BEFORE EXAMINER QUINTANA

OIL CONSERVATION DIVISION

READING & BATES EX. NO. 1

CASE NO. 8530

APPLICATION FOR AUTHORIZATION TO INJECT

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

II. Operator: Reading & Bates Petroleum Co.

Address: 1125 17th St. #2300 Denver, CO 80202

Contact party: T. Bruce Petitt Phone: 303-295-1447

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: T. Bruce Petitt Title Division-Engineer

Signature: T. Bruce Petitt Date: 2/4/85

• 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. _____

(Form C-108) Application for Authorization to Inject

I. Purpose

A. Disposal of salt water

II. Operator

A. Reading and Bates Petroleum Co.
1125 17th Street, Suite 2300
Denver, CO 80202
Attn: T. Bruce Petitt

III. Well Data (also see Exhibit "A")

A. Lease name

1. Navajo Tocito #4
1963'FSL, 997'FWL. Sec. 10-T26N-R18W

B. Casing

1. Surface Casing

a. 8 5/8" 24# set at 1,665' with 290 sx. Class "A" & 4% gel and 190 sx. Pozmix "A" and 2% $CaCl_2$. Hole size 11". TOC @ surface. TOC determined by circulation.

2. Production Casing.

a. 4 1/2" 9.5# set at 6,397' cemented with 250 sacks Class C and 7#/sx. salt and 12 1/2#/sx. gilsonite. Hole size 7 7/8". TOC @ 5,680'. TOC determined by temperature log.

3. Tubing String

a. 2 3/8" 4.7# EUE 8rd. set at approximately 6,332'.

4. Packer

a. Baker Model "R" set at 6,332'.

C. 1. Injection Formation

a. Tocito Dome Penn., North (Associated) Pool, Penn. "E" Formation

2. Injection Interval

a. 6,382-6,386' KB. Perforated through casing.

3. The Navajo Tocito #4 was originally completed as a gas well.

4. This well is perforated in the Pennsylvanian "E" from 6382'-6386' K.B. Well was initially perforated 6,382-6,392'. Perforations 6,382-6,392' squeezed with 100 sx. Class "B" to 75% CFR-2.

5. The next higher producing zone to the injection zone is the Pennsylvania "D" at a depth of 6198' KB. There are no known producing intervals below the injection zone in the Tocoto Dome Field.

IV. This well is not the expansion of any existing projects.

V. Map (See Exhibit "B")

VI. Well Data for wells within 1/2 mile

A. #3 Navajo Tocito (See Exhibit "C" for schematic)
Operator: Airco
900'FNL, 900'FEL. Sec. 10-T26N-R18W
Elevation: 5668KB. Spud 9-17-68
T.D. - 6777. 11" surface casing at 1616' w/480 sx.
P&A 10-9-68

Plugged - 6500 - 6625 37 sx
6250 - 6350 27 sx.
5425 - 5525 27 sx.
3650 - 3830 55 sx.
2000 - 2100 27 sx.
1550 - 1650 27 sx.
0'- 30'10 sx.

B. #5 Navajo (See Exhibit "D" for schematic)
Operator: Mobil Oil Co.
1840'FSL, 800'FEL. Sec. 9-T26N-R18W
Elevation - 5724' gr. T.D. 6469
8 5/8" @1617'w/730 sx.
5 1/2" @6450'w/275 sx.
Perforated interval 6408' - 6460'

Plugged - Perforated 4 holes @3850', pumped 75 sx. Class A cement. Left 200' plug in casing from 3850' - 3650'. Cut 5 1/2" casing at 1990'.

50 sx. 1990' - 1890'
45 sx. 1517' - 1617'
15 sx. 20' - surface

VII. Proposed Operations

A. The average daily rate of injection is estimated to be 1500 BWPD. The maximum volume being estimated at 2000 BWPD.

B. The injection system will be open.

C. The estimated average injection pressure is 150 psi. The maximum injection pressure is estimated at 500 psi.

D. The well will be utilized to dispose of produced water from the Navajo Tocito #1 SWNE Sec. 9-T26N-R18W. Water analysis attached (see Exhibit "E"). Compatibility of injection fluid with receiving formation should be positive as injected fluid comes from same formation as receiving formation in offset well.

E. The water from the injection zone should be similar to the water to be injected since they are both from the Pennsylvanian "E".

VIII. Geological Data - Injection Zone

A. Tocito Dome, North - Pennsylvanian Associated Pool; Pennsylvanian "E"

1. A paradox member of the Hermosa formation. The top of the Pennsylvanian "E" is at approximately 6354' and extends to approximately 6392'. The lithology is fossiliferous, calcareous boundstone, packstone and grainstone with interbeds of varicolored claystone and silstone.

The well penetrated the Morrison at approximately 1140' which is a fresh water aquifer in the area.

IX. Stimulation

A. 2,000 gallons of 15% HCl acid.

X. A copy of the well logs is attached.

XI. Water Wells

A. There are no fresh water wells within a one mile radius of the proposed injection well.

XII. All of the available geologic and engineering data have been examined and no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water have been found.

XIII. Proof of Notice (See Exhibit F)

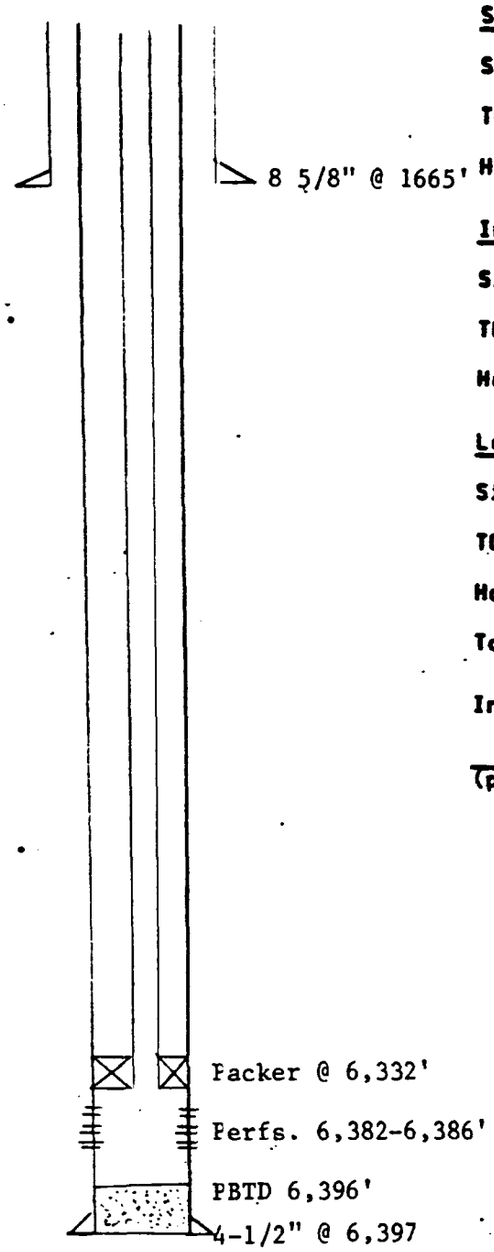
XIV. I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

Name: T. Bruce Petitt Title: Division Engineer

Signature: T. Bruce Petitt Date: 2/4/85

OPERATOR		LEASE		
Reading & Bates Petroleum Co.		Navajo Tocito		
WELL NO.	FOOTAGE LOCATION	SECTION	TOWNSHIP	RANGE
4	1963' FSL, 997'FWL	10	26N	18W

Schematic



Tabular Data

Surface Casing

Size 8 5/8" " Cemented with 480 sx.

TOC Surface feet determined by observation

Hole size 11"

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 4-1/2 " Cemented with 250 sx.

TOC 5,680 feet determined by temperature log

Hole size 7 7/8"

Total depth TD 6,397' PBTD 6,396'

Injection interval

6,382 feet to 6,386 feet

(perforated ~~or open-hole, indicate which~~)

Tubing size 2-3/8" lined with Plastic (material) set in a

Baker Model "R-3" double-grip (brand and model) packer at app. 6,332' feet

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation Pennsylvanian "E"

2. Name of Field or Pool (if applicable) Tocito Dome Penn., North (Associated) Pool

3. Is this a new well drilled for injection? ☐ Yes ☒ No

   If no, for what purpose was the well originally drilled? gas well

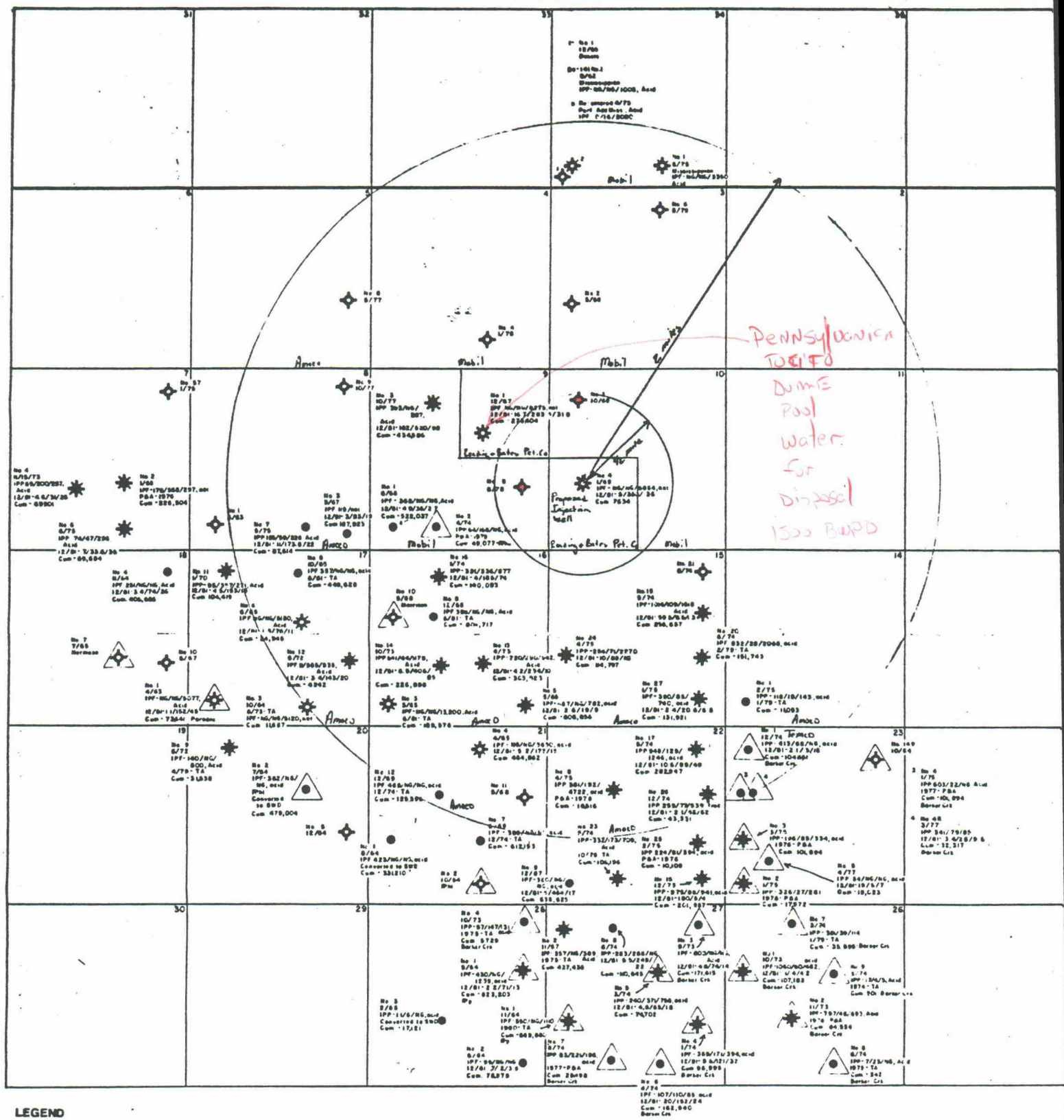
4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) no

5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. Pennsylvanian "E", top at 6,392'. No overlying oil or gas zones.

Exhibit "B"

R 18 W

T 26 N



LEGEND

- PRODUCTION-BOPD/BWPD/MCFPD
- Cum. (1981)-BO
- DATE COMPLETED-Month/Year
- NG-Not Given
- Except Where Noted, The Producing Interval is The Pennsylvanian.

△ - Other Producing Interval

READING & BATES PETROL

TOCITO DOME AR
San Juan Co., New Me

Base to:	1"=2000'	Date: 11-18-
Drawn by:		Approved by: D

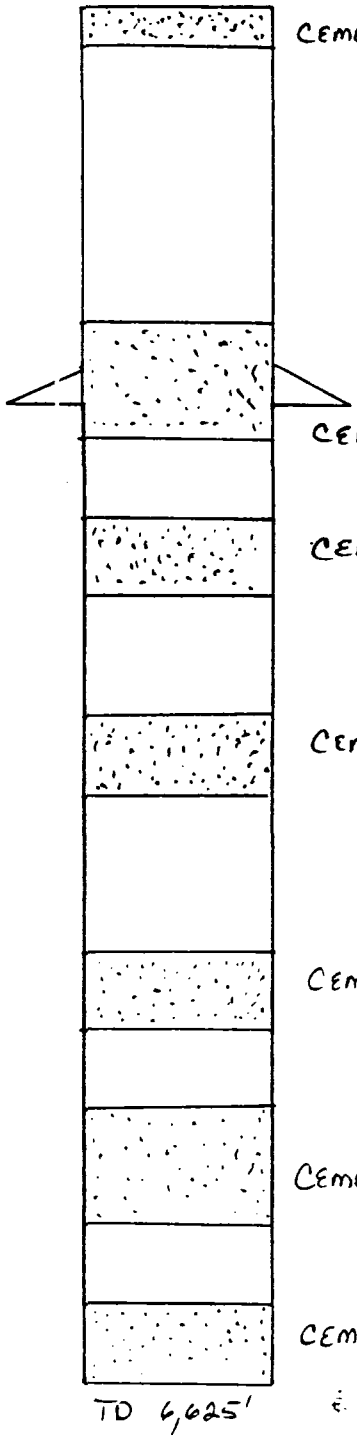
EXHIBIT "C"

WELL SCHEMATIC

AIRCO NAVAJO-TOCITO #3

900' FNL, 900' FWL SEC. 10, T26N, R18W

CONDITION AFTER P&A



CEMENT PLUG 0-30' (10 SX.)

11" SURFACE CASING @ 1,616', CMTD. W/ 480 SX

CEMENT PLUG 1,550-1,650' (27 SX.)

CEMENT PLUG 2,000-2,100' (27 SX.)

CEMENT PLUG 3,650-3,830' (55 SX.)

CEMENT PLUG 5,425-5,525' (27 SX.)

CEMENT PLUG 6,250-6,350' (29 SX.)

CEMENT PLUG 6,500-6,625' (37 SX.)

TD 6,625'

EXHIBIT #

WELL SCHEMATIC

MOBIL NAVAJO #5

1,840' FSL, 800' FEL, Sec. 9, T26N, R18W

CONDITION AFTER P+A

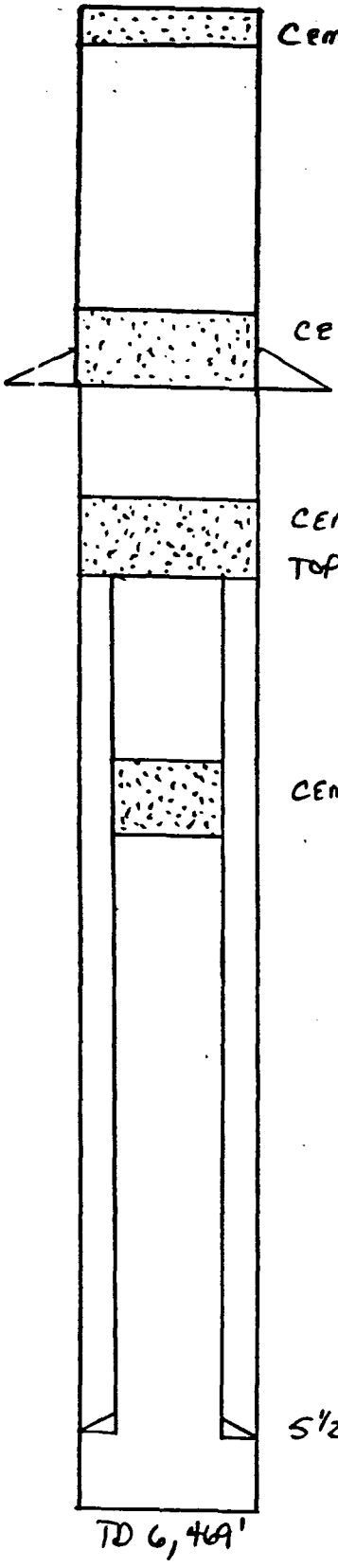


EXHIBIT "E"

RECEIVED
NOV - 7 1984
READING & BATES PETROLEUM CO. NORTHWEST DIVISION

UNICHEM INTERNATIONAL

601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : READING AND BATES PETROLEUM
DATE : 10-26-84
FIELD,LEASE&WELL : NAVAJO TOCITO #1
SAMPLING POINT: WELLHEAD
DATE SAMPLED : 10-25-84

SPECIFIC GRAVITY = 1.072
TOTAL DISSOLVED SOLIDS = 108422
PH = 6.09

		ME/L.	MG/L
CATIONS			
CALCIUM	(CA)+2	560	11222.
MAGNESIUM	(MG)+2	30	364.
SODIUM	(NA).CALC.	1319.	30339.
ANIONS			
BICARBONATE	(HCO3)-1	2.4	146.
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	7.2	350
CHLORIDES	(CL)-1	1900	66000
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		81.2
BARIUM	(BA)+2		0.7
MANGANESE	(MN)	NOT RUN	

IONIC STRENGTH (MOLAL) =2.357

SCALING INDEX	TEMP 30C 86F	48.8C 120F
CARBONATE INDEX	-.28	.142
CALCIUM CARBONATE SCALING	UNLIKELY	LIKELY
CALCIUM SULFATE INDEX	-12.	-13
CALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY

Exhibit "F"

XIV. Proof of Notice

Copies of the application were sent by certified mail to the offset operators, Mobil Oil Corp. and Amoco, and to the surface owner, The Navajo Nation.

A waiver was received from Amoco (copy attached) and copies of the return receipts from Mobil and The Navajo Nation are attached.

Proof of publication of a legal advertisement containing the required information is attached.

AMOCO PRODUCTION CO.
NORTHWEST DIVISION

J. C. Burnside
Division Production Manager

Amoco Production Company

Western Division
1670 Broadway
Post Office Box 800
Denver, Colorado 80201
303-830-4040

October 25, 1984

Reading and Bates Petroleum Company
Northwest Division
Denver National Bank Building
1125 Seventeenth Street, Suite No. 2300
Denver, Colorado 80202

File: JTM-508-WF

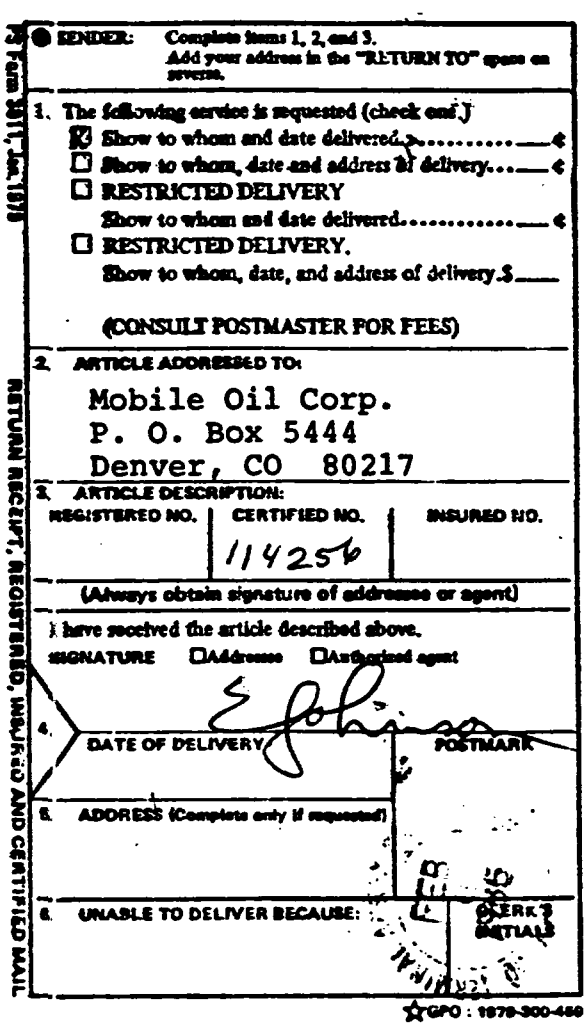
Navajo Tocito No. 4
SW/4 Section 10-T26N-R18W
San Juan County, New Mexico
Application for Authorization to Inject Water

Amoco Production Company has no objection to Reading and Bates disposing produced water into the Navajo Tocito No. 4. This letter serves as our waiver of objection of the proposed disposal well and can be used by Reading and Bates for administrative purposes while seeking disposal approval.

If you have any questions regarding this matter, please contact Tim Clawson at our Western Division Office on (303) 830-5631.

John C Burnside

TDC/pjg



PS Form 3811, Jan. 1978

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

SENDER: Complete items 1, 2, and 3. Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one.)
- [X] Show to whom and date delivered.....¢
- [ ] Show to whom, date and address of delivery.....¢
- [ ] RESTRICTED DELIVERY
  Show to whom and date delivered.....¢
- [ ] RESTRICTED DELIVERY.
  Show to whom, date, and address of delivery.$

(CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
Mobile Oil Corp.
P. O. Box 5444
Denver, CO 80217

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	114256	

(Always obtain signature of addressee or agent)

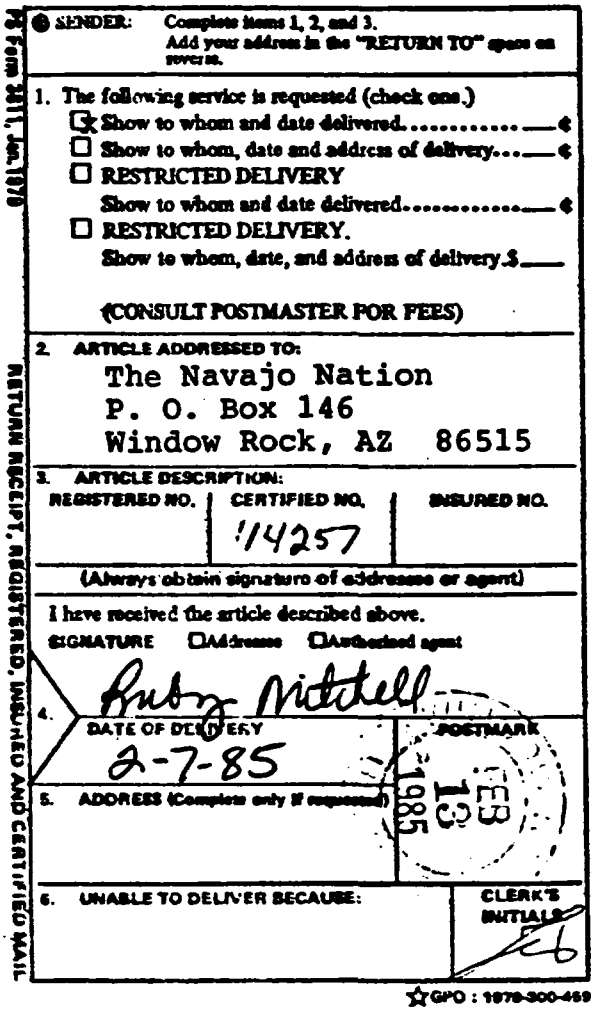
I have received the article described above.
SIGNATURE ☐Addressee ☐Authorized agent
E Johnson

4. DATE OF DELIVERY
POSTMARK

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE:
CLERK'S INITIALS

☆GPO : 1979-300-459



PS Form 3811, Jan. 1978

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

SENDER: Complete items 1, 2, and 3. Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one.)
- [X] Show to whom and date delivered.....¢
- [ ] Show to whom, date and address of delivery.....¢
- [ ] RESTRICTED DELIVERY
  Show to whom and date delivered.....¢
- [ ] RESTRICTED DELIVERY.
  Show to whom, date, and address of delivery.$

(CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
The Navajo Nation
P. O. Box 146
Window Rock, AZ 86515

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	114257	

(Always obtain signature of addressee or agent)

I have received the article described above.
SIGNATURE ☐Addressee ☐Authorized agent
Ruby Mitchell

4. DATE OF DELIVERY
2-7-85
POSTMARK
FEB 1985

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE:
CLERK'S INITIALS

☆GPO : 1979-300-459

AFFIDAVIT OF PUBLICATION

No. 16711

STATE OF NEW MEXICO,
County of San Juan:

Margaret Billingsley being duly sworn, says: That he is the Sec. to the Publisher of THE FARMINGTON DAILY TIMES, a daily newspaper of general circulation published in English at Farmington, said county and state, and that the hereto attached Legal Notice

was published in a regular and entire issue of the said FARMINGTON DAILY TIMES, a daily newspaper duly qualified for the purpose within the meaning of Chapter 167 of the 1937 Session Laws of the State of New Mexico for 1 consecutive (days) (weeks) on the same day as follows:

First Publication March 27, 1985

Second Publication

Third Publication

Fourth Publication

and that payment therefor in the amount of $ 10.92 has been made.

Margaret Billingsley

Subscribed and sworn to before me this 27th day of March 19 85.

Virginia L Leavitt
NOTARY PUBLIC, SAN JUAN COUNTY, NEW MEXICO

My Commission expires: June 9, 1989

Copy of Publication

NOTICE

Reading & Bates Petroleum Co. has filed an application with the State of New Mexico Oil Conservation Division to convert an existing wellbore to an injection well for the purpose of disposal of salt water. The proposed injection well is the Navajo Tocito No. 4 located 1973' FSL, 977' FWL of Section 10 - Township 26 North - Range 18 West, San Juan County, NM. The proposed injection zone is the Pennsylvania "E" at a depth of 6,382-6,386' KB. The maximum injection rate is estimated at 2000 barrels of water per day with the maximum injection pressure estimated at 500 psi.

All interested parties must file objections or requests for hearing with the Oil Conservation Division, P.O. Box 2088, Santa Fe, N.M. 87501 within 15 days.

The applicant may be contacted at the following address:

Reading & Bates Petroleum Co.
1125 - 17th St., Suite 2300
Denver, CO 80202
Phone: 303-295-1447
Attention: T. Bruce Petitt

Legal No. 16711 published in the Farmington Daily Times, Farmington, New Mexico on Wednesday, March 27, 1985.

FORM 933148

Dresser Atlas — Induction Electrolog

FILE NO. FM-4296

COMPANY SOUTHERN GULF PRODUCTION CO.

WELL #4 NAVAJO TOCITO

FIELD TOCITO DOME

COUNTY SAN JUAN STATE NEW MEXICO

LOCATION: 990' FWL & 1980' FSL
SW¼ & NE¼

SEC 10 TWP 26N RGE 18W

Other Service
ALC-GR

Permanent Datum G.L. Elev. 5705
Log Measured from K.B. 13.0 Ft. Above Permanent Datum
Drilling Measured from K.B.

Elevations:
KB 5718
DF 5717
GL 5705

Date	12-16-68			
Run No.	ONE			
Depth—Driller	6397			
Depth—Logger	6399			
Bottom Logged Interval	6395			
Top Logged Interval	1664			
Casing—Driller	8 5/8 @ 1674	@	@	@
Casing—Logger	1664			
Bit Size	7 7/8			
Type Fluid in Hole	CHEM GEL			
Density and Viscosity	10.5 | 56			
pH and Fluid Loss	11.5 | 3.9 cc	cc	cc	
Source of Sample	FLOWLINE			
Rm @ Meas. Temp.	0.98 @ 60 °F	@ °F	@ °F	@
Rmf @ Meas. Temp.	0.75 @ 60 °F	@ °F	@ °F	@
Rmc @ Meas. Temp.	1.4 @ 60 °F	@ °F	@ °F	@
Source of Rmf and Rmc	MEASURED			
Rm @ BHT	0.48 @ 126 °F	@ °F	@ °F	@
Time Since Circ.	3 HRS.			

Reading & Bates - Exhibit No. 3

Wells within the area of review which penetrate the injection zone.

1) Mobil Navajo #5

1840' FSL, 800' FEL, Sec. 9, T26N, R18W
San Juan County, New Mexico

a) Well type: (plugged and abandoned)

b) Construction: 13 3/8" @ 117' w/150 sx.
8 5/8" @ 1,617' w/730 sx.
5 1/2" @ 6,450' w/275 sx.

perf'd. 6408-16'; 6120-30'; 6454-60'; 1 spf.
frac'd w/15,000 gal. gel & 50,000 # sand

c) Date Drilled: Spud 6-17-78; Comp. 8-15-78

d) Location: 1,840' FSL, 800' FEL, Sec. 9, T26N, R18W, San Juan County, New Mexico

e) Depth: 6,469'

f) Record of Completion: See b) above and schematic for plugging details

2) AircoNavajo-Tocito #3

900' FNL, 900' FWL, Sec. 10, T26N, R18W,
San Juan County, New Mexico

a) Well Type: (plugged and abandoned)

b) Construction: 13 3/8" @ 93' w/110 sx.
11" @ 1,616' w/480 sx.

c) Date Drilled: Spud 9-17-68; Compl. 10-9-68

d) Location: 900' FNL, 900' FWL, Sec. 10, T26N, R18W, San Juan County, New Mexico

e) Depth: TD 6,777'

f) Record of Completion: See schematic for plugging details

BEFORE EXAMINER QUINTANA
OIL CONSERVATION DIVISION
Reading & Bates EXHIBIT NO. 3
CASE NO. 8530