



SWD-136  
1/22/73

**Amoco Production Company**

Security Life Building  
Denver, Colorado 80202

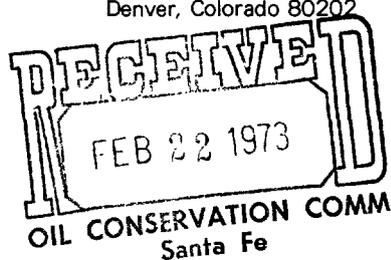
M. S. Kraemer  
Division Production  
Manager

H. T. Hunter  
Assistant Division  
Production Manager

K. W. Bolt  
T. M. Curtis  
District Superintendents

February 15, 1973

File: KWB-151-986.511



SWD-136

Mr. A. L. Porter, Jr. (3)  
New Mexico Oil Conservation Commission  
P. O. Box 2088  
Santa Fe, New Mexico 87501

Dear Mr. Porter:

**Subject:** Application to Dispose of Salt Water into Penn "D" Formation, Amoco's Navajo Tribal N-2 Well, Tocito Dome-Penn "D" Field, San Juan County, New Mexico

Amoco Production Company respectfully requests your approval of this application under the provisions of Order No. R-3558, dated November 18, 1968, to dispose of produced salt water from the Tocito Dome Field into the Pennsylvanian "D" formation in its Navajo Tribal "N" No. 2 Well located in Unit "G", Section 20-T26N-R18W, San Juan County, New Mexico. In connection with this application, attached are the following exhibits:

1. Three copies of New Mexico Oil Conservation Commission's Form C-108. A copy of this form is also being sent to the United States Geological Survey as representative of the Navajo Tribe of Indians, the surface and royalty owner, and to all operators within a 2 mile radius of the proposed disposal well.
2. A map of the field and surrounding area showing in detail the location of all wells and dry holes, the operators of various leases and the specific location of the present disposal well and the proposed disposal well.
3. A copy of the Induction-Electric log on the proposed disposal well.
4. A schematic diagram showing particulars of the casing and tubing program of the proposed well. Also shown are the Pennsylvanian "D" perforations 6237-6252' through which water will be disposed in this well. The proposed disposal well, Navajo Tribal N-2, was originally completed as an oil well on July 20, 1964, for an initial potential of 362 BOPD with no water.

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At the time the well was shut-in during January, 1971, due to high water production, the well was producing over 98% water and was shut-in due to being uneconomic. The last test before the well was shut-in was on December 3, 1970, when, during a 24-hour period, the well tested 7 BOPD, 463 BWPD and 29 MCFD. At the time of shut-in the well had produced 479,000 barrels of oil cumulative.

5. A copy of a typical water analysis obtained from one of the wells in the field - the water being unfit for domestic stock, irrigation or other general use.

New Mexico Oil Conservation Commission Order No. R-2984 issued October 13, 1965, granted Amoco permission to dispose of Tocito Dome Penn "D" Field produced water into Navajo Tribal "U" No. 6, located in Unit "D" of Section 22, T26N-R18W. Disposals into that well commenced November 22, 1965. During October, 1972 communication was detected between the tubing and casing in this well. Repair work was begun, however, it was determined that both the casing and tubing were parted and it would be impossible to successfully return the well to useful disposal service, and plans are being made to permanently abandon this well.

Under Order No. R-3558 issued November 18, 1968, Amoco began disposing of produced water into a second well, Nabajo Tribal U-1, located in Unit "L" of Section 21, T26N-R18W. Both Well No. U-6 and U-1 were used for disposal purposes until recently when Well No. U-6 failed. Since that time, all field produced water has been injected into Well No. U-1. Cumulative injections into Well U-1 have been 3,100,375 barrels through December 31, 1972. At the time of failure the cumulative volume disposed of into Well No. U-6 was 2,754,145 barrels.

Texaco, Inc., another operator in the field, recently obtained approval to dispose of their produced water into their Navajo Tribal No. 3, located in Unit "K", Section 28, T26N-R18W. Amoco will continue to dispose of its produced water into existing Well No. U-1. However, our system is operating at capacity and we have no standby disposal outlet, which creates a very serious production problem and potential pollution hazard. In order to relieve the situation, Amoco is therefore requesting herein approval to convert Navajo Tribal N-2 to disposal use. Both Well Nos. U-1 and N-2 would then be used for injection purposes. Amoco's lease water production is averaging 3000 BWPD and is expected to increase with continued drilling activity and increasing water cuts on existing producing wells. It is essential, therefore, that adequate disposal facilities be maintained to continue successful disposal of this produced water.

The existing perforations in Well No. N-2 are below the present oil-water contact as evidenced by several factors. First, as pointed out previously, Well No. N-2 was producing over 98% water at the time of shut-in two years ago. Second, the

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nearest producer, Well No. N-9, located in Unit "D" Section 20, T26N-R18W is situated 41' structurally higher than Well No. N-2 and is producing 27 BOPD and 11 BWPD based on a test December 18, 1972. Finally, Well No. U-1 to the southeast of N-2 is located only 10' lower structurally and has disposed of more than 3,000,000 barrels of water since conversion to disposal use in 1968.

Approval of this application will prevent unnecessary wells, otherwise prevent waste, protect correlative rights and eliminate a potential pollution hazard. Amoco Production Company, therefore, respectfully requests administrative approval of this application under the provisions of Order No. R-3558. If objections are raised or if you believe this application should only be considered for approval after a public hearing, please set the matter for hearing on the next scheduled docket.

Yours very truly,

*R. B. Giles*

CJB:im

Attachments

cc: Texaco, Inc.  
Box 2100  
Denver, Colorado 80201

Mobil Oil Corporation  
Box 633  
Midland, Texas 79701

Southern Gulf Prod. Co.  
840 Houston National Gas Bldg.  
Houston, Texas

United States Geological Survey  
P. O. Drawer 1857  
Roswell, New Mexico 88201

United States Geological Survey  
P. O. Box 959  
Farmington, New Mexico 87401

562 559, 562, 563

NEW MEXICO OIL CONSERVATION COMMISSION  
APPLICATION TO DISPOSE OF SALT WATER BY INJECTION INTO A POROUS FORMATION

OPERATOR <b>AMOCO PRODUCTION COMPANY</b>		ADDRESS <b>501 Airport Drive, Farmington, New Mexico</b>	
LEASE NAME <b>Navajo Tribal "N"</b>	WELL NO. <b>2</b>	FIELD <b>Tocito Dome Penn. "D"</b>	COUNTY <b>San Juan</b>
LOCATION UNIT LETTER <b>G</b> ; WELL IS LOCATED <b>1850</b> FEET FROM THE <b>North</b> LINE AND <b>1850</b> FEET FROM THE <b>East</b> LINE, SECTION <b>20</b> TOWNSHIP <b>26-N</b> RANGE <b>18-W</b> NMPM.			

CASING AND TUBING DATA

NAME OF STRING	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY
SURFACE CASING	13-3/8"	95'	100	Surface	Circulated
INTERMEDIATE	8-5/8"	1520'	400	Surface	Calculated
LONG STRING	4-1/2"	6417'	1100	Tie in to intermediate string.	
TUBING	NAME, MODEL AND DEPTH OF TUBING PACKER				
To be run	2-7/8"	6150'	Baker Model "D"		

NAME OF PROPOSED INJECTION FORMATION <b>Pennsylvanian "D"</b>	TOP OF FORMATION <b>6229'</b>	BOTTOM OF FORMATION <b>6260'</b>
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IS INJECTION THROUGH TUBING, CASING, OR ANNULUS? <b>Tubing</b>	PERFORATIONS OR OPEN HOLES? <b>Perforations</b>	PROPOSED INTERVAL(S) OF INJECTION <b>6237-6252'</b>
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IS THIS A NEW WELL DRILLED FOR DISPOSAL? <b>No</b>	IF ANSWER IS NO, FOR WHAT PURPOSE WAS WELL ORIGINALLY DRILLED? <b>Oil Producer</b>	HAS WELL EVER BEEN PERFORATED IN ANY ZONE OTHER THAN THE PROPOSED INJECTION ZONE? <b>No</b>
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LIST ALL SUCH PERFORATED INTERVALS AND SACKS OF CEMENT USED TO SEAL OFF OR SQUEEZE EACH

DEPTH OF BOTTOM OF DEEPEST FRESH WATER ZONE IN THIS AREA <b>Est. 1300'</b>	DEPTH OF BOTTOM OF NEXT HIGHER OIL OR GAS ZONE IN THIS AREA <b>None Known</b>	DEPTH OF TOP OF NEXT LOWER OIL OR GAS ZONE IN THIS AREA <b>None Known</b>
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ANTICIPATED DAILY INJECTION VOLUME (BBLs.) <b>500</b>	MINIMUM <b>3,000</b>	MAXIMUM <b>3,000</b>	OPEN OR CLOSED TYPE SYSTEM <b>Closed</b>	IS INJECTION TO BE BY GRAVITY OR PRESSURE? <b>As Necessary</b>	APPROX. PRESSURE (Psi) <b>200 psi</b>
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ANSWER YES OR NO WHETHER THE FOLLOWING WATERS ARE MINERALIZED TO SUCH A DEGREE AS TO BE UNFIT FOR DOMESTIC, STOCK, IRRIGATION, OR OTHER GENERAL USE - <b>Yes</b>	WATER TO BE DISPOSED OF <b>Yes</b>	NATURAL WATER IN DISPOSAL ZONE <b>Yes</b>	ARE WATER ANALYSES ATTACHED? <b>Previously Submitted</b>
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NAME AND ADDRESS OF SURFACE OWNER (OR LESSEE, IF STATE OR FEDERAL LAND)  
**U.S.G.S. for the Navajo Tribe of Indians**

LIST NAMES AND ADDRESSES OF ALL OPERATORS WITHIN ONE-HALF MILE OF THIS INJECTION WELL  
**Texaco, Inc. Box 2100, Denver, Colorado 80201**

**Mobil Oil Corporation, Box 633, Midland, Texas 79701**

**Southern Gulf Production Co., 840 Houston Nat'l Gas Bldg., Houston, Texas 77002**

HAVE COPIES OF THIS APPLICATION BEEN SENT TO EACH OF THE FOLLOWING? <b>Yes</b>	SURFACE OWNER <b>Yes</b>	EACH OPERATOR WITHIN ONE-HALF MILE OF THIS WELL <b>2 miles</b>	THE NEW MEXICO STATE ENGINEER <b>No</b>
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ARE THE FOLLOWING ITEMS ATTACHED TO THIS APPLICATION (SEE RULE 701-B) <b>Yes</b>	PLAT OF AREA <b>Yes</b>	ELECTRICAL LOG <b>Yes</b>	DIAGRAMMATIC SKETCH OF WELL <b>Yes</b>
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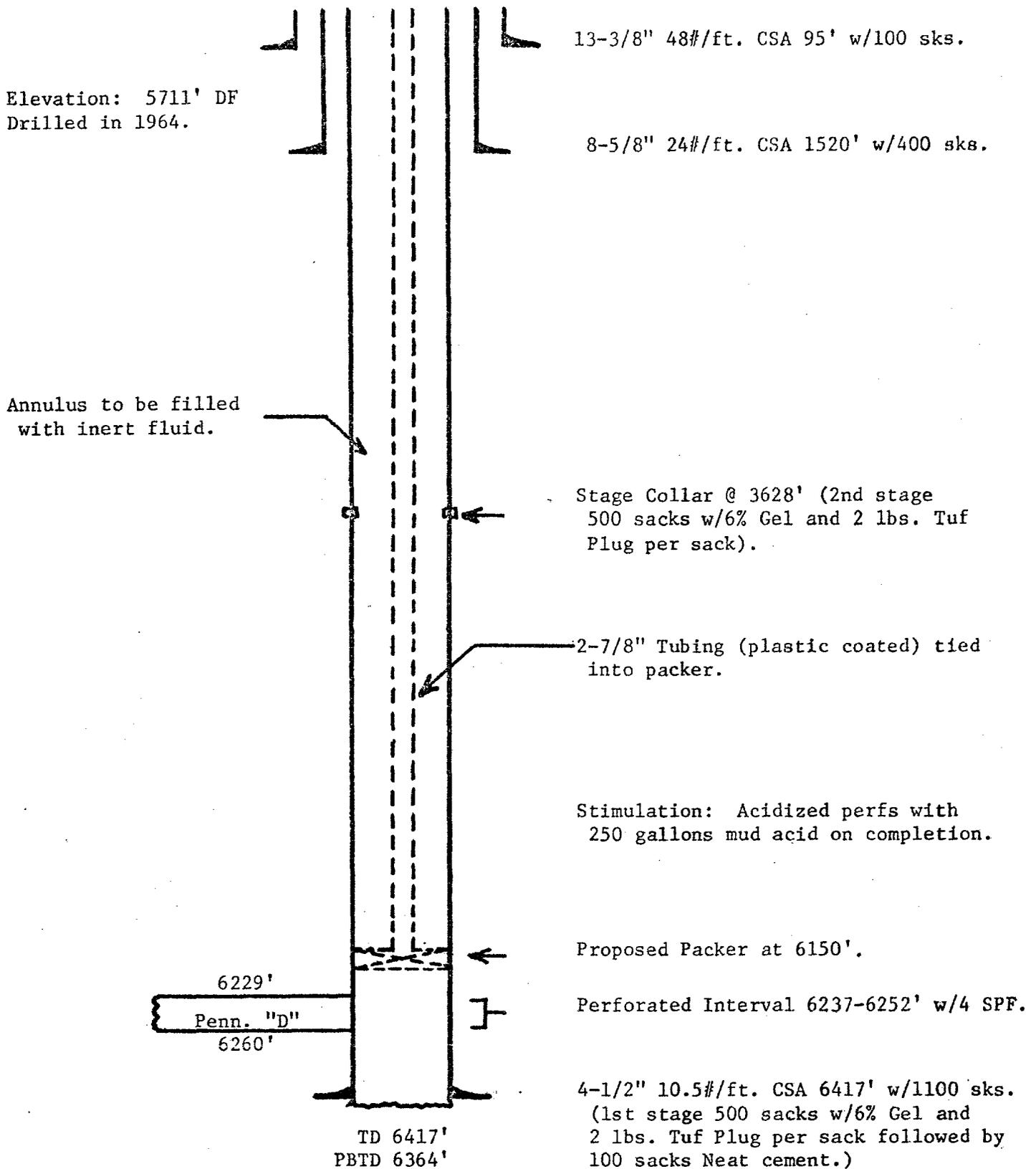
I hereby certify that the information above is true and complete to the best of my knowledge and belief.

*RB Giles* (Signature)      *Dr. Staff Engineer* (Title)      **2/15/73** (Date)

NOTE: Should waters from the State Engineer, the surface owner, and all operators within one-half mile of the proposed injection well not accompany this application, the New Mexico Oil Conservation Commission will hold the application for a period of 15 days from the date of receipt by the Commission's Santa Fe office. If at the end of the 15-day waiting period no protest has been received by the Santa Fe office, the application will be processed. If a protest is received, the application will be set for hearing, if the applicant so requests. SEE RULE 701.

NAVAJO TRIBAL "N" WELL NO. 2  
 TOCITO DOME PENN. "D" FIELD

Elevation: 5711' DF  
 Drilled in 1964.





CHEM LAB

WATER ANALYSIS EXCHANGE REPORT

ILLEGIBLE

MEMBER Pan American Petroleum Corp. LAB NO. 24896 REPORT NO. OCT 15 1968  
 OPERATOR Pan American Petroleum Corp. LOCATION NW SW 21-26N-15W  
 WELL NO. Navajo Tribal U-1 FORMATION Pennsylvanian "D"  
 FIELD Tocito Dome INTERVAL 6383-6386  
 COUNTY San Juan SAMPLE FROM Production (5-9-68)  
 STATE New Mexico DATE October 10, 1968

REMARKS & CONCLUSIONS: Clear water.

Cations			Anions		
	mg/l	meq/l		mg/l	
Sodium	26036	1132.49	Sulfate	1181	
Potassium	165	4.22	Chloride	50700	1420.74
Lithium	-	-	Carbonate	-	-
Calcium	4336	216.37	Bicarbonate	610	10.00
Magnesium	1353	111.22	Hydroxide	-	-
Iron	Absent	-	Hydrogen sulfide	Absent	-
Total Cations		1464.30	Total Anions		1464.30

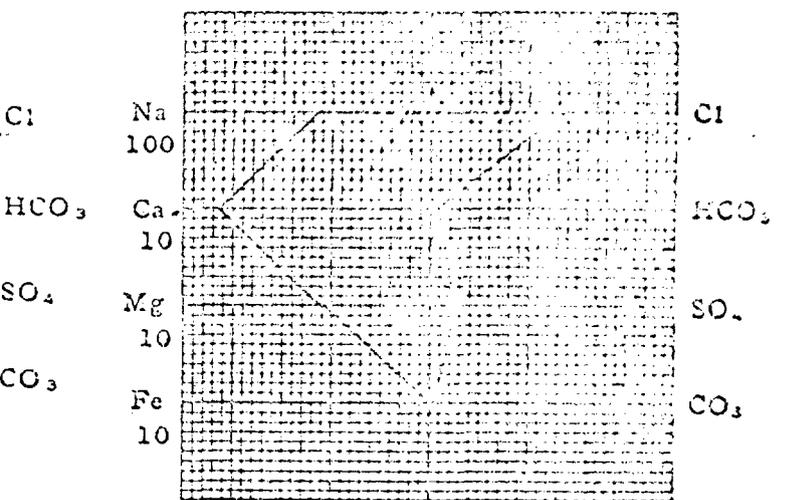
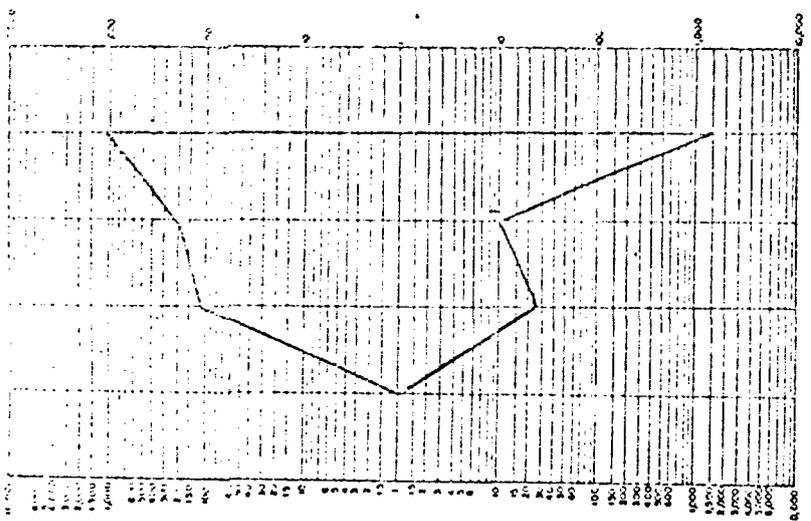
Total dissolved solids, mg/l 84071 Specific resistance @ 68° F.:  
 NaCl equivalent, mg/l 84481 Observed 0.110 ohm-centimeters  
 Observed pH 7.3 Calculated 0.029 ohm-centimeters

WATER ANALYSIS PATTERNS

MEQ per unit

LOGARITHMIC

STANDARD



(Na value in above graphs includes Na, K, and Li)  
 NOTE: Mg/l = Milligrams per liter. Meq/l = Milligram equivalents per liter.



**RECEIVED**  
 MAR - 5 1973  
 OIL CONSERVATION  
 Santa Fe

File: 986.511 N.M.O.C.  
 Tocito Dome

**United States Department of the Interior**  
**GEOLOGICAL SURVEY**

P. O. Box 959  
 Farmington, New Mexico 87401

February 27, 1973

Amoco Production Company  
 Security Life Bldg.  
 Denver, Colorado 80202

Re: Navajo tribal lease  
 14-20-603-5035  
 water disposal

Attn: H. T. Hunter

Gentlemen:

Your application to the New Mexico Oil Conservation Commission requests approval to dispose of produced salt water from the Tocito Dome field, San Juan County, New Mexico, into an existing well No. 2 Navajo Tribal "N", SW $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 20, T. 26 N., R. 18 W., on Navajo tribal lease 14-20-603-5035.

This office has no objection to the disposal of salt water as outlined in your request whereby produced water is injected into the Pennsylvanian "D" formation at a perforated interval from 6237 to 6252 ft. It is understood that the well will be conditioned for disposal by setting a packer at 6150', running plastic coated tubing to the perforated zone, and isolating the annular space by filling the 4 $\frac{1}{2}$ " casing - 2-7/8" tubing annulus with inhibited or inert fluid. Like approval must be given by the N.M.O.C.C. and any change in the method outlined must be approved by this office.

Sincerely yours,

P. T. McGrath  
 District Engineer

RECEIVED	
PROD. DIST. CT.	
MAR 2 1973	
DATE	
BY	
FILE	

*Handwritten notes: 14-20-603-5035*

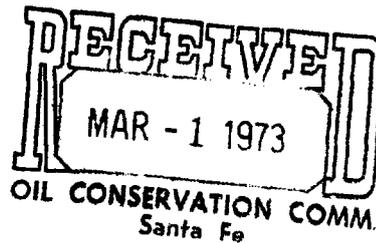
Send copy to  
 NMOCC

SOUTHERN GULF PRODUCTION COMPANY

840 HOUSTON NATURAL GAS BLDG.

HOUSTON, TEXAS 77002

713-225-2055



February 26, 1973

Mr. A. L. Porter, Jr.  
Secretary-Director of the  
New Mexico Oil Conservation Commission  
P. O. Box 2088  
Santa Fe, New Mexico 87501

Re: Application to Dispose of Salt Water  
Navajo Tribal "N" Well No. 2  
Tocito Dome Field  
San Juan County, New Mexico

Dear Mr. Porter:

This is to advise that Southern Gulf Production Company does not have any objection to Amoco's proposal to dispose of salt water into the Navajo Tribal "N" Well No. 2, Tocito Dome Field, San Juan County, New Mexico.

Yours very truly,

  
Gordon B. Puckett  
Vice President

GBP:mad

cc: Mr. H. T. Hunter  
Amoco Production Company  
Security Life Building  
Denver, Colorado 80202

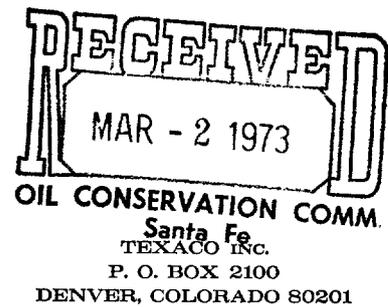


PETROLEUM PRODUCTS

PRODUCING DEPARTMENT  
ROCKY MOUNTAINS-U. S.  
DENVER DIVISION

J. C. WHITE  
ASSISTANT DIVISION MANAGER

February 27, 1973



AMOCO APPLICATION  
FOR SALT WATER DISPOSAL  
TOCITO DOME FIELD, NEW MEXICO  
6.02-1

Mr. A. L. Porter, Jr.  
New Mexico Oil Conservation Commission  
P. O. Box 2088  
Santa Fe, New Mexico 87501

Dear Mr. Porter:

On February 15, 1973, Amoco Production Company filed with the New Mexico Oil Conservation Commission an application to dispose of salt water into the Pennsylvanian "D" formation in Navajo Tribal "N" Well No. 2, Tocito Dome Field, San Juan County, New Mexico. Texaco has oil producing leases within two miles of the proposed disposal well and has received a copy of Amoco's application, in accordance with Rule 701-C.

Please be advised that Texaco waives objection to Amoco's subject application.

Very truly yours,

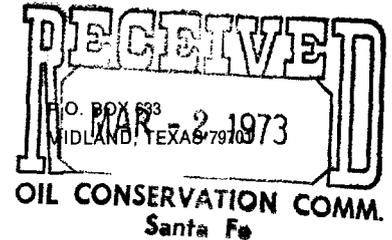
LEA:BKM

cc: Mr. H. T. Hunter  
Amoco Production Company  
Security Life Building  
Denver, Colorado 80202

cc: U. S. Geological Survey  
P. O. Drawer 1857  
Roswell, New Mexico 88201

cc: United States Geological Survey  
P. O. Box 959  
Farmington, New Mexico 87401

# Mobil Oil Corporation



February 28, 1973

New Mexico Oil Conservation Commission  
P. O. Box 2088  
Santa Fe, New Mexico 87501

Attn: Mr. A. L. Porter, Jr.

AMOCO PRODUCTION COMPANY APPLICATION  
TO DISPOSE OF SALT WATER INTO THE  
NAVAJO TRIBAL "N" WELL NO. 2,  
TOCITO DOME FIELD, SAN JUAN COUNTY,  
NEW MEXICO

Gentlemen:

Mobil Oil Corporation has been informed of the Amoco proposal to dispose of salt water into the Navajo Tribal "N" Well NO. 2, Unit G, Section 20, T26N, R18W, San Juan County, New Mexico. It is our understanding that the produced salt water from the Tocito Dome Field will be injected through tubing, below a packer, into the Pennsylvanian "D" formation.

Mobil Oil Corporation, as an operator in the Tocito Dome Field, hereby waives objection to this application.

Yours very truly,

A handwritten signature in cursive script that reads "J. A. Morris".

J. A. Morris  
Production Engineering Supervisor

JHSeerey/cs

cc: Amoco, Denver

LARGE FORMAT  
EXHIBIT HAS  
BEEN REMOVED  
AND IS LOCATED  
IN THE NEXT FILE