

**CHECKLIST for ADMINISTRATIVE INJECTION APPLICATIONS**

Operator: ARCO PERMIAN Well: WASHINGTON '33' No. 20  
Contact: ELIZABETH CASPER Title: REGULATORY Phone: 915-688-5570  
DATE IN 4-7-98 RELEASE DATE 4-22-98 DATE OUT 5-27-98

Proposed Injection Application is for:  WATERFLOOD  Expansion  Initial  
Original Order: R-  Secondary Recovery  Pressure Maintenance  
**SENSITIVE AREAS**  SALT WATER DISPOSAL  Commercial Well

WIPP  Capitan Reef

Data is complete for proposed well(s)?  Additional Data Req'd \_\_\_\_\_

**AREA of REVIEW WELLS**

0 Total # of AOR C # of Plugged Wells  
1 Tabulation Complete 1 Schematics of P & A's  
1 Cement Tops Adequate 1 AOR Repair Required

**INJECTION FORMATION**

Injection Formation(s) WICHITA / CISCO Compatible Analysis YES

Source of Water or Injectate AREA PRODUCTION

**PROOF of NOTICE**

Copy of Legal Notice  Information Printed Correctly  
 Correct Operators  Copies of Certified Mail Receipts  
NO Objection Received  Set to Hearing \_\_\_\_\_ Date

**NOTES:** \_\_\_\_\_

**APPLICATION QUALIFIES FOR ADMINISTRATIVE APPROVAL?** YES

**COMMUNICATION WITH CONTACT PERSON:**

1st Contact:  Telephoned  Letter \_\_\_\_\_ Date \_\_\_\_\_ Nature of Discussion \_\_\_\_\_  
2nd Contact:  Telephoned  Letter \_\_\_\_\_ Date \_\_\_\_\_ Nature of Discussion \_\_\_\_\_  
3rd Contact:  Telephoned  Letter \_\_\_\_\_ Date \_\_\_\_\_ Nature of Discussion \_\_\_\_\_



ARCO Permian  
600 North Marienfeld  
Midland TX 79701-4373  
Post Office Box 1610  
Midland TX 79702-1610  
Telephone 915 688 5570

Elizabeth A. Casbeer  
Regulatory Compliance Analyst

SWD 4/22/98  
711  
APR - 7 1998

March 31, 1998

New Mexico Oil Conservation Division  
ATTN: David Catanach  
2040 S. Pacheco Street  
Santa Fe, New Mexico 87505

RE: Application for Authorization to Inject  
Washington 33 Well No. 20-SWD  
Section 33, T17S, R28E  
Eddy Co., NM

Mr. Catanach:

ARCO Permian respectfully requests approval for the enclosed Application for Authorization to Inject (Form C-108) for the Washington 33 Well No. 20-SWD, located in Section 33, T17S, R28E, Eddy County, New Mexico. Enclosed are the required attachments.

If you have any questions, please contact me at 915/688-5570. Please send the permit to:

ARCO Permian  
ATTN: Elizabeth A. Casbeer, Room 959-54  
P. O. Box 1610  
Midland, TX 79702

Yours very truly,

Elizabeth A. Casbeer  
Regulatory Compliance Analyst

xc: Larry Henson - EUN  
Donald Knipe - 61323/MIO  
Central Files - 41/MIO  
R/C Files

DATE  
APPROVED  
SUPERVISOR  
LOGNO  
TIME

ABOVE THIS LINE FOR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION  
- Engineering Bureau -

ADMINISTRATIVE APPLICATION COVERSHEET

THIS COVERSHEET IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS

Application Acronyms:

[NSP-Non-Standard Proration Unit] [NSL-Non-Standard Location]  
[DD-Directional Drilling] [SD-Simultaneous Dedication]  
[DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling]  
[PC-Pool Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement]  
[WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion]  
[SWD-Salt Water Disposal] [IPI-Injection Pressure Increase]  
[EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response]

[1] TYPE OF APPLICATION - Check Those Which Apply for [A]

[A] Location - Spacing Unit - Directional Drilling  
 NSL  NSP  DD  SD

Check One Only for [B] or [C]

[B] Commingling - Storage - Measurement  
 DHC  CTB  PLC  PC  OLS  OLM

[C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery  
 WFX  PMX  SWD  IPI  EOR  PPR

] NOTIFICATION REQUIRED TO: - Check Those Which Apply, or  Does Not Apply

[A]  Working, Royalty or Overriding Royalty Interest Owners

[B]  Offset Operators, Leaseholders or Surface Owner

[C]  Application is One Which Requires Published Legal Notice

[D]  Notification and/or Concurrent Approval by BLM or SLO  
U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office

[E]  For all of the above, Proof of Notification or Publication is Attached, and/or,

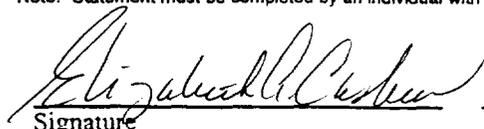
[F]  Waivers are Attached

[3] INFORMATION / DATA SUBMITTED IS COMPLETE - Statement of Understanding

I hereby certify that I, or personnel under my supervision, have read and complied with all applicable Rules and Regulations of the Oil Conservation Division. Further, I assert that the attached application for administrative approval is accurate and complete to the best of my knowledge and where applicable, verify that all interest (WI, RI, ORRI) is common. I further verify that all applicable API Numbers are included. I understand that any omission of data, information or notification is cause to have the application package returned with no action taken.

Note: Statement must be completed by an individual with supervisory capacity.

Elizabeth A. Casbeer  
Print or Type Name

  
Signature

Regulatory Compliance Analyst  
Title

March 31, 1998  
Date

## APPLICATION FOR AUTHORIZATION TO INJECT

- I. Purpose:  Secondary Recovery  Pressure Maintenance  Disposal  Storage  
Application qualifies for administrative approval?  yes  no
- II. Operator: ARCO Permian  
Address: PO Box 1510, Midland, TX 79702  
Contact party: Elizabeth A. Casbeer Phone: (915) 688-5570
- III. Well data: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.
- IV. Is this an expansion of an existing project?  yes  no  
If yes, give the Division order number authorizing the project \_\_\_\_\_.
- V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.
- \* VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.
- VII. Attach data on the proposed operation, including:
1. Proposed average and maximum daily rate and volume of fluids to be injected;
  2. Whether the system is open or closed;
  3. Proposed average and maximum injection pressure;
  4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and
  5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).
- \*VIII. Attach appropriate geological data on the injection zone including appropriate lithologic detail, geological name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such source known to be immediately underlying the injection interval.
- IX. Describe the proposed stimulation program, if any.
- \* X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division they need not be resubmitted.)
- \* XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.
- XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.
- XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.
- XIV. Certification
- I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.
- Name: Elizabeth A. Casbeer Title Regulatory Compliance Analyst  
Signature: *Elizabeth A. Casbeer* Date: March 31, 1998
- \* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be duplicated and resubmitted. Please show the date and circumstance of the earlier submittal.  
\_\_\_\_\_

## III. WELL DATA

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

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

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

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

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

## XIV. PROOF OF NOTICE

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

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

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

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

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

Form C-108  
Application For Authorization To Inject  
ARCO Permian, Operator  
Washington 33 No. 20-SWD  
(formerly: Empire Abo Unit No. G-301)  
API: 30-015-21891  
Section 33, T17S, R28E, Eddy County, New Mexico

- I. The purpose of the well is as a disposal well for area Grayburg/San Sandres produced water.
- II. Operator: ARCO Permian  
P. O. Box 1610  
Midland, Texas 79702-1610  
Contact: Donald L. Knipe, P.E. (915) 688-5316
- III. Well Data: See Attachment A, B, and C.
- IV. This is not an expansion of an existing project.
- V. Map of wells and leases within 2 miles and 1/2 mile radius: See Attachment D.
- VI. Data on wells within 1/2 mile area of review: See Attachment E and E1.
- VII.
  1. Proposed average daily injection volume: 10,000 BWPD  
Proposed maximum daily injection volume: 10,000 BWPD  
Attachment F
  2. This will be a closed system.
  3. Proposed average daily injection pressure: 1640 psi  
Proposed maximum daily injection pressure: 1640 psi  
Attachment F
  4. Sources of injection water will be produced water from area Grayburg/San Andres wells that are scheduled to be drilled in Section 33, T17S, R28E.  
Attachment G
  5. Chlorides in all of the source well is expected to be similar to the water analysis in Attachment H.

- VIII. The proposed injection zone is the Wolfcamp interval 6990'-7550' and Cisco interval 7890'-8680'. The Wolfcamp is Permian age carbonate and the Cisco is Pennsylvanian age carbonate. Possible fresh drinking water zones overlie the proposed injection formations at depths to approximately 460'. No drinking water sources are found underlying the proposed injection zone.
- IX. The proposed injection interval may be acidized with 15% HCL acid and sand fractured as needed.
- X. All well logs and test data available have been previously submitted to the NMOCD, Once the well is recompleted, a copy of any additional logs run will be forwarded to the NMOCD.
- XI. One fresh water well exist within a mile of the proposed injection well. The well is owned by ARCO Permian in the NW/NW of Section 3, T18S, R28E. Attachment L.
- XII. The applicant has examined geological and engineering data and find there is no evidence of open faults or other hydrologic connection between the proposed disposal zone and any underground source of drinking water. Attachment I.
- XIII. Proof of Notice
- A. A copy of the application has been sent by certified mail to the surface owner and offset operators of leases within 1/2 mile (see list attached - Attachment J).
- B. A copy of the legal advertisement is attached (Attachment K). Proof of publication in an Eddy County newspaper will be forwarded once available.
- XIV. Certification: See signature on form C-108.

ARCO Permian  
 Washington 33 No. 20-SWD  
 (formerly: Empire Abo Unit No. G-301)  
 API: 30-015-21891  
 1315' FSL & 1315' FWL (K)  
 Section 33, 17S, 28E  
 Eddy County, New Mexico

**Attachment A**

III. Well Data

Section A:

1. Lease Name: Washinton 33 No. 20-SWD

Location: 1315' FSL & 1315' FWL, Sec. 33, T17S, R28E, Eddy County, NM

2. Casing and Cement

EXISTING

<u>Casing Size</u>	<u>Setting Depth</u>	<u>Sacks Cement</u>	<u>Hole Size</u>	<u>Top of Cement</u>
10-3/4"	700'	410	17-1/2"	circ. to surface
7-5/8"	6705'	1550	9-1/2"	circ. to surface

PROPOSED

<u>Casing Size</u>	<u>Setting Depth</u>	<u>Sacks Cement</u>	<u>Hole Size</u>	<u>Top of Cement</u>
13-3/8"	745'	600	17-1/2"	circ. to surface
7-5/8"	6705'	1550	9-1/2"	circ. to surface
5-1/2"	6150'-8750'	150	6-1/2"	circ. to liner top

**NOTE:** It is proposed to drill out cement plugs to 8750'. RIH w/5-1/2" liner from 6100' to 8750' and circulate cement to top of liner.

3. Tubing: 3-1/2", 9.3# internally plastic coated set at ±6950'.
4. Packer: Baker Lok-Set or Guiberson UNI-VI nickel plated or plastic coated set at ±6950'.

ARCO Permian  
Washington 33 No. 20-SWD  
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API: 30-015-21891  
1315' FSL & 1315' FWL (K)  
Section 33, 17S, 28E  
Eddy County, New Mexico

**Attachment A-Continued**

III. Well Data - Continued

Section B:

1. Injection Formation: Wolfcamp and Cisco

Field or Pool Name: Undesignated

2. Injection Interval:

<u>Formation</u>	<u>Top</u>	<u>Porosity Interval</u>
Wolfcamp	6960'	6990'-7550'
Cisco	7863'	7890'-8680'

3. Original purpose of well: Drilled to test Morrow Formation.

4. Other perforated intervals, bridge plugs, cement plugs:

Perforations	6250' - 6270'	Squeezed w/50 sx cement
Drain Hole	6234' - 6235'	Squeezed w/150 sx cement

5. Next higher oil and gas zone: Abo (oil)  
Next lower oil and gas zone: Morrow (gas)

**See current and proposed wellbore schematic (Attachment B and C)**

# WELLBORE SCHEMATIC

## COMPLETION BEFORE SWD CONVERSION

10-3/4" 40.5# & 32.75# H-40 csg  
cmt'd w/410 sx, circ. to surf.  
Shoe @ 700'

**ATTACHMENT B**

## Empire Abo Unit G-301

1315' FSL & 1315' FWL (K)

Sec. 33, T-17-S, R-28-E

API: 30-015-21891

Spudded 9/16/76

Completed 12/29/76

KB: 3690.9'

GL: 3667'

5-1/2" FJ Sheath Pipe  
w/top of liner hanger @ 6100'

Drainhole  
f/6234-6435'

7-5/8" 26.4# K-55 & N-80 csg  
Cmt'd w/1550 sx, circ DV @ 3975'  
TOC @ Surf., Shoe @ 6705'

2-3/8" (194 Jts) tbg @ 6091'  
w/MA,PN, & TAC @ 6062'

Pkr & Whipstock @ 6234'

Perfs @ 6250-70' (2 spf - Sqzd)

Cement Retainer @ 6520'  
PBTD @ 6301'

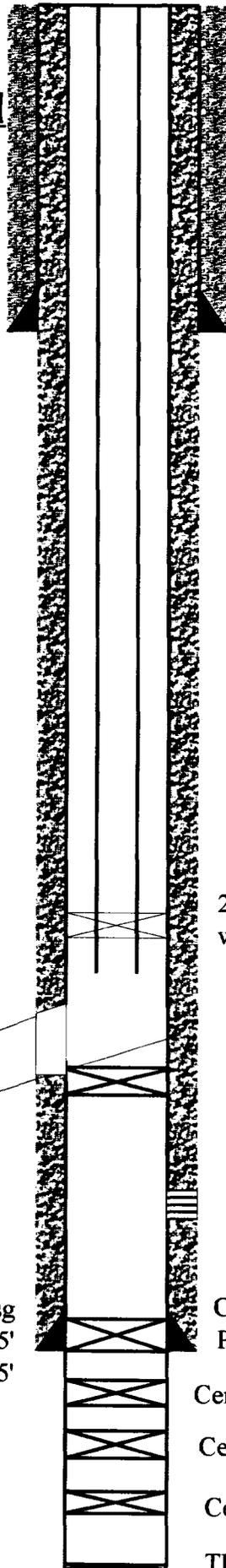
Cement Plug @ 7718-7900'

Cement Plug @ 9118-9300'

Cement Plug @ 10,018-200'

TD @ 10,498'

03/05/98  
D.KNIPE



# WELLBORE SCHEMATIC

## COMPLETION AFTER SWD CONVERSION

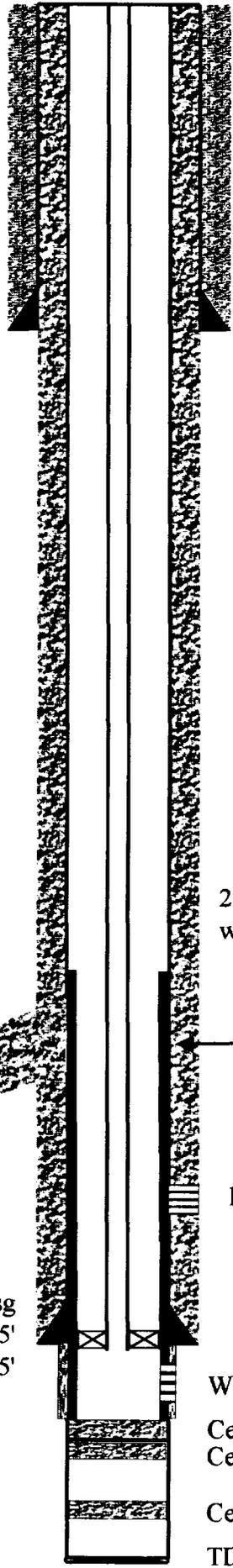
## Washington 33 State No. 20 - SWD

10-3/4" 40.5# & 32.75# H-40 csg  
cmt'd w/410 sx, circ. to surf.  
Shoe @ 700'

1315' FSL & 1315' FWL (K)  
Sec. 33, T-17-S, R-28-E  
API: 30-015-21891  
Spudded 9/16/76  
Completed 12/29/76

KB: 3690.9'      GL: 3667'

ATTACHMENT C



2-3/8" (194 Jts) tbg @ 6091'  
w/MA,PN, & TAC @ 6062'

5-1/2" N-80 liner  
cmt'd w/150 sx  
from 6150'-8750'

Perfs @ 6250-70' (2 spf - Sqzd)

Drainhole  
f/6234-6435'  
Sqz'd w/cmt.

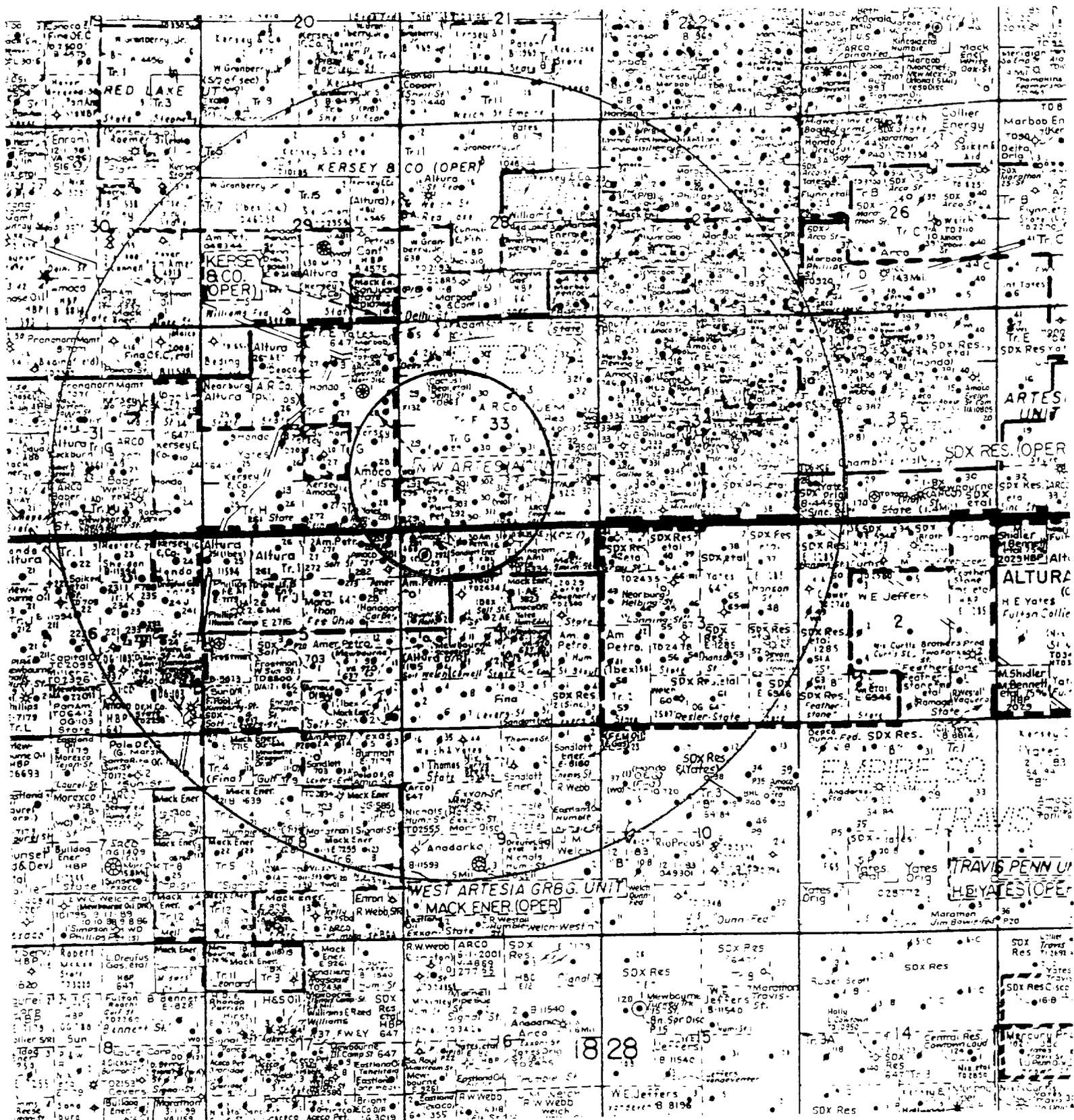
7-5/8" 26.4# K-55 & N-80 csg  
Cmt'd w/1550 sx, circ DV @ 3975'  
TOC @ Surf., Shoe @ 6705'

Wolfcamp & Cisco Perfs: 6990-8680'

Cement Plug @ 8750'-9118'  
Cement Plug @ 9118'-9300'

Cement Plug @ 10,018-200'  
TD @ 10,498'

03/05/98  
D.KNIPE



Attachment D

ARCO Permian - Washington 33 No. 20 - SWD

Wells within 1/2 mile and 2 mile Radius

ARCO Permian  
Washington 33 No. 20-SWD  
(formerly: Empire Abo Unit No. G-301)  
API: 30-015-21891  
1315' FSL & 1315' FWL (K)  
Section 33, 17S, 28E  
Eddy County, New Mexico

**Attachment E**

VI. Data on wells within the 1/2 mile area of review:

The are no wells within 1/2 mile of the Washington 33 No. 20-SWD that penetrate the zones of injection.

ARCO Permian  
Washington 33 No. 20-SWD  
(formerly: Empire Abo Unit No. G-301)  
API: 30-015-21891  
1315' FSL & 1315' FWL (K)  
Section 33, 17S, 28E  
Eddy County, New Mexico

**Attachment F**

Proposed Operation:

1. Plans are to inject 10,000 barrels of produced water per day.
2. The injection system will be a closed system.
3. The proposed injection pressure is 1640 psig.
4. The injection fluid will be Grayburg/San Andres produced water.
5. See attached water analysis taken from an offset operator's Grayburg/San Andres producing well. Attachment H.

ARCO Permian  
Washington 33 No. 20-SWD  
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Section 33, 17S, 28E  
Eddy County, New Mexico

**Attachment G**

VII. Item 4.

List of Proposed Produced Water Source Wells:

Washington 33 State No. 1	Washington 33 State No. 16
Washington 33 State No. 2	Washington 33 State No. 17
Washington 33 State No. 3	Washington 33 State No. 18
Washington 33 State No. 4	Washington 33 State No. 19
Washington 33 State No. 5	Washington 33 State No. 20A
Washington 33 State No. 6	Washington 33 State No. 21
Washington 33 State No. 7	Washington 33 State No. 22
Washington 33 State No. 8	Washington 33 State No. 23
Washington 33 State No. 9	Washington 33 State No. 24
Washington 33 State No. 10	Washington 33 State No. 25
Washington 33 State No. 11	Washington 33 State No. 26
Washington 33 State No. 12	Washington 33 State No. 27
Washington 33 State No. 13	Washington 33 State No. 28
Washington 33 State No. 14	Washington 33 State No. 29
Washington 33 State No. 15	Washington 33 State No. 30

# ATTACHMENT H

## Pro-Kem, Inc.

### WATER ANALYSIS REPORT

#### SAMPLE

Oil Co. : Devon Energy  
 Lease : West Red Lake Unit  
 Well No.: Free-Water Knock-Out  
 Salesman:

Sample Loc. :  
 Formation : GRAYBURG - SAN ANDRES  
 Date Analyzed: 17-June-1996

#### ANALYSIS

1. pH 6.820
2. Specific Gravity 60/60 F. 1.091
3. CaCO<sub>3</sub> Saturation Index @ 80 F. +0.731  
 @ 140 F. +1.611

Dissolved Gasses MG/L EQ. WT. \*MEQ/L

4. Hydrogen Sulfide 275
5. Carbon Dioxide 200
6. Dissolved Oxygen Not Determined

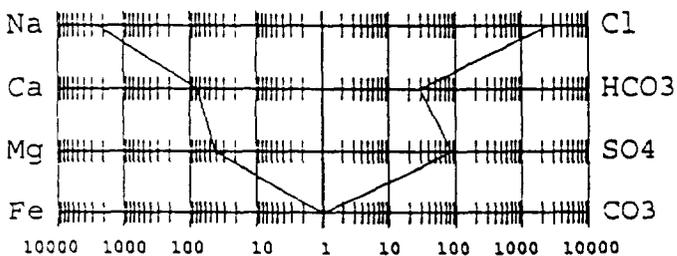
Cations

- |     |           |                     |                |   |        |          |
|-----|-----------|---------------------|----------------|---|--------|----------|
| 7.  | Calcium   | (Ca <sup>++</sup> ) | 1,503          | / | 20.1 = | 74.78    |
| 8.  | Magnesium | (Mg <sup>++</sup> ) | 486            | / | 12.2 = | 39.84    |
| 9.  | Sodium    | (Na <sup>+</sup> )  | 55,071         | / | 23.0 = | 2,394.39 |
| 10. | Barium    | (Ba <sup>++</sup> ) | Not Determined |   |        |          |

Anions

- |     |                                     |                                  |            |   |        |          |
|-----|-------------------------------------|----------------------------------|------------|---|--------|----------|
| 11. | Hydroxyl                            | (OH <sup>-</sup> )               | 0          | / | 17.0 = | 0.00     |
| 12. | Carbonate                           | (CO <sub>3</sub> <sup>=</sup> )  | 0          | / | 30.0 = | 0.00     |
| 13. | Bicarbonate                         | (HCO <sub>3</sub> <sup>-</sup> ) | 1,713      | / | 61.1 = | 28.04    |
| 14. | Sulfate                             | (SO <sub>4</sub> <sup>=</sup> )  | 4,100      | / | 48.8 = | 84.02    |
| 15. | Chloride                            | (Cl <sup>-</sup> )               | 84,981     | / | 35.5 = | 2,393.83 |
| 16. | Total Dissolved Solids              |                                  | 147,854    |   |        |          |
| 17. | Total Iron (Fe)                     |                                  | 2          | / | 18.2 = | 0.11     |
| 18. | Total Hardness As CaCO <sub>3</sub> |                                  | 5,755      |   |        |          |
| 19. | Resistivity @ 75 F. (Calculated)    |                                  | 0.042 /cm. |   |        |          |

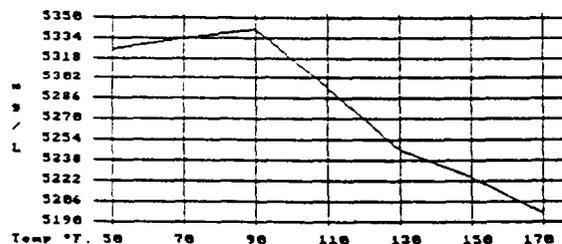
LOGARITHMIC WATER PATTERN  
 \*meq/L.



PROBABLE MINERAL COMPOSITION  
 COMPOUND EQ. WT. X \*meq/L = mg/L.

Na	Cl	Ca(HCO <sub>3</sub> ) <sub>2</sub>	81.04	28.04	2,272
Ca	HCO <sub>3</sub>	CaSO <sub>4</sub>	68.07	46.74	3,182
Mg	SO <sub>4</sub>	CaCl <sub>2</sub>	55.50	0.00	0
Fe	CO <sub>3</sub>	Mg(HCO <sub>3</sub> ) <sub>2</sub>	73.17	0.00	0
		MgSO <sub>4</sub>	60.19	37.28	2,244
		MgCl <sub>2</sub>	47.62	2.56	122
		NaHCO <sub>3</sub>	84.00	0.00	0
		NaSO <sub>4</sub>	71.03	0.00	0
		NaCl	58.46	2,391.27	139,794

Calcium Sulfate Solubility Profile



\*Milli Equivalents per Liter

This water is slightly corrosive due to the pH observed on analysis. Corrosivity is increased by the content of mineral salts, and the presence of H<sub>2</sub>S, CO<sub>2</sub> in solution.

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Section 33, 17S, 28E  
Eddy County, New Mexico

**Attachment I**

**Geology and Lithology:**

Injection zones are dolomite and limestone porosity zones within the Wolfcamp and Cisco formations. Specifically they are:

<u>Formation</u>	<u>Top</u>	<u>Porosity Interval</u>
Wolfcamp	6960'	6990'-7550'
Cisco	7863'	7890'-8680'

**Fresh Water Zones:**

Base of near surface aquifer is at the top of the Yates Sand at 460'. No fresh water zones exist below the proposed injection interval.

**STATE OF TEXAS**

**COUNTY OF MIDLAND**

**BEFORE ME**, the undersigned authority on this day personally appeared Elizabeth A. Casbeer, an Regulatory Compliance Analyst with **ARCO Permian**, who being by me duly sworn, deposes and states that the persons listed on the foregoing attached list have been sent a copy on March 31, 1998, of the New Mexico Oil Conservation Division form C-108 entitled, "Application For Authorization To Inject" for the Washington 33 Well No. 20-SWD, located in Section 33, T17S, R28E, Eddy County New Mexico.

**ARCO Permian**

  
Elizabeth A. Casbeer

**SUBSCRIBED AND SWORN TO** before me on March 31, 1998, to certify which witness my hand and seal of office.

  
**NOTARY PUBLIC, STATE OF TEXAS**



LEIGH ANN LANE  
Notary Public, State of Texas  
My Commission Expires: 12-12-2000

ARCO Permian  
Washington 33 No. 20-SWD  
(formerly: Empire Abo Unit No. G-301)  
API: 30-015-21891  
1315' FSL & 1315' FWL (K)  
Section 33, 17S, 28E  
Eddy County, New Mexico

**Attachment J**

XIII. Item A.

Proof of Notice

List of Surface Owners within 2 Miles:

State of New Mexico  
P. O. Box 1148  
Santa Fe, New Mexico 87504-1148

Bureau of Land Management  
620 East Greene Street  
Carlsbad, New Mexico 88220

Pulitzer Broadcasting Corporation  
P. O. Box 25982  
Albuquerque, New Mexico 87107

Bogle, Ltd.  
P. O. Box 460  
Dexter, New Mexico 88230

ARCO Permian  
Washington 33 No. 20-SWD  
(formerly: Empire Abo Unit No. G-301)  
API: 30-015-21891  
1315' FSL & 1315' FWL (K)  
Section 33, 17S, 28E  
Eddy County, New Mexico

**Attachment J - Continued**

XIII. Item A-Continued.

List of Lease Operators Within 1/2 Mile:

ARCO Permian  
P. O. Box 1610  
Midland, Texas 79702

(NE/4 & E/2 of SE/4, Section 32, T17S, R28E, Eddy County, New Mexico  
Kersey & Company  
808 Grand  
Artesia, New Mexico 88210

(NE/4 of NE/4, Section 4, T18S, R28E, Eddy County, New Mexico  
Mack Chase, Trustee of Mack C. & Marilyn Y. Chase Trust - Operator  
P. O. Box 1767  
Artesia, New Mexico 88211  
Mr. Robert Chase

(NW/4 of NE/4, Section 4, T18S, R28E, Eddy County, New Mexico  
Bulldog Energy Corporation  
P. O. Box 668  
Artesia, New Mexico 88210

(NE/4 of NW/4, Section 4, T18S, R28E, Eddy County, New Mexico  
ARCO Permian  
P. O. Box 1610  
Midland, Texas 79702  
Mr. Lee Scarborough

Altura Energy, Ltd.  
P. O. Box 4294  
Houston, Texas 77210-4294  
Mr. Jerry D. West

ARCO Permian  
Washington 33 No. 20-SWD  
(formerly: Empire Abo Unit No. G-301)  
API: 30-015-21891  
1315' FSL & 1315' FWL (K)  
Section 33, 17S, 28E  
Eddy County, New Mexico

**Attachment J - Continued**

XIII. Item A-Continued.

(NW/4 of NW/4, Section 4, T18S, R28E, Eddy County, New Mexico  
Jack Brewer d/b/a Sandlott Energy - Operator  
1504 W. Madison  
Lovington, New Mexico 88260

(NE/4 of NE/4, Section 5, T18S, R28E, Eddy County, New Mexico  
Fina Oil & Chemical Company      Tom L. Ingram  
P. O. Box 62102                      P. O. Box 1757  
Houston, Texas 77205-2102        Roswell, New Mexico 88201  
Mr. Keith Turner

Petco Ltd.  
P. O. Box 911  
Breckenridge, Texas 76424

Eugene E. Nearburg Estate  
c/o Gretchen Nearburg, a widow  
1608 Lakeway Blvd.  
Austin, Texas 78734

Ben A. Cooper, Jr.  
P. O. Box 606  
Cisco, Texas 76437

Emma Jean Warren  
P. O. Box 1025  
Mineral Wells, Texas 76067

ARCO Permian  
Washington 33 No. 20-SWD  
(formerly: Empire Abo Unit No. G-301)  
API No. 30-015-21891  
1315' FSL & 1315' FWL (K)  
Section 33, T17S, R28E  
Eddy County, New Mexico

**Attachment K**

XIII. Item B.

**LEGAL NOTICE**

**ARCO PERMIAN**, P. O. Box 1610, Midland, Texas 79702, has filed form C-108 (Application For Authorization To Inject) with the New Mexico Oil Conservation Division seeking administrative approval for a salt water disposal well. The proposed well, the Washington 33 No. 20-SWD is located 1315' FSL, 1315' FWL, Section 33, Township 17 South, Range 28 East, Eddy County, New Mexico. Disposal water will be sourced from area wells producing from the Grayburg/San Andres formations. The disposal water will be injected into the Wolfcamp and Cisco formations at a depth of 6960'-8700', a maximum surface pressure of 1640 psi, and a maximum rate of 10,000 BWPD.

All interested parties opposing the action must file objections or requests for hearing with the Oil Conservation Division, 2040 S. Pacheco Street, Santa Fe, New Mexico 87505, within 15 days. Additional information can be obtained by contacting Elizabeth A. Casbeer, Regulatory Compliance Analyst, at P. O. Box 1610, Midland, Texas 79702, or (915) 688-5570.

# Affidavit of Publication

No 18384

State of New Mexico,  
County of Eddy, ss.

March 20, 1998

### LEGAL NOTICE

Amy McKay

ARCO PERMIAN, P.O. Box 1610, Midland, Texas 79702, has filed form C-108 (Application For Authorization To Inject) with the New Mexico Oil Conservation Division seeking administrative approval for a salt water disposal well. The proposed well the Washington 33 No. 20-SWD is located 1315 FSL, 1315 FWL, Section 33, Township 17 South, Range 28 East, Eddy County, New Mexico. Disposal water will be sourced from area wells producing from the Grayburg/San Andres formations. The disposal water will be injected into the Wolfcamp and Cisco formations at a depth of 6960' - 8700', a maximum surface pressure of 1640 psi, and a maximum rate of 10,000 BWPD.

being first duly sworn, on oath says:

That she is Business Manager of the Carlsbad Current-Argus, a newspaper published daily at the City of Carlsbad, in said county of Eddy, state of New Mexico and of general paid circulation in said county; that the same is a duly qualified newspaper under the laws of the state wherein legal notices and advertisements may be published; that the printed notice attached hereto was published in the regular and entire edition of said newspaper and not in supplement thereof on the date as follows, to wit:

All interested parties opposing the action must file objections or requests for hearing with the Oil Conservation Division, 2040 S. Pacheco Street, Santa Fe, New Mexico 87505, within 15 days. Additional information can be obtained by contacting Elizabeth A. Casbeer, Regulatory Compliance Analyst, at P.O. Box 1610, Midland, Texas 79702, or (915) 688-5570.

March 20, 1998  
\_\_\_\_\_, 19\_\_\_\_  
\_\_\_\_\_, 19\_\_\_\_  
\_\_\_\_\_, 19\_\_\_\_  
\_\_\_\_\_, 19\_\_\_\_  
\_\_\_\_\_, 19\_\_\_\_

That the cost of publication is \$ 26.31, and that payment thereof has been made and will be assessed as court costs.

Amy McKay

Subscribed and sworn to before me this

30<sup>th</sup> day of March, 1998

Donna Crump

My commission expires 8/1/98  
Notary Public