

APPLICATION FOR AUTHORIZATION TO INJECT

'80 JUL 9 AM 9 38

- I. Purpose: ☐ Secondary Recovery ☐ Pressure Maintenance ☒ Disposal ☐ Storage
Application qualifies for administrative approval? ☐ yes ☐ no
- II. Operator: Amoco Production Company
Address: P.O. Box 800 Denver, CO 80201
Contact party: Paul Edwards Phone: (303) 830-5572
- 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: Kevin J. Kilstrom Title: Division Operations Engineer
Signature: Kevin J. Kilstrom Date: 5-21-90
- * 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.

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

- III. A. See Injection Well Data Sheet
- B. 1. Name of injection formation is the Morrison.
(no field or pool name for this formation.)
2. The 7425' - 7580' injection interval has been selected from logs run to total depth. Intervals will be perforated with 4 spf.
3. This well will be recompleted for the purpose of injection for water disposal.
4. The Dakota sand which had 164' of perforations from 7078' to 7355' was squeezed with 100 sacks of cement. Also, a foot of perforations at 4227' were squeezed with 50 sacks of cement.
5. The Dakota formation, top 7078', is the next higher formation known to produce gas in this area; there is no known lower oil or gas producing formation.
- VI. No wells within the area of review penetrate the proposed injection zone.
- VII. 1. Rate of disposal will be determined by a step rate injection test. The primary use of the facility will be for disposal of produced water from area Fruitland coal development wells. The amount of water to be injected will depend on this development.
2. The proposed injection system will be designed as a closed system.
3. Maximum injection pressure will be determined by a step rate injection test. Average injection pressure will be kept below this maximum pressure.
4. Area Fruitland Coal Wells

	Na	Ca	Mg	K	Cl	HCO ₃	SO ₄	CO ₃	TDS
Cahn #1	5670	48	23	106	2016	12029	25	0	19917
Ealum C-1R	5567	32	34	35	994	13445	0	0	20107
State BW #1	4850	40	24	70	861	11760	25	0	17630
State BX #1	5842	43	37	93	1483	13444	50	0	20967

The above listed wells and the analyses of produced water are indicative of the water that will be injected into the Mudge LS-16.

Compatibility - Attached is a copy of the results of an Amoco scaling tendency program which supports the source water is compatible with the injection zone water.

5. Attached is a water analysis sample from the Blackwood Nichols NEBU # 501, NW 1/4, Section 20, T30N, R7W, Rio Arriba County, New Mexico.

VIII. The closest overlying aquifers are the Ojo Alamo, Animas, San Jose, and Nacimiento. The Ojo Alamo should be encountered in this well at 1040'. There are no known aquifers below the Morrison.

The proposed injection zones are the sandy and porous portions of the Morrison formation. At the proposed Mudge LS 16 location the zone could be described as follows:

Morrison - light gray to gray, fine grained to medium grained, well rounded and slightly calcareous sandstones. Individual sandstone bodies are 10-50' thick separated by shales and siltstones. Some sandstones may be slightly arkosic, but generally are quartzitic with some friable sands. Overall depth is 7428' - 7570' with overlying unit being Burro Canyon. A sand thickness of 150' is penetrated.

- IX. Completion will consist of perforating selected porous intervals in the Morrison. There will be no fracture stimulation.
- X. Test information and logs will be provided to the District NMOC office as available.
- XI. A search of state records with the State Engineers office revealed no fresh water wells within the area of review. A field search also substantiates that find.
- XII. I hereby certify that I have examined available geologic

Mudge L.S. 16

and engineering data and can find no evidence of connection between the disposal zone and underground drinking water sources.

XIII. Proof of notice.

May 7, 1995
Date

Paul A. Edwards
Paul A. Edwards
Operations Engineer

90011.PAE/ses

(see attached addressee list)

File: KJK- -400.1

Proposed Water Disposal Well
Mudge IS 16

Dear Sir:

This is to advise you that Amoco Production Company is requesting approval from the Division Director of the New Mexico Oil Conservation Division to convert an existing natural gas well to a water disposal well.

Mudge IS 16
920' FNL x 1650' FEL
Section 10, T31N R 11W
San Juan County, New Mexico

Find attached a copy of the application that is being submitted. Please note that you have 15 days from the date this application is received to file any objections or requests for hearing with the Oil Conservation Division, P. O. Box 2088, Santa Fe, NM 87501.

Very truly yours,

T.D. Aubrey /KJK

90011.PAE/ses

Attachment

Leasehold Operators

Amoco Production Company
(making application)

Fina Oil & Chemical
6 Desta Drive, Suite 4400
Midland, Texas 79705

Conoco Inc.
3817 Northwest Expressway
Oklahoma City, OK 73112-1400

Meridian Oil Inc.
P. O. Box 4289
Farmington, NM 87499

Surface Owners

Bureau of Land Management
Farmington Resource Area
1235 La Plata Highway
Farmington, NM 87401

<p>● SENDER: Complete Items 1 and 2 when additional services are desired, and complete Items 3 and 4.</p> <p>Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. <u>The return receipt fee will provide you the name of the person delivered to and the date of delivery.</u> For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.</p> <p>1. <input type="checkbox"/> Show to whom delivered, date, and addressee's address. 2. <input type="checkbox"/> Restricted Delivery ↑(Extra charge)↑ ↑(Extra charge)↑</p>	
<p>3. Article Addressed to:</p> <p style="text-align: center;">Meridian Oil Inc. P.O. Box 4284 Farmington NM 87499</p>	<p>4. Article Number</p> <p style="text-align: center;">P447 437 311</p> <p>Type of Service:</p> <p><input type="checkbox"/> Registered <input type="checkbox"/> Insured</p> <p><input checked="" type="checkbox"/> Certified <input type="checkbox"/> COD</p> <p><input type="checkbox"/> Express Mail</p> <p>Always obtain signature of addressee or agent and DATE DELIVERED.</p>
<p>5. Signature — Addressee</p> <p>X</p>	<p>8. Addressee's Address (ONLY if requested and fee paid)</p>
<p>6. Signature — Agent</p> <p>X <i>[Signature]</i></p>	
<p>7. Date of Delivery</p> <p style="text-align: center;">6-27-90</p>	
<p>PS Form 3811, Mar. 1987 ★ U.S.G.P.O. 1987-178-268 DOMESTIC RETURN RECEIPT</p>	

<p>● SENDER: Complete Items 1 and 2 when additional services are desired, and complete Items 3 and 4.</p> <p>Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. <u>The return receipt fee will provide you the name of the person delivered to and the date of delivery.</u> For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.</p> <p>1. <input type="checkbox"/> Show to whom delivered, date, and addressee's address. 2. <input type="checkbox"/> Restricted Delivery ↑(Extra charge)↑ ↑(Extra charge)↑</p>	
<p>3. Article Addressed to:</p> <p style="text-align: center;">Bureau of Land Management Farmington Resource Area 1235 La Plata Highway Farmington NM 87401</p>	<p>4. Article Number</p> <p style="text-align: center;">P447 437 312</p> <p>Type of Service:</p> <p><input type="checkbox"/> Registered <input type="checkbox"/> Insured</p> <p><input checked="" type="checkbox"/> Certified <input type="checkbox"/> COD</p> <p><input type="checkbox"/> Express Mail</p> <p>Always obtain signature of addressee or agent and DATE DELIVERED.</p>
<p>5. Signature — Addressee</p> <p>X <i>[Signature]</i></p>	<p>8. Addressee's Address (ONLY if requested and fee paid)</p>
<p>6. Signature — Agent</p> <p>X</p>	
<p>7. Date of Delivery</p> <p style="text-align: center;">6-27-90</p>	
<p>PS Form 3811, Mar. 1987 ★ U.S.G.P.O. 1987-178-268 DOMESTIC</p>	

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1. ☐ Show to whom delivered, date, and addressee's address. ☐ Restricted Delivery
↑(Extra charge)↑

3. Article Addressed to: Fina Oil + Chemical 6 Dista Dr. #4400 Midland, TX 79705	4. Article Number P 447 437 313
	Type of Service: <input type="checkbox"/> Registered <input type="checkbox"/> Insured <input checked="" type="checkbox"/> Certified <input type="checkbox"/> COD <input type="checkbox"/> Express Mail
	Always obtain signature of addressee or agent and DATE DELIVERED.
5. Signature - Addressee X <i>R. Winger</i>	8. Addressee's Address (ONLY if requested and fee paid)
6. Signature - Agent X	
7. Date of Delivery 6-28-90	

PS Form 3811, Mar. 1987 * U.S.G.P.O. 1987-178-268 DOMESTIC RETURN RECEIPT

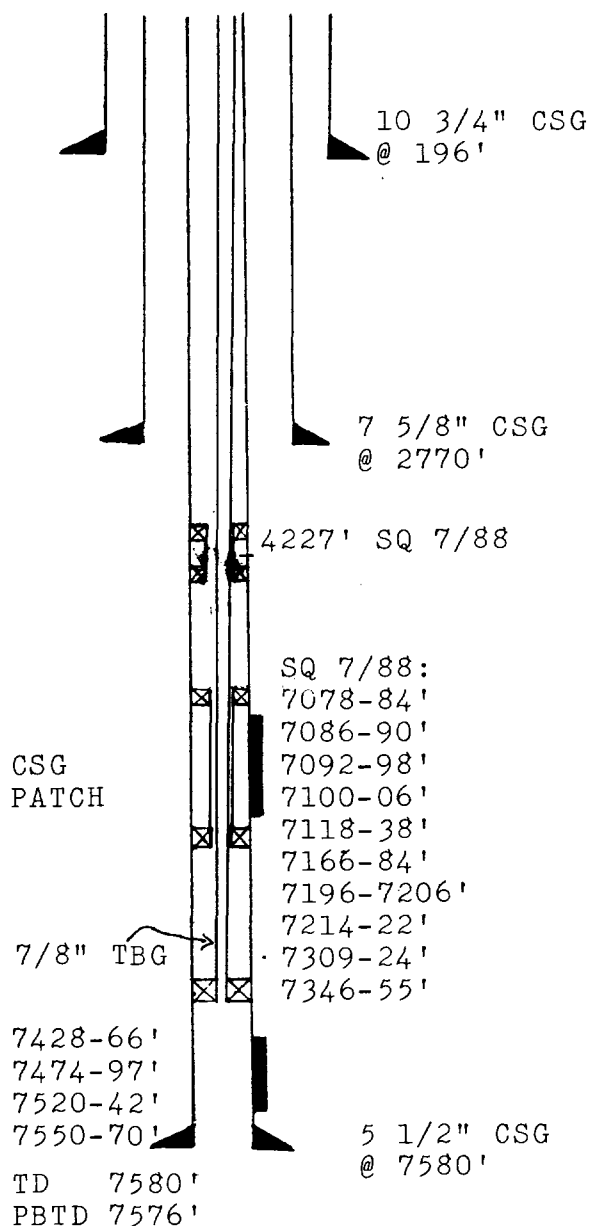
SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.
Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. ☐ Show to whom delivered, date, and addressee's address. ☐ Restricted Delivery
↑(Extra charge)↑

3. Article Addressed to: Coroco Inc 3817 Northwest Express Oklahoma City, OK 73112-1400	4. Article Number 447 437 310
	Type of Service: <input type="checkbox"/> Registered <input type="checkbox"/> Insured <input checked="" type="checkbox"/> Certified <input type="checkbox"/> COD <input type="checkbox"/> Express Mail
	Always obtain signature of addressee or agent and DATE DELIVERED.
5. Signature - Addressee X <i>[Signature]</i>	8. Addressee's Address (ONLY if requested and fee paid)
6. Signature - Agent X <i>[Signature]</i>	
7. Date of Delivery 6-27-90	

PS Form 3811, Mar. 1987 * U.S.G.P.O. 1987-178-268 DOMESTIC RETURN RECEIPT

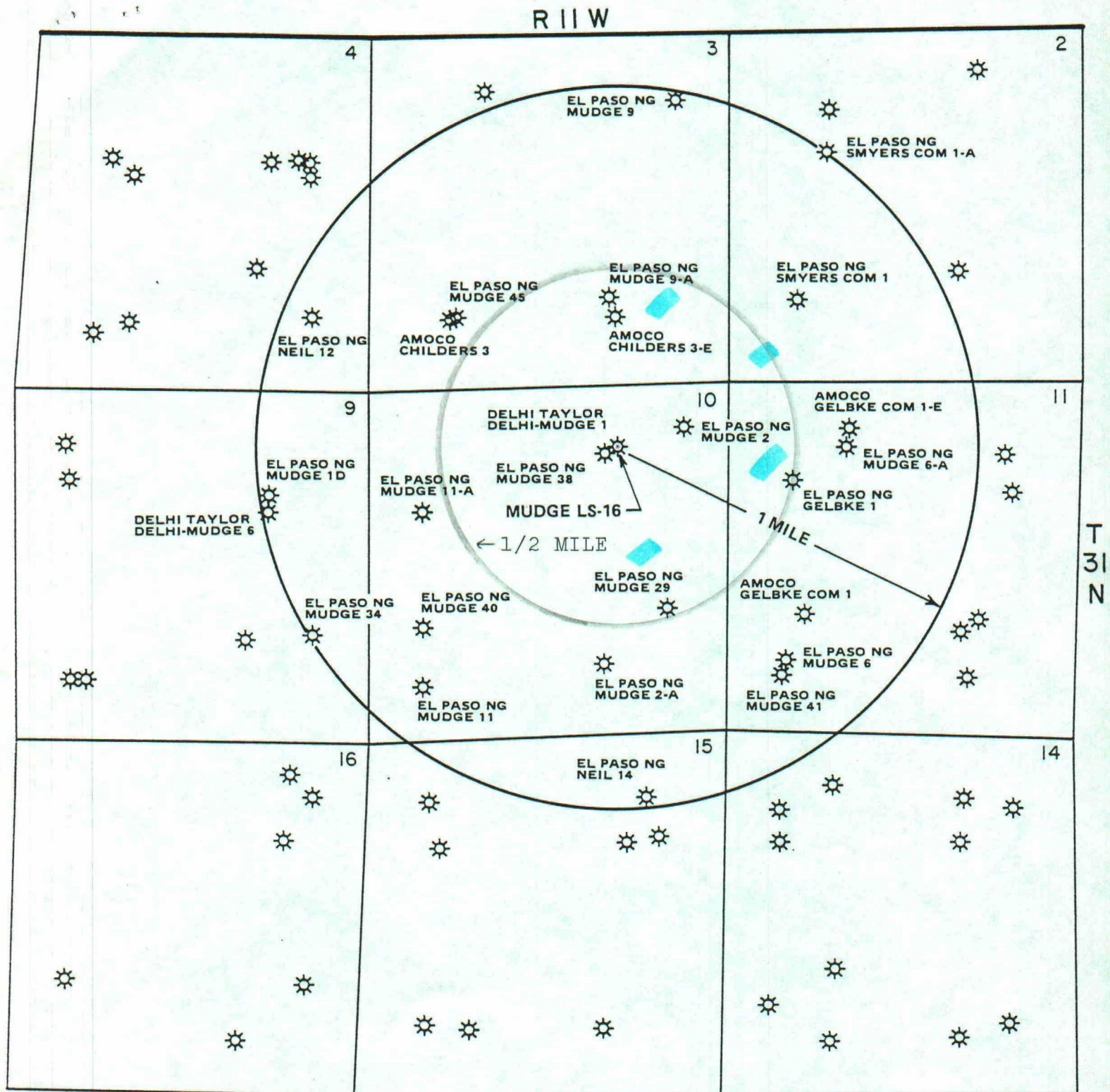
AMOCO PRODUCTION COMPANY		MUDGE LS-16		
Operator	Lease			
16	920' FNL X 1650' FEL 10	31 NORTH	11 WEST	
Well No.	Footage Location	Section	Township	Range
SAN JUAN COUNTY, NEW MEXICO				
<u>Schematic</u>		<u>Tabular Data</u>		

Surface CasingSize 10 3/4" Cemented with 200 sx.TOC SURFACE feet determined by CIRCULATIONHole size 15"Intermediate CasingSize 7 5/8" Cemented with 250 sx.TOC 980' feet determined by TEMP SURVEYHole size 9 7/8"Long StringSize 5 1/2" Cemented with 200 sx.TOC 4950' feet determined by TEMP SURVEYHole size 6 3/4"Total depth 7580'Injection interval
(will perforate selected intervals)7428 feet to 7570 feet~~LINER~~ NO LINERSize " Cemented with sx.TOC feet determined by Hole size "Total depth 

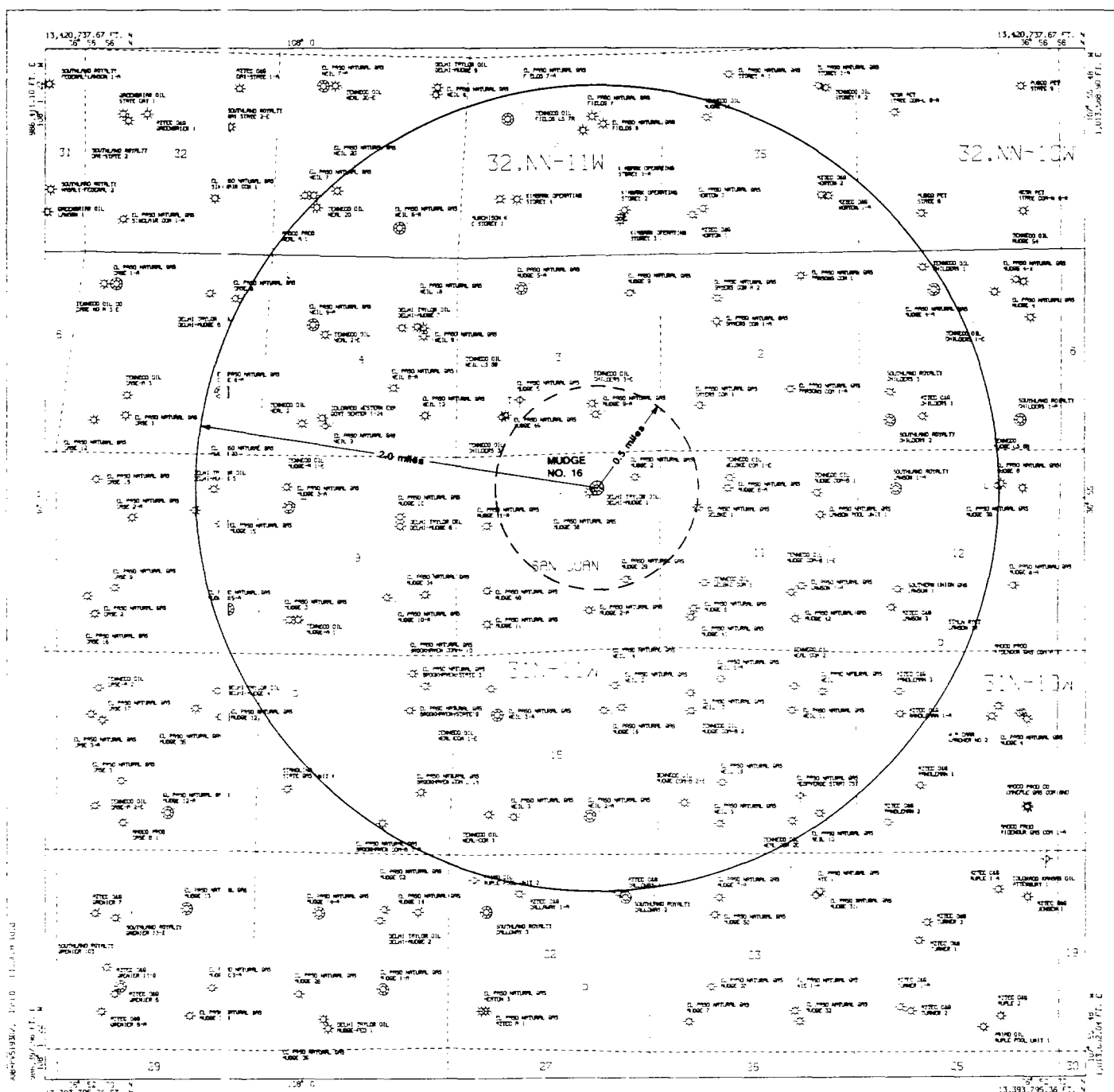
Tubing size 2 7/8" lined with set in a
 (material)
 packer at feet
 (brand and model)
 (or describe any other casing-tubing seal).

Other Data

- Name of the injection formation Morrison
- Name of Field or Pool (if applicable) NA
- Is this a new well drilled for injection? ☐ Yes ☒ No
 If no, for what purpose was the well originally drilled? Natural Gas Well
- Has the well ever been perforated in any other zone(s)? List all such intervals and give plugging detail (sacks or cement or bridge plug(s) used). YES Dakota with 164' of perforations between 7078' and 7355' 7/16/88 squeezed with 100 sx of Class G w/2% CaCl; pressure tested to 600 psi, held OK
- Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. 3620' ASL Fruitland; 3340' ASL Pictured Cliffs; 1600' ASL Mesaverde; -1095 ASL Dakota



AMOCO PRODUCTION COMPANY
SAN JUAN COUNTY, NEW MEXICO



All geological and geophysical data, including the interpretation thereof, appearing on this map is the private and confidential property of Armaco Production Company. No duplication or reproduction thereof without the written permission of said Company is strictly prohibited.



AMOCO PRODUCTION COMPANY
PO BOX 2000
DALLAS TEXAS
75201

SCALE : 1" = 1,000 FT. MAP 22, 1990

HORIZONTAL DATUM NAD27

SCALE PREDICTION, MIXTURE NO. 1: 90.0 PERCENT FRUITLAND
10.0 PERCENT MORRISON

CALCULATED COMPOSITION OF MIXTURE NO. 1 IN MG/L:

(NA)= 6070. (CL)= 2715.
(CA)= 97. (SO4)= 175.
(MG)= 37. (HCO3)= 13443.
(BA)= 0. (CO3)= 0.
(SR)= 0. PH= 7.5
MOLAL IONIC STRENGTH= 0.294
SPECIFIC GRAVITY= 1.016

SCALING TENDENCIES(MG/L):

TEMP(F)	P(Psi)	CO2(Psi)	CASO4	BASO4	SRSO4	CACO3
80.	14.7	0.000	-4266.	0.	-283.	216.
110.	14.7	0.000	-3228.	0.	-305.	220.
140.	14.7	0.000	-2493.	-1.	-260.	225.
170.	14.7	0.000	-1938.	-1.	-127.	229.
200.	14.7	0.000	-1504.	-1.	-78.	232.

SCALE INDEX = ANALYZED CONCENTRATION - EQUILIBRIUM SOLUBILITY
A POSITIVE SCALE INDEX INDICATES SCALE PRECIPITATION CAN OCCUR WITH
THE MAGNITUDE OF THE SCALE INDEX INDICATING THE MAXIMUM AMOUNT WHICH
COULD PRECIPITATE. A NEGATIVE SCALE INDEX INDICATES THE WATER IS
UNSATURATED AND NO SCALE PRECIPITATION WILL OCCUR.

PO BOX 2605
DURANGO, CO 81302
(303) 247-4220

PO BOX 1237
DURANGO, CO 81302
(303) 247-0728

WELL NAME: NEED UNIT 001
LOCATION:
FORMATION: MORRISON FERFS.
SAMPLED FROM:
WELL ON/OFF:

Attachment VII 5.

CDS ID #: 1120

CONSTITUENT		ppm	epm
Sodium	Na +	10600	461.1
Potassium	K +	1810	46.3
Calcium	Ca ++	685	34.2
Magnesium	Mg ++	65.9	5.4
Iron Total	Fe++ & Fe+++	230	12.4

Item 3A
SWD-339

POSITIVE SUB-TOTAL 13390.9 557.3565

Chloride	Cl -	18200	513.2
Carbonate	CO3 =	0	0.0
Bicarbonate	HCO3-	537	8.8
Hydroxide	OH -	0	0.0
Sulfate	SO4 =	1750	36.4

NEGATIVE SUB-TOTAL 20487 558.47643

Total Dissolved Solids 35100 ppm
pH 6.71 units
Specific Gravity 1.023 @ 73 F.
Resistivity 24 ohm-cm

APPROVED BY:


DR. JOE BOWDEN, DIRECTOR

This Laboratory report may not be published or used for advertising or in connection with advertising of any kind without prior written permission from CDS Laboratories.
Results are based on analysis made at the time samples are received at the laboratory.

AFFIDAVIT OF PUBLICATION

COPY OF PUBLICATI

No. 24837

STATE OF NEW MEXICO,
County of San Juan:

BETTY SHIPP being duly
sworn, says: "That she is the
NATIONAL AD MANAGER of
The Farmington Daily Times, a daily
newspaper of general circulation
published in English in Farmington,
said county and state, and that the
hereto attached LEGAL NOTICE

was published in a regular and entire
issue of the said Farmington Daily
Times, a daily newspaper duly quali-
fied for the purpose within the
meaning of Chapter 167 of the 1937
Session Laws of the State of New
Mexico for ONE consecutive
(days) (/////) on the same day as
follows:

First Publication WEDNESDAY, FEBRUARY 28, 1990

Second Publication _____

Third Publication _____

Fourth Publication _____

and that payment therefore in the
amount of \$14.25 has been made.

Betty Shipp

Subscribed and sworn to before me
this 28TH day of
FEBRUARY, 1990

J. Shuster
Notary Public, San Juan County,
New Mexico

My Comm expires: June 23, 1990

NOTICE

Notice is hereby given
that Adco Production
Company, 1670 Broad-
way, Denver, CO 80202,
303-830-4040, Attn. Paul
Edwards, intends to re-
complete the Mudge
LS-116 for the use as a
water disposal well. Ap-
plication will be filed with
the New Mexico Oil Con-
servation Division.

The Mudge LS-116 is
located in the NW/4 NE/4
of Section 10, Township
31 North, Range 11 West
N.M.P.M. The well has a
total depth of 7580' and
the injection zone will be
into the Morrison for-
mation. Rate of disposal
will be determined by a
step-rate injection test.

Any person, firm, as-
sociation, or corporation,
of the State of New Mexi-
co, or the United States
of America, deeming that
the granting of the above
application will impair or
be detrimental to their
water rights, may protest
in writing the proposal
set forth and writing all
Protestant reasons why
the application should
not be approved and
must be filed with the Oil
and Gas Conservation
Division, P. O. Box 2088,
Santa Fe, New Mexico
87501, within 15 days of
the date of the last publi-
cation on this notice.

Legal No. 24837 pub-
lished in the Farmington
Daily Times, Farmington,
New Mexico on Wednes-
day, February 28, 1990.

MUDGE LS-16 SWD Well

Township 31 North, Range 11 West, NMPM, San Juan County, New Mexico

Section 10: NE/4
160.00 acres

Tracts located within 1/2 mile of NE/4 10-31N-11W:

Section 2: SW/4
160.00 acres

NW/4 SW/4 - Fee
40.00 acres

Surface Owner

Mineral Owner

Current Lessee(s)

Buyer Under Contract:

Robb Ranches, Inc.

Rt. 1, Box 95

Aztec, NM 87410

President:

Bryan Robb

41230 Country Road G

Mancos, CO 81328

(303) 533-7469

Sellers Under Contract:

Irvin Randlemon,

Charles Randlemon and

Esther Bandy

33.33%-Charles C. Randlemon
& Marie Randlemon,
Trustees of the
Charles C. Randlemon
and Marie V. Randlemon
Revocable Trust
Center Point
Aztec, NM 87410
(505) 334-2142

33.33%-Irvin Randlemon
229 Road 2800
Aztec, NM 87410
(505) 334-2439

33.33%-Esther F. Bandy
Trustee under Trust
Agreement dated
Jan. 10, 1985
312 Bunker Avenue
Aztec, NM 87410
(505) 334-6716

via OGL dated 11/2/51, Book 172,
Page 352, by and between Frank
Randlemon and Eva Randlemon,
h/w, as Lessors to H.B. Dickinson,
as Lessee, current leasehold
ownership appears in the San
Juan County records as follows:
65.625% -El Paso Production Company
c/o El Paso Natural
Gas Company
P.O. Box 1492
El Paso, TX 79978

23.4375%-Sunac Petroleum Corp.
(formerly Stekol Petroleum
Corp.)
Mercantile Continental
Bldg.
Dallas, TX
(7/30/62- address - no
further address found)

5.46875%-Leo Wayne Moore and
Jo Ann Montgomery Moore,
Trustees of the Moore
Loyal Trust under Trust
Agreement dated 8/20/79,
as amended.
403 No. Mariefield
Midland, TX 79701

MUDGE LS-16 SWD Well

Township 31 North, Range 11 West, NMPM, San Juan County, New Mexico

Section 10: NE/4
160.00 acres

Tracts located within 1/2 mile of NE/4 10-31N-11W:

Section 2: SW/4
160.00 acres
NW/4 SW/4 ~ Fee
40.00 acres

Surface Owner

Mineral Owner

Current Lessee(s)

5.46875%-Paul H. Umbach, c/o
Robert Umbach, Personal
Executor of the Estate
of Paul H. Umbach,
deceased
Last known address:
Boulder, CO

Strangers to title:
Crown Central Petroleum Corporation
(Wayne Moore, President) conveys
their leasehold interest as
follows:
*59.17%-North Timbers Ltd. Prtshp.
*15.16%-East Timbers Ltd. Prtshp.
* 4.17%-West Timbers Ltd. Prtshp.
*21.50%-Cross Timbers Partners
810 Houston St., #2000
Ft. Worth, TX 76102

*12/28/88-Assigned to Amoco
undivided 85% of all
their rights below
base of MV formation.

MUDGE LS-16 SWD Well

Township 31 North, Range 11 West, NMPM, San Juan County, New Mexico

Section 10: NE/4
160.00 acres

Tracts located within 1/2 mile of NE/4 10-31N-11W:

<u>Surface Owner</u>	<u>Mineral Owner</u>	<u>Current Lessee(s)</u>
Section 2: SW/4 160.00 acres SE/4 SW/4 40.00 acres	State of New Mexico Commissioner of Public Lands P.O. Box 1148 Santa Fe, NM 87504-1148	State of New Mexico OGL #B-11419 Record Title: 100%-El Paso Production Company P.O. Box 1492 El Paso, TX 79978

Operating Rights:

93.75%-Minatome Corporation
One Allen Center
Suite 400
Houston, TX 77002

6.25%-Amoco Production
Company (Pan American)
P.O. Box 800
Denver, CO 80201

NOTE: Following are instruments that appear of record in the San Juan County records which appear to affect the leasehold interest in this lease:

MUDGE LS-16 SWD Well

Township 31 North, Range 11 West, NMPM, San Juan County, New Mexico

Section 10: NE/4
160.00 acres

Tracts located within 1/2 mile of NE/4 10-31N-11W:

Section 2: SW/4
160.00 acres

SE/4 SW/4
40.00 acres

<u>Surface Owner</u>	<u>Mineral Owner</u>	<u>Current Lessee(s)</u>
		Book 537, Page 89 Recorded: 12/3/62 Assignment of Operating Rights Assignor: Brookhaven Oil Co. Assignee: Pan Am (Amoco) Conveys an undivided 1/2 interest of their undivided 1/8 interest.
		Book 537, Page 163 Recorded: 12/26/62 Assignment of Operating Rights Assignor: Paul H. Umbach Assignee: Pan Am (Amoco) Conveys an undivided 3/4 interest of his undivided 3/32 interest.
		Book 568, Page 217 Notice Recorded: 12/16/63 Assignor: Estate of John W. Watson who states he had a 1/8 of 7/8 working interest under this lease. (After Warranty Deeds 908-238 and 1067-168), it appears that this interest is now owned by Eleanor P. Caughren Albuquerque, NM - 1981

MUDGE LS-16 SMD Well

Township 31 North, Range 11 West, NMPM, San Juan County, New Mexico

Section 10: NE/4
160.00 acres

Tracts located within 1/2 mile of NE/4 10-31N-11W:

Section 2: SW/4
160.00 acres

SE/4 SW/4
40.00 acres

Surface Owner

Mineral Owner

Current Lessee(s)

Book 1507, Page 32
Recorded: 10/23/86
Assignor: El Paso Natural Gas Co.
Assignee: El Paso Production Co.
Conveys all rights

Book 1057, Page 88
Special Warranty Deed
Recorded on 11/17/86
Dated: 11/8/86

Assignor: Leo Wayne/Jo Ann Moore,h/
Assignee: Leo Wayne Moore and
Jo Ann Montgomery Moore
Trustees of the Moore Loyal
Trust under Trust Agreement
dated Aug. 20, 1979, as
Amended. States they own a
1.558846% WI in the MV (2:W/2)
Smyers 1-A and a 1.56250% WI
in Smyers Com B#3 PC in the
SW/4 of Section 2.
Address for Moore:
403 No. Marienfield
Midland, TX 79701

MUDGE LS-16 SWD Well

Township 31 North, Range 11 West, NMPM, San Juan County, New Mexico

Section 10: NE/4
160.00 acres

Tracts located within 1/2 mile of NE/4 10-31N-11W:

Section 2: SW/4
160.00 acres
SE/4 SW/4
40.00 acres

Surface Owner

Mineral Owner

Current Lessee(s)

Book 1057, Page 152
Conveyance recorded 12/8/86
Assignor: Lear Petroleum
Exploration (successor
to Brookhaven)

Assignees 03.12500% to:

- 75.00% - Estate of Paul Umbach
 - 6.25% - Lowell White
 - 6.25% - Family Trust
 - 6.25% - Walter A. Steele
 - 5.2083% - Estate of G.W. Hannett
 - 4.1666% - T.G. Cornish
 - 1.0416% - Patricia Hueter
 - 1.0416% - Mary Emily Voller
 - 1.0416% - A.T. Hannett II
- (no addresses were given for
the above)

Book 1057, Page 152
Conveyance recorded 1/9/87
Assignor: Lear Petroleum Explor.
Assignee: Minatome Corporation
One Allen Center, #400
Houston, TX 77002

Conveys all rights.

MUDGE LS-16 SWD Well

Township 31 North, Range 11 West, NMEM, San Juan County, New Mexico

Section 10: NE/4
160.00 acres

Tracts located within 1/2 mile of NE/4 10-31N-11W:

Section 2: SW/4
160.00 acres

NE/4 SW/4
40.00 acres

Surface Owner

State of New Mexico
Commissioner of Public Lands
P.O. Box 1148
Santa Fe, NM 87504-1148

Mineral Owner

State of New Mexico
Commissioner of Public Lands
P.O. Box 1148
Santa Fe, NM 87504-1148

Current Lessee(s)

State of New Mexico OGL
#B-11127

Record Title:

Book 212, Page 130

A Development Contract

Recorded: 6/11/53

Assignor: Standard Oil of Texas

Assignee: Critchell Parsons

Assignor agrees to convey an

interest to this lease if

Assignee drills on these lands.

What interest to be assigned

is not defined.

Book 220, Page 40

Agreement Recorded: 8/21/53

between Standard Oil of Texas

and Critchell Parsons states

that Parsons has fulfilled all

requirements of their Development

Contract. Interest to be

assigned is still not described.

Box 256, Page 237

Assignment Dated: 6/5/53

Recorded: 8/7/54

Assignor: A.L. Duff, Jr., et ux

Assignee: Bolack Oil & Gas Co.

Conveys all rights that were

owned by Critchell Parsons.

Interest still not defined.

MUDGE LS-16 SWD Well

Township 31 North, Range 11 West, NMPM, San Juan County, New Mexico

Section 10: NE/4
160.00 acres

Tracts located within 1/2 mile of NE/4 10-31N-11W:

Section 2: SW/4
160.00 acres

NE/4 SW/4
40.00 acres

Surface Owner

Mineral Owner

Current Lessee(s)

Book 310, Page 58
Assignment recorded: 9/20/56
Assignor: Atlas Corporation
Assignee: Petro-Atlas Corp.
Conveys all rights (a full
working interest) to the shallow
zones (which is described in the
Development Contract in
Book 212, Page 130). The
shallow zone is the surface down
to the base of the Point
Lookout Formation of the
Mesa Verde Group.

MUDGE LS-16 SWD Well

Township 31 North, Range 11 West, NMPM, San Juan County, New Mexico

Section 10: NE/4
160.00 acres

Tracts located within 1/2 mile of NE/4 10-31N-11W:

	<u>Surface Owner</u>	<u>Mineral Owner</u>	<u>Current Lessee(s)</u>
Section 2: SW/4 SW/4	USA	USA	USA OGL SF-78040
Section 3: S/2			All Rights:
Section 10: All			50.00%-Amoco
Section 11: SW/4			TOC-Rocky Mountains
1,160.00 acres			P.O. Box 800
			Denver, CO 80201

*43.50%-Conoco, Inc.
P.O. Box 2197
Houston, TX 77252

* 6.50%-FMP Operating Compa
P.O. Box 60004
New Orleans, LA 701

* Per telephone conversatio
Michael Cuba on 2/23/90,
Conoco, Inc. has recently
acquired all interest in
subject lands from FMP Op
Company providing Conoco,
Inc. 50% interest in All
Rights of SF-78040

MUDGE LS-16 SWD Well

Township 31 North, Range 11 West, NMPM, San Juan County, New Mexico

Section 10: NE/4
160.00 acres

Tracts located within 1/2 mile of NE/4 10-31N-11W:

Section 11: NW/4
160.00 acres

Surface Owner
USA

Mineral Owner
USA

Current Lessee(s)
USA OGL SF-79691
All Rights:
50.00%-Amoco
TOC-Rocky Mountains, Inc
P.O. Box 800
Denver, CO 80201

*43.50%-Conoco, Inc.
P.O. Box 2197
Houston, TX 77252

* 6.50%-FMP Operating Company
P.O. Box 60004
New Orleans, LA 70160

* Per telephone conversation with Michael Cuba on 2/23/90, Conoco, Inc. has recently acquired all interest in subject lands from FMP Operating Company providing Conoco, Inc 50% interest in All Rights of SF-79691.



STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION
AZTEC DISTRICT OFFICE

OIL CONSERVATION DIVISION
RECEIVED

GARREY CARRUTHERS
GOVERNOR

'90 AUG 20 AM 10 00
1000 RIO BRAZOS ROAD
AZTEC, NEW MEXICO 87410
(505) 334-6178

Date: 8/17/90

Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87504-2088

Re: Proposed MC _____
Proposed DHC _____
Proposed NSL _____
Proposed SWD X _____
Proposed WFX _____
Proposed PMX _____

Gentlemen:

I have examined the application dated 8-2-90
for the Ammon Bridge & L 416
Operator Lease & Well No.

B 10-31N-11W and my recommendations are as follows:
Unit, S-T-R

Approve requiring a CIL

Yours truly,

[Signature]

API WATER ANALYSIS REPORT FORM

Laboratory No. 25-910524-1

Company AMCO PRODUCTION		Sample No.		Date Sampled	
Field	Legal Description		County or Parish		State
Lease or Unit HUIGRE	Well LS 16	Depth	Formation Morrison	Water, B/D	
Type of Water (Produced, Supply, etc.)		Sampling Point		Sampled By	

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na (calc.)	6185	268.9
Calcium, Ca	72	3.6
Magnesium, Mg	56	4.6
Barium, Ba		

OTHER PROPERTIES

pH	8.15
Specific Gravity, 60/60 F.	1.012
Resistivity (ohm-meters) 68° F.	0.44

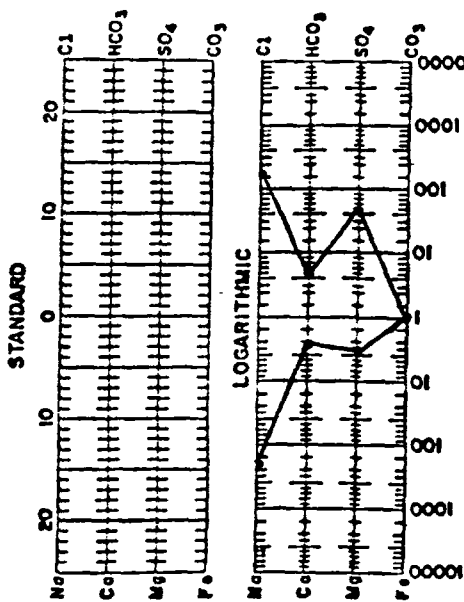
WATER PATTERNS -- me/l

Chloride, Cl	7584	214
Sulfate, So ₄	2693	86.1
Carbonate, CO ₃	39	1.0
Bicarbonate, HCO ₃	366	6.0

Total Dissolved Solids (calc.)

16,982

Iron, Fe (total)
Sulfide, as H₂S



REMARKS & RECOMMENDATIONS: OIL AND GREASE FILM IN SAMPLE

ATTN: LARRY HUMPHREY

Date Received 5-24-91	Preserved	Date Analyzed 5-24-91	Analyzed By HLK
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SAN JUAN OPER. DIV.
DATE RECEIVED
MAY 24 1991

Post-It™ brand fax, smittal memo 7671 # of pages > 1/1	
To LARRY HUMPHREY	From MYKE LANG
Co. AMCO	Co. TOH
Dept.	Phone # 327-3311
Fax # 326-9262	Fax # 325-3311



TECH, Inc.
333 East Main
Farmington
New Mexico
87401
505/327-3311