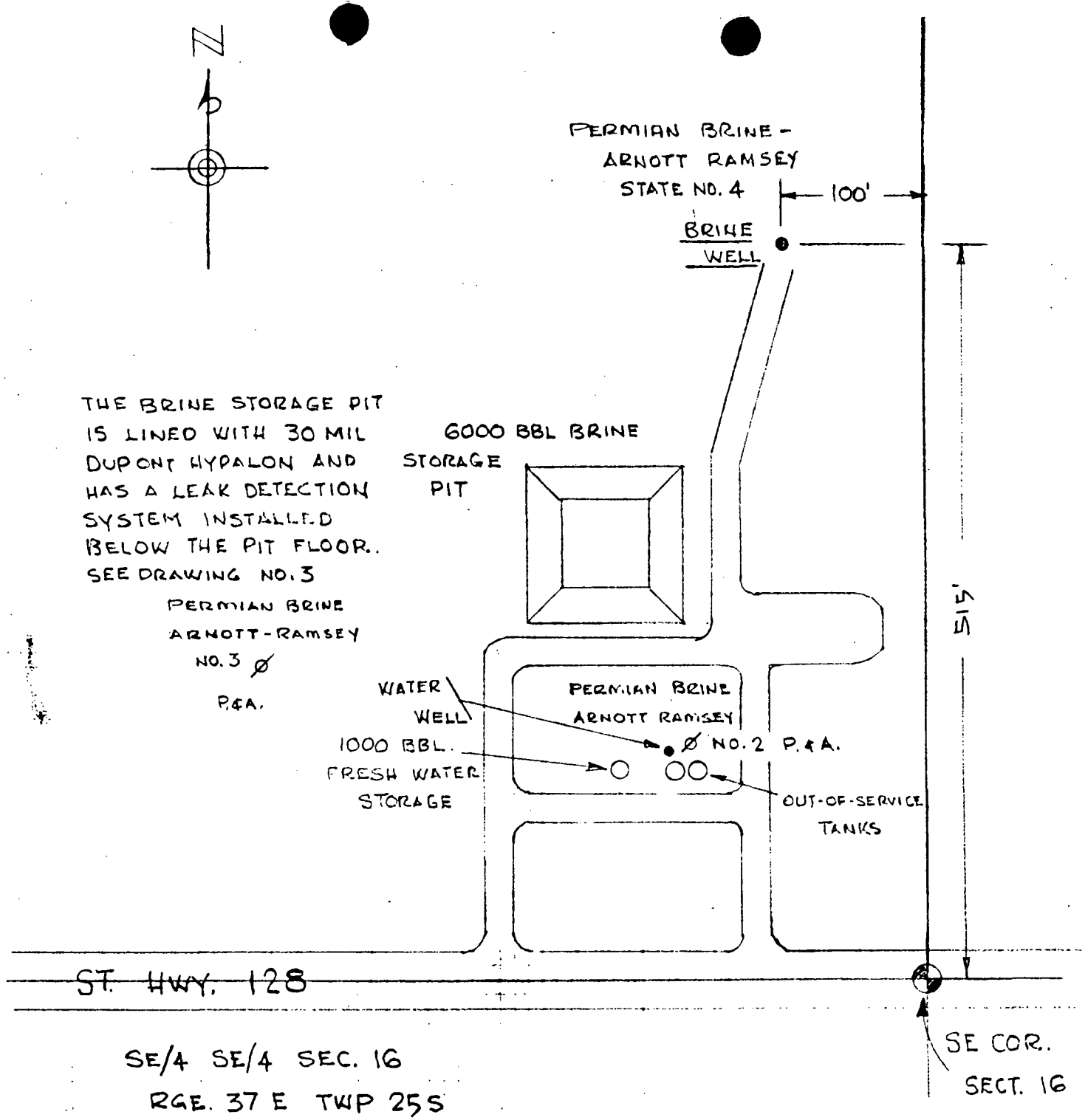
## DRAWINGS




SE/4 SE/4 SEC. 16
RGE. 37 E TWP 25S
LEA CO. NEW MEXICO

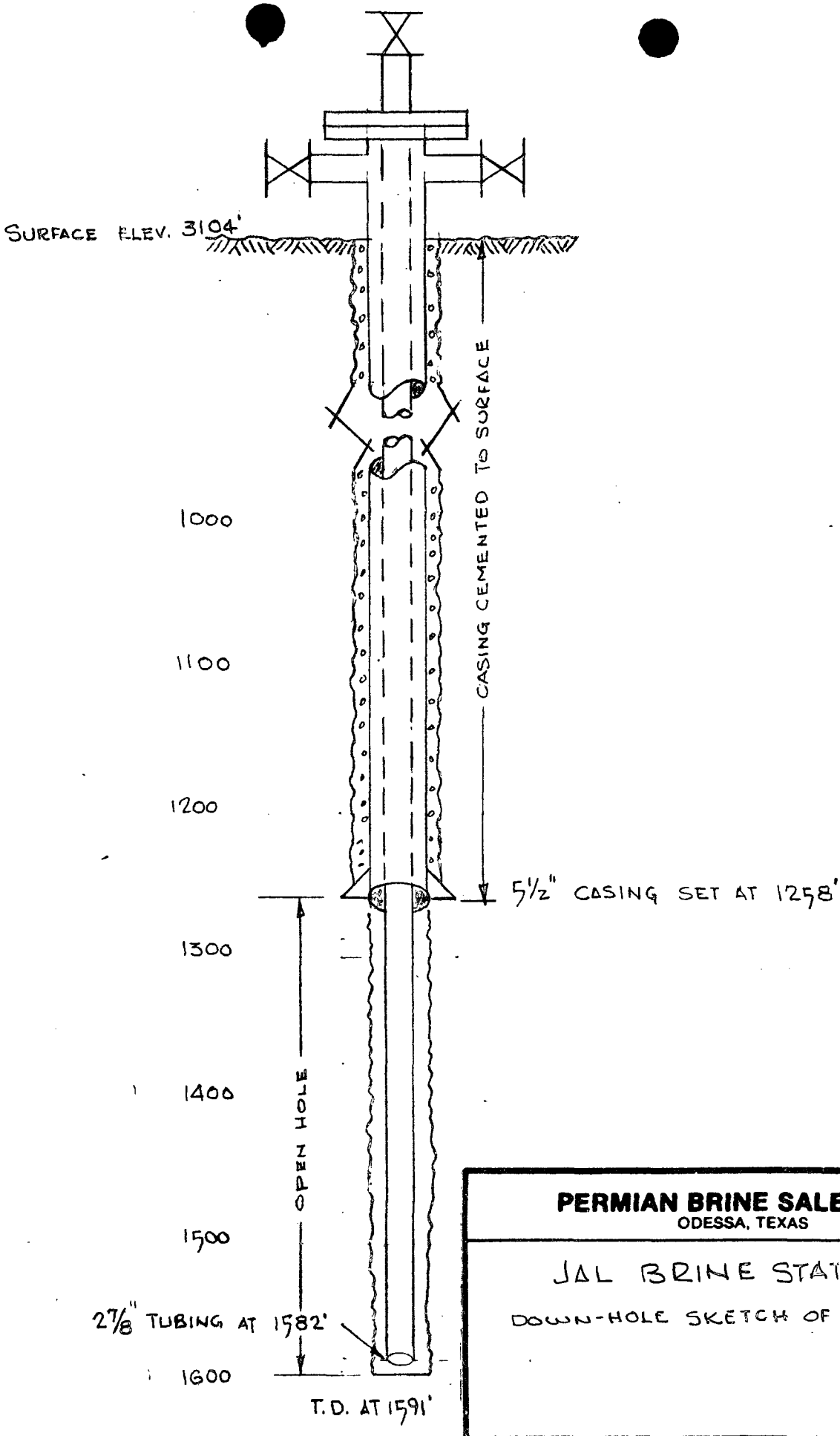
SCALE 1" = 100'

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

LAYOUT OF OPERATING FACILITIES

___SAL BRINE STATION

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 4-18-84 | R.C. McCUTCHAN TEX. P.E. 9844 | 1 |



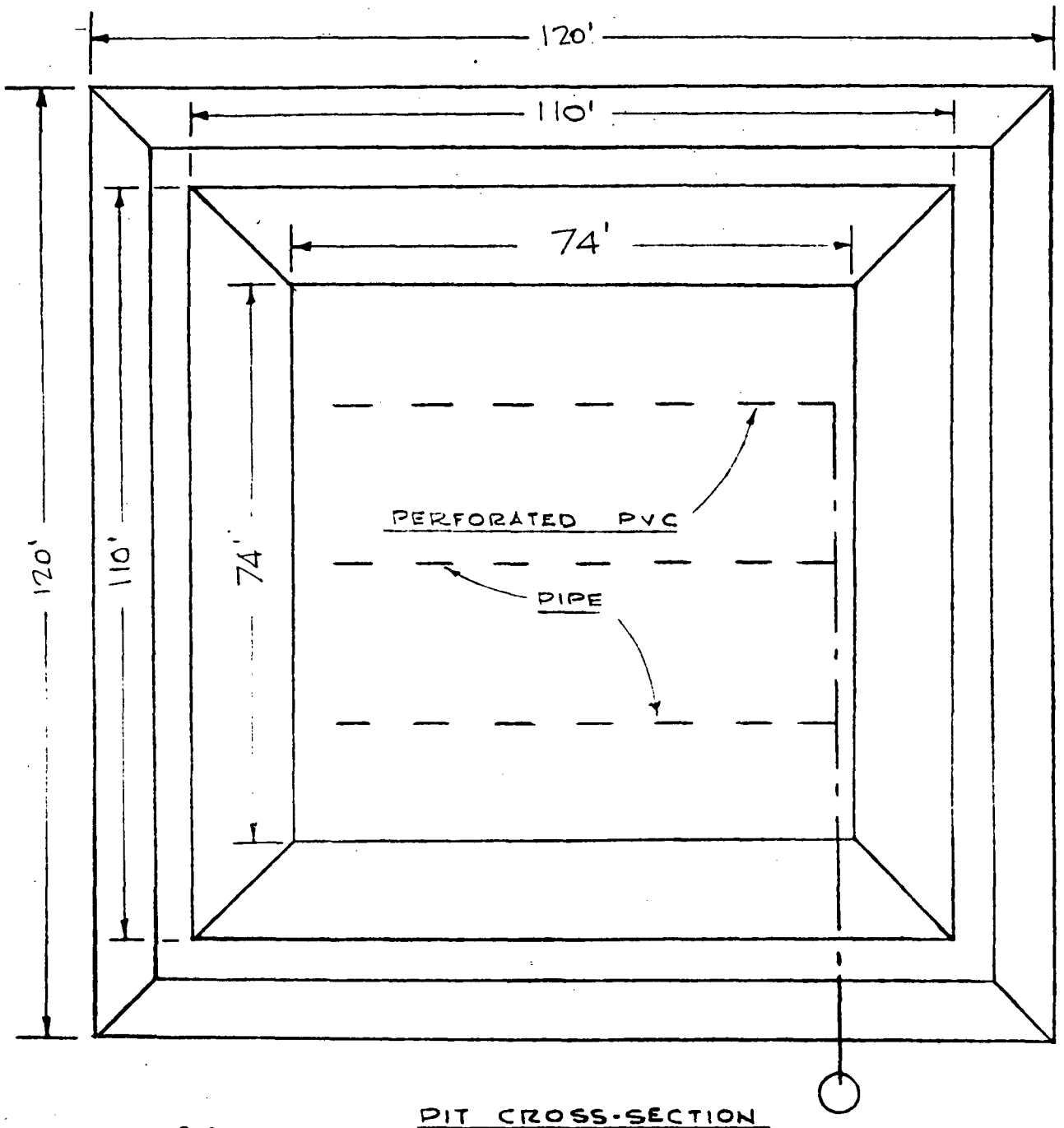

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

# JAL BRINE STATION

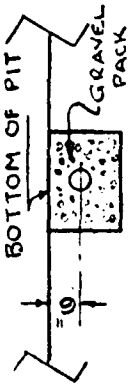
DOWN-HOLE SKETCH OF BRINE WELL

| DATE: | BY: | DRAWING NO.: |
|---|---|---|
| 4-18-84 | R.C. McCUTCHAN TEX. P.E. 9844 | 2 |

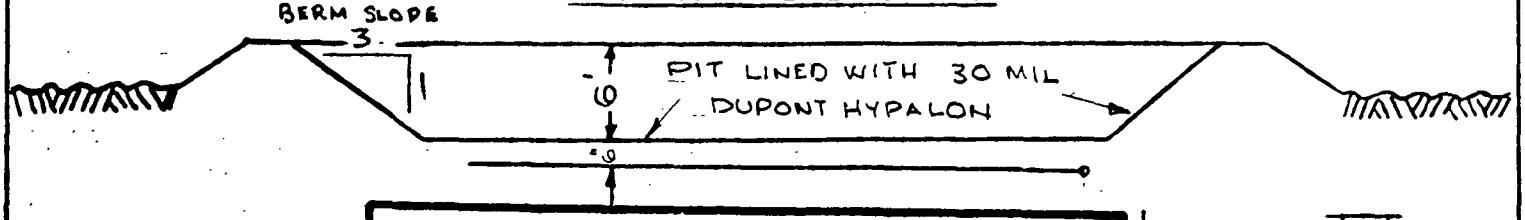
# BRINE STORAGE PIT




CROSS-SECTION OF LEAK DETECTION PIPING




## PIT CROSS-SECTION

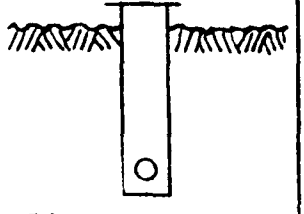



NO SCALE

**PERMIAN BRINE SALES, INC.**
ODESSA, TEXAS

DETAILS OF BRINE STORAGE PIT
JAL BRINE STATION

| DATE | BY | DRAWING NO |
|---|---|---|
| 5-2-84 | R.C. McCUTCHAN TEX. P.E. 9844 | 3 |



LEAK DETECTION SUMP

Form 205 5-57—88017-D

PERMIAN BRINE SALES, INC.

JAL BRINE STATION

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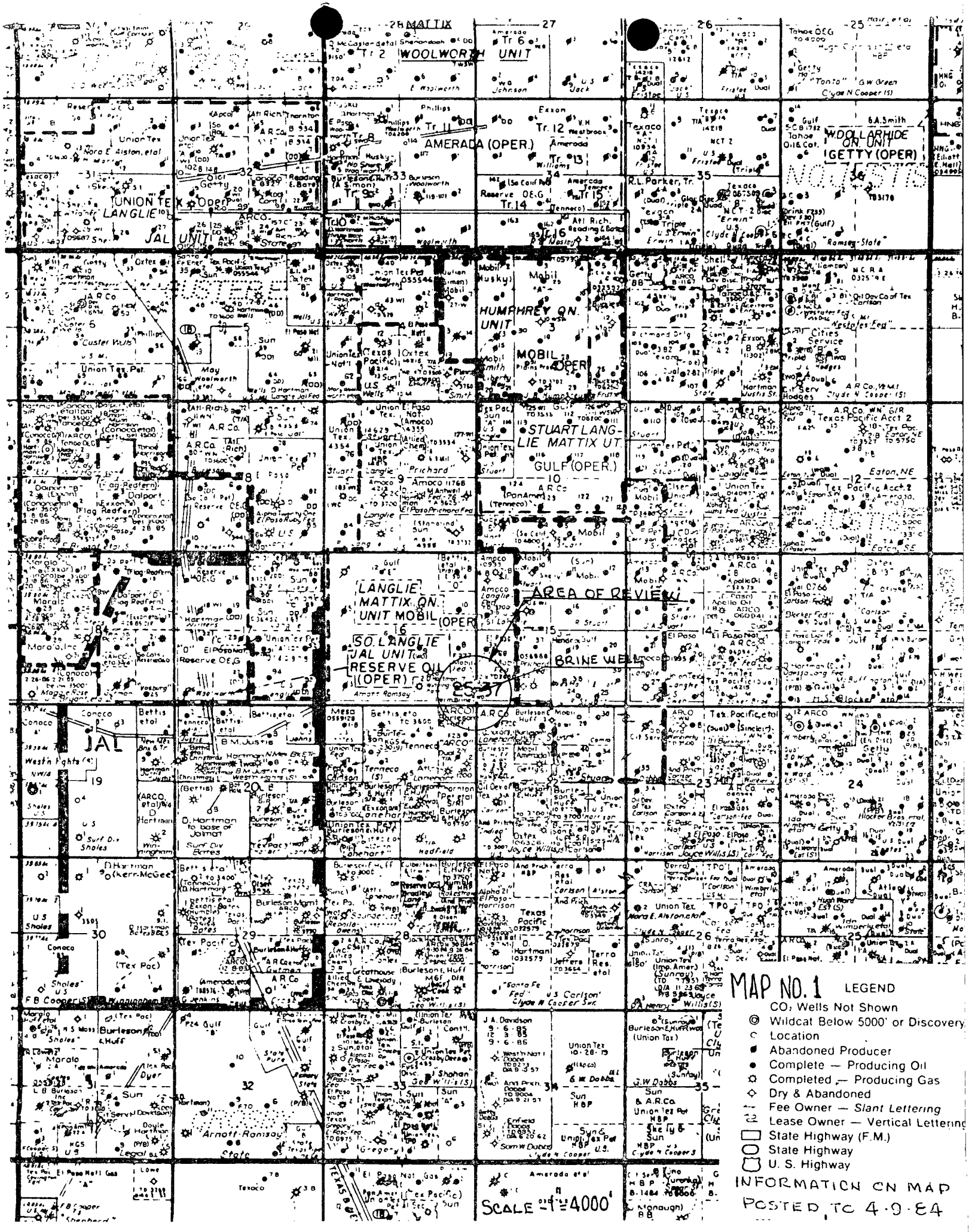
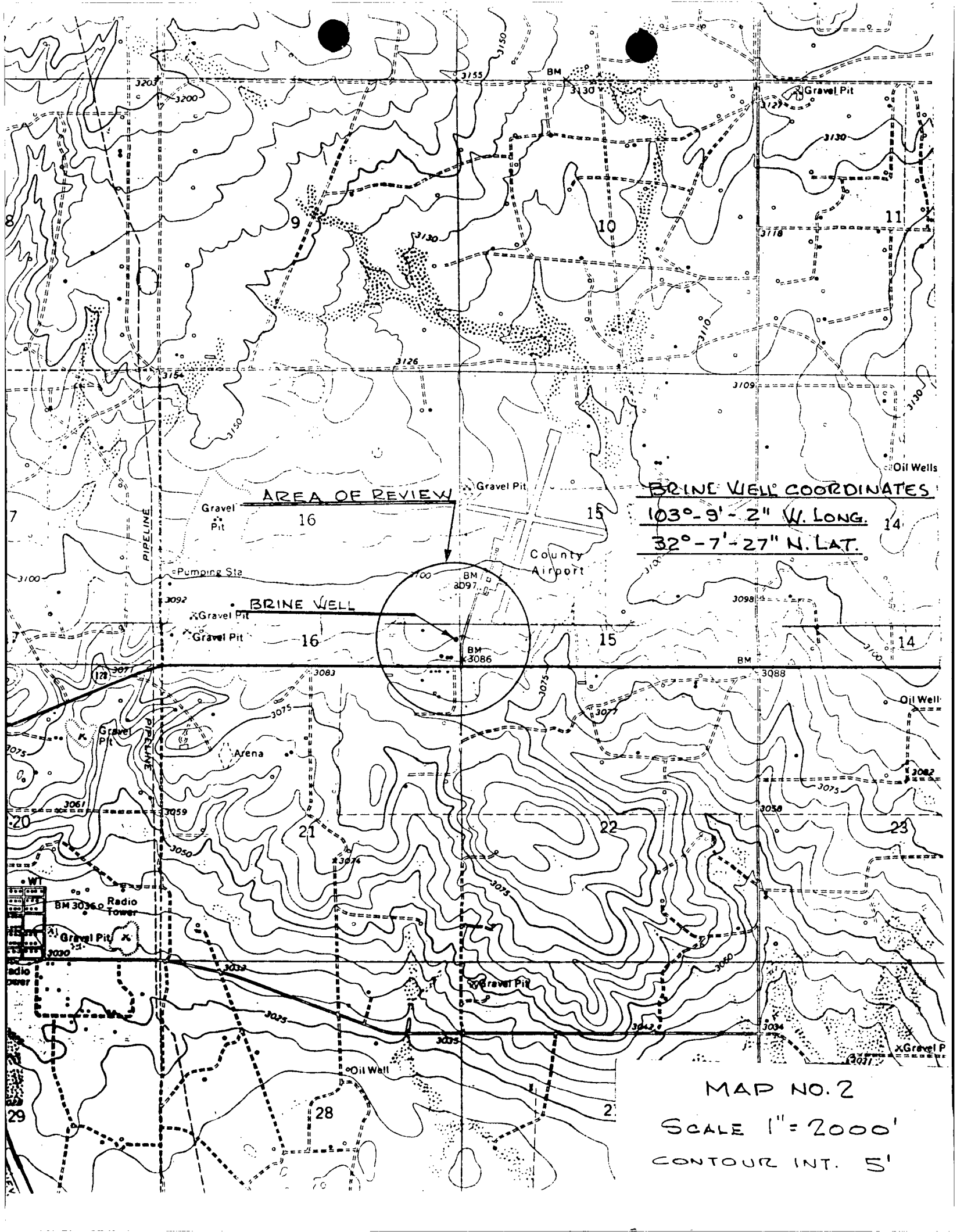
MAPS


WOOLWORTH UNIT
AMERADA (OPER.)
WOOLARHIDE OR UNIT
GETTY (OPER)
HUMPHREY QN. UNIT
MOBIL (OPER)
STUART LANG-LIE MATTIX UT.
GULF (OPER.)
LANGLIE MATTIX QN. UNIT MOBIL (OPER)
SO. LANGLIE JAL UNIT RESERVE OIL (OPER)
AREA OF REVIEW
BRINE WELL
UNION TEX LANGLIE JAL UNIT
Texaco
Tr 2
Tr 6
Tr 12
Tr 13
Tr 14
Tr 15
Tr 11
Tr 9
Tr 8
Tr 16
Tr 1
Tr 3
Tr 4
Tr 5
Tr 7
Tr 10
Tr 17
Tr 18
Tr 19
Tr 20
Tr 21
Tr 22
Tr 23
Tr 24
Tr 25
Tr 26
Tr 27
Tr 28
Tr 29
Tr 30
Tr 31
Tr 32
Tr 33
Tr 34
Tr 35
Tr 36
Nora E. Alston, etal
Ramsey-State
Custer Hills
Arnott-Ramsey State
Westates Fed
Eaton, NE
Texas Pacific Acct 2
Cities Service
Tex Pac Acct 2
Tex Pac Acct 2 Amerada, etal
Tex Pac Acct 2 Eaton, SE
Tex Pac Acct 2 Eaton, NE
Tex Pac Acct 2 Eaton, SW
Tex Pac Acct 2 Eaton, NW


AREA OF REVIEW
BRINE WELL
BRINE WELL COORDINATES
103°-9'-2" W. LONG.
32°-7'-27" N. LAT.
MAP NO. 2
SCALE 1" = 2000'
CONTOUR INT. 5'
PIPELINE
Gravel Pit
Pumping Sta
County Airport
Oil Wells
Oil Well
Arena
Radio Tower
BM 3036
BM 3086
BM 3097
BM 3088
16
15
14
21
22
23
28
29

PERMIAN BRINE SALES, INC.

JAL BRINE STATION

---

WELL COMPLETION AND CEMENTING
REPORTS

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

| NO. OF COPIES RECEIVED | | |
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| DISTRIBUTION | | |
| SANTA FE | | |
| FILE | | |
| U.S.G.S. | | |
| LAND OFFICE | | |
| OPERATOR | | |

# OIL CONSERVATION DIVISION

P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Jal #4

Form C-103
Revised 10-1-78

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: M14474

## 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. OIL WELL [ ] GAS WELL [ ] OTHER- Brine Well

7. Unit Agreement Name:

2. Name of Operator: Permian Brine Sales & Service, Inc.

8. Farm or Lease Name: Arnott Ramsey State

3. Address of Operator: P.O. Box 1591 Odessa, Texas 79760

9. Well No.: 4

4. Location of Well: UNIT LETTER P, 515 FEET FROM THE South LINE AND 100 FEET FROM THE East LINE, SECTION 16 TOWNSHIP 25S RANGE 37E NMPM.

10. Field and Pool, or Wildcat: Wildcat

15. Elevation (Show whether DF, RT, GR, etc.)

12. County

16. 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 [ ] | | COMMENCE DRILLING OPNS. [ ] | PLUG AND ABANDONMENT [ ] |
| PULL OR ALTER CASING [ ] | CHANGE PLANS [ ] | CASING TEST AND CEMENT JOB [X] | |
| OTHER [ ] | | OTHER [ ] | |

17. 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.

Open Hole Drilled to 1269'
17# - 5½" casing cemented with 400 sacks
Class H with 2% $CaCl_2$
Circulated to 60' - cemented
0-60' through 1" pipe - waited 48 hours.
Drilled out cement plug to 1271' - tested casing and cement.
Held 500# for 30 minutes.
Drilled ahead to 1591 feet, and hung 2 7/8 tubing in open hole @ 1582 ft.

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

SIGNED A.L. Hickerson TITLE President DATE 3-18-81

A.L. Hickerson

APPROVED BY _____ TITLE _____ DATE _____ 1981

CONDITIONS OF APPROVAL, IF ANY:

RECEIVED
MAR 20 1981
OIL CONSERVATION DIV.

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| OPERATOR | | |

Form C-105
Revised 1-1-65

# NEW MEXICO OIL CONSERVATION COMMISSION
# WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: M14474

1a. TYPE OF WELL — OIL WELL [ ] GAS WELL [ ] DRY [ ] OTHER

b. TYPE OF COMPLETION — NEW WELL [ ] WORK OVER [ ] DEEPEN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] OTHER

7. Unit Agreement Name:

8. Farm or Lease Name: Arnott Ramsey State

2. Name of Operator: Permian Brine Sales & Service, Inc.

9. Well No.: 4

3. Address of Operator: P.O. Box 1591, Odessa, Texas 79760

10. Field and Pool, or Wildcat: Wildcat

4. Location of Well

UNIT LETTER P LOCATED 515 FEET FROM THE South LINE AND 100 FEET FROM THE East LINE OF SEC. 16 TWP. 25S RGE. 37E NMPM

12. County: Lea

| 15. Date Spudded | 16. Date T.D. Reached | 17. Date Compl. (Ready to Prod.) | 18. Elevations (DF, RKB, RT, GR, etc.) | 19. Elev. Cashinghead |
|---|---|---|---|---|
| 10-8-80 | 3-10-81 | 3-10-81 | 3104 G.L. | 3106 |

| 20. Total Depth | 21. Plug Back T.D. | 22. If Multiple Compl., How Many | 23. Intervals Drilled By | Rotary Tools | Cable Tools |
|---|---|---|---|---|---|
| 1591' | 1582 | - | → | 120-1591 | 0-120 |

24. Producing Interval(s), of this completion — Top, Bottom, Name: Salt Section Open Hole 1258-1591

25. Was Directional Survey Made: NO

26. Type Electric and Other Logs Run: NONE

27. Was Well Cored: NO

28. CASING RECORD (Report all strings set in well)

| CASING SIZE | WEIGHT LB./FT. | DEPTH SET | HOLE SIZE | CEMENTING RECORD | AMOUNT PULLED |
|---|---|---|---|---|---|
| 5 1/2" | 17# | 1258' | 7 7/8 | 400 SX | NONE |
| | | | | | |
| | | | | | |
| | | | | | |

29. LINER RECORD

| SIZE | TOP | BOTTOM | SACKS CEMENT | SCREEN |
|---|---|---|---|---|
| | | | | |
| | | | | |

30. TUBING RECORD

| SIZE | DEPTH SET | PACKER SET |
|---|---|---|
| | | |
| | | |

31. Perforation Record (Interval, size and number): Open Hole 1258-1591

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

| DEPTH INTERVAL | AMOUNT AND KIND MATERIAL USED |
|---|---|
| | |
| | |
| | |

33. PRODUCTION

| Date First Production | Production Method (Flowing, gas lift, pumping — Size and type pump) | Well Status (Prod. or Shut-in) |
|---|---|---|
| | | |

| Date of Test | Hours Tested | Choke Size | Prod'n. For Test Period → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Gas — Oil Ratio |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| Flow Tubing Press. | Casing Pressure | Calculated 24-Hour Rate → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Oil Gravity — API (Corr.) |
|---|---|---|---|---|---|---|
| | | | | | | |

34. Disposition of Gas (Sold, used for fuel, vented, etc.)

Test Witnessed By

35. List of Attachments

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED A.L. Hickerson TITLE President DATE 3-11-81

A.L. Hickerson

This form is to be filed with the appropriate District Office of the Commission not later than [redacted] days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radioactivity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

## INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

| Southeastern New Mexico | | | | Northwestern New Mexico | | | |
|---|---|---|---|---|---|---|---|
| T. Anhy | 1035 | T. Canyon | | T. Ojo Alamo | | T. Penn. "B" | |
| T. Salt | 1155 | T. Strawn | | T. Kirtland-Fruitland | | T. Penn. "C" | |
| B. Salt | | T. Atoka | | T. Pictured Cliffs | | T. Penn. "D" | |
| T. Yates | | T. Miss | | T. Cliff House | | T. Leadville | |
| T. 7 Rivers | | T. Devonian | | T. Menefee | | T. Madison | |
| T. Queen | | T. Silurian | | T. Point Lookout | | T. Elbert | |
| T. Grayburg | | T. Montoya | | T. Mancos | | T. McCracken | |
| T. San Andres | | T. Simpson | | T. Gallup | | T. Ignacio Qtzte | |
| T. Glorieta | | T. McKee | | Base Greenhorn | | T. Granite | |
| T. Paddock | | T. Ellenburger | | T. Dakota | | T. | |
| T. Blinebry | | T. Gr. Wash | | T. Morrison | | T. | |
| T. Tubb | | T. Granite | | T. Todilto | | T. | |
| T. Drinkard | | T. Delaware Sand | | T. Entrada | | T. | |
| T. Abo | | T. Bone Springs | | T. Wingate | | T. | |
| T. Wolfcamp | | T. | | T. Chinle | | T. | |
| T. Penn. | | T. | | T. Permian | | T. | |
| T Cisco (Bough C) | | T. | | T. Penn. "A" | | T. | |

## OIL OR GAS SANDS OR ZONES

No. 1, from ..... to ..... No. 4, from ..... to .....

No. 2, from ..... to ..... No. 5, from ..... to .....

No. 3, from ..... to ..... No. 6, from ..... to .....

## IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from 450 To 475' to 260 feet. .....

No. 2, from ..... to ..... feet. .....

No. 3, from ..... to ..... feet. .....

No. 4, from ..... to ..... feet. .....

## FORMATION RECORD (Attach additional sheets if necessary)

| From | To | Thickness in Feet | Formation | From | To | Thickness in Feet | Formation |
|---|---|---|---|---|---|---|---|
| 0 | 10 | 10 | Caliche | | | | |
| 10 | 60 | 50 | Sand | | | | |
| 60 | 1035 | 975 | Red Beds | | | | |
| 1035 | 1155 | 120 | Rustler Anhydrite | | | | |
| 1155 | 1591 | 436 | Salt With Shale And Anhydrite Stringers | | | | |

EXHIBIT 1

PERMIAN BRINE SALES, INC.

JAL BRINE STATION

---

MECHANICAL INTEGRITY TEST

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531


July 7, 1983

Jerry Sexton
New Mexico Oil Conservation Commission
P.O. Box 1980
Hobbs, New Mexico 88240

RE: Mechanical Integrity Test on
Arnott-Ramsey #4

Dear Mr. Sexton:

Find enclosed our test chart, test report, and an explanation thereof.

We feel that the minute pressure decline is due to salt going into solution and thus making the cavern larger. Other wells have declined as much as 4% and still been determined to be tight.

To protect the fresh water of New Mexico we propose to:

1. Run a pressure test annually,
2. Report any loss of injection pressure within forty-eight (48) hours,
3. Report any loss of brine return within forty-eight (48) hours.

Please let me know if this will meet your New Mexico Oil Coservation Commission rules.

If you have any questions, please do not hesitate to call me at (915) 332-0531.

Sincerely yours,

PERMIAN BRINE SALES, INC.

Russell D. Hickerson
Vice President

RDH/smc
Enclosures

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

P. O. BOX 1591 ODESSA, TEXAS 79760 PHONE 332-0531


Jerry Sexton
New Mexico Oil Conservation Commission
P.O. Box 1980
Hobbs, New Mexioc 88240

## MECHANICAL INTEGRITY TEST REPORT

Station JAL (ARNOTT-RAMSEY #4) Date 7-6-83

Station Number 5 Witness TONY PLATTSMIER

Run By RUSS HICKERSON Witness DAVE PACCIARELLI

Normal Operating Pressure 210# PSI.

Depth of Well 1591' T.D.

Pressure attained in Test 218# PSI.

Rate of Injection (approximate) 45 gpm

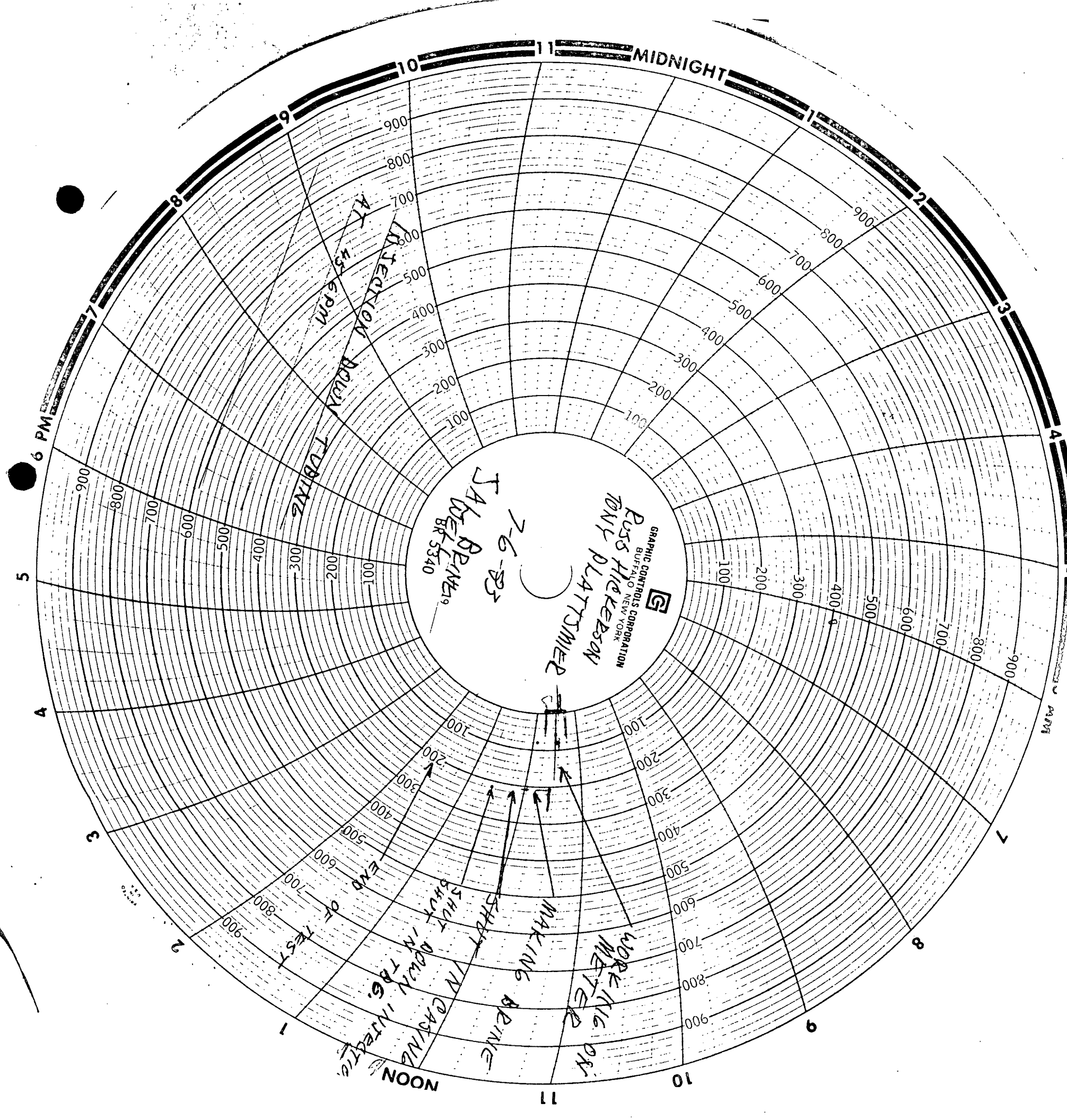
Pressuring up time 20 MINUTES

Static test time 1 HR. 10 MINUTES

Pounds of decline 3# PSI. (218# TO 215#)

Percentage of decline 1.3 %

REMARKS INJECTION PUMP WOULD NOT GO PAST 218#. SMALL PER CENTAGE OF DECLINE INDICATES CASING, CEMENT JOB AND CAVERN IS TIGHT.


MIDNIGHT
1
2
3
4
5
6 PM
7
8
9
10
11
NOON
100
200
300
400
500
600
700
800
900
GRAPHIC CONTROLS CORPORATION
BUFFALO NEW YORK
7-6-82
JAMES RIVER
BRK 5340
RUSS HIGHER
TONE PLATTSMEAR
DOWN TIME
AT 3:45PM
DIVISION
END OF TEST
SHUT DOWN IN TAG.
SHUT DOWN
MAKING PRINT
MEETING ON
WORKING

12. The test for mechanical integrity of the underground casing and cavern is accomplished by pressuring the well to 1 ½ times the normal operating pressure. This is done by pumping fresh water into the well, through the tubing while the casing outlet is closed. A record of the volume of fresh water pumped and the time required to reach the test pressure is recorded. The well is then shut-in and is left in this condition for at least four hours. The pressures are monitored on a pressure recorder at the well site.

Small reductions in the test pressure, during the test period, are the result of salt entering solution. This process is influenced by the downhole conditions in the salt strata. If the well has a large cavern capacity and has not been circulated at high volume rates in the recent past, the fluid in the underground system is fully saturated. Therefore, the volume of fresh water required to pressure the cavern will be comparatively less than under the opposite conditions. The shut-in pressure will also indicate minimum change, over the test period, due to the fact that the comparatively small amount of fresh water entering solution will not materially effect the huge volume of saturated brine in the cavern. Conversely, if brine has been produced at a high rate immediately preceeding the test then, not only is the water used for pressuring entering solution, but some of the previously pumped fresh water for brine production is also dissolving salt, and thus enlarging the cavern during the pressure test.

PERMIAN BRINE SALES, INC.

JAL BRINE STATION

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GEOLOGIC & HYDROLOGIC TABLES

TABLE 3. STRATIGRAPHIC UNITS IN SOUTHERN LEA COUNTY, N. MEX.

| Geologic age | | Geologic unit | Thickness (ft) | General character | Water-bearing properties |
|---|---|---|---|---|---|
| Cenozoic Quaternary | Recent and Pleistocene | Sand | 0–30± | Dune sand, unconsolidated stabilized to drifting, semiconsolidated at depth; fine- to medium-grained. | Above the zone of saturation, hence, does not yield water to wells. Aids recharge to underlying formations by permitting rapid infiltration of rainwater. |
| | | Alluvium | 0–400± | Channel and lake deposits; alternating thickbedded calcareous silt, fine sand, and clay; thickest in San Simon Swale; less than 100 feet thick in most places. | Saturated and highly permeable in places in east end of Laguna Valley. Forms continuous aquifer with Ogallala formation. Wells usually yield less than 30 gpm. Locally above the water table. |
| Cenozoic Tertiary | Pliocene | Ogallala | 0–300± | Semiconsolidated fine-grained calcareous sand capped with thick layer of caliche; contains some clay, silt, and gravel. | Major water-bearing formation of the area. Unsaturated in many localities, such as north side of Grama Ridge, west side of Eunice Plain, Antelope Ridge area, and Rattlesnake Ridge. Greatest saturated thickness along east side of Eunice Plain, west of Monument Draw, where wells yield up to 30 gpm. Highest yields, up to 700 gpm, obtained from wells along south edge of Eunice Plain, east of Jal. |
| Mesozoic Cretaceous | | Undifferentiated | 35± | Small isolated and buried residual blocks of limestone, about 3 miles east of Eunice. | Possibly small isolated bodies of water locally. |
| Mesozoic Triassic | Dockum group | Chinle formation | 0–1,270± | Claystone, red and green; minor fine-grained sandstones and siltstones; underlies all of eastern part of southern Lea County area; thins westward; absent in extreme west. | Yields small quantities of water from sandstone beds. Yields are rarely over 10 gpm. Water has high sulfate content. |
| | | Santa Rosa sandstone | 140–300± | Sandstone, chiefly red but locally white, gray, or greenish-gray; fine- to coarse-grained; exposed in extreme west; underlies Cenozoic rocks in western part of area, and is present at depth in eastern part. | Yields small quantities of water over most of the area. Some wells are reported to yield as much as 100 gpm. Water has high sulfate content. |
| Paleozoic | Permian or Triassic | Undifferentiated | 90–400+ | Siltstone, red, shale, and sandstone; present at depth under all of southern Lea County. | No wells are known to be bottomed in the red beds. Probably can yield very small quantities of high-sulfate water. |
| Paleozoic | Ordovician through Permian | | 6,500–17,000± | Thick basin deposits ranging in character from evaporites to coarse clastics; thinnest on the east side of the area over the Central basin platform, thickest toward the southwest. | No presently usable water supply available from these rocks. Source of highly mineralized oil-field waters. |
| Precambrian | | | | Granite, granodioritic and other igneous and metamorphic rocks; complex structure. | Not hydrologically significant. |

## TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX.

LOCATION NUMBER: Explanation in section on well-numbering system.

OWNERS: EPNG, El Paso Natural Gas Co.; MCRA, Maljamar Co-operative Repressuring Agreement.

AQUIFER: Tr, Triassic rocks; To, Ogallala formation; Qal, Quaternary alluvium.

DEPTH OF WELL: M, measured; all other depths are reported.

ALTITUDE: Altitudes interpolated from topographic maps. Probable error less than 10 feet.

WATER LEVEL: Measured depths are given to nearest tenth of a foot; reported depths are given to nearest foot. All are non-pumping water levels except as noted otherwise in remarks column.

SURFACE DIAMETER OF WELLS: Expressed in inches unless otherwise indicated. Diameters of cased, drilled wells are given in inches. Diameters and rectangular dimensions of dug wells are given in feet.

METHOD OF LIFT: Lw, lift pump, windmill powered; Li, lift pump, internal-combustion-engine powered; Le, lift pump electrically driven; Te, turbine pump, electrically driven; Ti, turbine pump, internal-combustion-engine powered; Je, jet pump, electrically driven; N, unequipped or partly equipped.

USE OF WATER: D, domestic; L, domestic use other than drinking, such as watering lawns and gardens; P, public supply; I, irrigation; In, industrial; S, stock; N, none; O, observation.

REMARKS: EY, reported estimated yield; gpm, gallons per minute; gpd, gallons per day; MWP, measured while pumping; PR pumped recently; WBZ, water-bearing zone.

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16.32.27.441 | Buffalo Oil Co. | To | 265 | 4,300 | 200(?) | — | — | 8⅝ | — | In | Perforations 194-254 feet. |
| 35.400 | Drew Taylor | To | 246M | 4,265 | 160(?) | — | — | 8¼ | Te | In,D | Taylor well 2. Northwest well of 3. EY 60-80 gpm. |
| 17.32.2.433 | MCRA | To | 200 | 4,240 | 60 | 1948 | — | 7 | Te | In,D | Well 6. EY 50 gpm. |
| 2.434 | MCRA | To | 192 | 4,240 | 60 | 6- 1-50 | 1948 | 7 | Te | In,D | Well 5. EY 50 gpm. |
| 2.443 | MCRA | To | 190 | — | — | — | — | 7 | Te | In,D | Well 7. EY 50 gpm. |
| 3.140 | Buffalo Oil Co. | To | — | — | — | — | — | — | — | In | Buffalo-Taylor well 3. Chemical analysis in table 8. |
| 3.320a | do. | To | — | 4,250 | 175.6 | 7-21-54 | — | 6 | N | N | Buffalo-Taylor well 2. Nearby well pumping. |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 17.32.4.442 | W. Taylor | Qal | — | 4,180 | 82.9 | 6- 3-54 | — | 6 | N | N | — |
| 11.231 | MCRA | To | 139 | 4,180 | — | — | 1947 | 7 | Te | In,D | Well 4. |
| 17.32.11.233 | MCRA | To(?) | 140 | 4,200 | 70 | 9-20-47 | — | 8 | Li | In,D | Well 2. EY 9 gpm. |
| 11.411 | MCRA | To(?) | 200 | 4,170 | 70 | 6-15-46 | — | 8 | Te | In,D | Well 1. EY 90 gpm. |
| 11.411a | MCRA | To(?) | 130 | — | 70 | 9-23-47 | — | 8 | Li | In,D | Well 3. EY 50 gpm. |
| 17.33.13.341 | Potash Co. of America | To | 252M | 4,124 | 149.7 | 11-20-53 | 1952 | 6 | N | O | — |
| 18.322 | Kewanee Oil Co. | To | 220 | 4,230 | — | — | — | 10¾ | Te | In,D | Two wells. Chemical analysis in table 8. |
| 26.422 | Phillips Oil Co. | To | — | 4,125 | 161.2 | 11-20-53 | 1950 | 8 | N | In,O | — |
| 28.110 | — | To | 241M | 4,185 | 198.0 | 5-11-54 | — | 7 | N | N | — |
| 30.124 | Walter Williams | Qal | — | 4,045 | 70.0 | 7-29-54 | — | 7 | Lw | S | PR |
| 18.33.14.111 | — | Qal | 40M | 3,965 | 35.8 | 6- 3-54 | — | 5 | N | N | — |
| 19.142 | — | Tr(?) | — | 3,820 | >140 | 12- 9-58 | — | 4 | Lw | S | — |
| 34.133 | — | Tr | 200M | 3,760 | 177.4 | 12- 9-58 | — | 8½ | N | N | — |
| 19.32.8.200 | — | Tr | — | 3,650 | 365.3 | 12- 9-58 | — | 7½ | Lw | S | Chemical analysis in table 8. |
| 36.100 | W. M. Snyder | Tr | 485 | 3,565 | — | — | — | — | Li | D,S | — |
| 19.33.5.213 | — | Tr | — | 3,710 | >299 | 12- 9-58 | — | — | Lw | S | — |
| 26.244 | Mark Smith | Qal | 101 | 3,600 | 92.9 | 7- 1-54 | — | — | Lw | D,S | MWP |
| 19.34.9.114 | Scharbauer Cattle Co. | Tr(?) | 33 | 3,790 | 28.6 | 6- 3-54 | — | 6 | Lw | S | Chemical analysis in table 8. |
| 31.131 | Clark Scharbauer | Qal | — | 3,625 | 65.8 | 7- 1-54 | — | 6 | Lw | S | MWP |
| 19.35.5.121 | Gene Dalmont | To | 88 | 3,890 | 50 | 7-28-54 | — | 8 | Ti | I | — |
| 5.234 | Jules Smith | To | 90 | 3,860 | 35 | — | — | — | Lw | D,S | — |
| 10.113 | N. T. Roberts | To | 36 | 3,860 | 19.9 | 7-28-54 | — | 6 | Lw | S | EY 5 gpm. |
| 12.444 | — | Qal | — | 3,740 | 34.2 | 7-28-54 | — | 3 ft. | Lw | S | — |
| 19.35.17.122 | J. D. Roberts | Qal | 50 | 3,835 | 29.9 | 7-28-54 | — | 3×3 ft. | Lw | D,S | Dug 0-30 feet; drilled 30-50 feet. |
| 22.334 | — | Qal | — | 3,740 | 23.5 | 7-28-54 | — | 8 | Lw | N | — |
| 24.121 | — | Qal | — | 3,735 | 28.6 | 11-16-53 | — | 6 ft. | N | N | — |
| 25.424 | — | Qal | — | 3,675 | 22.6 | 11-16-53 | — | — | N | N | Uncased shothole. |
| 25.434 | — | Qal | — | 3,660 | 22.8 | 11-16-53 | — | 6 | Lw | S | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 19.36.5.233 | Tom Green | To | 60 | 3,815 | 52.3 | 7-28-54 | — | — | Lw | D,S | — |
| 19.313 | — | Qal | 44.6M | 3,685 | 18.6 | 11-16-53 | — | — | N | N | Uncased shothole. |
| 20.111 | Tom Green | Qal | — | 3,695 | 25.7 | 7-28-54 | — | — | Lw | S | EY 10 gpm. PR |
| 25.123 | — | To | 43M | 3,680 | 16.0 | 3-18-54 | — | 6 | N | N | Northwest well of six. Chemical analysis in table 8. |
| 19.36.26.224 | J. E. Weir | Qal | 12.7M | 3,650 | 6.7 | 5- 7-54 | — | 4×5 ft. | N | N | At Monument Spring. |
| 28.422 | Mrs. Abi Hall | To | 52M | 3,720 | 36.6 | 3-18-54 | — | 7 | N | N | — |
| 28.441 | do. | To | 27M | 3,680 | 22.7 | 3-18-54 | — | 6 | N | N | — |
| 32.110 | S. P. Jordan | Qal | 32 | 3,645 | 19 | 11-20-29 | — | — | — | — | Chemical analysis in table 8. |
| 32.324 | — | Qal | 30 | 3,630 | 27.2 | 7-28-54 | — | 4×4 ft. | Lw | N | — |
| 19.37.4.110 | V. Linam | To | 29 | 3,680 | 21 | 9-19-29 | — | — | — | — | Chemical analysis in table 8. |
| 18.111 | Amerada Oil Co. | To | 134 | 3,705 | 35 | 9- -47 | 1947 | 10¾ | Ti | D | Monument District Camp. WBZ 67-108 feet, 112-125 feet. EY 385 gpm. |
| 18.331 | EPNG | To | — | 3,710 | 51.9 | 3-18-54 | — | 10 | N | N | — |
| 20.242 | Humble Oil Co. | — | 80 | 3,660 | Dry | — | 1937 | — | N | N | Plugged and abandoned. |
| 21.132 | do. | To | 67 | 3,635 | — | — | 1937 | — | — | — | State "D" well 2. EY 30 gpm. |
| 19.37.25.422 | — | To | — | 3,600 | 40 | 4- 6-54 | — | — | Lw | S | — |
| 29.333 | — | Qal | — | 3,595 | 13.3 | 7-28-54 | — | 7 | Lw | D | MWP |
| 29.344 | Hobbs School district | Qal | 30± | — | 21.5 | 3-23-60 | — | 8 | Te | P | — |
| 29.344a | do. | Qal | 30± | — | — | — | — | 6 | Te | P | Chemical analysis in table 8. |
| 30.113 | Continental Oil Co. | Qal | 60 | 3,660 | — | — | — | — | Te | D | Pumps dry in summer. |
| 20.32.1.322 | W. M. Snyder | Qal | 30 | 3,510 | 21.8 | 7- 1-54 | — | 6 | Li | S | Water not potable. |
| 18.233 | Freeport Sulfur Co. | Tr | 400 | 3,450 | 89.2 | 3-24-54 | 1954 | 8 | Li | In | WBZ 215-243 feet. |
| 27.144 | Joel Frey | Qal | 25 | 3,545 | 12.3 | 6-11-54 | — | — | Lw | N | — |
| 30.142 | — | Qal | — | 3,530 | 9.9 | 6-11-54 | — | 8⅝ | N | N | Located in sink. |
| 36.214 | Mrs. Bingham | Qal | 60 | 3,588 | 46.6 | 6- 6-55 | 1950 | 7¼ | Lw | D | West well of three. |
| 20.33.15.221 | — | Tr | — | 3,570 | 336.1 | 4-20-55 | — | 4 | Li | N | — |
| 24.122 | D. C. Berry | Tr | 700± | 3,630 | 300± | — | — | 10 | Lw | S | — |
| 20.34.17.334 | Mark Smith | Tr | 200 | 3,635 | 140 | 7- 1-54 | 1940 | 10 | Lw | S | MWP |
| 22.223 | D. C. Berry | Tr | 235 | 3,655 | — | — | — | 10 | Lw | S | — |
| 20.35.1.221 | J. L. Wood | Qal | 35 | 3,655 | 24.5 | 11-16-53 | — | 4×4 ft. | N | O | — |
| 31.113 | Leo Sims | To | 85 | 3,740 | 68.4 | 6-25-54 | — | 6 | Lw | S | PR |
| 33.433 | do. | To | 135 | 3,700 | 94.1 | 6-25-54 | — | 7 | Lw | S | MWP |
| 35.333 | do. | To | 105 | 3,690 | 88.9 | 4-15-54 | — | — | Lw | D,S | MWP Southeast well of two. |
| 20.36.1.412 | Amerada Oil Co. | Qal | 72M | 3,565 | 33.1 | 3-30-54 | — | 7 | N | N | — |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20.36.5.321 | — | Qal | — | 3,635 | 28.3 | 11-16-53 | — | 6 | Lw | S | — |
| 12.141 | — | Qal | 40±M | 3,550 | 29.5 | 3-25-54 | — | — | Lw | S | — |
| 12.222 | Sunray Oil Co. | Qal | 56 | 3,560 | 29.0 | 3-30-54 | — | 7 | Lw | L | Water not potable. |
| 20.36.15.222 | Continental Oil Co. | Tr | 700 | 3,575 | — | — | — | — | Li | D | — |
| 15.421 | H. S. Record | Qal | 50 | 3,575 | 35.7 | 3-30-54 | 1938 | 8½ | Lw | S | Water not potable. MWP. Chemical analysis in table 8. |
| 24.423 | — | Qal | 50±M | 3,540 | 36.4 | 3-25-54 | — | 7 | Lw | In | Water used to soak wooden tanks. |
| 25.312 | Stanolind Oil and Gas Co. | Tr | 225 | 3,550 | 117.3 | 3-25-54 | — | 6 | Lw | D | — |
| 26.244 | Amerada Oil Co. | Tr | 265 | 3,555 | — | — | — | 7½ | Li | In | Water used for oil well drilling. |
| 32.112 | Leo Sims | Tr | 612 | 3,640 | 300 | 4-15-54 | — | — | Lw | S | — |
| 35.244 | Humble Oil Co. | Tr | 230 | 3,550 | — | — | 1938 | — | — | In | Federal Fopeano well 2. EY 18 gpm. |
| 20.27.3.341 | — | Qal | — | 3,560 | 19.5 | 4- 1-54 | — | 7½ | Lw | S | Water not potable. |
| 20.37.4.111 | Jim Cooper | Qal | 40 | 3,560 | — | — | — | — | Je | L | Chemical analysis in table 8. |
| 4.221 | Nolan and Lane | Qal | 45 | 3,555 | 31.4 | 4- 2-54 | 1940 | 6 | Lw | D | Chemical analysis in table 8. |
| 4.314 | — | Qal | 48M | 3,550 | 32.8 | 4- 2-54 | — | 8 | N | N | — |
| 4.341 | Humble Oil Co. | Qal | 106 | 3,550 | — | — | 1935 | — | — | — | Plugged and abandoned. |
| 4.444 | — | Qal | 30±M | 3,560 | 23.5 | 4- 1-54 | — | 8 | N | N | — |
| 5.333 | Amerada Oil Co. | Qal | 75 | 3,555 | — | — | 1954 | 7 | Ti | In | WBZ 35-65 feet. |
| 7.133 | — | Qal | — | 3,555 | 27.1 | 3-29-54 | — | 8½ | N | N | — |
| 7.241 | — | Qal | 28.5M | 3,550 | 26.4 | 3-29-54 | — | 8½ | N | N | About 70 feet northwest of windmill. MWP |
| 7.434 | — | Qal | — | 3,540 | 25.2 | 3-30-54 | — | 8½ | Lw | S | |
| 8.321 | Amerada Oil Co. | Qal | 86 | 3,550 | 30 | 1-23-54 | 1954 | 7 | Ti | In | Reportedly had no measurable drawdown at 50 gpm. |
| 20.37.8.424 | Tidewater Oil Co. | Qal | 62 | 3,545 | 25.9 | 3-22-54 | — | — | Li | D | EY less than 1 gpm. |
| 9.110 | W. H. Laughlin | Qal | 55 | 3,558 | 34.0 | 11-16-53 | — | 4×6 ft. | N | O | — |
| 9.351 | Skelly Oil Co. | Qal | — | 3,545 | 18.0 | 3-22-54 | — | 7 | N | N | — |
| 13.321 | Earl Kornegay | Qal(?) | 78M | 3,545 | 75.7 | 4- 2-54 | — | — | Lw | S | — |
| 16.144 | — | Qal | 36M | 3,525 | 13.2 | 2- 8-53 | — | 6 | N | N | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 17.131 | — | Qal | — | 3,540 | 24.8 | 4- 1-54 | — | 7½ | Lw | N | — |
| 20.431 | — | Qal | 40 | 3,510 | 24.1 | 3-26-54 | — | 12 | Lw | S | PR |
| 21.400 | — | Qal | — | 3,500 | 43.0 | 3-26-54 | — | 7 | N | N | — |
| 28.122 | Gulf Oil Corp. | Qal | 60 | 3,500 | 29.3 | 3-26-54 | — | 7 | N | N | — |
| 28.244 | — | Qal | 42±M | 3,490 | 37.4 | 3-26-54 | — | 6 | Lw | S | PR |
| 29.111 | Mid-Continent Petroleum Co. | Qal | — | 3,520 | 43.8 | 3-25-54 | — | 7 | N | N | — |
| 31.144 | Humble Oil Co. | Qal | 144 | 3,600 | — | — | — | — | — | — | WBZ gray sand, 60-98 feet. |
| 20.37.31.211 | Humble Oil Co. | Qal | 125 | 3,540 | Dry | — | — | — | — | — | Penetrated red beds at 40 feet. |
| 35.441 | Continental Oil Co. | Qal | 63M | 3,480 | 53.4 | 3-23-54 | — | 12 | N | N | — |
| 36.330 | do. | Qal | 120 | — | — | — | — | — | Te | In,D | One of two wells supplying pump station for lease houses. |
| 20.38.6.143 | — | To | — | 3,575 | 45.9 | 4- 6-54 | — | — | Lw | S | PR |
| 7.222 | William Walker | To(?) | 112 | — | — | — | — | 24 | Ti | I | — |
| 7.411 | A. E. Galloway | To(?) | 125 | — | — | — | — | — | Ti | I | — |
| 8.231 | City of Eunice | Qal | — | 3,570 | — | — | — | — | Te | P | West well of two. EY 600 gpm. |
| 8.232 | do. | Qal | — | 3,570 | — | — | — | — | Te | P | East well of two. |
| 8.311 | A. E. Galloway | Qal | 125 | 3,570 | 64.1 | 4- 2-54 | — | — | Ti | I | — |
| 9.124 | — | Qal | 40±M | 3,570 | 35.2 | 4- 2-54 | — | — | Lw | S | — |
| 11.414 | — | To | 93M | 3,565 | 30.7 | 12- 9-53 | — | 3½ ft. | N | N | — |
| 20.38.12.244 | — | To | — | 3,565 | 43.7 | 12- 7-53 | — | 6½ | N | N | — |
| 16.133 | Earl Kornegay | Qal | — | 3,560 | 50 | 3-22-54 | — | — | Lw | S | — |
| 17.113 | Amerada Oil Co. | Qal | 120 | 3,565 | — | — | 1951 | 7 | Ti | In | EY 40 gpm. |
| 17.141 | Earl Kornegay | Qal | 105±M | 3,555 | 59.3 | 3-22-54 | — | 7 | N | N | — |
| 17.142 | do. | Qal | 96M | 3,555 | 57.2 | 3-22-54 | — | — | N | N | — |
| 17.333 | Amerada Oil Co. | Qal | 116 | — | — | — | — | 7 | Ti | In | EY 35 gpm. |
| 17.334 | do. | Qal | 168 | 3,550 | 72.8 | 3-22-54 | — | — | N | N | — |
| 18.242 | do. | Qal | 124 | 3,565 | 50 | 3- -52 | — | 7 | Je | D | EY 17 gpm. |
| 19.320 | Continental Oil Co. | Qal | 115 | 3,545 | 78.8 | 4- 2-54 | — | 8 | Le | D | Chemical analysis in table 8. |
| 31.341 | — | Qal | 70±M | 3,490 | 66.7 | 3-23-54 | — | 6 | N | N | — |
| 20.39.7.133 | — | To | — | 3,565 | 43.6 | 12- 7-53 | — | 7½ | N | N | — |
| 18.344 | Earl Kornegay | To | 60±M | 3,540 | 46.2 | 12- 9-53 | — | — | N | N | Located northwest of windmill. |
| 21.33.2.231 | The Texas Co. | Tr | 1,150 | 3,810 | — | — | — | — | Li | D | Chemical analysis in table 8. |
| 21.33.2.422 | D. C. Berry | To | 120 | 3,805 | 107.2 | 6-28-54 | — | — | Lw | D | Chemical analysis in table 8. |
| 2.442 | do. | To | — | 3,800 | 72.9 | 6-28-54 | — | 10 | Lw | S | Located on west side of sink and west of earthen tank. |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21.33.2.442a | do. | To | — | — | — | — | — | — | Lw | D,S | Located on east side of earthen tank. Chemical analysis in table 8. |
| 18.112 | do. | To | — | 3,900 | 143.0 | 6-21-54 | — | — | Lw | S | — |
| 28.124 | San Simon Ranch | Tr | 224 | 3,690 | 179.5 | 6-30-54 | — | 7½ | N | N | "Standard" well. |
| 21.34.8.422 | do. | To | 120 | 3,705 | 105.8 | 6-30-54 | — | — | Lw | S | — |
| 13.324 | Wilson Oil Co. | Tr | 335 | 3,655 | 200 | 1943 | 1943 | — | Li | D | — |
| 23.223 | do. | To | 220 | 3,660 | 150 | 1954 | — | — | Li | In,D | — |
| 21.34.24.222 | Mid-Continent Oil Co. | Tr(?) | 125 | 3,655 | — | — | — | — | Li | D | — |
| 33.233 | San Simon Ranch | To | 80M | 3,665 | 67.0 | 6- 6-55 | — | 7¼ | N | N | "Christmas" well. |
| 21.35.1.122 | Amerada Oil Co. | Tr | 312 | 3,550 | 175 | 6- 7-54 | 1954 | 7 | Li | In | EY 9 gpm. |
| 7.211 | Wilson Oil Co. | Tr | 430 | 3,700 | 340 | 1940(?) | 1940 | — | Li | D | One of two water wells at Wilson Camp. |
| 14.111 | San Simon Ranch | Tr | 250 | 3,580 | 147.3 | 6- 7-55 | — | 6 | Lw | S | "Scharbauer" well. |
| 24.223 | do. | Tr | — | 3,620 | 205.7 | 4-14-54 | — | — | Lw | S | — |
| 27.321 | — | To | — | 3,615 | 21.8 | 12- 8-58 | — | — | N | N | — |
| 27.321a | — | To | — | 3,620 | — | — | — | — | Lw | S | Chemical analysis in table 8. |
| 21.35.30.411 | San Simon Ranch | To | 58M | 3,630 | 35.6 | 11-25-53 | — | 7½ | Lw | S | — |
| 21.36.9.222 | W. L. Van Noy | Tr | 447 | 3,605 | <350 | — | — | 8 | Li | P | EY 6 gpm. Public supply for Oil Center. Chemical analysis in table 8. |
| 10.112 | Humble Oil Co. | Tr | 495 | — | — | — | — | — | N | N | WBZ sand, 385-395 feet. |
| 19.222 | Pacific-Western Oil Co. | To(?) | 230M | 3,630 | 216.0 | 1- 7-54 | — | 8 | N | N | — |
| 23.233 | Frontier Country Club | To | 200 | 3,555 | 139.0 | 4-22-55 | 1955 | 8⅝ | — | — | Unfinished well. Recently bailed. |
| 28.243 | — | To | 197M | 3,585 | 174.5 | 1-15-54 | — | 6¾ | N | N | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21.36.29.144 | Humble Oil Co. | To(?) | 305 | 3,630 | — | — | 1935 | — | N | N | WBZ sand, 225-305 feet. |
| 33.223 | — | To | 215 ± M | 3,590 | 205.5 | 11-12-53 | — | 6½ | N | N | — |
| 36.242 | W. M. Snyder | To | — | 3,505 | 113.3 | 1-15-54 | — | 6 | Lw | S | MWP |
| 21.37.6.244 | — | To | — | 3,495 | 70.3 | 3-23-54 | — | 8 | Li | — | — |
| 10.211 | Continental Carbon Black Co. | Qal | 76 | 3,440 | 26 | 1953 | 1945 | 8 | Te | In,D | — |
| 11.311 | — | Qal | 77M | 3,426 | 39.1 | 12- 8-53 | — | 7½ | N | N | — |
| 12.341 | Terry and McNeil | Qal | 100 | 3,450 | 76.3 | 10- 2-53 | — | 7 | Ti | In | — |
| 13.111 | Western Oil Field Corp. | Qal | 185 | 3,425 | 60 | 10- 2-53 | 1953 | — | — | — | Drilled for oil. |
| 14.123 | — | Qal | — | 3,420 | 25.4 | 12- 8-53 | — | 6 | Lw | S | — |
| 18.442 | T. Davis | To | 125 | 3,510 | 99.7 | 1-10-54 | — | 7 | Ti | D,S | — |
| 21.111 | — | To | — | 3,460 | 73.1 | 1-10-54 | — | 7¾ | N | N | — |
| 21.37.22.211 | — | To | 49M | 3,420 | 37.7 | 4-21-55 | — | — | N | N | — |
| 22.413 | — | To | — | 3,410 | 75.0 | 10- 1-53 | — | 7 | N | N | — |
| 23.211 | Skelly Oil Co. | To(?) | 81 | 3,420 | 42.5 | 10- 1-53 | 1948 | — | N | N | Skelly Eunice Plant 2, well 1. Initial yield, 55 gpm. |
| 23.213 | do. | To(?) | 83 | 3,410 | 45.8 | 10- 1-53 | 1948 | — | N | N | Skelly Eunice Plant 2, well 2. |
| 23.231 | do. | To(?) | 84 | 3,410 | 43.0 | 10- 1-53 | 1948 | — | N | N | Skelly Eunice Plant, 2, well 3. Initial yield, 100 gpm. |
| 23.233 | do. | To(?) | 81 | 3,405 | 44.1 | 10- 1-53 | 1948 | — | N | N | Skelly Eunice Plant 2, well 4. Initial yield, 60 gpm. |
| 23.300 | Gulf Oil Corp. | To | 100 | 3,390 | 59 | 5-31-50 | 1948 | 10¾ | Te | In,D | Gulf Eunice Gasoline Plant, well 22. |
| 21.37.23.331 | — | To | — | 3,385 | 72.9 | 10- 1-53 | — | 8½ | N | N | — |
| 23.331a | Gulf Oil Corp. | To | 96 | 3,390 | 64 | 5-31-50 | — | 7 | Te | In,D | Gulf Eunice Plant, well 23. |
| 26.323 | do. | To | 101 | 3,365 | 64 | 12- 3-48 | — | — | Te | In,D | Gulf Eunice Plant, Cone well 1. |
| 26.400 | do. | Qal | 160 | 3,365 | 53 | 7-23-51 | — | 5⅞ | N | N | Gulf Eunice Plant, well 5. |
| 27.232 | do. | To | 99 | 3,400 | 62 | 1948 | 1948 | 7 | Te | In,D | Gulf Eunice Plant, well 14. Initial yield, 55 gpm. |
| 27.241 | do. | To | 180 | 3,385 | 60 | 1948 | — | 7 | N | N | Gulf Eunice Plant, well 4. |
| 30.414 | — | To | — | 3,480 | 101.6 | 1-11-54 | — | — | Lw | In | — |
| 32.121 | Skelly Oil Co. | To | 92M | 3,460 | 90.7 | 1-15-54 | — | 6½ | N | N | — |
| 33.110 | City of Eunice | To | 130 | 3,450 | — | — | — | 6 | N | N | Old public-supply well. WBZ 90-130 feet. Chemical analysis in table 8. |
| 21.37.33.111 | Magnolia Oil Co. | To | 110(?) | 3,450 | 103.8 | 12-10-53 | — | 6 | Ti | In,D | Water used for oil well flooding. Chemical analysis in table 8. |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21.37.33.210 | City of Eunice | Tr | 350 | 3,430 | — | 1944 | — | 6 | N | N | Old public-supply well. WBZ 320-350 feet. Chemical analysis in table 8. EY 10 gpm. |
| 33.211 | — | To | 103M | 3,430 | 99.6 | 11-12-53 | — | 10¾ | N | N | — |
| 33.233 | City of Eunice | To | 135 | 3,435 | 100 | 1944 | — | 8 | Te | P | City well 1. Perforated 100-130 feet. Chemical analysis in table 8. |
| 35.423 | Gulf Oil Corp. | Qal | 110 | 3,375 | 61 | 5-17-50 | — | 10¾ | Te | In,D | Gulf Eunice Plant, well 21. |
| 35.442 | do. | Qal | 87 | 3,360 | 59 | 11-14-51 | — | 7 | Te | In,D | Gulf Eunice Plant, well 17. WBZ sand and gravel, 65-74 feet. |
| 21.37.36.144 | P. Wallach | Qal | 66±M | 3,370 | 47.8 | 10- 9-53 | — | 6 | Lw | S | — |
| 36.344 | do. | Qal | — | 3,360 | 49.8 | 10- 9-53 | — | 8⅝ | Lw | S | — |
| 21.38.6.133 | Ray McNeil | Qal | 90+ | 3,550 | 79.4 | 12- 7-53 | — | 7 | N | N | — |
| 6.133a | do. | To | 90? | — | — | — | — | — | Lw | — | Chemical analysis in table 8. |
| 6.133b | do. | To | 108 | — | — | — | — | — | N | N | do. |
| 8.144 | Humble Oil Co. | — | 133 | 3,565 | Dry | — | — | — | — | — | Plugged and abandoned. |
| 22.33.13.200 | San Simon Ranch | Tr | 508 | 3,510 | — | — | — | — | Lw | S | WBZ 420-470 feet. |
| 22.34.12.111 | do. | Qal | 62 | 3,530 | 48 | — | 1951 | — | Lw | D,S | — |
| 12.114 | do. | Qal | 16M | 3,515 | 12.6 | 3-17-54 | — | — | Lw | S | Is an infiltration tunnel about 70 feet long and 5 feet in diameter feeding 2 windmills, 1 centrifugal pump and 1 siphon. |
| 22.36.1.333 | Gulf Oil Co. | To | 150 | 3,490 | 111.2 | 11-12-53 | — | — | Li | L | Chemical analysis in table 8. |
| 2.444 | — | — | — | — | — | — | — | — | Lw | S | Chemical analysis in table 8. |
| 8.443 | United Carbon Co. | Tr | 1,000± | 3,580 | 700 | — | — | 8 | Le | In,D | Three wells. EY 30 gpm each. Chemical analysis in table 8. |
| 11.224 | Texas-Pacific Coal and Oil Co. | To | 120+ | 3,500 | 113.8 | 11-12-53 | — | 8 | Lw | D | Chemical analysis in table 8. |
| 13.222 | Ohio Oil Co. | Tr(?) | — | 3,455 | Flowing | — | — | 7 | N | N | Capped and flowing. |
| 25.434 | R. L. Robinson | To | — | 3,430 | 118.5 | 11-23-53 | — | — | Li | S | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 22.36.35.314 | do. | To | 197 | 3,490 | 187.4 | 11-23-53 | — | — | Lw | S | — |
| 1.132 | G. Sims | Qal | — | 3,350 | 47.6 | 10-14-53 | — | — | N | N | Open, uncased hole. |
| 1.440 | do. | Qal | — | — | — | — | — | — | Lw | S | Chemical analysis in table 8. |
| 2.442 | Humble Oil Co. | Qal | 86M | 3,360 | 53.3 | 10- 9-53 | — | 7 | N | N | Initial yield, 68 gpm. |
| 3.133 | Sinclair Oil and Gas Co. | To | 120 | 3,425 | 90 | — | 1946 | — | Je | D | — |
| 3.134 | do. | — | 52M | 3,420 | Dry | 9-28-53 | — | — | N | N | — |
| 3.440 | Cities Service Oil Co. | To | — | 3,390 | 75.8 | 9-29-53 | — | 7½ | N | N | — |
| 4.211 | City of Eunice | To | 155 | 3,445 | 110 | 1953 | 1953 | 10 | Te | P | Well 12. Initial yield, 100 gpm; yield in 1953, 60 gpm. |
| 4.213 | do. | To | 155 | 3,440 | 114.8 | 3- 6-54 | 1952 | 10 | Te | P | Well 11. EY 60 gym. |
| 4.214a | Eunice Cemetery Assoc. | To | 115±M | 3,435 | 108.2 | 9-29-53 | — | 6½ | N | N | — |
| 22.37.4.233 | City of Eunice | To | 155 | 3,435 | 110 | 1951 | 1951 | 8 | Te | P | Well 9. |
| 4.421 | Sinclair Oil and Gas Co. | To | 114±M | 3,430 | 90.1 | 9-28-53 | — | 7⅝ | N | N | — |
| 4.424 | Skelly Oil Co. | To | 164 | — | <139 | — | 1950 | 8⅝ | Ti | In,D | Skelly Eunice Plant 1, well 13. Initial yield, 150 gpm; dropped to 20 gpm. |
| 8.441 | Shell Oil Co. | To | 168 | 3,400 | 60 | 1953 | 1936 | 6⅝ | Lw | D | — |
| 9.313a | Humble Oil Co. | To | 166M | 3,400 | 72.7 | 9-29-53 | 1944 | 9½ | N | N | Humble—J. L. Greenwood well 2. |
| 9.331 | do. | To | 160 | — | — | — | 1945 | 7⅝ | Te | D | Humble—J. L. Greenwood well 4. |
| 9.333 | do. | To | 172 | — | — | — | 1946 | 4 | Te | In | Humble—J. L. Greenwood well 5. Water used for oil well flooding. |
| 22.37.9.441 | Humble Oil Co. | To | 104±M | 3,410 | 85.5 | 9-29-53 | 1940 | 6⅝ | N | N | Humble—J. L. Greenwood well 1. |
| 10.213 | Gulf Oil Corp. | To | 220 | 3,400 | 100 | 1950 | — | — | Lw | D | Gulf-Brunson lease well. |
| 10.320 | Skelly Oil Co. | To | — | 3,395 | 81.0 | 9-29-53 | — | 11½ | N | N | — |
| 11.324 | — | Qal | 100M | 3,350 | 45.3 | 10-16-53 | 1952 | 5 | N | N | — |
| 11.444 | Leo Sims | Qal | — | 3,345 | 58.7 | 10-16-53 | — | 8⅝ | Lw | S | — |
| 12.114 | G. Sims | Qal | 84M | 3,340 | 53.9 | 10-14-53 | — | 7 | N | N | — |
| 12.443 | do. | Qal | 59M | 3,335 | 53.9 | 10-14-53 | — | 15 | N | N | — |
| 12.443a | do. | Qal | 59M | 3,335 | 53.3 | 10-14-53 | — | — | N | N | Uncased and open. |
| 15.333 | H. O. Sims | To | — | 3,380 | 81.0 | 9- -53 | — | 4¼ | Lw | D,S | — |
| 16.432 | Skelly Oil Co. | To | 135 | — | — | — | — | 7 | Ti | In,D | Skelly Eunice Plant 1, well 11. EY 40 gpm. |
| 16.443 | do. | To | 136 | 3,385 | 80.9 | 9-28-53 | 1947 | 8⅝ | Ti | In,D | Skelly Eunice Plant 1, well 10. |
| 22.37.21.221 | — | To(?) | — | 3,380 | 76.5 | 9- -53 | — | 6⅝ | N | N | — |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 22.37.21.421 | — | To(?) | — | 3,360 | 62.0 | 9- -53 | — | 4½ | N | N | — |
| 22.331 | Skelly Oil Co. | To(?) | 115± | 3,350 | 69.0 | 9-29-53 | 1949 | — | Ti | In,D | Skelly Eunice Plant 1, well 12. EY 40 gpm. |
| 23.233 | Leo Sims | Qal | 77M | 3,345 | 55.0 | 10-14-53 | — | 14 | N | N | Open and uncased. |
| 23.441 | O. I. Boyd | Qal | 70± | 3,335 | 55.3 | 10-12-53 | — | — | Lw | S | Dug. |
| 23.441a | do. | Qal | 70± | 3,335 | 55.2 | 10-12-53 | — | 7½ | N | N | — |
| 24.133a | G. Sims | Qal | 127M | 3,322 | 59.3 | 4-21-55 | — | 10 | Li | N | — |
| 24.133b | do. | Qal | 80 | — | — | — | — | — | Lw | N | Chemical analysis in table 8. |
| 25.313 | Marshal Drinkard | Qal | 69M | 3,300 | 50.1 | 10-14-53 | 1945 | 13½ | N | N | — |
| 27.334b | Skelly Oil Co. | Qal | 127M | 3,335 | 54.4 | 9- -53 | — | 8½ | N | N | Skelly Eunice Plant 1, well 9. |
| 27.410 | do. | To? | 182 | — | — | — | — | 7 | Te | In,D | EY 25 gpm. Perforations 150-170 feet. |
| 22.37.28.323 | Clower Drilling Co. | Qal | — | 3,353 | 66.1 | 9- -53 | — | 9¼ | N | N | — |
| 34.221 | Humble Oil Co. | Qal and Tr | 229 | 3,520 | — | — | 1938 | — | — | In | WBZ 58-61 feet, 138-146 feet, 185-192 feet. EY 22 gpm. |
| 36.141a | Tom Linebury | Qal | 40 | 3,300 | 32.2 | 10-12-54 | — | — | Lw | S | — |
| 36.141b | do. | Qal | 46 | 3,300 | 31.1 | 6- 3-55 | — | 6 | N | N | — |
| 22.38.18.234 | The Texas Co. | Tr | 386M | 3,360 | 180 | 10- -53 | 1953 | — | Li | In | WBZ gray sand, 325-380 feet. EY 20 gpm. |
| 19.222 | do. | Tr | — | 3,365 | 146.0 | 10-14-53 | — | 7 | N | N | — |
| 23.32.4.222 | C. H. and W. O. James | Tr | 550 | 3,630 | — | — | 1931 | 8 | Lw | S | EY 10 gpm. |
| 21.222 | Frank and Charles James | Tr | 550 | 3,700 | 500 | — | — | 8 | Li | S | — |
| 23.33.12.322 | San Simon Ranch | Tr | 400 | 3,685 | — | — | 1953 | — | Lw | S | WBZ 370-400 feet. |
| 23.33.28.334 | Brinninstool | Tr | 575 | 3,675 | 500 | — | — | — | Lw | D,S | EY 2.5 gpm. |
| 23.34.1.444 | San Simon Ranch | Qal | 144±M | 3,360 | 137.3 | 11-25-53 | — | 6 | N | N | — |
| 31.340 | Continental Oil Co. | Tr | 678 | 3,620 | — | — | 1953 | 8 | Li | In | EY 47 gpm. Chemical analysis in table 8. |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 23.35.27.444 | — | To | — | 3,480 | 117.2 | 3- -53 | — | 7 | N | N | — |
| 23.36.15.414 | J. E. Matkins | To(?) | 230 | 3,390 | 148.4 | 12- 4-53 | — | 6 | Lw | D,S | — |
| 16.343 | do. | Tr | 1,100 | 3,465 | 150 | 1952 | — | — | Lw | S | — |
| 22.434 | Texas Pacific Coal and Oil Co. | To | 210±M | 3,395 | 188.6 | 12- 1-53 | — | 8½ | N | N | — |
| 23.111 | do. | To | — | 3,370 | 143.6 | 12- 4-53 | — | 8 | Li | In | — |
| 31.233 | J. Combass | To | — | — | — | — | — | — | Lw | S | Chemical analysis in table 8. |
| 23.36.35.211 | J. Combass | To | 170 | 3,330 | 123.0 | 3- -53 | — | 6½ | N | N | — |
| 36.341 | EPNG | To | 250 | 3,330 | 124 | — | — | 10¾ | Ti | In,D | Jal Plant 4, well 8. |
| 36.342 | EPNG | To | 261 | 3,330 | 120 | — | 1952 | — | Ti | In,D | Jal Plant 4, well 7. |
| 23.37.2.133 | — | To | — | 3,304 | 62.8 | 10-16-53 | — | — | N | N | — |
| 2.422 | — | Qal | — | 3,295 | 64.1 | 6- 3-55 | — | 6 | Lw | S | — |
| 3.421 | H. O. Sims | To | 80 | 3,295 | 64.1 | 10-16-53 | — | — | Lw | D,S | — |
| 4.114 | — | To | 84—M | 3,341 | 81.8 | 12- 3-53 | — | 5½ | N | N | — |
| 4.211 | Skelly Oil Co. | Tr(?) | 226 | 3,340 | — | — | 1947 | 10¾ | Le | D | H. O. Sims Camp well 1. EY 10 gpm. |
| 6.144 | — | To | — | 3,375 | 102.9 | 12- 3-53 | — | 6½ | Lw | S | — |
| 20.333 | Bert Steeler | Qal(?) | 177 | 3,300 | 117 | — | 1939 | — | Lw | D,S | — |
| 25.132 | M. L. Goins | To(?) | — | 3,215 | 28.3 | 10-15-53 | — | 7 | Lw | S | — |
| 27.441 | — | Qal | — | 3,270 | 78.3 | 3- 4-53 | — | 5½ | Lw | S | — |
| 23.37.31.442 | EPNG | To(?) | 173 | 3,300 | 118 | 1952 | 1952 | 12½ | Te | In,D | Jal Plant 4, well 4. |
| 32.122 | — | To(?) | — | 3,300 | 99.0 | 7-23-54 | — | 6 | Lw | S | — |
| 32.331 | EPNG | To(?) | 173 | 3,310 | — | — | — | 20 | Te | In,D | Jal Plant 4, well 1. WBZ 115-171 feet. EY 40 gpm. |
| 33.122 | — | To(?) | 120M | 3,310 | 91.2 | 3- 4-53 | — | 9 | N | N | — |
| 23.38.5.233 | Humble Oil Co. | Tr | 400M | 3,385 | 189.8 | 10-15-53 | 1943 | 7½ | N | N | W. F. Scarbrough well 1. EY 14 gpm. |
| 8.214 | Tom Linebury | Tr | — | 3,372 | 198.3 | 10-15-53 | — | 6½ | Lw | D,S | — |
| 24.32.3.322 | Frank James | Tr | 550 | 3,650 | — | — | — | 10 | Lw | D,S | — |
| 10.344 | do. | Qal | 60 | 3,588 | 31.1 | 6- 3-55 | 1910 | 6 | Lw | S | Located in sink. |
| 33.422 | Richard Ritz | Tr | 367M | 3,510 | 313.4 | 2-18-58 | — | 12 | Lw | S | EY 0.25 gpm. |
| 24.33.10.113 | Carl Johnson | Qal | 36±M | 3,595 | 24.6 | 11-27-53 | — | 6½ | Lw | S | — |
| 24.33.23.311 | — | Tr | 232M | 3,565 | 208.6 | 11-27-53 | — | 9½ | N | N | — |
| 24.444 | — | Qal | — | 3,530 | 16.9 | 11-27-53 | — | 5½ | Lw | S | — |
| 33.231 | Carl Johnson | Qal | — | 3,460 | 93.2 | 3-17-54 | — | 6 | Lw | D,S | — |
| 24.34.4.111 | — | To | — | 3,570 | 51.3 | 6- 3-55 | — | — | Lw | S | — |
| 5.444 | — | To | 78(?) | 3,590 | 66.6 | 4-21-55 | — | — | Lw | N | — |
| 10.112 | Madera Ranch | To | 83M | 3,525 | 71.8 | 4-27-53 | — | 6 | N | N | — |
| 10.422 | do. | To | 94M | 3,315 | 63.2 | 4-27-53 | — | 7½ | N | N | — |

TABLE 6. RECORDS OF WELLS IN SOUTHERN LEA COUNTY, N. MEX. (continued)

| Location No. | Owner | Aquifer | Depth of well (feet) | Altitude of well (feet) | Water level: Depth below land surface (feet) | Water level: Date measured | Year completed | Surface diameter of wells | Method of lift | Use of water | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 24.34.35.122 | do. | Tr | 258M | 3,410 | 223.9 | 3-29-53 | — | 6 | Lw | S | — |
| 24.35.30.341 | do. | Tr | 150±M | 3,320 | 139.6 | 11-27-53 | — | 6 | Lw | S | — |
| 24.36.3.111 | — | To | — | 3,400 | 181.1 | 3-12-53 | — | 7½ | N | N | — |
| 3.333 | Charles Whitten | To(?) | 190±M | 3,390 | 181.1 | 3-12-53 | — | 11½ | N | N | — |
| 9.133 | do. | To | 230 | 3,395 | 195.0 | 3- 6-53 | 1948 | 7 | N | N | — |
| 13.314 | Humble Oil Co. | To | 160 | — | — | — | 1941 | — | — | — | WBZ sand, 138-158 feet. EY 10 gpm. |
| 24.36.15.222 | Canmex Oil Co. | To | 200 | 3,370 | 181.3 | 3-12-53 | 1937 | 7 | Lw | D | — |
| 22.220 | Continental Oil Co. | Tr | 692 | 3,340 | — | — | — | 8¼ | Li | D | A. H. Meyers "A" well 1. Intake set at about 475 feet. Maximum yield 6 gpm. |
| 23.222 | — | To | — | 3,345 | 147.9 | 3- 6-53 | — | 6¼ | Lw | I | Measurement made inside pipe column. |
| 27.221 | J. R. Wilson | To | — | 3,320 | 122.9 | 3- 6-53 | — | 10 | N | N | — |
| 24.37.5.111 | EPNG | To | 173 | 3,275 | 111 | 9- 8-52 | 1952 | 10¾ | Te | In,D | Jal Plant 4, well 6. |
| 7.431 | Fowler Hair | To | 132M | 3,300 | 119.9 | 3- 6-53 | — | 6¼ | N | N | — |
| 10.123 | Trinity Production Co. | Tr | 747 | 3,260 | 120 | 2- -53 | 1953 | — | Li | In | EY 42 gpm. Chemical analysis in table 8. |
| 14.211 | Fowler Hair | To(?) | 72M | 3,205 | 64.5 | 3- 3-53 | — | 5 | N | N | — |
| 24.37.16.342 | — | To | 106M | 3,235 | 67.7 | 3-11-53 | — | 9 | N | N | — |
| 16.423 | Humble Oil Co. | To | 150 | 3,240 | — | — | 1951 | 6⅝ | Te | D | Fowler-Ellenburger Camp well 1. WBZ 90-150 feet. |
| 17.422 | Fowler Hair | To | 92M | 3,260 | 86.5 | 3- 4-53 | — | 7½ | N | N | — |
| 19.234 | — | To | 124M | 3,290 | 117.4 | 3- 5-53 | — | 10 | Lw | S | — |
| 21.444 | Dollarhide Water Co. | To | 74M | 3,210 | 69.6 | 3- 2-53 | — | 7½ | N | N | — |
| 25.322 | Fowler Hair | To | — | 3,136 | 76.1 | 3- 3-53 | — | 6½ | Lw | D,S | — |
| 34.320 | Plains Production Co. | To | 75±M | 3,160 | 56.8 | 3- 2-53 | — | 12 | N | N | — |
| 25.33.20.443 | — | Tr | — | 3,395 | 200-250 | 8-18-58 | — | 6 | Lw | D,S | — |
| 31.244 | Nick Ritz | Tr | 320 | 3,400 | 257.5 | 7-26-54 | — | 8 | Lw | S | — |
| 25.34.1.132 | Madera Ranch | Tr | 300+ | 3,385 | 231.0 | 4-15-53 | — | 6 | N | N | — |

PERMIAN BRINE SALES, INC.

JAL BRINE STATION

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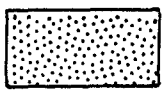
# GEOLOGIC & HYDROLOGIC FIGURES

## EXPLANATION



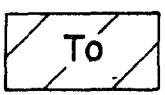
Sand

*Thin cover of drift sand in most places; locally dunes 20-40 feet high*

Qal

Alluvium

*Sand and gravel along dry washes; silt and sand in lake beds; includes some wind-deposited sand around depressions*




Ogallala formation

*Chiefly sand, poorly to well-cemented with calcium carbonate; contains some clay, silt, and gravel; capped in most places by caliche*

Pleistocene and Recent

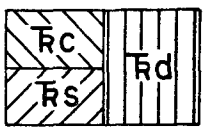
Pliocene

QUATERNARY

TERTIARY

Cretaceous rocks, undifferentiated

*Slumped blocks of buff, tan, or white fossiliferous limestone*




Dockum group

TRc-*Chinle formation, red and green claystone, minor siltstone, and fine-grained sandstone;* TRs-*Santa Rosa sandstone, red to white poorly sorted, coarse-grained, crossbedded sandstone;* TRd-*rocks of the Dockum group, undifferentiated*

Upper Triassic

—— 3500 ——

Contours on the red-bed surface

*Dashed where approximate or inferred. Contour interval 50 feet. Datum mean sea level*

CRETACEOUS

TRIASSIC

FIG. 1 EXPLA.

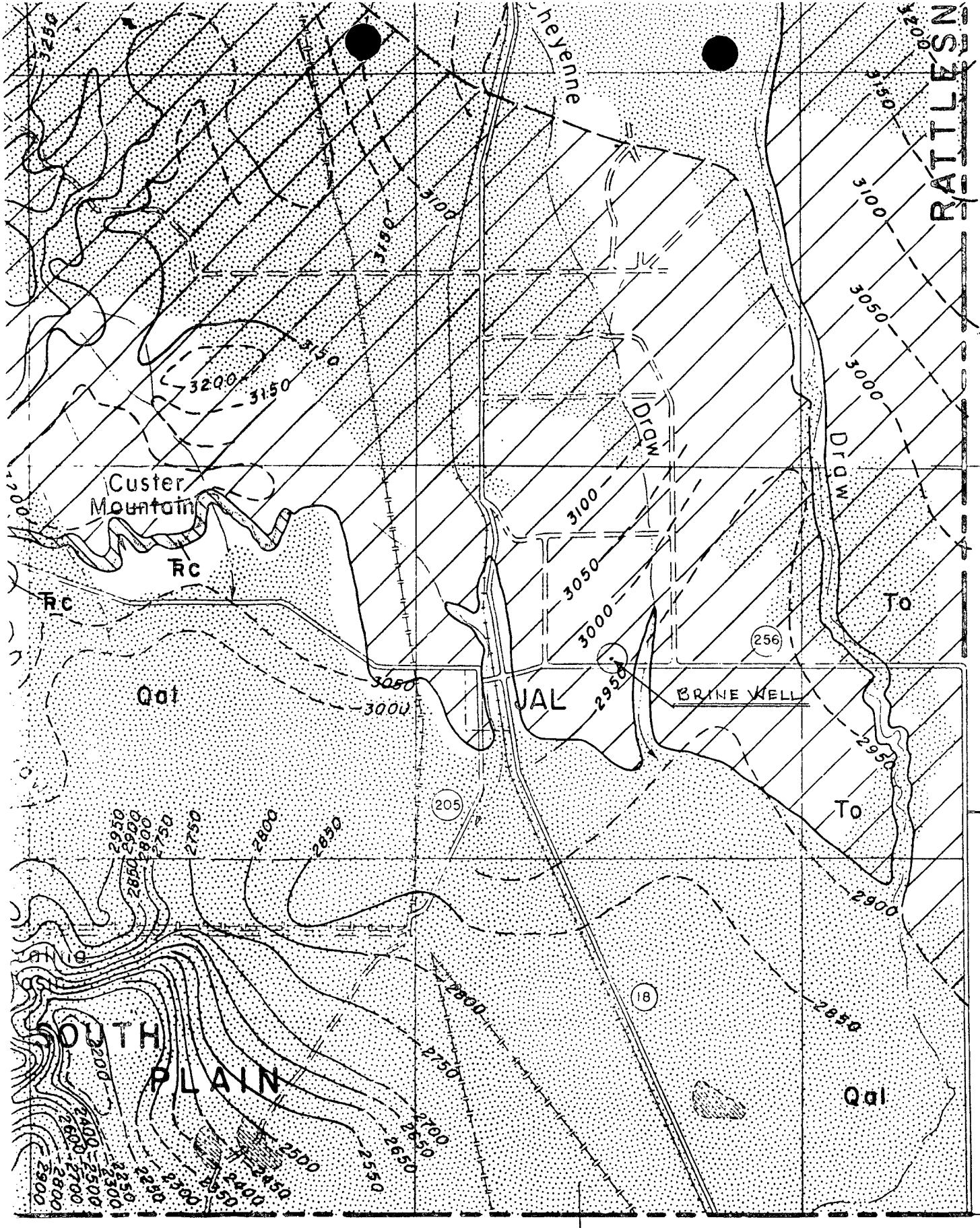



FIG. 1

WINKLER COUNTY

SCALE 1" = 2 MILES

Geology by Alexander Nicholson, Jr., 1953
Contours on buried red-bed surface
compiled by Alexander Nicholson, Jr.,
Alfred Clebsch, Jr., and S. R. Ash from

# EXPLANATION

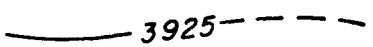
$\frac{150}{252}$ ○

Water well

*Upper figure is depth to water; lower figure is depth of well. Open circles are wells finished in Tertiary or Quaternary rocks; solid circles are wells finished in Triassic rocks*

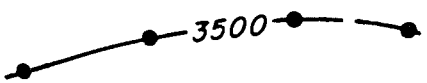
F = Flowing
R = Reported
P = Water level measured while pumping
D = Dry
? = Uncertainty as to aquifer
> = More than
< = Less than

(See tables 6 and 7 for detailed well data.)



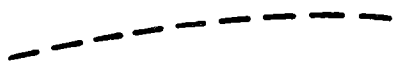

Water-table contour in Tertiary or Quaternary rocks

*Dashed where inferred or uncertain. Contour interval 25 feet. Datum mean sea level*




Water-table or piezometric contour on water body in Triassic aquifers

*Dashed where inferred or uncertain. Contour interval 100 feet. Datum mean sea level*



Approximate position of boundary between Triassic rocks and saturated Tertiary and Quaternary rocks

FIG. 2
EXPLA.

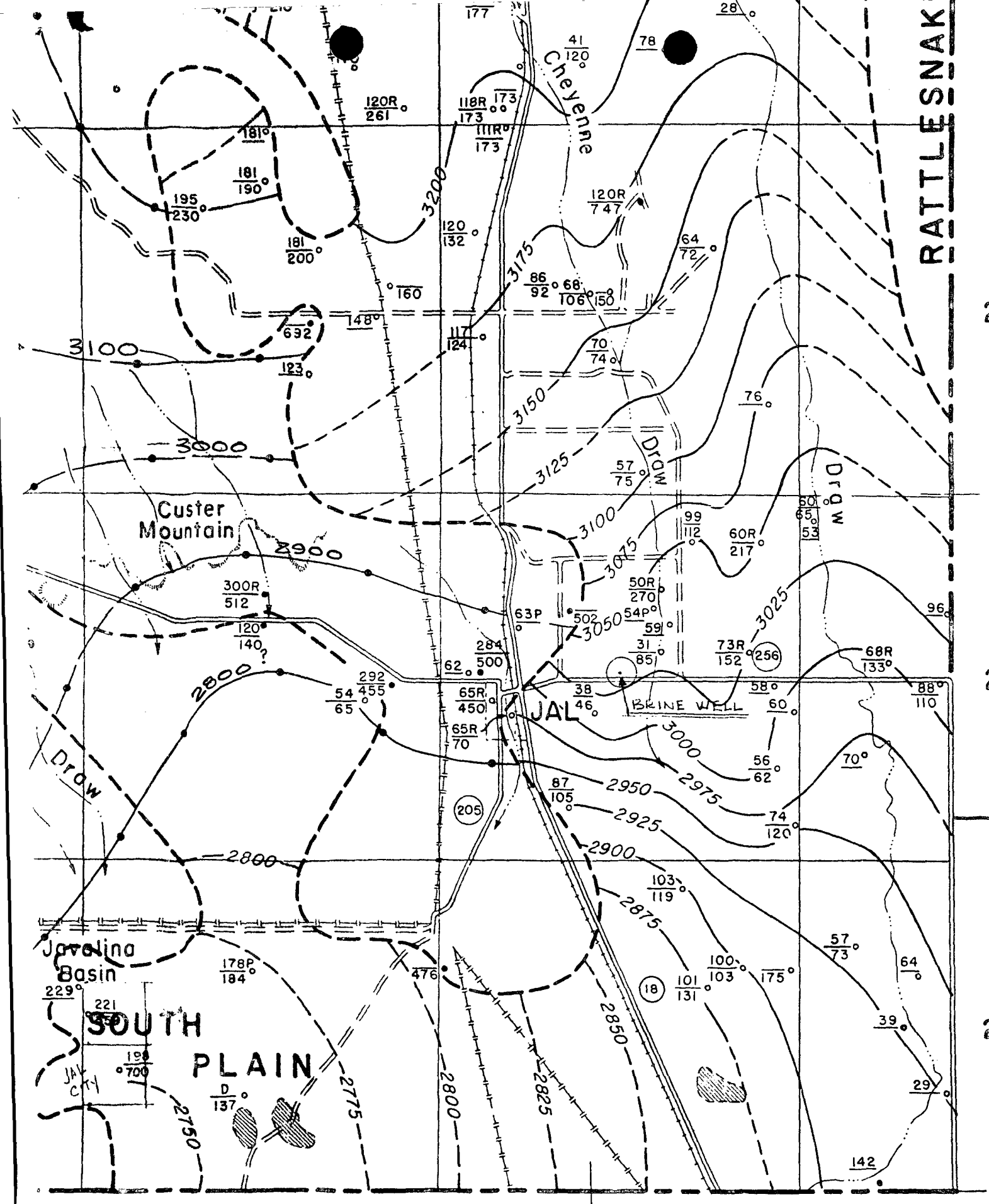

RATTLESNAK
Cheyenne
Custer Mountain
Draw
Draw
Draw
JAL
BRINE WELL
Javelina Basin
SOUTH PLAIN
JAL CITY
3200
3175
3150
3125
3100
3075
3050
3025
3000
2975
2950
2925
2900
2875
2850
2825
2800
2775
2750
T. 24 S.
T. 25 S.
T. 26 S.
R. 36 E.
R. 37 E.
R. 38 E.
SCALE 1" = 2 MILES
103°10'
WINKLER COUNTY

FIG. 2

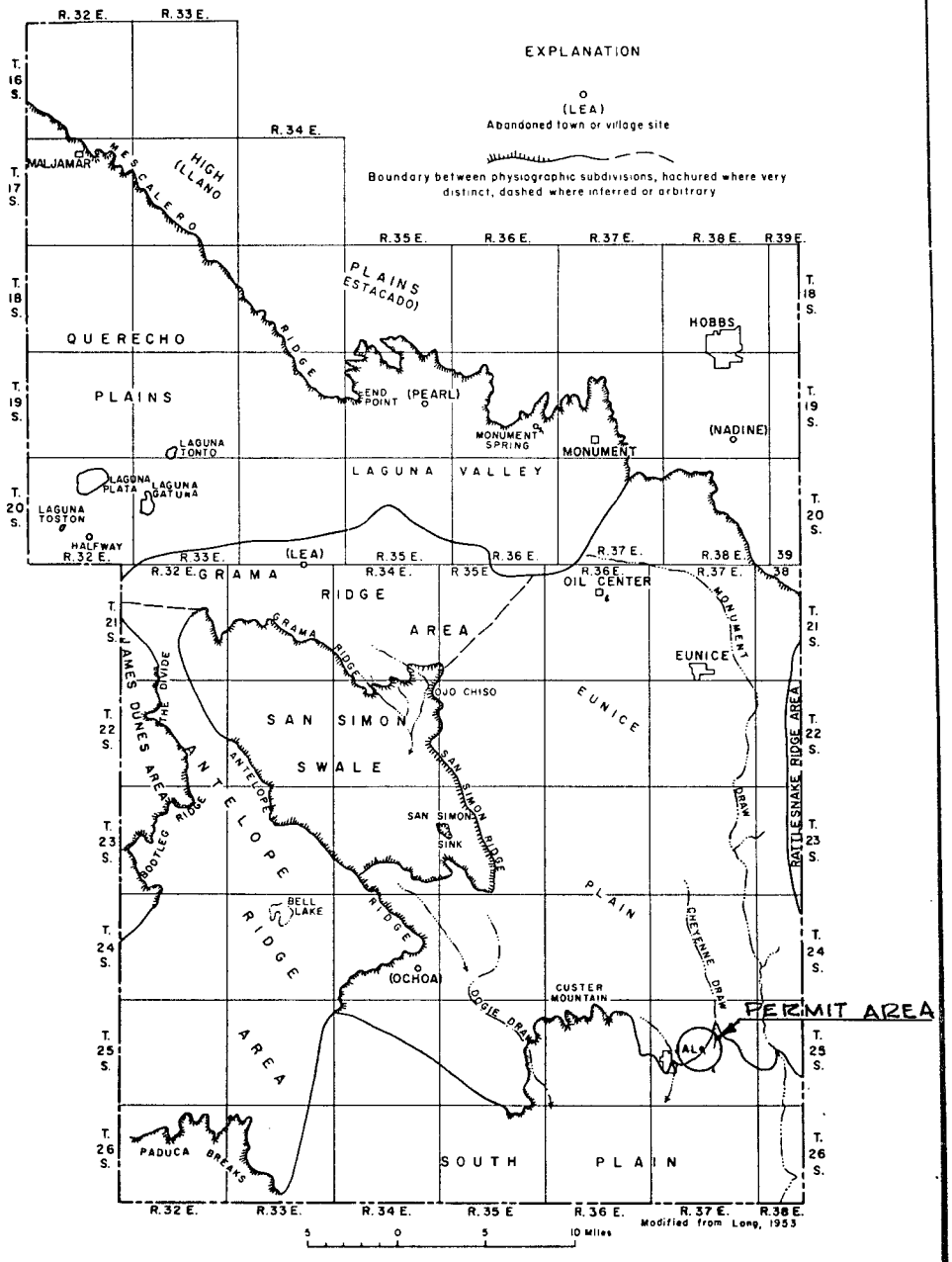



Figure 3

PHYSIOGRAPHIC SUBDIVISIONS OF SOUTHERN LEA COUNTY, N. MEX.

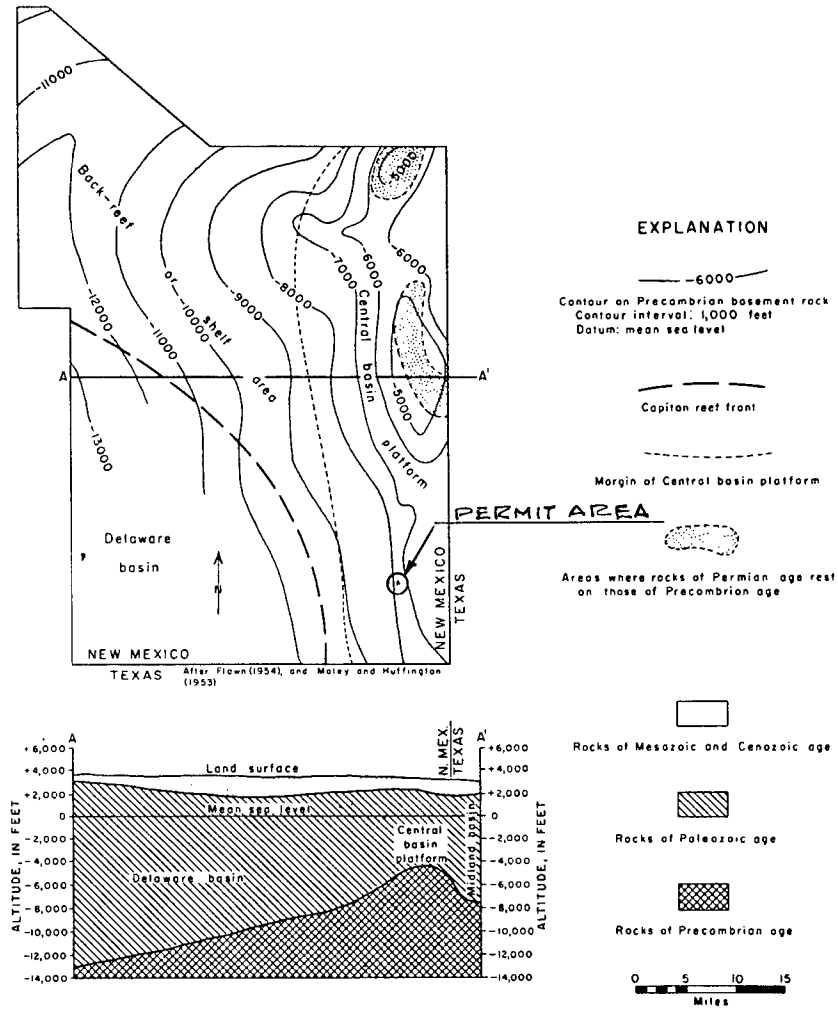



Figure 13

STRUCTURE MAP AND CROSS SECTION OF THE DELAWARE BASIN AND CENTRAL BASIN PLATFORM, LEA COUNTY, N. MEX.

PERMIAN BRINE SALES, INC.

JAL BRINE STATION

---

WELL PLUGGING AND ABANDONMENT
REPORTS

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

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# OIL CONSERVATION DIVISION

P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Form C-103
Revised 10-1-78

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: M14474

## 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.)

OIL WELL [ ] GAS WELL [ ] OTHER- brine

7. Unit Agreement Name:

1. Name of Operator: PERMIAN BRINE SALES, INC.

8. Farm or Lease Name: Arnott Ramsey

2. Address of Operator: Rt. 3 Box 3033 Odessa, Texas 79763

9. Well No.: 2

4. Location of Well: UNIT LETTER P, 165 FEET FROM THE South LINE AND 165 FEET FROM THE East LINE, SECTION 16 TOWNSHIP 25S RANGE 37E NMPM.

10. Field and Pool, or Wildcat: None

15. Elevation (Show whether DF, RT, GR, etc.): 3150 GR

12. County: Lea

16. 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 [X] | REMEDIAL WORK [ ] | ALTERING CASING [ ] |
| TEMPORARILY ABANDON [ ] | | COMMENCE DRILLING OPNS. [ ] | PLUG AND ABANDONMENT [ ] |
| PULL OR ALTER CASING [ ] | CHANGE PLANS [ ] | CASING TEST AND CEMENT JOB [ ] | |
| OTHER [ ] | | OTHER [ ] | |

17. 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.

The well was never converted to a fresh water well. It is now proposed to plug the well by setting a cast iron bridge plug, testing the casing to 200 PSIG, and then filling the casing with cement.

CIBP - 1140 (WELL DATA)
Converted to Surface by UNIVERSAL (KERMIT)

TONY & EDDIE SAW WORK

THE [illegible] MUST BE NOTIFIED 24 [illegible] OR TO THE BEGINNING OF [illegible] WORK ON THE C-103

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

SIGNED W. L. Anderson TITLE President DATE 5/11/83

ORIGINAL SIGNED BY JERRY SEXTON
DISTRICT I SUPERVISOR

APPROVED BY _____ TITLE _____ DATE MAY 19 1983

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ENERGY AND MINERALS DEPARTMENT

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# OIL CONSERVATION DIVISION

P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Form C-103
Revised 10-1-78

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: M 14474

## 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.)

7. Unit Agreement Name:

OIL WELL [ ] GAS WELL [ ] OTHER- BRINE WELL

1. Name of Operator: PERMIAN BRINE SALES, INC.

8. Farm or Lease Name: ARNOTT RAMSEY

2. Address of Operator: RT. 3 BOX 3033 ODESSA, TEXAS 79763

9. Well No.: 3

4. Location of Well: UNIT LETTER P, 220 FEET FROM THE SOUTH LINE AND 465 FEET FROM THE EAST LINE, SECTION 16 TOWNSHIP 25 S RANGE 37 E NMPM.

10. Field and Pool, or Wildcat: NONE

15. Elevation (Show whether DF, RT, GR, etc.): 3150 GL

12. County: LEA

16. 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 | [X] | REMEDIAL WORK | [ ] | ALTERING CASING | [ ] |
| TEMPORARILY ABANDON | [ ] | | | COMMENCE DRILLING OPNS. | [ ] | PLUG AND ABANDONMENT | [ ] |
| PULL OR ALTER CASING | [ ] | CHANGE PLANS | [ ] | CASING TEST AND CEMENT JOB | [ ] | | |
| OTHER | [ ] | | | OTHER | [ ] | | |

17. 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.

SET CIBP AT 1145 FEET, CIRCULATED CEMENT TO SURFACE INSIDE CASING. LAID DOWN TUBING. FILLED CASING BACK UP WITH CEMENT. WELDED PLATE AND MARKER ON CASING.

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

SIGNED O. L. Anderson TITLE PRESIDENT DATE AUGUST 30, 1983

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

PERMIAN BRINE SALES, INC.

JAL BRINE STATION

---

# WATER ANALYSES

Robert.

# WATER ANALYSIS REPORT

NL

NL Testing Chemicals/Petrolite Corp.
P.O. Box 4428, Houston, Texas 77210

Permian Brine
COMPANY

PHONE NUMBER

DATE 4-24-84

FIELD

COUNTY OR PARISH

STATE New Mexico

LEASE OR UNIT Jal

WELL(S) NAME OR NO. 1# MONITOR WELL

WATER SOURCE (FORMATION)

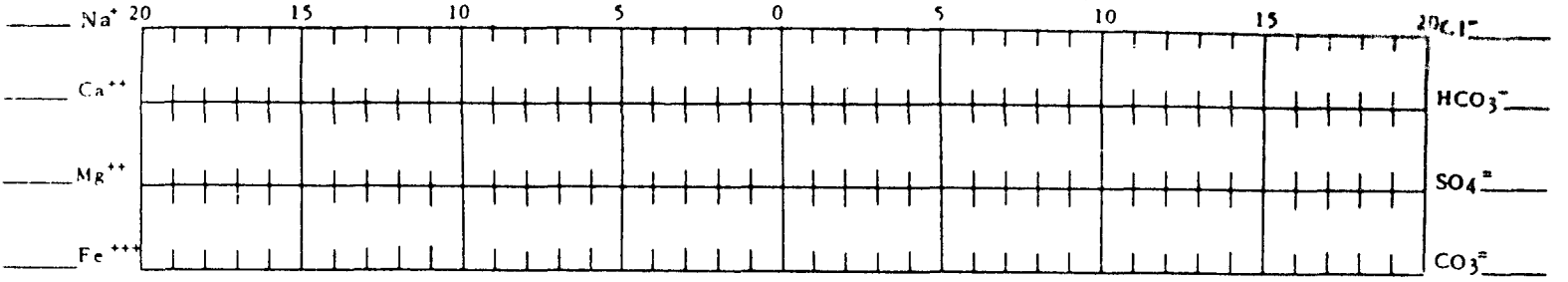
| DEPTH, FT. | BHT, F | SAMPLE SOURCE | TEMP, F | WATER, BBL/DAY | OIL, BBL/DAY | GAS, MCF/DAY |
|---|---|---|---|---|---|---|
| | | | | | | |

DATE SAMPLED

TYPE OF WATER
☐ PRODUCED ☐ SUPPLY ☐ WATERFLOOD ☐ SALT WATER DISPOSA

## WATER ANALYSIS PATTERN

(NUMBER BESIDE ION SYMBOL INDICATES me/l* SCALE UNIT)




## DISSOLVED SOLIDS

| CATIONS | me/l* | mg/l* |
|---|---|---|
| Total Hardness | 7.2 | |
| Calcium, Ca++ | .2 | 4.0 |
| Magnesium, Mg++ | 1.0 | 12.2 |
| Iron (Total) Fe+++ | | |
| Barium, Ba++ | | |
| Sodium, Na+ (calc.) | 21 | 483.0 |
| | | |

| ANIONS | | |
|---|---|---|
| Chloride, Cl- | 11.3 | 400.0 |
| Sulfate, SO4 | 4.4 | 212.5 |
| Carbonate, CO3 | | |
| Bicarbonate, HCO3 | 6.5 | 396.5 |
| Hydroxyl, OH | | |
| Sulfide, S- | 21 | |

## DISSOLVED GASES

| | |
|---|---|
| Hydrogen Sulfide, $H_2S$ | _____ mg/l* |
| Carbon Dioxide, $CO_2$ | _____ mg/l* |
| Oxygen, $O_2$ | _____ mg/l* |

## PHYSICAL PROPERTIES

| | |
|---|---|
| pH | 7.8 |
| Eh (Redox Potential) | _____ MV |
| Specific Gravity | |
| Turbidity, JTU Units | |
| Total Dissolved Solids (calc.) | 1025 mg/l* |
| Stability Index @____F | |
| @____F | |
| $CaSO_4$ Solubility @____F | _____ mg/l* |
| @____F | _____ mg/l* |
| Max. $CaSO_4$ Possible (calc.) | _____ mg/l* |
| Max. $BaSO_4$ Possible (calc.) | _____ mg/l* |
| Residual Hydrocarbons | _____ ppm(Vol/Vo |

CONDUCTANCE 11,000 MMHOS

## SUSPENDED SOLIDS (QUALITATIVE)

Iron Sulfide ☐ Iron Oxide ☐ Calcium Carbonate ☐ Acid Insoluble ☐

*NOTE: me/l and mg/l are commonly used interchangeably for epm and ppm respectively. Where epm and ppm are used, corrections should be made for specific gravity.

*REMARKS AND RECOMMENDATIONS:*

change bal OK

received
4-30-84

| BTC ENGINEER | DIST. NO. | ADDRESS | OFFICE PHONE | HOME PHONE |
|---|---|---|---|---|
| | | | | |

ANALYZED (Perry) DATE 4/30/84 DISTRIBUTION ☐ CUSTOMER ☐ AREA OR ☐ DISTRICT OFFICE ☐ BTC ENGINEER ☐ FILE ☐ BTC SALES SUPERVISOR

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

Joseph Goldberg
SECRETARY
Ted Guambana
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

April 17, 1984

"Mac" McCutchin, Geologist
Permian Brine Sales, Inc.
P.O. Box 1591
Odessa, TX 79760

Dear Mr. McCutchin:

I am sending you the draft of an outline that I have put together to help guide the preparation of discharge plans for brine wells. Please note that this outline is subject to change - in fact, after our telephone conversation last week I altered the language of Section III.C.2 to clarify the matter of "area of review." Also, note that this outline is only intended as a guide: you need not prepare a discharge plan according to this format. The codes in bold type throughout the outline refer to Sections in the Water Quality Control Commission Regulations that apply to brine wells: these regulations are your ultimate guide as to what to include in the discharge plan application.

Sincerely,

Paige Grant

Paige Grant
Water Resource Specialist
Ground Water Section

PG:egr

Enclosure

msz

# PERMIAN BRINE SALES, INC.

**24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN**

RTE. 3, BOX 3033 ODESSA, TEXAS 79763 PHONE 332-0531


March 30, 1984


RECEIVED

APR 05 1984

GROUND WATER/HAZARDOUS WASTE BUREAU


Paige Grant
Environmental Improvement Division
Box 968
Sante Fe, New Mexico 87504-0968

RE: In response to your letter of February 20, 1984.

Dear Mr. Grant:

Thank you for your letter advising us of our permit status. We will work with your department in every way to assure a smooth transfer of permit responsibility. We are already preparing our section 5 application.

In response to your next to final paragraph, the Arnott-Ramsay #2 and #3 wells were plugged in July of 1983. Cast iron bridge plugs were set (1,140' in #2 and 1,145' in #3), the casings were tested to 200 P.S.I., and the entire well bores were filled with cement. Tony Plattsmier of the N.M.O.C.C. witnessed most of the procedures.

If you have any question, please call me at 915-332-0531.

Sincerely,

PERMIAN BRINE SALES, INC.

R.D. Hickerson
Operations Manager

RDH/rdt

STATE OF NEW MEXICO
# ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

TONEY ANAYA
GOVERNOR

March 13, 1984

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88240
(505) 393-6161

Permian Brine Sales
Route 3, Box 3033
Odessa, Texas 79763

SUBJECT: Final Inspection Plugged Brine Wells
Arnott Ramsey #2-P 16-25-37
Arnott Ramsey #3-P 16-25-37

Gentlemen:

In response to your notice that the above-listed brine wells were ready for final inspection, our Field Inspector checked the surface location on March 9, 1984. It was observed that you did not have the regulation dry-hole marker installed. This should be corrected.

The regulation of brine wells has been transferred from the Oil Conservation Division to the EID. When the above has been corrected you should notify Mr. Dave Boyer with the EID in Santa Fe at: P.O. Box 968, Santa Fe, NM 87504 (Phone 505-984-0020)

Very truly yours,

OIL CONSERVATION DIVISION

Jerry Sexton
Supervisor, District I

ed

cc: File
Mr. Dave Boyer

RECEIVED
MAR 14 1984
GROUND WATER/HAZARDOUS WASTE
BUREAU

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO

ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020
STEVEN ASHER, Director

TONEY ANAYA
GOVERNOR

ROBERT McNEILL
SECRETARY

ROBERT L. LOVATO, M.A.P.A.
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

P 506 253 751

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

*(See Reverse)*

| | |
|---|---|
| Sent to A L Hickerson | |
| Street and No. P.O. Box 1591 | |
| P.O., State and ZIP Code Odessa, TX 79760 | |
| Postage | $ |

February 20, 1984

Mr. A.L. Hickerson, President
Permian Brine Sales, Inc.
P.O. Box 1591
Odessa, TX 79760

Dear Mr. Hickerson:

For your information, the responsibility for regulating brine extraction wells in the state of New Mexico was transfered in September, 1983 from the Oil Conservation Division (OCD) of the Energy and Minerals Department, to the Environmental Improvement Division (EID) of the Health and Environment Department.

The transfer will probably have no effect on your operation until 1986, when, if you plan to continue producing brine at your facility, you will need to start the process of applying for renewed approval of your discharge plan. Your present approval expires December 18, 1987, five years after the date the plan was approved.

At that time, you will need to prepare a discharge plan which includes the elements required under Section 5 as well as Section 3 of the Water Quality Control Commission (WQCC) Regulations (copy enclosed). Prior to December 20, 1982, a discharge plan consisted of only those elements listed in Section 3. Section 5 was added to the regulations in order to comply with federal Environmental Protection Agency (EPA) regulations to protect drinking water from pollution that might occur due to injection of fluids underground. The preparation of a Part 5 UIC application will require you to provide considerably more technical information than was needed for Part 3 discharge plan approval. It is for this reason that we recommend you begin to prepare your discharge plan renewal about eighteen months before the date that you current permit lapses. This should allow ample time for preparation, review, correction and final submittal of your new plan.

In the meantime, you are required to operate your facility in compliance with the standards of Section 3 of the WQCC Regulations. As time permits, we will

undertake a review of your present discharge plan and your field operation, to assure that it meets those standards.

I do have one question regarding your wells Arnott-Ramsay #2 and #3, both in T25S, R37E, Section 16, SW¼SW¼SW¼. These are listed in the 1982 report by Lee Wilson and Associates, UIC Evaluation of Salt Extraction Wells in New Mexico (prepared for OCD), as abandoned wells. Please describe the procedures used to plug these wells prior to abandonment.

If you have any questions or require further information, please contact me at the above address and telephone number (ext. 285).

Sincerely,

Paige Grant

Paige Grant
Hydrologist
Ground Water Section

PG:egr

Enclosure

cc: John Guinn, EID District IV, Manager
EID Field Office, Hobbs
Joe Ramey, Director, OCD

DTB

NOTICE OF PUBLICATION

STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION

SANTA FE, NEW MEXICO

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission Regulations, the following proposed discharge plan has been submitted for approval to the Director of the Oil Conservation Division, P. O. Box 2088, State Land Office Building, Santa Fe, New Mexico 87501, telephone (505) 827-3260.

PERMIAN BRINE SALES, INC., P. O. Box 1591, Odessa, Texas 79760, telephone (915) 332-0531, Al Hickerson requests approval of their discharge plan for their brine in situ extraction wells and facilities located in: Section 16, Township 25 South, Range 37 East, Lea County; Section 17, Township 22 South, Range 27 East, Eddy County; and Section 24, Township 18 South, Range 28 East, NMPM, Eddy County, New Mexico. Permian Brines Sales, Inc. injects water down their injection well to an underlying salt formation thereby dissolving the salt, forming a brine water solution with a total dissolved solids content of approximately 300,000 mg/L. Permian Brine Sales, Inc. extracts and sells the brine water solution to various companies for use in oil and gas production.

Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. Prior to ruling on any proposed discharge plan or its modification, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and a public hearing may be requested by any interested person. Requests for a public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the Director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN Under the Seal of the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 12th day of November, 1982.

STATE OF NEW MEXICO

OIL CONSERVATION DIVISION

JOE D. RAMEY

Director

S E A L

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

December 18, 1982

Permian Brine Sales, Inc.
P. O. Box 1591
Odessa, Texas 79760

Re: GWB-6 Discharge Plan

Gentlemen:

The Discharge Plan submitted for the brine production facility and in site extraction well located in Section 16, Township 25 South, Range 37 East, NMPM, Eddy County, New Mexico, is hereby approved.

The discharge plan was submitted pursuant to section 3-106 of the Water Quality Control Commission regulations. It is approved pursuant to section 109. Please note subsections 3-109.E and 3-109.F which provide for possible future amendment of the plan. Please also be advised that the approval of this plan does not relieve you of liability should your operation result in actual pollution of surface or ground waters which may be actionable under other laws and/or regulations.

Yours very truly,

JOE D. RAMEY
Director

JDR/jc

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

P. O. BOX 1591

ODESSA, TEXAS
79760

PHONE 332-0531



RECEIVED
JAN - 7 1983
OIL CONSERVATION DIVISION
SANTA FE


January 3, 1983

State of New Mexico
Energy and Minerals Department
Oil Conservation Division
Box 2088
Santa Fe, New Mexico 87501

Attn: Joe D. Ramey. Division Director

Te: GWB-6 Discharge Plan

Dear Mr. Ramey:

This will acknowledge your letter of December 18, 1982, which was in response to our application for a discharge plan for in SITU brine extraction well at our Jal, New Mexico station. Copies of this correspondence is attached. As indicated by red underlining, we wish to correct the location of this station, in contrast to that which your letter refers: namely,

Section 16, Township 25 South, Range 37 East,
Lea County, New Mexico

Should you feel that additional information is required, please do not hesitate to contact me.

Very truly yours,
PERMIAN BRINE SALES, INC.

A.L. HICKERSON
PRESIDENT

ALH/lah
Attached

STATE OF NEW MEXICO
# ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

RECEIVED
JAN - 7 1983
OIL CONSERVATION DIVISION
SANTA FE

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

December 18, 1982

Permian Brine Sales, Inc.
P. O. Box 1591
Odessa, Texas 79760

Re: GWB-6 Discharge Plan

Gentlemen:

The Discharge Plan submitted for the brine production facility and ~~in site extraction well located~~ in Section 16, Township 25 South, Range 27 East, NMPM, Eddy County, New Mexico, is hereby approved.

Corr 37 EAST LEA "

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Yours very truly,

JOE D. RAMEY
Director

JDR/jc

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

P. O. BOX 1591 ODESSA, TEXAS 79760 PHONE 332-0531



RECEIVED
JAN - 7 1983
OIL CONSERVATION DIVISION
SANTA FE


November 8, 1982

State of New Mexico
Energy and Minerals Department
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

Attention: Mr. Joe D. Ramey
Division Director

Dear Sir:

Pursuant to your letter of September 9, 1982, and to subsequent telephone conversations with Mr. Oscar Simpson, attached hereto is a filing of a discharge plan for an in situ extraction well for brine. This filing is for the well located in:

Section 16, Township 25 South,
Range 37 East in Lea County.

If additional information is required, please call me.

Very truly yours,

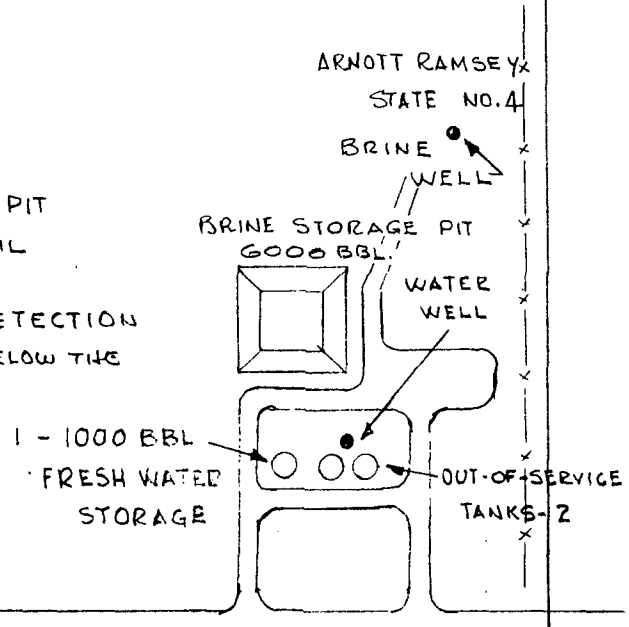
PERMIAN BRINE SALES, INC.

A.L. Hickerson
President

ALH/rdt
Attachment

CC/Mr. Cecil Brown
Unichem, Inc.

THE BRINE STORAGE PIT
IS LINED WITH 30 MIL
DUPONT HYPALON.
THERE IS A LEAK DETECTION
SYSTEM INSTALLED BELOW THE
FLOOR OF THE PIT



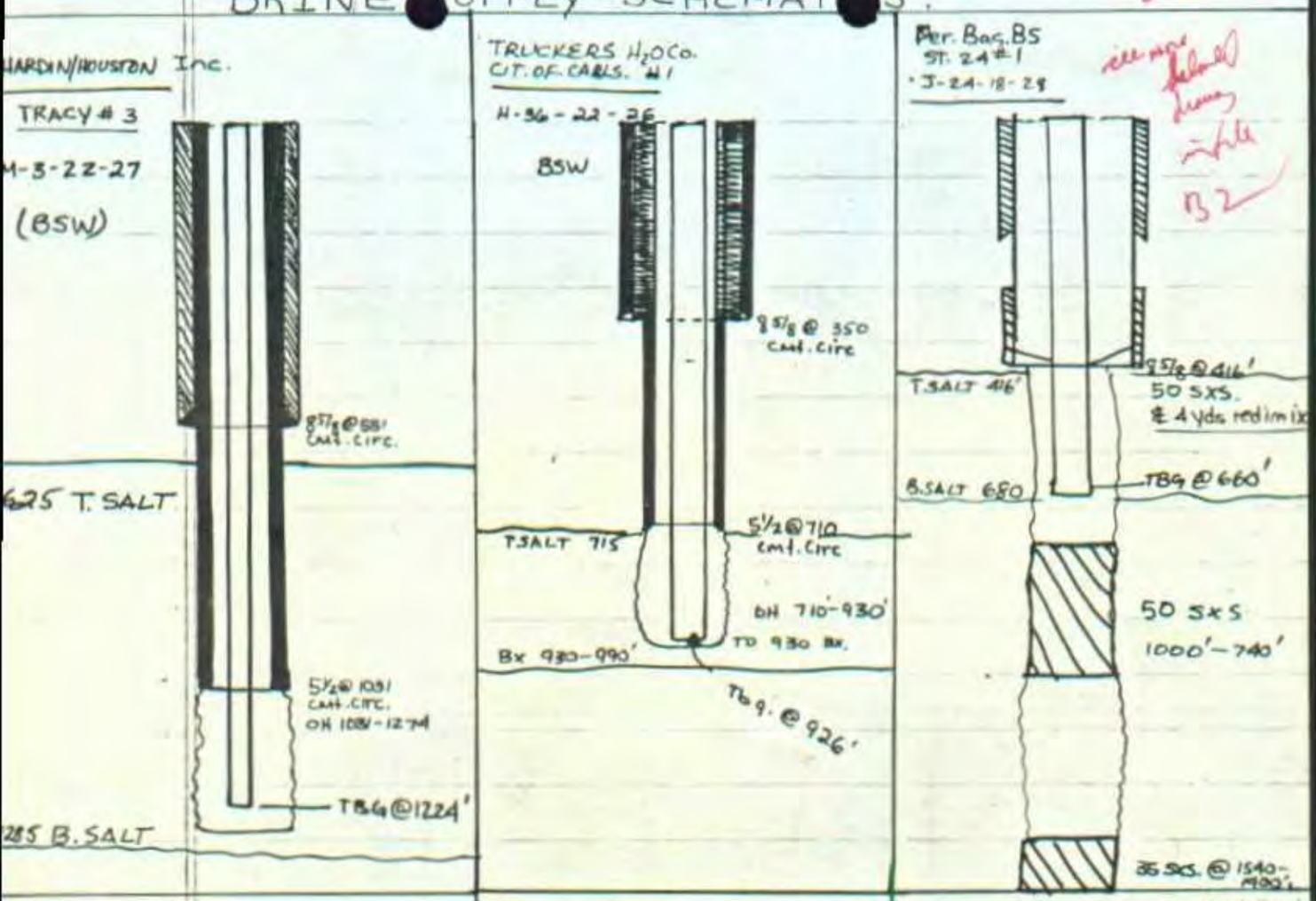

ST. HWY. 128

SE/4 SE/4 SEC. 16
RGE. 37 E TWP. 25 S
LEA CO. NEW MEX.

SCALE 1" = 200'

| PERMIAN BRINE SALES, INC.<br>ODESSA, TEXAS | | |
|---|---|---|
| JAL BRINE STATION | | |
| DATE: 11-5-82 | R.C. McCUTCHAN<br>P.E. TEX. 9844 | DRAWING NO.<br>1 |

# BRINE SUPPLY SCHEMATICS:




Communication by Fracture

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

P. O. BOX 1591 ODESSA, TEXAS 79760 PHONE 332-0531


November 8, 1982

State of New Mexico
Energy and Minerals Department
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

Attention: Mr. Joe D. Ramey
Division Director

Dear Sir:

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Section 16, Township 25 South,
Range 37 East in Lea County.

If additional information is required, please call me.

Very truly yours,

PERMIAN BRINE SALES, INC.

A.L. Hickerson
President

ALH/rdt
Attachment

CC/Mr. Cecil Brown
Unichem, Inc.

# JAL BRINE STATION

The Jal Brine Station is located in the SE/4, SE/4 Section 16, Township 25 South, Range 37 East, Lea County, New Mexico. This station is approximately 2 1/2 miles East of Jal on State Highway 128. See map 1 and drawing No. 1, attached.

The pumping rate is 40 GPM at 175 PSI pressure. The brine well, designated as Arnott Ramsey State No. 4 is located 515' FSL and 100' FEL. Section 16. It was drilled to a total depth of 1591', plugged back to 1582'. 1258' of 5 1/2" O.D., 17#/ft., casing was set and 400 sacks of cement were circulated. 1582' of 2 7/8" tubing was hung in the hole. Opposite the exposed salt section.

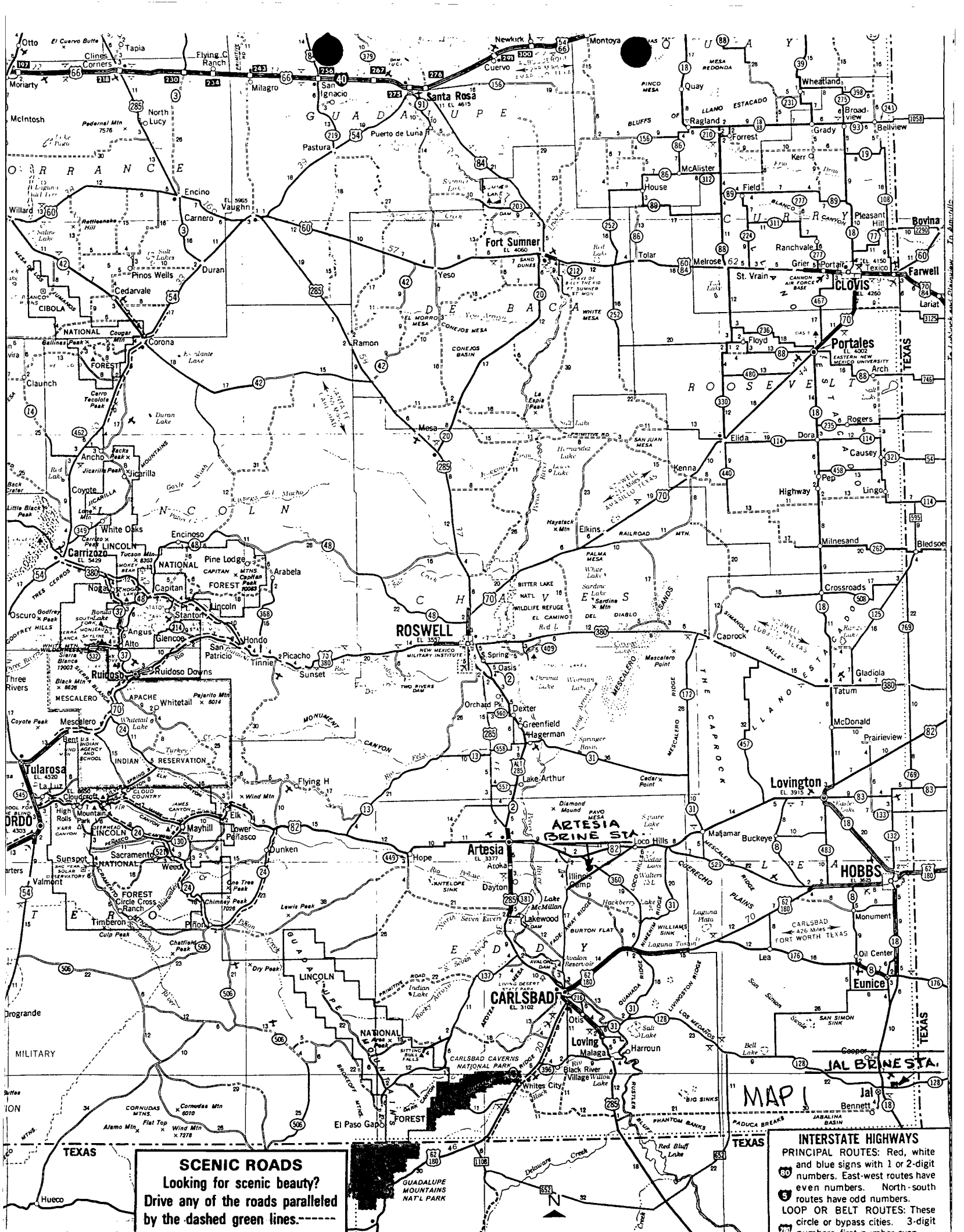
The Fresh Water well #1 is 460' deep and has a TDS concentration of 900 PPM.

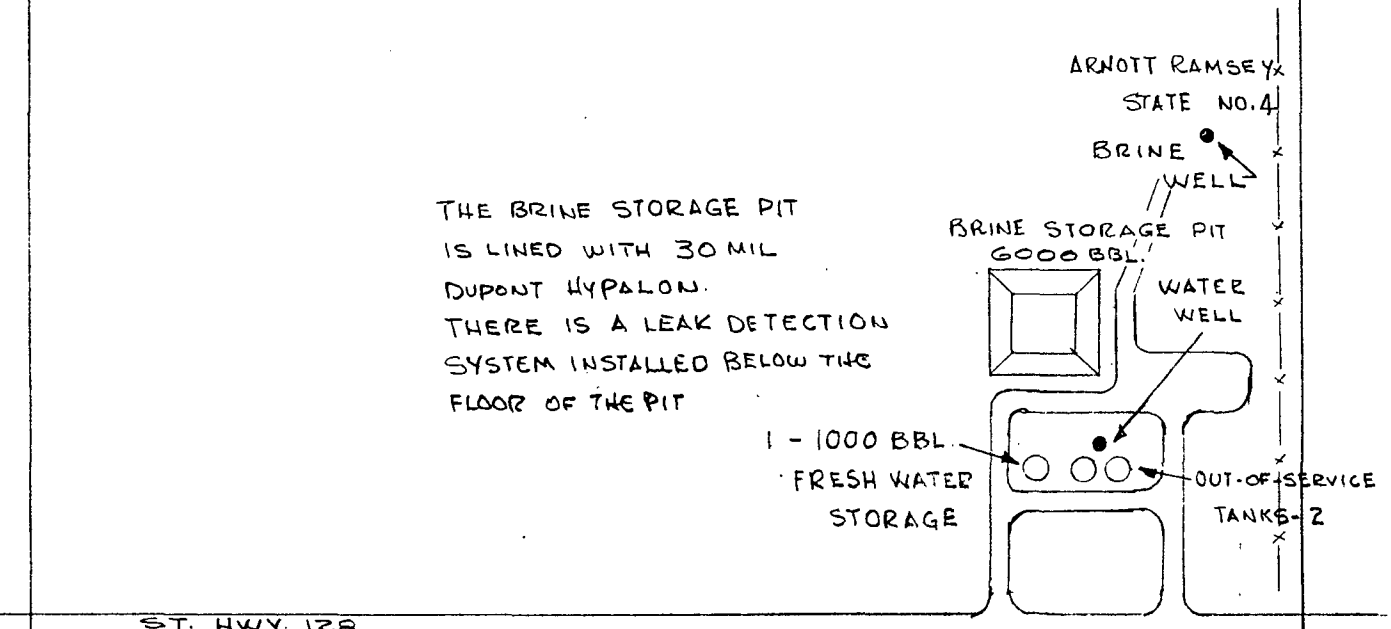
The Jal Brine Station site is located on the typical Southeast New Mexico plains. No major elevation changes in this area and the highway barrow ditches adequately carry the meager precipitation that occurs at this location.

Sample connections are located on the well heads and fresh water samples are also available at the storage tank.

See exhibit 1, attached drillers log showing the lithological character of the underground formations at this site.

The water well at the station site will provide a monitoring facility.


SCENIC ROADS
Looking for scenic beauty?
Drive any of the roads paralleled by the dashed green lines.------
INTERSTATE HIGHWAYS
PRINCIPAL ROUTES: Red, white and blue signs with 1 or 2-digit numbers. East-west routes have even numbers. North-south routes have odd numbers.
LOOP OR BELT ROUTES: These circle or bypass cities. 3-digit
MAP 1
ROSWELL
CARLSBAD
ARTESIA
Artesia
Lakewood
Hope
Dayton
Atoka
Illinois Camp
Loco Hills
Maljamar
Buckeye
HOBBS
Lovington
Tatum
Gladiola
McDonald
Prairieview
Crossroads
Caprock
Milnesand
Bledsoe
Elkins
Kenna
Elida
Dora
Causey
Rogers
Pep
Highway
Lingo
Portales
Floyd
Arch
Fort Sumner
Yeso
Ramon
Mesa
Tolar
Melrose
Grier
Portair
Texico
CLOVIS
Farwell
Lariat
Bovina
Ranchvale
St. Vrain
Pleasant Hill
Field
House
McAlister
Quay
Wheatland
Broadview
Bellview
Grady
Forrest
Kerr
Ragland
Santa Rosa
Puerto de Luna
Pastura
Encino
Vaughn
Willard
Carnero
Duran
Pinos Wells
Cedarvale
CIBOLA
NATIONAL FOREST
Corona
Claunch
Ancho
Jicarilla
Coyote
White Oaks
Encinoso
Carrizozo
Pine Lodge
Arabela
Capitan
Lincoln
Stanton
Noga
Oscuro
Alto
Angus
Glencoe
Hondo
San Patricio
Picacho
Tinnie
Sunset
Ruidoso
Ruidoso Downs
Three Rivers
Mescalero
Whitetail
Tularosa
La Luz
Cloudcroft
High Rolls
Mountain Park
Mayhill
Elk
Lower Peñasco
Dunken
Sacramento
Weed
Sunspot
Valmont
Timberon
Piñon
Circle Cross Ranch
Flying H
Wind Mtn
Orchard Pk.
Dexter
Greenfield
Hagerman
Lake Arthur
Oasis
S. Spring
Picosa
Mescalero Point
Cedar Point
Diamond Mound
Pavo Mesa
Square Lake
Illinois Camp
Lake McMillan
Walters
Monument
Oil Center
Lea
Eunice
Hobbs
Seven Rivers
Otis
Loving
Malaga
Harroun
Black River Village
Whites City
Carlsbad Caverns National Park
Guadalupe Mountains Nat'l Park
El Paso Gap
Cornudas Mtns.
Cornudas
Wind Mtn
Flat Top
Alamo Mtn.
Hueco
Delaware Creek
Red Bluff Lake
Bell Lake
Jal
Bennett
Jal Brine Sta.
Cooper
San Simon
Salt Lake
Lake Arrowhead
Avalon Reservoir
Lake Carlsbad
Indian Lake
Brantley Lake
Sumner Lake
Ute Lake
Conchas Lake
Tucumcari
Amarillo
Clovis
Portales
Roswell
Carlsbad
Hobbs
Lovington
Artesia
Alamogordo
El Paso
Las Cruces
Albuquerque
Santa Fe
Gallup
Farmington
Silver City
Deming
Lordsburg
Socorro
Truth or Consequences
Gallup
Grants
Los Alamos
Taos
Raton
Las Vegas
Clayton
Tucumcari
Logan
Newkirk
Montoya
Cuervo
Milagro
San Ignacio
Flying C Ranch
Clines Corners
Moriarty
Otto
Tapia
McIntosh
North Lucy
Encino
Vaughn
Willard
Carnero
Duran
Pinos Wells
Cedarvale
CIBOLA
NATIONAL FOREST
Corona
Claunch
Ancho
Jicarilla
Coyote
White Oaks
Encinoso
Carrizozo
Pine Lodge
Arabela
Capitan
Lincoln
Stanton
Noga
Oscuro
Alto
Angus
Glencoe
Hondo
San Patricio
Picacho
Tinnie
Sunset
Ruidoso
Ruidoso Downs
Three Rivers
Mescalero
Whitetail
Tularosa
La Luz
Cloudcroft
High Rolls
Mountain Park
Mayhill
Elk
Lower Peñasco
Dunken
Sacramento
Weed
Sunspot
Valmont
Timberon
Piñon
Circle Cross Ranch
Flying H
Wind Mtn
Orchard Pk.
Dexter
Greenfield
Hagerman
Lake Arthur
Oasis
S. Spring
Picosa
Mescalero Point
Cedar Point
Diamond Mound
Pavo Mesa
Square Lake
Illinois Camp
Lake McMillan
Walters
Monument
Oil Center
Lea
Eunice
Hobbs
Seven Rivers
Otis
Loving
Malaga
Harroun
Black River Village
Whites City
Carlsbad Caverns National Park
Guadalupe Mountains Nat'l Park
El Paso Gap
Cornudas Mtns.
Cornudas
Wind Mtn
Flat Top
Alamo Mtn.
Hueco
Delaware Creek
Red Bluff Lake
Bell Lake
Jal
Bennett
Jal Brine Sta.
Cooper
San Simon
Salt Lake
Lake Arrowhead
Avalon Reservoir
Lake Carlsbad
Indian Lake
Brantley Lake
Sumner Lake
Ute Lake
Conchas Lake
Tucumcari
Amarillo
Clovis
Portales
Roswell
Carlsbad
Hobbs
Lovington
Artesia
Alamogordo
El Paso
Las Cruces
Albuquerque
Santa Fe
Gallup
Farmington
Silver City
Deming
Lordsburg
Socorro
Truth or Consequences
Gallup
Grants
Los Alamos
Taos
Raton
Las Vegas
Clayton
Tucumcari
Logan
Newkirk
Montoya
Cuervo
Milagro
San Ignacio
Flying C Ranch
Clines Corners
Moriarty
Otto
Tapia
McIntosh
North Lucy
Encino
Vaughn
Willard
Carnero
Duran
Pinos Wells
Cedarvale
CIBOLA
NATIONAL FOREST
Corona
Claunch
Ancho
Jicarilla
Coyote
White Oaks
Encinoso
Carrizozo
Pine Lodge
Arabela
Capitan
Lincoln
Stanton
Noga
Oscuro
Alto
Angus
Glencoe
Hondo
San Patricio
Picacho
Tinnie
Sunset
Ruidoso
Ruidoso Downs
Three Rivers
Mescalero
Whitetail
Tularosa
La Luz
Cloudcroft
High Rolls
Mountain Park
Mayhill
Elk
Lower Peñasco
Dunken
Sacramento
Weed
Sunspot
Valmont
Timberon
Piñon
Circle Cross Ranch
Flying H
Wind Mtn
Orchard Pk.
Dexter
Greenfield
Hagerman
Lake Arthur
Oasis
S. Spring
Picosa
Mescalero Point
Cedar Point
Diamond Mound
Pavo Mesa
Square Lake
Illinois Camp
Lake McMillan
Walters
Monument
Oil Center
Lea
Eunice
Hobbs
Seven Rivers
Otis
Loving
Malaga
Harroun
Black River Village
Whites City
Carlsbad Caverns National Park
Guadalupe Mountains Nat'l Park
El Paso Gap
Cornudas Mtns.
Cornudas
Wind Mtn
Flat Top
Alamo Mtn.
Hueco
Delaware Creek
Red Bluff Lake
Bell Lake
Jal
Bennett
Jal Brine Sta.
Cooper
San Simon
Salt Lake
Lake Arrowhead
Avalon Reservoir
Lake Carlsbad
Indian Lake
Brantley Lake
Sumner Lake
Ute Lake
Conchas Lake
Tucumcari
Amarillo
Clovis
Portales
Roswell
Carlsbad
Hobbs
Lovington
Artesia
Alamogordo
El Paso
Las Cruces
Albuquerque
Santa Fe
Gallup
Farmington
Silver City
Deming
Lordsburg
Socorro
Truth or Consequences
Gallup
Grants
Los Alamos
Taos
Raton
Las Vegas
Clayton
Tucumcari
Logan




THE BRINE STORAGE PIT IS LINED WITH 30 MIL DUPONT HYPALON. THERE IS A LEAK DETECTION SYSTEM INSTALLED BELOW THE FLOOR OF THE PIT

SE/4 SE/4 SEC. 16
RGE. 37 E TWP. 25 S
LEA CO. NEW MEX.

SCALE 1" = 200'

PERMIAN BRINE SALES, INC.
ODESSA, TEXAS

JAL BRINE STATION

| DATE: 11-5-82 | R.C. McCUTCHAN P.E. TEX. 9844 | DRAWING NO. 1 |
|---|---|---|

...on is to be filed with the appropriate District Office of the Commission not later than ... days after the completion of any newly-drilled or ... well. It shall be accompanied by one copy of all electrical and radioactivity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

## INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

| Southeastern New Mexico | | | | Northwestern New Mexico | | | |
|---|---|---|---|---|---|---|---|
| T. Anhy | 1035 | T. Canyon | | T. Ojo Alamo | | T. Penn. "B" | |
| T. Salt | 1155 | T. Strawn | | T. Kirtland-Fruitland | | T. Penn. "C" | |
| B. Salt | | T. Atoka | | T. Pictured Cliffs | | T. Penn. "D" | |
| T. Yates | | T. Miss | | T. Cliff House | | T. Leadville | |
| T. 7 Rivers | | T. Devonian | | T. Menefee | | T. Madison | |
| T. Queen | | T. Silurian | | T. Point Lookout | | T. Elbert | |
| T. Grayburg | | T. Montoya | | T. Mancos | | T. McCracken | |
| T. San Andres | | T. Simpson | | T. Gallup | | T. Ignacio Qtzte | |
| T. Glorieta | | T. McKee | | Base Greenhorn | | T. Granite | |
| T. Paddock | | T. Ellenburger | | T. Dakota | | T. | |
| T. Blinebry | | T. Gr. Wash | | T. Morrison | | T. | |
| T. Tubb | | T. Granite | | T. Todilto | | T. | |
| T. Drinkard | | T. Delaware Sand | | T. Entrada | | T. | |
| T. Abo | | T. Bone Springs | | T. Wingate | | T. | |
| T. Wolfcamp | | T. | | T. Chinle | | T. | |
| T. Penn. | | T. | | T. Permian | | T. | |
| T Cisco (Bough C) | | T. | | T. Penn. "A" | | T. | |

## OIL OR GAS SANDS OR ZONES

No. 1, from ..... to ..... No. 4, from ..... to .....

No. 2, from ..... to ..... No. 5, from ..... to .....

No. 3, from ..... to ..... No. 6, from ..... to .....

## IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from 450 To 475' to 260 feet. .....

No. 2, from ..... to ..... feet. .....

No. 3, from ..... to ..... feet. .....

No. 4, from ..... to ..... feet. .....

## FORMATION RECORD (Attach additional sheets if necessary)

| From | To | Thickness in Feet | Formation | From | To | Thickness in Feet | Formation |
|---|---|---|---|---|---|---|---|
| 0 | 10 | 10 | Caliche | | | | |
| 10 | 60 | 50 | Sand | | | | |
| 60 | 1035 | 975 | Red Beds | | | | |
| 1035 | 1155 | 120 | Rustler Anhydrite | | | | |
| 1155 | 1591 | 436 | Salt With Shale And Anhydrite Stringers | | | | |

EXHIBIT 1

ARNOTT RAMSAY #2
OK 11

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

*.= please attach pertinent documents

ARNOTT RAMSEY #2

I. OPERATOR / LOCATION INFORMATION

Operator PERMIAN BRINE SALES

Address P.O. Box 1591

ODESSA, TEXAS 79760 Phone

Well unit # P Location 165/S 165/E

T. 25 R. 32 Sec. 16 SE 1/4 . SE 1/4 SE 1/4 .444

County LEA

Purpose of well (brine supply, LPG storage, potash dissolution)

BRINE SUPPLY

II. DRILLING / SITING INFORMATION

Contractor Not known

Date drilling started " Date drilling completed "

Drilling method Rotary

Elevation of ground surface 3104 How measured —

Date measured 1-10-64 Order of survey —

Name of surveyor John West

Total depth of hole N.K.

Attach schematic of well, include open hole interval, perforations, etc. *
7" casing to 1100 ft. open hole in salt to T.D.

Type of drilling fluid N.K.

Type of drilling mud if used (brand if known) N.K.

List any additives to the drilling mud, or any other chemicals put down well:

N.K.

Describe casing tests performed N.K.

Other tests N.K.

* = please attach pertinent documents

II. DRILLING / SITING (continued)

Casing, tubing, and cementing record (please attach copy)*

Note: if a copy is not available detail casing record on back of this sheet using the following format. Include brand or type of cement if known.

| From | To | Size of Hole | Size of Casing | Weight per Foot | Sacks of Cement | Estimated Top of cmt. |
|---|---|---|---|---|---|---|
| 0 | 1100 | NK | 7" | NK | NK | Circulated |

Was mudcake on bore wall removed before cementing production casing? NK

Was salt saturated cementing material used opposite salt formation? NK

Is site within 1/2 mile of another well? If so, use note to explain. No

Site preparation (concrete pad, graded dirt, pit, etc) Cellar

Type of surface seal or well-head (locking security cap, welded, etc.) Well Head

Comments (include problems encountered while drilling, loss of circulation, deviation of hole from vertical, centralizers used, tools lost or stuck, fracturing techniques used, etc.) NK

(use back of sheet if more space is required)

* = please attach pertinent documents

## III. FORMATION INFORMATION

Formation Record

| From | To | Thickness | Formation (name, description) |
|---|---|---|---|

Same as NO 4 well

Logs (specify type) None

Identify where logs are on file None

* = please attach pertinent documents

## IV. AQUIFER INFORMATION

Aquifers encountered during drilling

| From | To | Aquifer Description | Amount of Water entering hole | Quality of Water |
|---|---|---|---|---|
| Same as No 3 | | | | |

**Note:** if water quality analyses are available please attach.*

Source of aquifer description NK

Depth at which water was first encountered NK

Depth to which water rose NK

Source of water level data NK

Comments (include information regarding determination of piezometric level and method of sealing off water zone) NK

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

* = please attach pertinent documents

V. PRODUCTION / BRINE STORAGE INFORMATION

Method of production (describe fully) water pumped down Tubing and out annulus

Was well used previously for some purpose other than brine supply, potash dissolution, or LPG storage. If so use note to explain. Brine Supply only

Use of brine Sold for drilling fluid

Source of injection water (be specific) Water well

Attach detailed production history (include dates of production, amount of water injected, injection rates, amount of brine produced, production rates, method of gaging injection/production rates )*

Note: If the cavity was used for LPG storage include volumes of product injected and withdrawn as well as a summary of the maximum and minimum pressures during injection, storage and withdrawal.

Chemical analyses of injection water (attach)*

Note : Chemical analyses should include sampling point and method, pH, temperature, method of analysis, name and location of laboratory, etc.

Chemical analyses of water produced (attach)*

Not Known

* = please attach pertinent documents

V. PRODUCTION / BRINE STORAGE (continued)

Brine storage facilities (describe) steel Tanks

Current condition/status of brine storage pit: Salvaged or converted to fresh water ?

Is brine storage pit currently being monitored for leakage? —

Specify company or agency which is monitoring leakage —

If pit leakage has been monitored in past use note to explain. —

Comments on production history (note if production rates or brine concentrations have changed through time) —

* = please attach pertinent documents

VI. ABANDONMENT / PLUGGING RECORD

Date well abandoned/plugged Not yet plugged *

Reason for well abandonment or plugging Lost circulation

Method of Plugging (describe fully, include amounts of cement, est. top, plug type, depth, etc.) Plan to set cement plug in bottom, middle and top of 7" casing.

VII. Further comments (subsidence noted, subsidence monitoring, leakage noted, natural subsidence features noted nearby, LPG storage data, etc.)

No subsidence
No leakage

Recorded by R. L. Dickerson

Date 11-17-81

PBS - ~~Ed~~ bo get there
after the problem occurred.

Salt plugging in casing

Remedy — caused a fracture
in ? Rustler

TRIED to correct plugging - caused
lost pulls

(possible repeat)

ARNOTT - RAMSAY #3

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

BY 17

*.= please attach pertinent documents

I. OPERATOR / LOCATION INFORMATION ARNOTT RAMSEY #3

Operator PERMIAN BRINE SALES

Address P.O. BOX 1591

ODESSA, TEXAS, 79760 Phone

Well unit # P Location 220/S 460/E

T. 25 R. 37 Sec. 16 SE 1/4 . SE 1/4 SE 1/4 .444

County LEA

Purpose of well (brine supply, LPG storage, potash dissolution)

BRINE SUPPLY

II. DRILLING / SITING INFORMATION

Contractor NOT KNOWN

Date drilling started 11 Date drilling completed 11

Drilling method ROTARY

Elevation of ground surface 3104' How measured —

Date measured 1-10-64 Order of survey —

Name of surveyor JOHN WEST

Total depth of hole 1860

Attach schematic of well, include open hole interval, perforations, etc. *
7" casing cemented to 1223 ft. OPEN HOLE TO 1860 ft.

Type of drilling fluid Water

Type of drilling mud if used (brand if known)

NOT KNOWN

List any additives to the drilling mud, or any other chemicals put down well:

NOT KNOWN

Describe casing tests performed NOT KNOWN

Other tests

* = please attach pertinent documents

II. DRILLING / SITING (continued)

Casing, tubing, and cementing record (please attach copy)*

Note: if a copy is not available detail casing record on back of this sheet using the following format. Include brand or type of cement if known.

| From | To | Size of Hole | Size of Casing | Weight per Foot | Sacks of Cement | Estimated Top of cmt. |
|---|---|---|---|---|---|---|
| 0 | 1230 | 10" | 7" | — | — | Circulated |

Was mudcake on bore wall removed before cementing production casing? Not known

Was salt saturated cementing material used opposite salt formation? N.K.

Is site within 1/2 mile of another well? If so, use note to explain. 400 ft west of No 1 well

Site preparation (concrete pad, graded dirt, pit, etc) Caliche

Type of surface seal or well-head (locking security cap, welded, etc.) Well Head

Comments (include problems encountered while drilling, loss of circulation, deviation of hole from vertical, centralizers used, tools lost or stuck, fracturing techniques used, etc.) We started operating this well in 1975. Records of original drilling are sketchy.

(use back of sheet if more space is required)

* = please attach pertinent documents

**III.** FORMATION INFORMATION

Formation Record

| From | To | Thickness | Formation (name, description) |
|---|---|---|---|

Same as No. 4

Logs (specify type) None

Identify where logs are on file —

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

* = please attach pertinent documents

IV. AQUIFER INFORMATION

Aquifers encountered during drilling

| From | To | Aquifer Description | Amount of Water entering hole | Quality of Water |
|---|---|---|---|---|
| 400 | 500 | Sand | to 200' | fair |

Note: if water quality analyses are available please attach.* None

Source of aquifer description cuttings

Depth at which water was first encountered 400

Depth to which water rose 200'

Source of water level data Sand Zone, measurements

Comments (include information regarding determination of piezometric level and method of sealing off water zone)

Cemented off zone

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

* = please attach pertinent documents

V. PRODUCTION / BRINE STORAGE INFORMATION

Method of production (describe fully) Pumped water down Tubing and circulated brine out 7" - 2 7/8 annulus

Was well used previously for some purpose other than brine supply, potash dissolution, or LPG storage. If so use note to explain. only Brine Supply

Use of brine Sold for drilling fluid

Source of injection water (be specific) Water production well

Attach detailed production history (include dates of production, amount of water injected, injection rates, amount of brine produced, production rates, method of gaging injection/production rates )*

Note: If the cavity was used for LPG storage include volumes of product injected and withdrawn as well as a summary of the maximum and minimum pressures during injection, storage and withdrawal.

Chemical analyses of injection water (attach)*

Note : Chemical analyses should include sampling point and method, pH, temperature, method of analysis, name and location of laboratory, etc.

Chemical analyses of water produced (attach)*

No record of volume of water injected
Brine produced & sold - Volume by truck sales
No record before 1976

1976 - 115,204 BBL
1977 - 293,801 "
1978 - 448,883 "
1979 - 626,072 "
1980 - 740,777 "
2,225,000

No brine analyses available

37,083/mo

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

* = please attach pertinent documents

V. PRODUCTION / BRINE STORAGE (continued)

Brine storage facilities (describe) 2 - 1000 BBL steel tanks

Current condition/status of brine storage pit Tanks salvaged or converted to fresh water storage

Is brine storage pit currently being monitored for leakage? See report on file

Specify company or agency which is monitoring leakage

If pit leakage has been monitored in past use note to explain.

Comments on production history (note if production rates or brine concentrations have changed through time)

Made 100% brine while operating.

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

* = please attach pertinent documents

VI. ABANDONMENT / PLUGGING RECORD

Date well abandoned/plugged Not yet plugged

Reason for well abandonment or plugging Cannot circulate well

Method of Plugging (describe fully, include amounts of cement, est. top, plug type, depth, etc.) plugging application made Well set plugs on bottom middle and top of 7" casing

VII. Further comments (subsidence noted, subsidence monitoring, leakage noted, natural subsidence features noted nearby, LPG storage data, etc.)

No subsidence

Recorded by A. L. Anderson

Date 11-17-81

ARNOTT-RAMSAY ST. #4

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981 B 13 12

*.= please attach pertinent documents

I. OPERATOR / LOCATION INFORMATION ARNOTT-RAMSAY ST #4

Operator PERMIAN BRINE SALES, INC

Address P.O. Box 1591

ODESSA, TEXAS 79760 Phone

Well unit # P Location 515/S 100/E

T. 25 R. 37 Sec. 16 SE 1/4 . SE 1/4 SE 1/4 .444

County LEA

Purpose of well (brine supply, LPG storage, potash dissolution)

BRINE SUPPLY

II. DRILLING / SITING INFORMATION

Contractor PERMIAN BRINE SALES, INC (REVERSE UNIT)

Date drilling started 10-8-80 Date drilling completed 3-10-~~80~~

Drilling method ROTARY

Elevation of ground surface 3104' How measured —

Date measured ~~3-10-64~~ 1-10-64 Order of survey — ??? maybe from map

Name of surveyor John West

Total depth of hole 1582'

Attach schematic of well, include open hole interval, perforations, etc. *
5½" casing cemented to 1269 ft. OPEN HOLE TO 1582 ft.

Type of drilling fluid BRINE

Type of drilling mud if used (brand if known) SALT WATER GEL

List any additives to the drilling mud, or any other chemicals put down well:

NONE

Describe casing tests performed Pressure test to 1000# before drilling cement plug

Other tests Tested to ~~500~~ 1000# after drilling plug.



ARNOTT-RAMSAY STATE #4

* = please attach pertinent documents

II. DRILLING / SITING (continued)

Casing, tubing, and cementing record (please attach copy)*

Note: if a copy is not available detail casing record on back of this sheet using the following format. Include brand or type of cement if known.

| From | To | Size of Hole | Size of Casing | Weight per Foot | Sacks of Cement | Estimated Top of cmt. |
|---|---|---|---|---|---|---|
| 0 | 1269 | 7 7/8 | 5 1/2 | 17# | 400 | circ to 60' |

Was mudcake on bore wall removed before cementing production casing? NO

Was salt saturated cementing material used opposite salt formation? Did not cement through salt section — or even to the interface?

Is site within 1/2 mile of another well? If so, use note to explain. ~~yes~~

350 North of No 2 well

Site preparation (concrete pad, graded dirt, pit, etc) Graded Dirt

Type of surface seal or well-head (locking security cap, welded, etc.) Well Head — Screwed

Comments (include problems encountered while drilling, loss of circulation, deviation of hole from vertical, centralizers used, tools lost or stuck, fracturing techniques used, etc.) No PROBLEMS

(use back of sheet if more space is required)

* = please attach pertinent documents

III. FORMATION INFORMATION

Formation Record

| From | To | Thickness | Formation (name, description) |
|---|---|---|---|

**Section 6** **LOG OF WELL**

| Depth in Feet From | Depth in Feet To | Thickness in Feet | Color | Type of Material Encountered |
|---|---|---|---|---|
| 0 | 25 | 25 | White | Caliche & rock |
| 25 | 60 | 35 | Grey | Sandy shale |
| 60 | 70 | 10 | " | Sand rock |
| 70 | 112 | 42 | Red | Shale |
| 112 | 130 | 18 | " | Red rock |
| 130 | 160 | 30 | " | Sandy shale |
| 160 | 205 | 45 | Grey | Sandy shale |
| 205 | 370 | 165 | Red | Shale |
| 370 | 400 | 30 | Grey | Sandy shale |
| 400 | 500 | 100 | " | Sand, consolidated |
| 500 | 1042 | 642 | RED | RED BEDS |
| 1042 | 1269 | 227 | GRAY | ANHYDRITE - DOLOMITE - SALT |
| 1269 | 1591 | 422 | " | SALT W/ ANHYDRITE STRINGERS |

Logs (specify type) NONE

Identify where logs are on file

* = please attach pertinent documents

IV. AQUIFER INFORMATION

Aquifers encountered during drilling

| From | To | Aquifer Description | Amount of Water entering hole | Quality of Water |
|---|---|---|---|---|
| 400 | 500 | | | |
| 400 | 500 | Sand | to 200' | FAIR |

Note: if water quality analyses are available please attach.* None

Source of aquifer description Cuttings

Depth at which water was first encountered 400'

Depth to which water rose 200'

Source of water level data Sand line measurement

Comments (include information regarding determination of piezometric level and method of sealing off water zone)

Cemented off zone

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

* = please attach pertinent documents

V. PRODUCTION / BRINE STORAGE INFORMATION

Method of production (describe fully) Pumped water down tubing and circulated brine out 5½-7⅞ annulus.

Was well used previously for some purpose other than brine supply, potash dissolution, or LPG storage. If so use note to explain. only brine supply

Use of brine Sold for drilling fluid

Source of injection water (be specific) Water production well

Attach detailed production history (include dates of production, amount of water injected, injection rates, amount of brine produced, production rates, method of gaging injection/production rates )*

Note: If the cavity was used for LPG storage include volumes of product injected and withdrawn as well as a summary of the maximum and minimum pressures during injection, storage and withdrawal.

Chemical analyses of injection water (attach)*

Note : Chemical analyses should include sampling point and method, pH, temperature, method of analysis, name and location of laboratory, etc.

Chemical analyses of water produced (attach)*

~7 month @ 10,000 bbl/mo

No record of volume of water injected
Brine produced 69739 in 1981
(all from this well) Rate 45 gpm Pres 160 #
Volume measured by truck sales
No analyses available of brine or water

INVENTORY OF SOLUTION MINING WELLS OIL CONSERVATION DIVISION, 1981

* = please attach pertinent documents

V. PRODUCTION / BRINE STORAGE (continued)

Brine storage facilities (describe) LINED PIT

Current condition/status of brine storage pit IN SERVICE
CONDITION OK

Is brine storage pit currently being monitored for leakage? YES

Specify company or agency which is monitoring leakage We have open sump pipe for visual observation

If pit leakage has been monitored in past use note to explain.

Comments on production history (note if production rates or brine concentrations have changed through time)
No change
100% saturation

* = please attach pertinent documents

VI. ABANDONMENT / PLUGGING RECORD

Date well abandoned/plugged —

Reason for well abandonment or plugging —

Method of Plugging (describe fully, include amounts of cement, est. top, plug type, depth, etc.) —

VII. Further comments (subsidence noted, subsidence monitoring, leakage noted, natural subsidence features noted nearby, LPG storage data, etc.)

No subsidence
No leakage

Recorded by A. L. Anderson

Date 11-11-81

ADD TO 3-12 file

Mr. Paul Kautz
New Mexico Oil Conservation Commission
P.O. Box 1980
Hobbs, New Mexico 88240

Dear Sir:

Attached is a copy of the workover and attempt to seal the lost circulation zone in the No. 2 brine well.

This work was done by the Permian Corporation, who were owners of the station at that time.

I cannot find a record of the previous work on the well. It is my understanding that the well was plugged and a "kill" truck was used in attempt to un-plug the casing or tubing. At this time circulation was lost and not recovered.

I do not have any record of the work done on the No. 1 well.

If additional information is needed, please let me know.

Very truly yours,
PERMIAN BRINE SALES, INC.

A. L. Hickerson

A.L. HICKERSON
PRESIDENT

ALH/lah
attached

SALINE #2 at JAL, NEW MEXICO

APRIL 1, 1974

7:30 AM m.s.t. - Rig up Clark Well Service - Pull on pipe string to determine if string in tight. Pipe was tight. McCullough was called to run free point. Water level - 600 feet.

12:30 PM m.s.t. - Magnetic free point was run. Due to coating (scale) on pipe string, the magnetic free point was not 100% effective. McCullough Hobbs Yard was notified to bring on the "spring type" free point tool. While waiting on other tool, we pulled twenty times on tubing string, working up to 40,000 pounds after several pulls, each time slacking off completely between pulls.

1:15 PM m.s.t. - Caliper type free point run. Caliper tight in 2 7/8" - Too loose in 4 1/2" - came out of hole with tool.

NOTE: The I.D. of the 7" casing is 7 1/4" - 5 3/8" wash pipe will go in the surface, but will not go over the 5 3/4" tool joints on the 4 1/2" drill pipe.

Put well head manifold on and pumped 15 minutes (90 psi - no return water), then shut down, removed well head - and rigged up for one more caliper (free point) attempt. Tubing now full of water. The water should help the free point tool go through the 2 7/8" tubing. Time is now 3:20 pm m.s.t.

4:55 PM m.s.t. - The caliper type free point tool went through the 2 7/8" after adjusting the caliper diameter to 4" OD, but at that setting the caliper spring tension was not enough to take a reading in the 4 1/2" drill pipe. We came out of the hole - picked up a full joint of 2 7/8. The plan now is to turn the tubing string clockwise 1 3/4 round (tighten). The turn clockwise 1 round and hold torque in that position and fire 200 grains of primer cord from the wire line suspended at the first tool joint below the 2 7/8 x 4 1/2 change-over. (Tool joint we want to break is at 1223' down hole.)
The 7" surface pipe is set to 1229'. The 2 7/8 x 4 1/2 changeover is at 1192'.

Start out with tubing string at 6:00 PM mst and got out at 7:10 PM mst - Shut down with 1223' pipe on the bank (including the one joint of 4 1/2")

SALINE #2 at JAL, NEW MEXICO

APRIL 2, 1974

8:am mst - Pipe (about 1300' plus-minus of X Line 3 1/2" spec. drill pipe) unloaded at 8:35 AM mst. Started at that time picking up subs and 3 1/2" drill pipe.

On bottom at 10:40 am mst, with 3 1/2" drill pipe and fishing sub - Began to fish at 10:42 AM. Fishing continued until 11:30 AM. We touched the fish 20' lower than expected, thus indicating that the fish may have slipped sideways and the top of the 4 1/2" drill pipe could have slipped out of the 7" surface pipe. Pipe talley indicated verification of this. Wind is now approaching 50 MPH with excessive dust. We laid one joint of 3 1/2 x line drill pipe down, and shut down rig until tomorrow at 7:00 AM mst.

Royce McGee

SALINE #2 BRINE WELL
Wednesday - April 3, 1974

7:00 AM mst - Start out of the hole with the x-line 3 1/2" rented drill pipe and fishing sub.
8:07 AM mst - Out of the hole.
8:30 AM to 9:30 AM mst - Talk to Dean Murray and John Draper.
9:30 AM - Call Haliburton for the squeeze job.
10:45 AM mst - Haliburton pickup arrived with the RTTS squeeze packer and we started in the hole with 2 7/8" tubing on it - - Strapping the tubing on the way down.
Haliburton cement and pump trucks arrive.
12:00 Noon - we set the RTTS packer at 1173' and prepared to test the surface casing for leaks.
12:40 PM - Casing tested to 300 psi - No leaks.
12:45 PM - Pulled 5 joints (148') and set squeeze packer at 1,025' in the surface pipe - Ready for squeeze job. After the cement is pumped very slowly into the lost circulation zone, we plan to displace clear water in the 7" casing below the packer, so the top of the cement should be at about 50' inside the 7" casing. We will drill this out in the morning.
12:55 PM - 5 joints pull out and the RTTS packer is set - Ready for Haliburton to tie onto.
1:00 PM - Start cement job.
1:20 PM - Cement pumped down and displaced with water. Cement was pumped as slow as possible with almost no pressure. Pressure increased to 200 psi just as we completed the water displacement, (a good indication).
1:40 PM - Pulling unit crew released - Wait on cement.

SALINE #2 BRINE WELL
Thursday - April 4, 1974

7:00 AM mst - Start rig motor - 800' of new 2 7/8" on location ready to unload.
7:20 AM - Unload tubing. Open valve on tubing string in well.
8:00 AM - Release packer and reset it in the same place. Pumped a small amount into tubing to see if the cement held. The cement did not hold - no pressure when pumping - disconnected to find a vacuum on the tubing.
8:10 AM - Called Haliburton for second stage on the squeeze job.
9:05 AM - Haliburton pump truck arrived.
9:35 AM - Bulk cement truck arrived.
10:00 AM - Start second state - Pumping cement at 4 bbl per minute 50 sack stage - same mixture as 1st stage. We will displace this time with 8 bbls of water - just enough to pump the cement past the RTTS packer.
10:20 AM - Cement pumped - water displacement of 8 bbls behind the cement went in on the vacuum at 1 1/2 bbls per minute. Wait on cement.
3:00 PM - Started pumping to fill hole to determine if we have a cement bridge. Pumped 48 bbls at 2 bbls per minute. Pressure never exceeded 20 psi. (18 bbls would displace slightly more than our tubing and casing). This indicated no results from the second or the first squeeze jobs. We pumped the balance of fresh water on hand at the well in tubing at 3 bbls per minute. Only pressure encountered was restriction pressure due to the increase in volume. We pumped 172 bbls at 3 bbls per minute, plus the 48 bbls at 2 bbls per minute. Total of 220 bbls of water - No pressure increase that indicated any benefit gained from the 2 stages of (100 sack) cement.
3:00 PM - Release RTTS packer and came out of hole - laying down tubing. Released Haliburton pump truck.

5:30 PM - Rigged down and dismissed rig.

CONCLUSION:

The lost circulation condition of our well was uneffected by two stages of cement squeeze job. Each stage consisted of the following:

50 sacks of class "C" cement.
8% gel.
10 lbs gilsonite.
1/2 lbs flocele.
3% calcium chloride per sack.

---

Slurry weight - 12.5 lbs/gal.
Slurry yield - 2.22 cu. ft./sack.
Water - 11.5 gals/sack.

SALINE #2 BRINE WELL

Both stages of cement was pumped into position, slow - (1.5 BPM). The first stage was displaced with 12 bbls of water. The second stage was displaced with 8 bbls of water - (2 bbls of water below the packer).

No pumping pressure encountered on the first stage except near the end of the water displacement, the pressure did increase to 200 psi. No pumping pressure encountered on the second stage while pumping cement. When we started displacing with water, the water went in on the vacuum (pump not used). Well shut in on vacuum.

After the proper time had expired, we pumped into the well with water as we outlined earlier in this report. It was concluded that no effect was gained from either squeeze stage.

After reviewing this situation with John Draper, we concluded to stop and evaluate before spending additional funds on a condition that may be impossible to correct. The "wash out" or cavern leading to the lost circulation zone may be more expensive to block off that the cost of another brine well.

**********

Royce McVeen

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NEW MEXICO OIL CONSERVATION COMMISSION

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JAN 17 1980

O. C. D.

ARTESIA, OFFICE

Form C-103
*Supersedes Old C-102 and C-103*
Effective 1-1-65

5a. Indicate Type of Lease: State ☐ Fee ☒

5. State Oil & Gas Lease No.

# 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. OIL WELL ☐ GAS WELL ☐ OTHER- Brine Water Well

7. Unit Agreement Name

2. Name of Operator
Permian Brine Sales & Service, Inc.

8. Farm or Lease Name
Eugenie

3. Address of Operator
Box 1591, 212 W. 5th St., Odessa, Texas 79760

9. Well No.
2

4. Location of Well
UNIT LETTER M, 1288 FEET FROM THE South LINE AND 497 FEET FROM THE West LINE, SECTION 17 TOWNSHIP 22S RANGE 27E NMPM.

10. Field and Pool, or Wildcat

15. Elevation *(Show whether DF, RT, GR, etc.)*
GL 3126

12. County
Eddy

16. 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 ☐ | | COMMENCE DRILLING OPNS. ☐ | PLUG AND ABANDONMENT ☐ |
| PULL OR ALTER CASING ☐ | CHANGE PLANS ☐ | CASING TEST AND CEMENT JOB ☐ | |
| OTHER ☐ | | OTHER ☐ | |

17. 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.

Completion

Ran 285' of 17# 5½" casing. B.J. Cemented on 11/6/79 with 125 sx Class C cement with 2% A-7 Calcium Chloride. Cement circulated. Let set 36 hours. Drilled out plug with cable tools. No water.

Ran 583' of 6.5# 2 7/8 tubing. B.J. Cemented 11/20/79 with 100 sx of Class C cement with 2% A-7 Calcium Chloride cement circulated. Let set 24 hours.

November 21, 1979 fractured across to Eugenie No. 1 in salt & shale stringer between 576' and 592'.

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

SIGNED A. L. Hickerson TITLE President DATE

A.L. Hickerson

APPROVED BY W. A. Gressett TITLE SUPERVISOR, DISTRICT II DATE JAN 18 1980

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| OPERATOR | | |

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NEW MEXICO OIL CONSERVATION COMMISSION
JAN 10 1980
O. C. D.
ARTESIA, OFFICE

Form C-103
*Supersedes Old C-102 and C-103*
Effective 1-1-65

5a. Indicate Type of Lease: State ☐ Fee ☒
5. State Oil & Gas Lease No.

# 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. OIL WELL ☐ GAS WELL ☐ OTHER- Brine Water Well

7. Unit Agreement Name

2. Name of Operator
Permian Brine Sales & Service, Inc. ✓

8. Farm or Lease Name
Eugenie

3. Address of Operator
Box 1591, 212 W. 5th St., Odessa, Texas 79760

9. Well No.
2

4. Location of Well
UNIT LETTER M , 1288 FEET FROM THE South LINE AND 497 FEET FROM THE West LINE, SECTION 17 TOWNSHIP 22S RANGE 27E NMPM.

10. Field and Pool, or Wildcat

15. Elevation *(Show whether DF, RT, GR, etc.)*
GL 3126

12. County
Eddy

16. 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 ☐ | | COMMENCE DRILLING OPNS. ☐ | PLUG AND ABANDONMENT ☐ |
| PULL OR ALTER CASING ☐ | CHANGE PLANS ☐ | CASING TEST AND CEMENT JOB ☐ | |
| OTHER ☐ | | OTHER ☐ | |

17. 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.

It is proposed to set the 5½" casing and cement @ 285' instead of 350' as originally approved. All fresh water has been penetrated and the red beds are sloughing on the cable tools.

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

SIGNED A. L. Hickerson TITLE Pres President DATE

APPROVED BY W. A. Gressett TITLE SUPERVISOR, DISTRICT II DATE JAN 18 1980

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Form C-105
Revised 1-1-65

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WELL COMPLETION OR RECOMPLETION REPORT AND LOG
JAN 10 1980
O. C. D.
ARTESIA, OFFICE

5a. Indicate Type of Lease: State ☐ Fee ☒
5. State Oil & Gas Lease No.
RECEIVED
JAN 17 1980
O. C. D.
ARTESIA, OFFICE

1a. TYPE OF WELL
b. TYPE OF COMPLETION
OIL WELL ☐ GAS WELL ☐ DRY ☐ OTHER Brine Water Well
NEW WELL ☒ WORK OVER ☐ DEEPEN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ OTHER

7. Unit Agreement Name
8. Farm or Lease Name: Eugenie
9. Well No.: 2
10. Field and Pool, or Wildcat

2. Name of Operator: Permian Brine Sales & Service, Inc.
3. Address of Operator: Box 1591, 212 W. 5th St., Odessa, Texas 79760
4. Location of Well
UNIT LETTER M LOCATED 1288 FEET FROM THE South LINE AND 497 FEET FROM THE West LINE OF SEC. 17 TWP. 22S RGE. 27E NMPM
12. County: Eddy

| 15. Date Spudded | 16. Date T.D. Reached | 17. Date Compl. (Ready to Prod.) | 18. Elevations (DF, RKB, RT, GR, etc.) | 19. Elev. Cashinghead |
|---|---|---|---|---|
| Oct. 22, 1979 | 11-19-79 | 11-22-79 | GL 3126 | - |

| 20. Total Depth | 21. Plug Back T.D. | 22. If Multiple Compl., How Many | 23. Intervals Drilled By | Rotary Tools | Cable Tools |
|---|---|---|---|---|---|
| 618' | 583' | | → | | X |

24. Producing Interval(s), of this completion — Top, Bottom, Name: Salt Top 456' Bottom 592'
25. Was Directional Survey Made: No
26. Type Electric and Other Logs Run: None
27. Was Well Cored: No

28. CASING RECORD (Report all strings set in well)

| CASING SIZE | WEIGHT LB./FT. | DEPTH SET | HOLE SIZE | CEMENTING RECORD | AMOUNT PULLED |
|---|---|---|---|---|---|
| 5½" | 17# | 285' | 8" | 125 sx Circulated | None |
| 2½" | 6.5# | 583' | 5" | 100 sx Circulated | None |

29. LINER RECORD

| SIZE | TOP | BOTTOM | SACKS CEMENT | SCREEN |
|---|---|---|---|---|
| | Non | None | | |

30. TUBING RECORD

| SIZE | DEPTH SET | PACKER SET |
|---|---|---|
| | None | |

31. Perforation Record (Interval, size and number): None

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

| DEPTH INTERVAL | AMOUNT AND KIND MATERIAL USED |
|---|---|
| None | |

33. PRODUCTION

| Date First Production | Production Method (Flowing, gas lift, pumping — Size and type pump) | Well Status (Prod. or Shut-in) |
|---|---|---|
| 11-22-79 | Water Pump | Brine Water |

| Date of Test | Hours Tested | Choke Size | Prod'n. For Test Period → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Gas — Oil Ratio |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| Flow Tubing Press. | Casing Pressure | Calculated 24-Hour Rate → | Oil — Bbl. | Gas — MCF | Water — Bbl. | Oil Gravity — API (Corr.) |
|---|---|---|---|---|---|---|
| | | | | | | |

34. Disposition of Gas (Sold, used for fuel, vented, etc.)
Test Witnessed By

35. List of Attachments

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED A. L. Hickerson TITLE President DATE 11-30-79
A. L. Hickerson

## INSTRUCTIONS

This form is to be filled with the appropriate District Office of the Commission not later than [illegible] days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

## INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

| Southeastern New Mexico | | | | Northwestern New Mexico | | | |
|---|---|---|---|---|---|---|---|
| T. Anhy | 225' | T. Canyon | | T. Ojo Alamo | | T. Penn. "B" | |
| T. Salt | 456' | T. Strawn | | T. Kirtland-Fruitland | | T. Penn. "C" | |
| B. Salt | 592' | T. Atoka | | T. Pictured Cliffs | | T. Penn. "D" | |
| T. Yates | | T. Miss | | T. Cliff House | | T. Leadville | |
| T. 7 Rivers | | T. Devonian | | T. Menefee | | T. Madison | |
| T. Queen | | T. Silurian | | T. Point Lookout | | T. Elbert | |
| T. Grayburg | | T. Montoya | | T. Mancos | | T. McCracken | |
| T. San Andres | | T. Simpson | | T. Gallup | | T. Ignacio Qtzte | |
| T. Glorieta | | T. McKee | | Base Greenhorn | | T. Granite | |
| T. Paddock | | T. Ellenburger | | T. Dakota | | T. | |
| T. Blinebry | | T. Gr. Wash | | T. Morrison | | T. | |
| T. Tubb | | T. Granite | | T. Todilto | | T. | |
| T. Drinkard | | T. Delaware Sand | | T. Entrada | | T. | |
| T. Abo | | T. Bone Springs | | T. Wingate | | T. | |
| T. Wolfcamp | | T. | | T. Chinle | | T. | |
| T. Penn. | | T. | | T. Permian | | T. | |
| T Cisco (Bough C) | | T. | | T. Penn. "A" | | T. | |

## OIL OR GAS SANDS OR ZONES

No. 1, from ..... to .....  No. 4, from ..... to .....

No. 2, from ..... to .....  No. 5, from ..... to .....

No. 3, from ..... to .....  No. 6, from ..... to .....

## IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from ..... to ..... feet. .....

No. 2, from ..... to ..... feet. .....

No. 3, from ..... to ..... feet. .....

No. 4, from ..... to ..... feet. .....

## FORMATION RECORD (Attach additional sheets if necessary)

| From | To | Thickness in Feet | Formation | From | To | Thickness in Feet | Formation |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

# PERMIAN BRINE SALES, INC.

24-HOUR BRINE SERVICE THROUGHOUT THE PERMIAN BASIN

P. O. BOX 1591

ODESSA, TEXAS
79760

PHONE 332-0531



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JAN 17 1980

O. C. D.
ARTESIA, OFFICE


November 30, 1979

EUGENIE No.2 - Sec 17-T22S-R27E

Carlsbad, New Mexico

| | |
|---|---|
| 0 to 18 | TOP SOIL WITH GRAVEL |
| 18 to 19 | CAVE |
| 19 to 46 | CALICHE & GRAVEL |
| 46 to 50 | SAND & GRAVEL - SOME WATER |
| 50 to 58 | GRAVEL & LIME |
| 58 to 64 | LIME |
| 64 to 65 | RED BEDS |
| 65 to 78 | RED SAND |
| 78 to 107 | GRAVEL |
| 107 to 163 | BROWN CLAY, GRAVEL & SAND |
| 163 to 171 | RED BEDS |
| 171 to 178 | LIME VERY HARD |
| 178 to 225 | RED BEDS |
| 225 to 237 | ANHYDRITE & RED BEDS |
| 237 to 252 | LIME & ANHYDRITE W/ SOME GYP |
| 252 to 268 | RED BED |
| 268 to 280 | LIME W/GYP. STRINGERS |
| 280 to 285 | ANHYDRITE |
| 285 to 305 | GYP. W/SOME RED BEDS |
| 305 to 320 | GYP. & ANHYDRITE |
| 320 to 330 | RED BEDS |
| 330 to 360 | ANHYDRITE W/LIME & SAND |

360 to 410----------HARD ROCK & ANHYDRITE

410 to 430----------ANHYDRITE W/SOME LIME

430 to 437----------GRAY LINE (HARD) & ANHYDRITE

437 to 445----------ANHYDRITE

445 to 456----------ANHYDRITE & GRAY LIME

456 to 568----------SALT

568 to 576----------SALT & BLUE SHALE STRINGER

576 to 592----------SALT

592 to 610----------ANHYDRITE

NEW MEXICO OIL CONSERVATION COMMISSION

# WELL LOCATION AND ACREAGE DEDICATION PLAT

Form C-102
Supersedes C-128
Effective 1-1-65

All distances must be from the outer boundaries of the Section

| Operator | Lease | Well No. |
|---|---|---|
| Permian Brine Sales & Service, Inc. | Salt Water | 2 |

| Unit Letter | Section | Township | Range | County |
|---|---|---|---|---|
| M | 17 | 22South | 27East | Eddy |

Actual Footage Location of Well:
1288 feet from the South line and 497 feet from the West line

| Ground Level Elev. | Producing Formation | Pool | Dedicated Acreage |
|---|---|---|---|
| 3126.4 | Salt | | Acres |

1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below.

2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

3. If more than one lease of different ownership is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling. etc?

☐ Yes ☐ No If answer is "yes," type of consolidation _____

If answer is "no," list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary.) _____

No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interests, has been approved by the Commission.

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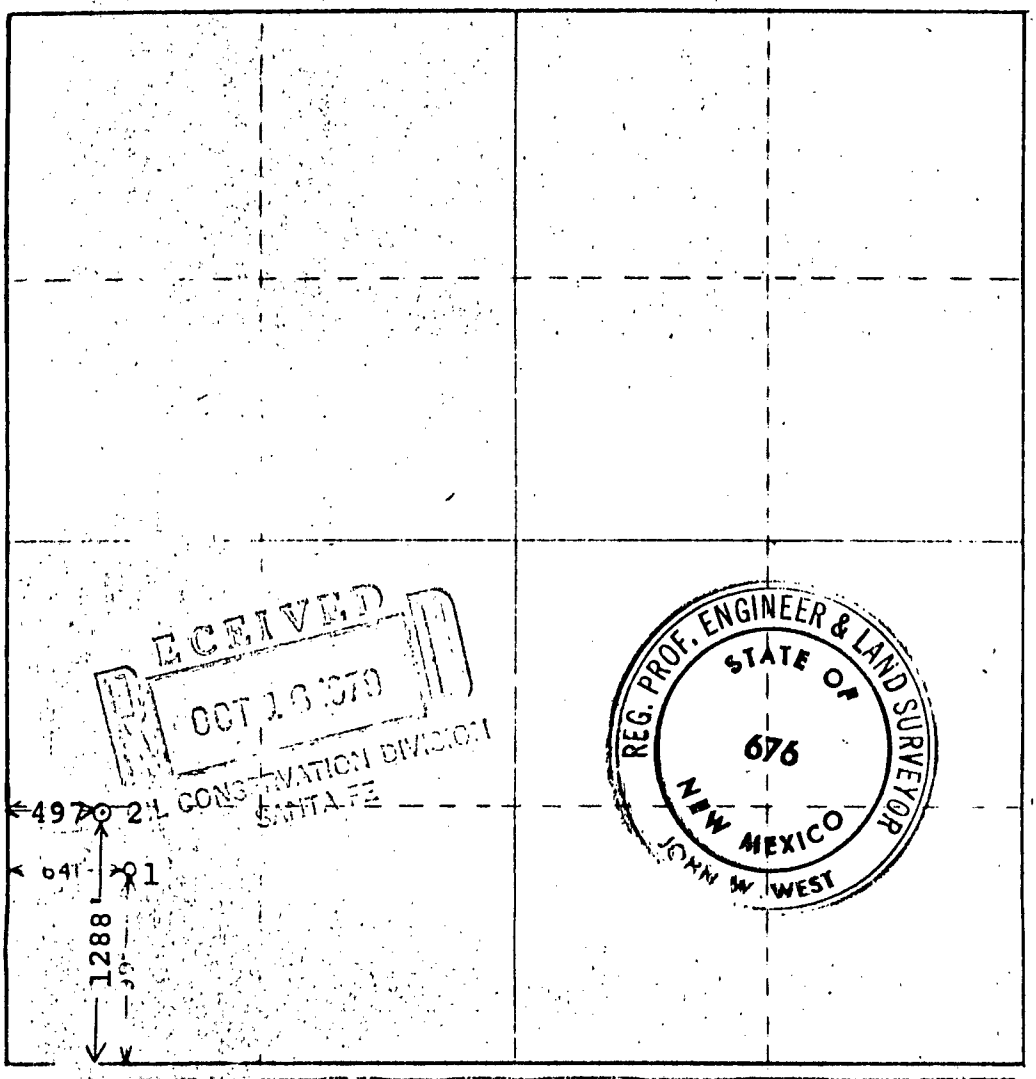


## CERTIFICATION

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

R. L. Henderson

Name Production Supt.

Position Permian Brine Sales & Service, Inc.

Company

8-28-79

Date

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

Aug. 15, 1979

Date Surveyed

Registered Professional Engineer and/or Land Surveyor

John W. West

Certificate No. John W. West 676
Ronald J. Eidson 3239

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30-015-23031

NEW MEXICO OIL CONSERVATION COMMISSION

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SEP 5 1979

O. C. C.

ARTESIA, OFFICE

Form C-101
Revised 1-1-65

5A. Indicate Type of Lease STATE ☐ FEE ☒

5. State Oil & Gas Lease No.

## APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. Type of Work

b. Type of Well: DRILL ☒ DEEPEN ☐ PLUG BACK ☐

OIL WELL ☐ GAS WELL ☐ OTHER Brine Water Well SINGLE ZONE ☐ MULTIPLE ZONE ☐

7. Unit Agreement Name

8. Farm or Lease Name: Eugenie

2. Name of Operator: Permian Brine Sales & Service, Inc. ✓

9. Well No.: 2

3. Address of Operator: Box 1591, 212 W. 5th St., Odessa, Texas 79760

10. Field and Pool, or Wildcat: Wildcat

4. Location of Well: UNIT LETTER M LOCATED 1288 FEET FROM THE South LINE AND 497 FEET FROM THE West LINE OF SEC. 17 TWP. 22S RGE. 27E NMPM

12. County: Eddy

| 19. Proposed Depth | 19A. Formation | 20. Rotary or C.T. |
|---|---|---|
| 600' | Salt | C.T. |

| 21. Elevations (Show whether DF, RT, etc.) | 21A. Kind & Status Plug. Bond | 21B. Drilling Contractor | 22. Approx. Date Work will start |
|---|---|---|---|
| 3126 G.L. | one well $5,000 applied for #610 057402 2 | Not selected yet | Oct. 1, 1979 |

23.

PROPOSED CASING AND CEMENT PROGRAM

| SIZE OF HOLE | SIZE OF CASING | WEIGHT PER FOOT | SETTING DEPTH | SACKS OF CEMENT | EST. TOP |
|---|---|---|---|---|---|
| 8" | 5 1/2" | 17# | 350' | 75 Sx. | Circulated |
| 4 3/4" | 2 7/8" | 6.4# | 580' | 50 Sx. | Circulated |
| | | | | | |

We propose to drill an 8" cable tool hole through the fresh water to 350', hang 5 1/2" casing, and circulate cement. Then drill a 4 3/4" hole inside the 5 1/2" casing to the bottom of the rock salt at approximately 600', hang 2 7/8" tubing to 580' and circulate cement. We then will fracture the rock salt section between 580-600 with fresh water across to the Eugenie #1 well, 327' away, Fresh water will then be circulated down the 2 7/8 in well No. 2, through the salt section to well No. 1 and out the tubing to storage for sale.

City of Carlsbad Notified

APPROVAL VALID FOR 90 DAYS UNLESS DRILLING COMMENCED,

EXPIRES 1-15-80

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: IF PROPOSAL IS TO DEEPEN OR PLUG BACK, GIVE DATA ON PRESENT PRODUCTIVE ZONE AND PROPOSED NEW PRODUCTIVE ZONE. GIVE BLOWOUT PREVENTER PROGRAM, IF ANY.

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

Signed C. V. Alexander Title President Date 9-4-79

(This space for State Use)

APPROVED BY W. A. Gressett TITLE SUPERVISOR, DISTRICT II DATE OCT 15 1979

CONDITIONS OF APPROVAL, IF ANY:

Cement must be circulated to surface behind 5 1/2" & 2 7/8" casing

Notify N.M.O.C.C. in sufficient time to witness cementing the 5 1/2" & 2 7/8" casing

OIL CONSERVATION DIVISION
ARTESIA, NEW MEX. 88210

TO: WAYNE PRICE

FROM: TIM GUM

DATE: 10-18-99

NUMBER OF SHEETS ( INCLUDING TRANSMITTAL SHEET ) 3

THIS TRANSMITTAL IS BEING FORWARDED TO YOU.

IF YOU HAVE ANY PROBLEMS WITH THIS TRANSMISSION, PLEASE CALL 505-748-1283.

FAX NUMBER (505) 748-9720

**P & S BRINE SALES**
**LIMITED PARTNERSHIP**
P.O. BOX 1769
EUNICE, NEW MEXICO 88231

October 18, 1999

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

Re: Mechanical Integrity Testing Supply Wells

Dear Mr. Wayne Price:

P & S Brine Sales would like to proceed with the cavern pressure test on the well in Eunice, October 25, 1999,8:00 am to 12:00 pm.

We are also in the process of purchasing Salado Brine Sales, #2 Brine Station. We would also like to proceed with the cavern pressure test on October 27, 1999, 8:00 am to 12:00 pm.

If possible, we would like to take the option to preform the cavern survey at a later date on both locations.

Sincerely yours,

Paul Prather
Owner

wp

P. & S. BRINE SALES, L.P.
(JAL)

| MONTH | BBLS. INJECTED | BBLS. SOLD |
|---|---|---|
| JANUARY | 0 | 0 |
| FEBRUARY | 0 | 0 |
| MARCH | 0 | 0 |
| APRIL | 0 | 0 |
| MAY | 0 | 0 |
| JUNE | 0 | 0 |
| JULY | 0 | 0 |
| AUGUST | 0 | 0 |
| SEPTEMBER | 0 | 0 |
| OCTOBER | | |
| NOVEMBER | | |
| DECEMBER | | |

THIS HAS BEEN PLUGGED. S.M.

| TOTALS BY QUARTER: | | | |
|---|---|---|---|
| 1998 | 0 | 1st QRTR. | 0 |
| | 0 | 2nd QRTR. | 0 |
| | 0 | 3rd QRTR. | 0 |
| | | 4th QRTR | |

Suzanne McReynolds
OFFICE MANAGER

10-7-98
DATE

P. & S. BRINE SALES, L.P.
P. O. BOX 1769
EUNICE, NM 88231

RECEIVED
OCT 16 1998
Environmental Bureau
Oil Conservation Division

P. & S. BRINE SALES, L.P.
(JAL)

| MONTH | BBLS. INJECTED | | BBLS. SOLD |
|---|---|---|---|
| JANUARY | 0 | | 0 |
| FEBRUARY | 0 | | 0 |
| MARCH | 0 | | 0 |
| APRIL | 0 | | 0 |
| MAY | 0 | | 0 |
| JUNE | 0 | | 0 |
| JULY | | | |
| AUGUST | | | |
| SEPTEMBER | | | |
| OCTOBER | | | |
| NOVEMBER | | | |
| DECEMBER | | | |
| TOTALS BY QUARTER: | 0 | 1st QRTR. | 0 |
| 1998 | 0 | 2nd QRTR. | 0 |
| | | 3rd QRTR. | |
| | | 4th QRTR | |

Suzanne M Reynolds
OFFICE MANAGER

7-8-98
DATE

P. & S. BRINE SALES, L.P.
P. O. BOX 1769
EUNICE, NM 88231

P. & S. BRINE SALES, L.P.
(JAL)

| MONTH | BBLS. INJECTED | | BBLS. SOLD |
|---|---|---|---|
| JANUARY | 0 | | 0 |
| FEBRUARY | 0 | | 0 |
| MARCH | 0 | | 0 |
| APRIL | | | |
| MAY | | | |
| JUNE | | | |
| JULY | | | |
| AUGUST | | | |
| SEPTEMBER | | | |
| OCTOBER | | | |
| NOVEMBER | | | |
| DECEMBER | | | |
| TOTALS BY QUARTER: | 0 | 1st QRTR. | 0 |
| 1998 | | 2nd QRTR. | |
| | | 3rd QRTR. | |
| | | 4th QRTR | |

Suzanne M'Reynolds
OFFICE MANAGER

4-8-98
DATE

P. & S. BRINE SALES, L.P.
P. O. BOX 1769
EUNICE, NM 88231

P. & S. BRINE SALES, L.P.
(JAL)

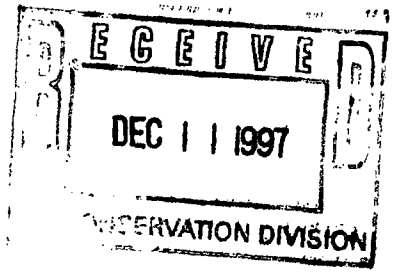
| MONTH | BBLS. INJECTED | | BBLS. SOLD |
|---|---|---|---|
| JANUARY | 0 | | 0 |
| FEBRUARY | 0 | | 0 |
| MARCH | 0 | | 0 |
| APRIL | 0 | | 0 |
| MAY | 0 | | 0 |
| JUNE | 0 | | 0 |
| JULY | 0 | | 0 |
| AUGUST | 0 | | 0 |
| SEPTEMBER | 0 | | 0 |
| OCTOBER | 0 | | 0 |
| NOVEMBER | 0 | | 0 |
| DECEMBER | 0 | | 0 |
| TOTALS BY QUARTER: | 0 | 1st QRTR. | 0 |
| 1997 | 0 | 2nd QRTR. | 0 |
| | 0 | 3rd QRTR. | 0 |
| | 0 | 4th QRTR | 0 |

Suzanne McReynolds
OFFICE MANAGER

1-27-98
DATE

P. & S. BRINE SALES, L.P.
P. O. BOX 1769
EUNICE, NM 88231

P & S BRINE SALES
LIMITED PARTNERSHIP
P.O. BOX 1769
EUNICE, NEW MEXICO 88231




December 5, 1997

Mr. Mark Ashley
Oil Conservation Division
2040 South Pacheco Street
Santa Fe, New Mexico 87505

Re: Requested Fluids Report

RECEIVED
DEC 1 1 1997
Environmental Bureau
Oil Conservation Division

Dear Mr. Mark Ashley:

Concerning your request of fluids injected and produced at the Jal brine well owned by P & S Brine Sales, we do not have the records to provide you this information. This well has changed hands four times. It has had no production for the last eighteen months.

Presently, this well is temporarily abandoned.

If we can be of further assistance, please contact this office.

Sincerely,

Paul Prather
Owner

P. & S. BRINE SALES, L.P.
(JAL)

| MONTH | BBLS. INJECTED | | BBLS. SOLD |
|---|---|---|---|
| JANUARY | 0 | | 0 |
| FEBRUARY | 0 | | 0 |
| MARCH | 0 | | 0 |
| APRIL | 0 | | 0 |
| MAY | 0 | | 0 |
| JUNE | 0 | | 0 |
| JULY | 0 | | 0 |
| AUGUST | 0 | | 0 |
| SEPTEMBER | 0 | | 0 |
| OCTOBER | 0 | | 0 |
| NOVEMBER | 0 | | 0 |
| DECEMBER | | | |
| TOTALS BY QUARTER: | 0 | 1st QRTR. | 0 |
| 1997 | 0 | 2nd QRTR. | 0 |
| | 0 | 3rd QRTR. | 0 |
| | | 4th QRTR | |

Suzanne McReynolds
OFFICE MANAGER

12-9-97
DATE

P. & S. BRINE SALES, L.P.
P. O. BOX 1769
EUNICE, NM 88231