

**(Subsurface)
Discharge Plan &
Authorization to
Inject
APPLICATION**

UIC-CL1-008



**DISCHARGE PLAN APPLICATION AND
APPLICATION FOR AUTHORIZATION TO INJECT,
PER OIL CONSERVATION DIVISION FORM C-108,
INTO CLASS I WELLS WDW-1, WDW-2
AND PROPOSED WDW-3**

**VOLUME I
SECTIONS I THROUGH VII**

**NAVAJO REFINING COMPANY
Artesia, New Mexico**

Subsurface Project No. 60D5497

September 2003

Prepared By:

**SUBSURFACE TECHNOLOGY, INC.
Houston, Texas**

TABLE OF CONTENTS

VOLUME I

DISCHARGE PLAN UIC-CLI-008-1 APPROVAL LETTERS

ADMINISTRATIVE APPLICATION CHECKLIST

DISCHARGE PLAN APPLICATION

FORM C-101: APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUG
BACK, OR ADD A ZONE

FORM C-102: WELL LOCATION AND ACREAGE DEDICATION PLAT

FORM C-108: APPLICATION FOR AUTHORIZATION TO INJECT

ADDENDUM NO. 1: RESPONSE TO REQUEST FOR ADDITIONAL
INFORMATION RECEIVED ON JUNE 10, 1998

ADDENDUM NO. 2 RESPONSE TO COMMENTS RECEIVED
ON AUGUST 6 and August 10, 1999

I.	PURPOSE.....	I-1
II.	OPERATOR.....	II-1
III.	WELL DATA.....	III-1

ATTACHMENTS

ATTACHMENT III-1:	WDW-1 Injection Well Data Sheet and Well Schematic	
ATTACHMENT III-2:	WDW-2 Injection Well Data Sheet and Well Schematic	
ATTACHMENT III-3:	Proposed WDW-3 Injection Well Data Sheet, Well Schematic, and Drilling and Completion Procedure	
ATTACHMENT III-4:	Closure Plan for WDW-1 and Proposed WDW-2 and WDW-3	
IV.	EXISTING PROJECT.....	IV-1



TABLE OF CONTENTS (Continued)

V.	AREA OF REVIEW	V-1
----	----------------------	-----

ATTACHMENTS

ATTACHMENT V-1: Non-Freshwater Wells in the Area of Review

ATTACHMENT V-2: Water Wells in the Vicinity of the Proposed Injection Wells

VI.	INJECTION ZONE WELLS	VI-1
-----	----------------------------	------

VI.A Protocol for Identifying Wells VI-1

VI.B Well Data Tabulations and Well Records VI-2

VI.C Well Schematics..... VI-5

VI.D Condition of Artificial Penetrations..... VI-5

VI.E Cone of Influence and AOR Determination..... VI-8

ATTACHMENTS

ATTACHMENT VI-1: Tabulation of Wells Within 1 Mile of the Injection Wells

ATTACHMENT VI-1A: Construction Data for Wells that Penetrate the Injection Zone within 1 Mile of the Injection Wells

ATTACHMENT VI-2: Well Records for Wells That Penetrate the Injection Zone and Schematics for Plugged and Abandoned Wells

ATTACHMENT VI-2A: Scout Tickets for Wells in the AOR Without Available Records at the OCD

TABLE OF CONTENTS (Continued)

ATTACHMENT VI-2B:	Map ID No. 754 (Mis-Plotted Location for Map ID No. 756): Note from Midland Map Company, Records for Map ID No. 756
ATTACHMENT VI-2C:	Map ID No. 795 (Mis-Plotted Location for Map ID No. 765): Note from Midland Map Company, Records for Map ID No. 765
ATTACHMENT VI-2D:	Map ID No. 942 (same as Map ID No. 89): Records for Map ID No. 89
ATTACHMENT VI-2E:	Map ID No. 778: Note from Midland Map Co.; 1959 Map of Wells in 2-18S-27E
ATTACHMENT VI-3:	Top of Cement in Injection Zone Wells in the Area of Review
ATTACHMENT VI-4:	<i>Intentionally Left Blank</i>
ATTACHMENT VI-5:	Predicted Pressure Increase and Cone of Influence
ATTACHMENT VI-6:	PREDICTW - Reservoir Pressure Increase Program
ATTACHMENT VI-7:	Water Viscosity at Various Salinities and Temperatures
ATTACHMENT VI-8:	Compressibility of Pore Volume and Distilled Water
VII. PROPOSED OPERATIONS	VII-1

ATTACHMENTS

ATTACHMENT VII-1:	Chemical Analyses of Injected Waste Water
ATTACHMENT VII-2:	Average Concentration Levels for Major Wastestream Constituents
ATTACHMENT VII-3:	Salinity of Formation Brines from Hydrocarbon-Producing Intervals in the Wolfcamp, Cisco, Canyon, and Strawn Formations



TABLE OF CONTENTS (Continued)

ATTACHMENT VII-4: Analysis of Formation Fluid from the Cisco in WDW-1

VOLUME II

VIII. GEOLOGY	VIII-1
VIII.A Injection Zone Lithology, Depth, Thickness, Porosity, and Permeability	VIII-1
VIII.B Confining Zone	VIII-4
VIII.C Structure	VIII-6
VIII.D Underground Sources of Drinking Water.....	VIII-7
VIII.E Compatibility Issues.....	VIII-8

ATTACHMENTS

ATTACHMENT VIII-1: Resistivity Log of WDW-1	
ATTACHMENT VIII-1A: Porosity Log of WDW-1	
ATTACHMENT VIII-2: Resistivity Log of Proposed WDW-2	
ATTACHMENT VIII-2A: Porosity Log of Proposed WDW-2	
ATTACHMENT VIII-2B: Resistivity Log of Proposed WDW-3	
ATTACHMENT VIII-2C: Porosity Log of Proposed WDW-3	
ATTACHMENT VIII-3: Dip Structure Cross Section A-A'	
ATTACHMENT VIII-4: Strike Structural Cross Section B-B'	
ATTACHMENT VIII-5: Thickness of the Wolfcamp Porous Interval	



TABLE OF CONTENTS (Continued)

ATTACHMENT VIII-6:	Thickness of the Cisco Porous Interval	
ATTACHMENT VIII-7:	Permeability, Porosity, and Thickness of Hydrocarbon-Producing Intervals in the Wolfcamp, Cisco, and Canyon Formations in Eddy and Lea Counties	
ATTACHMENT VIII-8:	Drilling Report from Proposed WDW-1	
ATTACHMENT VIII-9:	Drillstem Test Data from Proposed WDW-1	
ATTACHMENT VIII-9A:	Calculation of Permeability from DST No. 5 in WDW-1	
ATTACHMENT VIII-9B:	WDW-1 Pressure Falloff Test Analysis, July 30-31, 1998	
ATTACHMENT VIII-10:	Structure Map of the Top of the Rio Bonito Member of the San Andres Formation	
ATTACHMENT VIII-11:	Structure Map of the Strawn Formation	
ATTACHMENT VIII-12:	Local Structure Map of the Wolfcamp Formation	
ATTACHMENT VIII-13:	Local Structure Map of the Cisco Formation	
ATTACHMENT VIII-14:	Local Structure Map of the Canyon Formation	
ATTACHMENT VIII-15:	Local Structure Map of the Strawn Formation	
ATTACHMENT VIII-16:	Map Showing the Altitude of the 10-g/l Isosaline Surface	
IX.	PROPOSED STIMULATION PROGRAM.....	IX-1
X.	LOGGING AND TESTING	X-1
XI.	FRESHWATER CHEMISTRY	XI-1

ATTACHMENTS

ATTACHMENT XI-1:	Freshwater Wells in the Vicinity of the Proposed Injection Wells (Table)	
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TABLE OF CONTENTS (Continued)

ATTACHMENT XI-2:	Chemical Analysis of Samples from Water Well ID No. 18.28.7.430 in Section 7, T18S, R28E
ATTACHMENT XI-3:	Water Wells in the Vicinity of the Proposed Wells (Data from the State Engineer Office Water Well Database from March 1999)
ATTACHMENT XI-4:	Records on File with the State Engineer Office for Water Wells in the Vicinity of the Proposed Wells
XII.	FAULTING AND OTHER HYDRAULIC CONNECTIONS BETWEEN THE INJECTION ZONE AND THE USDWsXII-1
REFERENCES	



DATE IN	SUSPENSE	ENGINEER	LOGGED IN	TYPE	APP NO.
---------	----------	----------	-----------	------	---------

ABOVE THIS LINE FOR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION

- Engineering Bureau -

1220 South St. Francis Drive, Santa Fe, NM 87505



ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

Application Acronyms:

[NSL-Non-Standard Location] [NSP-Non-Standard Proration Unit] [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 - Simultaneous Dedication
☐ NSL ☐ NSP ☐ 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

[D] Other: Specify Class I Injection

[2] 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] SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED ABOVE.

[4] **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate and complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

Darrell Moore
 Print or Type Name

Darrell Moore
 Signature

Env. Mgr. for Water & Waste 9/17/03
 Title Date

darrell@navajo-refining.com
 e-mail Address

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Revised June 10, 2003

Submit Original
Plus 1 Copy
to Santa Fe
1 Copy to Appropriate
District Office

**DISCHARGE PLAN APPLICATION FOR SERVICE COMPANIES, GAS PLANTS,
REFINERIES, COMPRESSOR, GEOTHERMAL FACILITIES
AND CRUDE OIL PUMP STATIONS**

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

☐ New ☐ Renewal ☒ Modification

1. Type: Class I Injection Well Nos. WDW-1, WDW-2, and Proposed WDW-3

2. Operator: Navajo Refining Company

Address: Post Office Box 159, Highway 82 East, Artesia, New Mexico 88211

Contact Person: Darrell Moore Phone: 505-748-3311

3. Location: SE /4 SW /4 Section 1 Township 18S Range 27E

Submit large scale topographic map showing exact location.

4. Attach the name, telephone number and address of the landowner of the facility site.

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

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

7. Attach a description of present sources of effluent and waste solids. Average quality and daily volume of waste water must be included.

8. Attach a description of current liquid and solid waste collection/treatment/disposal procedures.

9. Attach a description of proposed modifications to existing collection/treatment/disposal systems.

10. Attach a routine inspection and maintenance plan to ensure permit compliance.

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

12. Attach geological/hydrological information for the facility. Depth to and quality of ground water must be included.

13. Attach a facility closure plan, and other information as is necessary to demonstrate compliance with any other OCD rules, regulations and/or orders.

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

Name: Darrell Moore

Title: Env. Mgr. for Waters West

Signature: Darrell Moore

Date: 9/17/03

E-mail Address: darrell@navajo-refining.com

**DISCHARGE PLAN APPLICATION
FOR SERVICE COMPANIES, GAS PLANTS, REFINERIES,
COMPRESSOR, AND CRUDE OIL PUMP STATIONS**

1. Type

Class I Wells WDW-1, WDW-2, and proposed WDW-3

2. Operator

Navajo Refining Company
Post Office Box 159
Highway 82 East
Artesia, New Mexico 88211

Contact

Darrell Moore
Environmental Manager of Water and Waste
Navajo Refining Company
Post Office Box 159
Artesia, New Mexico 88211
505-748-3311

3. Location

The locations of WDW-1 and proposed WDW-2 and WDW-3 are detailed on accompanying Forms C-102. The well locations are shown on Attachment V-2 of the Application for Authorization to Inject, Per OCD Form C-108, Into Proposed WDW-1, WDW-2, and WDW-3 (the "Application to Inject").

4. Facility Ownership

Navajo Refining Company owns the site of WDW-1. The sites of WDW-2 and proposed WDW-3 are owned by the United States government. Navajo is applying to the Bureau of Land Management for a right-of-way permit to use the site of proposed WDW-3.

5. Facilities

The facilities currently planned for each wellsite include the wellhead, the well annulus monitoring system, and monitoring and recording instrumentation. The waste water to be injected will be delivered to each well from Navajo's refineries in Artesia and Lovington by pipeline systems. Tankage to store up to 10,000 barrels may be constructed at the site of WDW-1.



6. Materials Storage

No materials storage is planned.

7. Waste Stream

The waste stream to be injected is described in Section VII of the "Application to Inject."

8. Current Treatment and Disposal

The waste stream to be injected is currently managed in evaporation ponds at Navajo's refineries. A portion of the stream is sent to publicly owned treatment works.

9. Modifications

Not applicable; this application is for planned facilities.

10. Inspection and Maintenance Plan

Navajo will operate instrumentation that will monitor and record continuously the injection pressure, flow rate, flow volume, and casing-tubing annulus pressure.

The injection well system will be equipped with a pressure-limiting device that will prevent the wellhead pressure from exceeding the permitted maximum surface injection pressure.

A well annulus monitoring system will be installed and maintained at each wellsite to monitor for tubing and casing leaks.

Mechanical integrity testing will be conducted annually and any time the tubing is pulled or the packer is resealed, in accordance with OCD testing procedures.

11. Contingency Plan

Navajo will notify the OCD District Office in Artesia within 24 hours of failures of the tubing, casing, or packer and will correct failures in a timely manner.

12. Geological and Hydrological Information

Geological and hydrogeological information is included in Sections VIII and XI of the "Application to Inject."

13. Closure Plan

The proposed closure plan for the wells is included as Attachment III-4 of the "Application to Inject."

Submit To Appropriate District Office
State Lease - 6 copies
Fee Lease - 5 copies
District I
1625 N. French Dr., Hobbs, NM 87240
District II
811 South First, Artesia, NM 87210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

SF Form C-105
Revised March 25, 1999

OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

WELL API NO.
30-015-20894

5. Indicate Type of Lease

STATE ☐ FEE ☒ Federal

State Oil & Gas Lease No. NM 6852

7. Lease Name or Unit Agreement Name

Navajo Refining Company
WDW-2

8. Well No.

WDW-2

9. Pool name or Wildcat

L. Wolfcamp-Cisco-Canyon Injection Zone

Navajo (Injecting) Permian-Penn 96915

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

1a. Type of Well:

OIL WELL ☐ GAS WELL ☐ DRY ☐ OTHER ☒ Class I Waste Disposal Well

b. Type of Completion:

NEW WORK ☐ PLUG ☐ DIFF. ☐
WELL ☐ OVER ☐ DEEPEN ☐ BACK ☐ RESVR. ☐

2. Name of Operator

Navajo Refining Company

3. Address of Operator

Post Office Box 159, Artesia, New Mexico 88211

4. Well Location

Unit Letter E 1980 Feet From The North Line and 660 Feet From The West Line

Section 12

Township 18 South

Range 27 East

NMPM Eddy

County

10. Date Spudded

July 18, 1973

11. Date T.D. Reached

August 27, 1973

12. Date Compl. (Ready to Prod.)

June 8, 1999

13. Elevations (DF& R(B. RT, GR, etc.)

3607 feet GL, 3623 feet RKB

14. Elev. Casinghead

3609 feet GL

15. Total Depth

10,372 feet

16. Plug Back T.D.

8770 feet

17. If Multiple Compl. How Many

Zones? 1

18. Intervals

Drilled By

Rotary Tools

All

Cable Tools

N/A

19. Producing Interval(s), of this completion - Top, Bottom, Name

L. Wolfcamp-Cisco-Canyon

20. Was Directional Survey Made

Yes

21. Type Electric and Other Logs Run

Fracture Finder and Caliper Logs, Dual Induction Laterolog,
Compensated Neutron Formation Density

22. Was Well Cored

No

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

CASING SIZE	WEIGHT LB./FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8"	N/A	40'	N/A	N/A	None
8-5/8"	32	1995'	11"	800 sacks circulated	None
5-1/2"	17	8869'	7-7/8"	1570 sacks circulated	None

24. LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN

25. TUBING RECORD

SIZE	DEPTH SET	PACKER SET
3-1/2"	7528'	7528'

26. Perforation record (interval, size, and number)

7570' to 7620', 7676' to 7736', 7826' to 7834', 7858' to 7880',
7886' to 7904', 7916' to 7936', 7944' to 7964', 7990' to 8042',
8096' to 8116', 8191' to 8201', 8304' to 8319', 8395' to 8399'
(2 jsp for total of 598 holes).

DEPTH INTERVAL

7570' to 8399'

AMOUNT AND KIND MATERIAL USED

10,000 gallons of 15% HCl, plus 4600 pounds
of rock salt as diverter

28. PRODUCTION

Date First Production

N/A

Production Method (Flowing, gas lift, pumping - Size and type pump)

N/A

Well Status (Prod. or Shut-in)

N/A

Date of Test

N/A

Hours Tested

N/A

Choke Size

N/A

Prod'n For

Test Period

Oil - Bbl

--

Gas - MCF

--

Water - Bbl.

--

Gas - Oil Ratio

--

Flow Tubing Press.

Casing Pressure

Calculated 24-

Hour Rate

Oil - Bbl.

--

Gas - MCF

--

Water - Bbl.

--

Oil Gravity - API - (Corr.)

--

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

N/A

Test Witnessed By

30. List Attachments

Deviation Report

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

Signature Darrell Moore

Printed Name Darrell Moore

Title Env. Mgr.

Date 7/19/99

INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Division not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths also be reported. For multiple completions, items 25 through 29 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico

T. Anhy		T. Canyon	8390
T. Salt		T. Strawn	8894
B. Salt		T. Atoka	
T. Yates		T. Miss	
T. 7 Rivers		T. Devonian	
T. Queen		T. Silurian	
T. Grayburg		T. Montoya	
T. San Andres	2005	T. Simpson	
T. Glorieta		T. McKee	
T. Paddock		T. Ellenburger	
T. Blinebry		T. Gr. Wash	
T. Tubb		T. Delaware Sand	
T. Drinkard		T. Bone Springs	
T. Abo	5506	T.	
T. Wolfcamp	6728	T.	
T. Penn		T.	
T. Cisco (Bough C)	7645	T.	

Northwestern New Mexico

T. Ojo Alamo	T. Penn. "B"
T. Kirtland-Fruitland	T. Penn. "C"
T. Pictured Cliffs	T. Penn. "D"
T. Cliff House	T. Leadville
T. Menefee	T. Madison
T. Point Lookout	T. Elbert
T. Mancos	T. McCracken
T. Gallup	T. Ignacio Otzte
Base Greenhorn	T. Granite
T. Dakota	T.
T. Morrison	T.
T. Todilto	T.
T. Entrada	T.
T. Wingate	T.
T. Chinle	T.
T. Permian	T.
T. Penn "A"	T.

OIL OR GAS SANDS OR ZONES

No. 1, from.....to.....
No. 2, from.....to.....

No. 3, from.....to.....
No. 4, from.....to.....

IMPORTANT WATER SANDS

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

No. 1, from.....to.....feet.....
 No. 2, from.....to.....feet.....
 No. 3, from.....to.....feet.....

LITHOLOGY RECORD (Attach additional sheet if necessary)

From	To	Thickness In Feet	Lithology

From	To	Thickness In Feet	Lithology

TELEPHONE
(505) 748-3311

EASYLINK
62905278



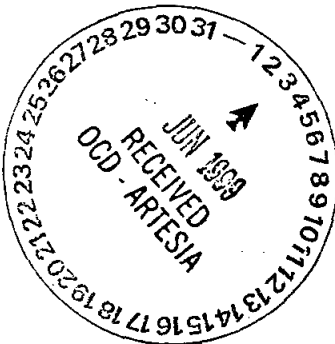
N.M. Oil Cons. Div. Jon
811 S. 1st Street
ARTEZIA, NEW MEXICO 88210-2834
REFINING COMPANY

501 EAST MAIN STREET • P. O. BOX 159
ARTESIA, NEW MEXICO 88211-0159

ST
FAX
(505) 746-6410 ACCTG
(505) 746-6155 EXEC
(505) 748-9077 ENGR
(505) 746-4438 P/L

May 10, 1999

Mr. Tim Gumm
State of New Mexico
Energy, Minerals and Natural
Resources Department
Oil Conservation Division
811 South First Street
Artesia, New Mexico 88210



RE: Re-Entry for Navajo Refining Company's Waste Disposal Well No. 2

Dear Mr. Gumm:

Navajo Refining Company (Navajo) has contracted Subsurface Technology, Inc. to re-enter, test and complete Waste Disposal Well No. 2 (WDW-2), formerly the Chukka Federal No. 2 operated by The Eastland Oil Company. The United States Department of the Interior, Bureau of Land Management approved the Application for Permit to Drill or Deepen on April 27, 1999. Subsequent approval from the State of New Mexico Oil Conservation Commission (OCD) was granted on Tuesday, May 4, 1999.

Navajo initiated field operations on Wednesday, May 5, 1999. The existing pumping equipment, rods, and tubing were removed from the wellbore. The perforations from 1446 feet to 1462 feet were squeezed using 100 sacks of Class 'H' cement (approximately 50 sacks of cement were displaced into the perforated interval). The cement was allowed to cure and drilled out to a total depth of 1922 feet (KB)(1911 feet below ground level).

On Sunday, May 9, 1999, the 8-5/8 inch surface casing, set from 1955 feet (KB) to surface, was pressure tested for internal mechanical integrity between 1922 feet (KB) and 30 feet (KB) using a packer set at 30 feet. The 8-5/8 inch surface casing was pressure tested to 660 pounds per square inch and monitored at the surface for one hour (Attachment A). The fluid used for testing was a clean fresh water fluid. A pressure loss of 1 psi (0.15%) was observed during the first 30 minutes of the test. A pressure loss of 2 psi (0.30%) was observed during the last 30 minutes of the test. The results from the pressure test confirmed internal mechanical integrity of the 8-5/8 inch surface casing from 1922 feet (KB) to 30 feet (KB).

The 8-5/8 inch surface casing was originally set in an 11 inch open-hole to a depth of 1955 feet (KB) and cemented to surface using 700 sacks of Class 'H' cement with 2% gel and 100 sacks of Class 'H' neat. A total of 200 sacks of cement was recorded circulated to surface. The calculated volume between an 11 inch hole and 8-5/8 inch casing is (0.2407 cubic feet per foot X 1955 feet) 471 cubic feet. The volume of cement pumped is (1.18 cubic feet per sack X 800 sacks) 944 cubic feet for an excess of 473 cubic feet or 400 sacks circulated to surface. The calculated volume of cement and apparent volume of actual cement pumped indicated excess cement was circulated to surface.

On Sunday, May 9, 1999, Halliburton Logging Services completed a cement bond and microseismogram (same as a variable density log) logging survey within the 8-5/8 inch casing from a wireline total depth of 1919 feet (KB) to the surface (Attachment B). The results from the survey indicate a continuous column of cement from 1922 feet to surface with good bonding characteristics. The cement behind the 8-5/8 inch casing will provide an effective hydraulic seal to prevent the movement of groundwater fluids into the underground source of drinking water with a base at 473 feet.

Please review and approve the pressure testing and cement bond log results at your earliest convenience. Navajo will proceed with the mobilization of the drilling rig Wednesday, May 12, 1999 and begin re-entry of the WDW-2 wellbore according to the approved drilling program. Navajo will periodically contact the OCD, Artesia office with a status update of the re-entry operations. The Bureau of Land Management will be notified in sufficient time for a representative to witness the cementing of the 5-1/2 inch protection casing.

Should you have any questions or concerns, please call me at (505) 748-3311.

Sincerely yours,



Darrell Moore
Environmental Manager for Water and Waste

c: Mr. David Glass
Bureau of Land Management
Roswell Field Office
2909 West Second Street
Roswell, New Mexico 88201

Mr. Brian Rogers
Subsurface Technology, Inc.
7020 Portwest, Suite 100
Houston, Texas 77024

File: Injection Wells

APPROVED

JUN 02 1999
(ORIG. SGD.) DAVID R. GLASS

AUTHORIZED OFFICER, MINERALS
BUREAU OF LAND MANAGEMENT

**SUBJECT TO
LIKE APPROVAL
BY STATE**

District I
1625 N. French Dr., Hobbs, NM 88240

District II
811 South First, Artesia, NM 88210

District III
1000 Rio Brazos Rd., Aztec, NM 87410

District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources

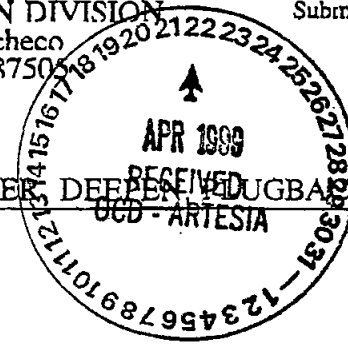
Form C-101
Revised March 12, 1999

OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

Submit to Appropriate District Office
State Lease - 6 Copies
Fee Lease - 5 Copies

☐ AMENDED REPORT

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUG BACK, OR ADD A ZONE



Operator Name and Address: Navajo Refining Company Post Office Box 159 Artesia, New Mexico 88211		OGRID Number 15694
Property Name WDW		API Number 30-015-20894
Property Code 23592	Well No. 2	

Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
E	12	18S	27E		1980	North	660	West	Eddy

Proposed Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
Proposed Pool 1 Lower Wolfcamp Cisco Canyon Injection Zone					Proposed Pool 2 Navajo Injection; Perma-Penn.				

Work Type Code E-Reentry	Well Type Code Class I Injection	Cable/Rotary R	Lease Type Code Federal	Ground Level Elevation 3607' GR, 3623' KB
Multiple No	Proposed Depth 9200'	Formation Strawn	Contractor	Spud Date 5/15/99

Proposed Casing and Cement Program

Hole Size	Casing Size	Casing weight/foot	Setting Depth	Sacks of Cement	Estimated TOC
11"	8-5/8"	32 lb/ft	1995 feet	800	Surface
7-7/8"	5-1/2"	17 lb/ft	9200 feet	Caliper vol. +20%	Surface

²² Describe the proposed program. If this application is to DEEPEN or PLUG BACK give the data on the present productive zone and proposed new productive zone. Describe the blowout prevention program, if any. Use additional sheets if necessary.

Proposed Reentry of The Eastland Oil Company (originally Fred Pool Drilling, Inc.) Chukka Federal No. 2 (PBDT 1912 feet, September 10, 1985) formerly Amoco Production Company Diamond Federal Gas Com. No. 1 (OTD 10,372 feet, P&A August 31, 1973). The well currently produces oil and gas from perforations from 1446 feet to 1462 feet (Penrose.)

Navajo will squeeze the perforations from 1446 feet to 1462 feet, drill out cement plugs, and clean out the well to 9200 feet, set 5-1/2 inch casing at 9200 feet and cement to the surface, perforate porous intervals in the Lower Wolfcamp, Cisco, and Canyon Formations between 7270 feet and 9200 feet, and conducted injectivity tests.

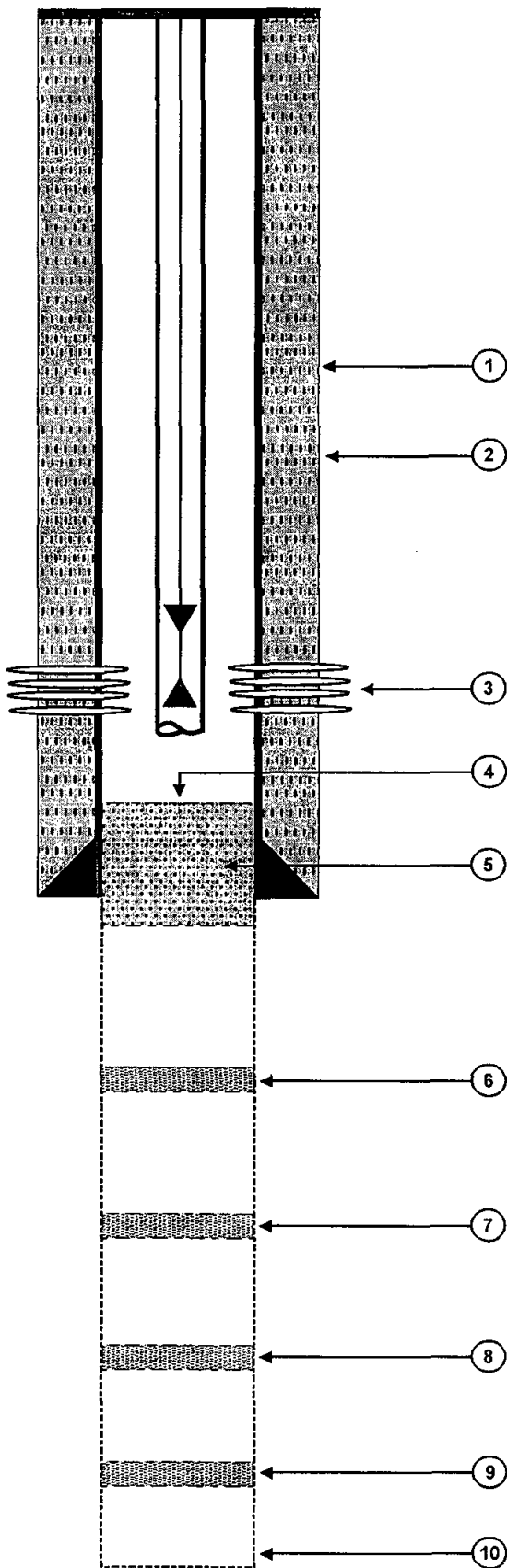
Attached are the Well Location Plat and Drilling Program.

²³ I hereby certify that the information given above is true and complete to the best of my knowledge and belief.

Signature: Darrell Moore
Printed name: Darrell Moore
Title: Env. Mgr. for Water & Waste
Date: 4/21/99
Phone: 505-748-3311

OIL CONSERVATION DIVISION

Approved by: Jim. W. Green. B6X
Title: District Supervisor
Approval Date: 5-3-99 Expiration Date: 5-3-00
Conditions of Approval:
Attached ☐



Total Depth: 10,372'

BELOW GROUND DETAIL

All depths are referenced to the kelly bushing elevation of 13 feet. The surface elevation is 3610 feet.

1. Base of the USDW at 473'.

2. Casing: 8-5/8", 32 lb/ft, set at 1995' in an 11" hole. Cemented to surface with 800 sacks of cement.

3. Perforations: 1446' - 1462'.

4. PBTD: 1912'.

5. Cement Plug: 40 sacks from 1912' to 2045'.

6. Cement Plug: 50 sacks from 3620' to 3720'.

7. Cement Plug: 40 sacks from 5456' to 5556'.

8. Cement Plug: 50 sacks from 7435' to 7535'.

9. Cement Plug: 45 sacks from 9675' to 9775'.

10. Hole Size: 7-7/8".

SUBSURFACE

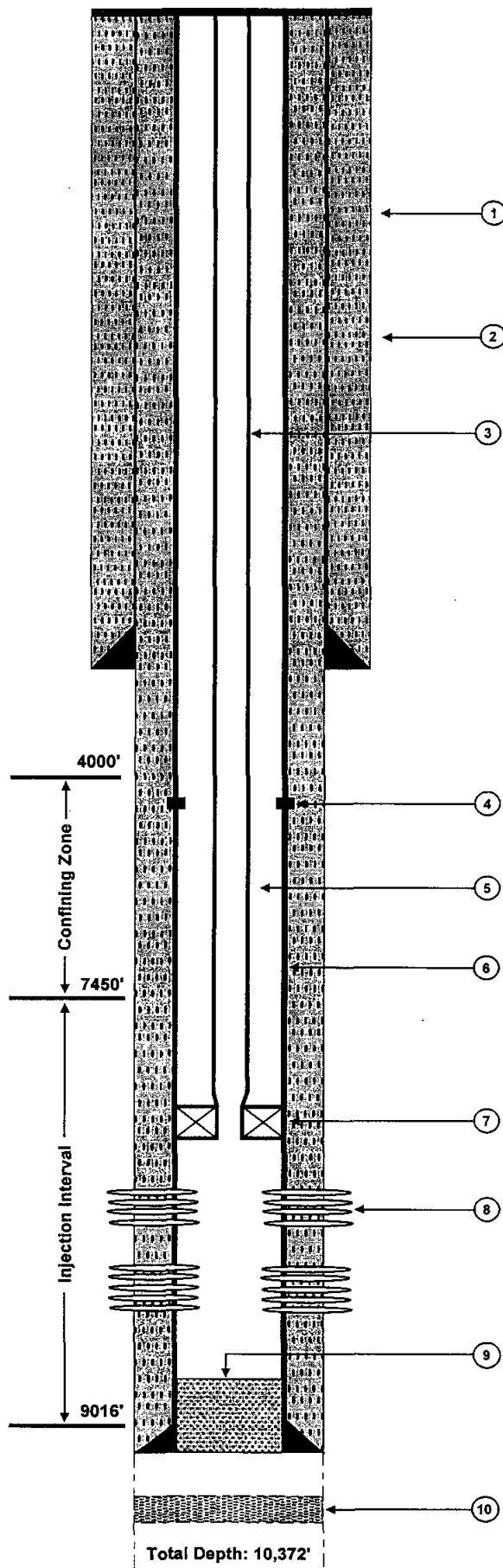
HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

FIGURE 2.0-1
THE EASTLAND OIL COMPANY
PLUGGED-BACK WELLBORE CONFIGURATION
CHUKKA FEDERAL No. 2

Date: 07/02/99	Checked By: B.R.	Job No.: 70A4955
Drawn By: LKM	Approved By: B.R.	File: WDW2B.DS4

BELOW GROUND DETAIL

All depths are referenced to the kelly bushing elevation of 13 feet. Surface elevation is 3610 feet.



1. Base of the USDW at 473'.

2. Casing: 8-5/8", 32 lb/ft, set at 1995' in an 11" hole. Cemented to surface with 800 sacks of cement.

3. Injection Tubing: 3-1/2", 9.2 lb/ft, J-55, smls, NUE 10 rd. set at 7528'.

4. DV Tool: at 5785'.

5. Annulus Fluid: 8.7 ppg brinewater mixed with Unichem Techni-Hib 370 corrosion inhibitor.

6. Protection Casing: 5-1/2", 17 lb/ft, L-80, LT&C; 8869' to the surface and set in a 7-7/8" hole. Casing cemented in two stages as follows:

First Stage: 575 sacks of modified Class "H" with 0.4% CFR-3, 5 lb/sk Gilsonite, 0.5% Halad-344, and 3 lb/sk salt. Mixed at 13.0 ppg. Opened DV tool at 5785' and circulated 20 sacks to surface.

Second Stage: Lead slurry: 300 sacks of Interfill "C" (35:65:6) mixed at 11.7 ppg. Tail slurry: 695 sacks modified Class "H" with 0.4% CFR-3, 5 lb/sk Gilsonite, 0.5% Halad-344, and 3 lb/sk salt mixed at 13.0 ppg. Circulated 150 sacks to surface. Top out with 10 yards of ready mix.

7. Packer: 5-1/2" x 2-7/8" Weatherford Completion Tools (Arrow) Model X-1 retrievable packer set at 7528'. Minimum ID is 2.4375". Wireline re-entry guide is on bottom. To release: turn 1/4 turn to the right and pick up.

8. Perforations (2 spf):

Zone 1: 7570' - 7620'; 7676' - 7736'.

Zone 2: 7826' - 7834'; 7858' - 7880'; 7886' - 7904'; 7916' - 7936'; 7944' - 7964'; 7990' - 8042'; 8096' - 8116'; 8191' - 8201'; 8304' - 8319'; 8395' - 8399'.

9. PBTD: 8770'

10. Cement Plug: 45 sacks from 9675' to 9775'.

SUBSURFACE

HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

FIGURE 2.0-2
NAVAJO REFINING COMPANY
WDW-2
ARTESIA, NEW MEXICO

Date: 07/02/99	Checked By: B.R.	Job No.: 70A4955
Drawn By: LKM	Approved By: B.R.	File: WDW2C.DS4

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB No. 1004-0135
Expires: January 31, 2004

SUNDRY NOTICES AND REPORTS ON WELLS
Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on reverse side

1. Type of Well

☐ Oil Well ☐ Gas Well ☐ Other TEMPORARILY ABANDONED

2. Name of Operator

NAVAJO REFINING COMPANY

3a. Address

PO BOX 159, ARTESIA, NM 88211

3b. Phone No. (include area code)

505-748-3311

4. Location of Well (Footage, Sec., T, R., M., or Survey Description)

790' FSL, 2250' FWL, 1-18S-27E

5. Lease Serial No.

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

8. Well Name and No.

WDW-3

9. API Well No.

30-015-26575

10. Field and Pool, or Exploratory Area

NAVAJO INJECTION; PERMO-PENN

11. County or Parish, State

EDDY

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
<input checked="" type="checkbox"/> Notice of Intent	<input type="checkbox"/> Acidize	<input type="checkbox"/> Deepen	<input type="checkbox"/> Production (Start/Resume)	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Alter Casing	<input type="checkbox"/> Fracture Treat	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Well Integrity
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> New Construction	<input type="checkbox"/> Recomplete	<input type="checkbox"/> Other RECOMPLETE AS
	<input type="checkbox"/> Change Plans	<input type="checkbox"/> Plug and Abandon	<input type="checkbox"/> Temporarily Abandon	CLASS I INJECTION
	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Plug Back	<input checked="" type="checkbox"/> Water Disposal	WELL

3. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 shall be filed once drilling has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

Original well name was CHALK BLUFF FEDERAL COM. NO. 1

DRILL OUT BRIDGE PLUG AT 7010' AND CLEAN OUT TO 7208'.
INJECTION-TEST PERFORATIONS AT 7050' - 7102', 7262' - 7278' TO PLAN SQUEEZE-CEMENT JOB.
DRILL OUT BRIDGE PLUGS AT 7208' AND 7294'. CLEAN OUT HOLE THROUGH PERFS AT 7304'-7314'.
SQUEEZE-CEMENT PERFORATIONS AT 7050' - 7102', 7262' - 7278', AND 7304' - 7314'.
DRILL OUT BRIDGE PLUG AT 7600' AND CLEAN OUT TO TOP OF LINER AT 9051'.
RUN CBL/VDL AND CALIPER FROM 9051' TO SURFACE.
PERFORATE 8540' - 8620' AND 7660' - 8450'.
RUN INJECTIVITY TEST, AND ACIDIZE IF NECESSARY.
RUN INJECTION/FALLOFF TEST.
RUN DIFFERENTIAL TEMPERATURE SURVEY.
RUN RADIOACTIVE TRACER SURVEY.
INSTALL INJECTION TUBING AND PACKER TO APPROX. 7600'.
INSTALL WELL ANNULUS MONITORING EQUIPMENT, AND PREPARE WELL FOR INJECTION.

14. I hereby certify that the foregoing is true and correct

Name (Printed/Typed)

Darrell Moore

Title

Env. Mgr. for Water & Waste

Signature

Darrell Moore

Date

9/17/03

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by (Signature)

Name

(Printed/Typed)

Title

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office

Date

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on next page)

GENERAL INSTRUCTIONS

This form is designed for submitting proposals to perform certain well operations, and reports of such operations when completed, as indicated on Federal and Indian lands pursuant to applicable Federal law and regulations. Any necessary special instructions concerning the use of this

form and the number of copies to be submitted, particularly with regard to local area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from the local Federal office.

SPECIFIC INSTRUCTIONS

Item 4 - Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult the local Federal office for specific instructions.

Item 13 - Proposals to abandon a well and subsequent reports of abandonment should include such special information as is required by the local Federal office. In addition, such proposals and reports should include reasons for the abandonment; data on any former or present

productive zones, or other zones with present significant fluid contents not sealed off by cement or otherwise; depths (top and bottom) and method of placement of cement plugs; mud or other material placed below, between and above plugs; amount, size, method of parting of any casing, liner or tubing pulled and the depth to top of any left in the hole; method of closing top of well and date well site conditioned for final inspection looking to approval of the abandonment.

NOTICE

The Privacy Act of 1974 and the regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.

AUTHORITY: 30 U.S.C. 181 et seq., 351 et seq., 25 U.S.C. 396; 43 CFR 3160.

PRINCIPAL PURPOSE: The information is used to: (1) Evaluate, when appropriate, approve applications, and report completion of subsequent well operations, on a Federal or Indian lease; and (2) document for administrative use, information for the management, disposal and use of National Resource lands and resources, such as: (a) evaluating the equipment and procedures to be used during a proposed subsequent well operation and reviewing the completed well operations for compliance with the approved plan; (b) requesting and granting approval to perform those actions covered by 43 CFR 3162.3-2, 3162.3-3 and 3162.3-4; (c) reporting the beginning or resumption of production, as required by 43 CFR 3162.4-1(c); and (d) analyzing future applications to drill or modify operations in light of data obtained and methods used.

ROUTINE USES: Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecutions in connection with congressional inquiries or to consumer reporting agencies to facilitate collection of debts owed the Government.

EFFECT OF NOT PROVIDING THE INFORMATION: Filing of this notice and report and disclosure of the information is mandatory for those subsequent well operations specified in 43 CFR 3162.3-2, 3162.3-3, 3162.3-4.

The Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.) requires us to inform you that:

This information is being collected to evaluate proposed and/or completed subsequent well operations on Federal or Indian oil and gas leases.

Response to this request is mandatory.

BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT

Public reporting burden for this form is estimated to average 25 minutes per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0135), Bureau Clearance Officer, (WO-630), Mail Stop 401 LS, 1849 C St., N.W., Washington, D.C. 20240.

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1701 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised June 10, 2003
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies
☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30 - 015 -26575	² Pool Code	³ Pool Name Navajo Injection; Permo-Penn
⁴ Property Code	⁵ Property Name WDW	⁶ Well Number 3
⁷ OGRID No.	⁸ Operator Name Navajo Refining Company	⁹ Elevation 3609' GL; 3625' KB

¹⁰ Surface Location

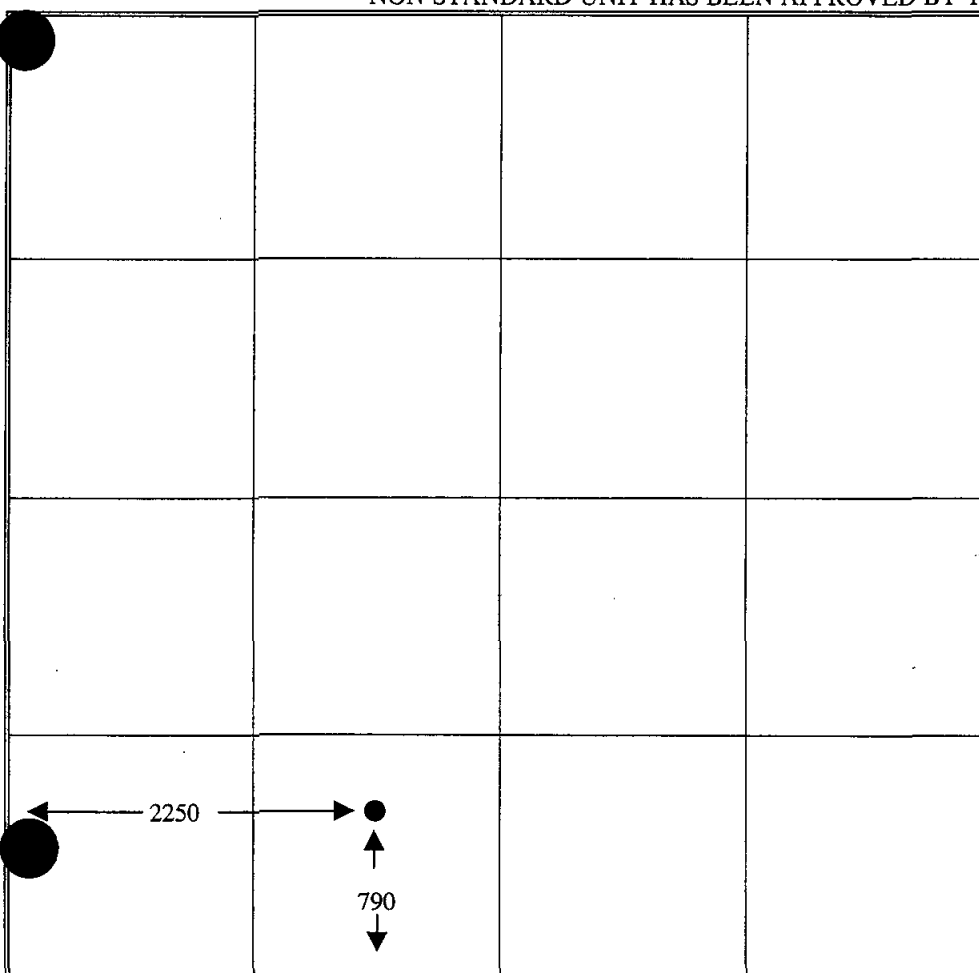
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	1	18S	27E		790	South	2250	West	Eddy

¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County

¹² Dedicated Acres	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

	<p>¹⁷ OPERATOR CERTIFICATION <i>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief.</i></p> <p>Signature _____</p> <p>Printed Name _____</p> <p>Title and E-mail Address _____</p> <p>Date _____</p>
	<p>¹⁸ SURVEYOR CERTIFICATION <i>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.</i></p> <p>Date of Survey _____</p> <p>Signature and Seal of Professional Surveyor: _____</p>
	Certificate Number _____

REENTRY PROCEDURE

NAVAJO REFINING COMPANY'S WDW-3 (PROPOSED)

790' FSL and 2250' FWL, Section 1, T18S, R27E
Eddy County, New Mexico
Chalk Bluff Federal Com. No. 1, API No. 30-015-26575

All depths are in feet below well's original kelly bushing height (RKB) of 16 feet above ground level. The original KB elevation is 3625 feet above mean sea level. The ground level elevation is 3609 feet above mean sea level.

Tops of Geologic Formations (from RKB)

The base of the lowermost USDW is at 420 feet.

San Andres	1976 feet	Lower Wolfcamp	7303 feet
Yeso	4030 feet	Cisco	7650 feet
Abo	5380 feet	Canyon	8390 feet
Wolfcamp	6745 feet	Strawn	8894 feet

Depth of Plugs

7010 feet in 7-inch casing above perforations 7050 feet to 7102 feet
7208 feet in 7-inch casing above perforations 7262 feet to 7278 feet
7294 feet in 7-inch casing above perforations 7304 feet to 7314 feet
7600 feet in 7-inch casing above perforations 7676 feet to 7678 and
7826 feet to 7830 feet
9800 feet in 4-1/2-inch liner above perforations 9861 feet to 9967 feet

Anticipated Formation Pressure

The expected bottom-hole pressure is 3448 pounds per square inch absolute (psia) at 9000 feet, for a gradient of 0.383 pounds per square inch (psi) per foot, or an equivalent

mud weight of 7.36 pounds per gallon (ppg). The bottom-hole pressure was determined from the pressure measured in Navajo's WDW-2, or 2813 psia, at 7570 feet. Navajo's WDW-2 is completed in the same interval proposed for WDW-3 and is located in 12-T18S-R27E, 3200 feet southwest of proposed WDW-3. The average specific gravity of the fluid in the Cisco and Canyon Formations is expected to be 1.025, which is the specific gravity of the fluid swabbed from WDW-2 in June 1999 from the interval between 7826 feet and 8399 feet. The expected bottom-hole pressure at 9000 feet in proposed WDW-3 is calculated below:

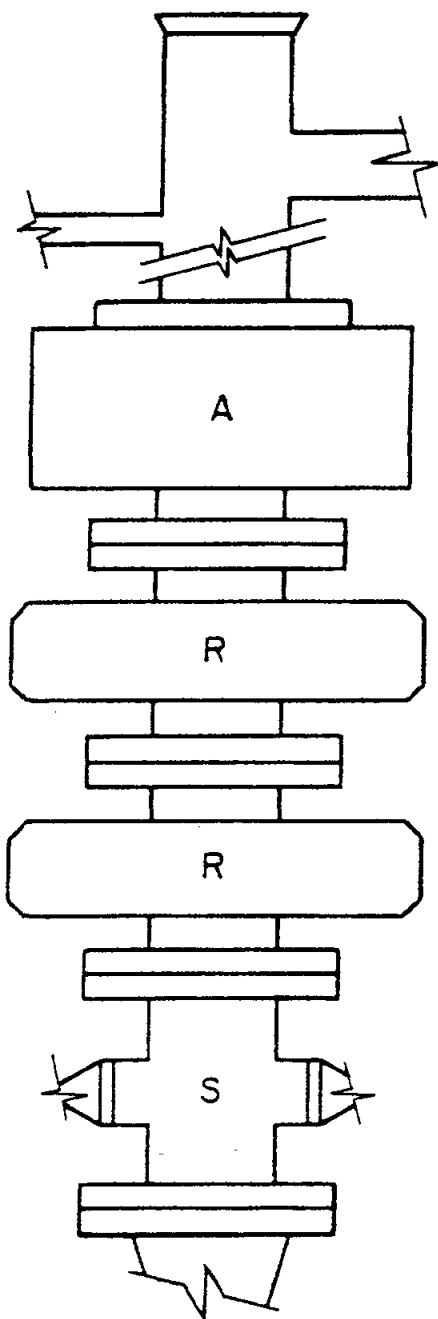
$$\begin{aligned}\text{BHP (9000 feet)} &= 2813 \text{ psia} + (9000 \text{ feet} - 7570 \text{ feet}) \times 0.433 \text{ psi/ft} \times 1.025 \\ &= 3448 \text{ psia}\end{aligned}$$

Reentry Procedure

1. Level location to accommodate a workover rig, pump, tanks, and ancillary equipment. Build a small working pit approximately 30 feet square and 3 feet deep with a plastic lining. Move in the rig, tank, shale shaker, and work string.
2. Install a 7-1/16-inch, 3000-psi double hydraulic blowout preventer (BOP) and a 7-1/16-inch, 3000-psi annular BOP (see Exhibit A for schematic). Pressure test the BOP stack and casing to 1500 psi for 30 minutes. Pick up a 6-1/8-inch bit, and sufficient 4-3/4-inch drill collars to drill out the cement plugs, on a 2-7/8-inch work string. Mix a tank of 8.5-ppg sodium chloride brine water for circulating fluid.
3. Run the bit to 7000 feet and circulate the wellbore fluid out of the casing into a frac tank for disposal. Drill out the cast iron bridge plug (CIBP), cement at 7010 feet, and clean out to the CIBP at 7208 feet. Circulate the hole clean and pump into the perforations from 7050 feet to 7102 feet to establish a rate and pressure for a pending squeeze cement job.
4. Drill out the CIBP at 7208 feet and clean out past the perforations from 7262 feet to 7278 feet and drill out the third CIBP at 7294 feet. Clean out below the perforations from 7304 feet to 7314 feet. Run a second injection test for injection rate and pressure comparison.

5. Pull the bit and run a retrievable squeeze packer on the work string. Set the packer at 7150 feet and test for communication between the perforations. Squeeze the perforations from 7262 feet to 7278 feet and 7304 feet to 7314 feet with approximately 100 sacks of neat cement (actual squeeze cement volume to be determined by the injection rate established previously), attempting to reach 1500 psi to 2000 psi squeeze pressure. Release the packer and reverse out any excess cement, then re-test the perforations to the squeeze pressure.
6. Re-set the packer at 6900 feet and squeeze the perforations from 7050 feet to 7102 feet as before.
7. Lay down the squeeze packer and drill out the cement to the CIBP at 7600 feet. Conduct a pressure test to 500 psi for 12 hours to confirm the squeeze cement will contain the annular fluid pressure required during injection operations.
8. Drill out the CIBP at 7600 feet and circulate to the top of the liner at 9051 feet. Circulate the casing clean with 8.5-ppg brine water. Pull the bit and lay down the drill collars.
9. Run a cement bond log with variable density (CBL/VDL) from the liner top to the surface, followed by a baseline multi-finger caliper log from the liner top to the surface.
10. Perforate the intervals 8540 feet to 8620 feet and 7660 feet to 8450 feet with 2 JSPF, using hollow steel carrier perforating guns.
11. Run the work string and retrievable packer to 7600 feet. Swab, or backflow, the perforated interval to recover a representative sample of the formation water for laboratory analysis. Monitor the recovered fluid for hydrogen sulfide.
12. Conduct a short injectivity test with 8.5-ppg brine water to determine the need for stimulation. If required, stimulate the perforations with acid (type and amount to be determined from injectivity results), followed by 500 barrels of 8.5-ppg brine water.

13. Pull the work string and lay it down. Run a surface readout pressure gauge, with memory backup, to 7600 feet. Conduct an injection test down the casing at 420 gallons per minute for 12 hours (7200 barrels). Shut the well in and record the pressure falloff for a minimum of 12 hours.
14. Pull the gauges and run a differential temperature survey from surface to 9100 feet. Run a radioactive tracer survey to demonstrate mechanical integrity.
15. Run a tubing conveyed injection packer on 4-1/2-inch, 11.60 lb/ft, K-55, LT&C, 8rd injection tubing. Set the packer at approximately 7600 feet. Fill the annular space with 8.5-ppg brine water containing oxygen scavenger and corrosion inhibitor. Land the injection tubing in the wellhead and install the upper section.
16. Pressure test the annulus as required by New Mexico regulations.
17. Install well annulus monitoring equipment and prepare the well for injection.



A = ANNULAR BLOWOUT PREVENTER
7-1/16", 3000 psi working pressure

R = RAM TYPE BLOWOUT PREVENTER
7-1/16", 3000 psi working pressure

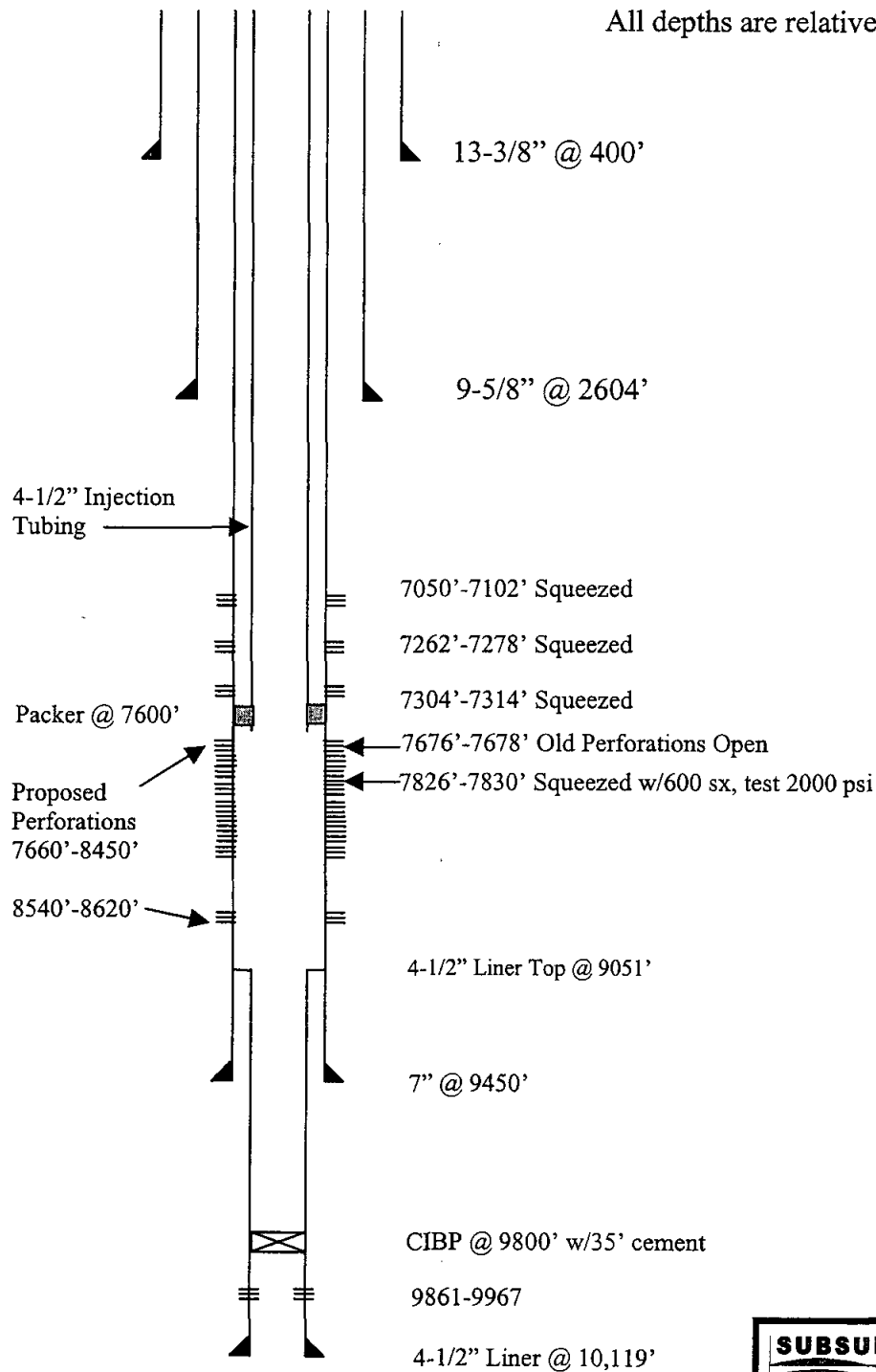
S = DRILLING SPOOL WITH SIDE OUTLETS
7-1/16", 3000 psi working pressure

Manual Choke Manifold 2", 3000 psi working pressure

Source: API RP 53, Recommended Practices
for Blowout Prevention Equipment Systems

SUBSURFACE <small>HOUSTON, TX SOUTH BEND, IN BATON ROUGE, LA</small>	
Exhibit A Blowout Preventer Minimum Requirements	
DATED: 07/24/03	APPROVED BY:
DRAWN BY: JDB	CHECKED BY:
JOB NO. 60d5497	SCALE: N/A

All depths are relative to kelly bushing



Not to Scale



HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

Navajo Refining Company
Proposed WDW-3
orig. Chalk Bluff Federal Com 1

DATED: 07/24/03	APPROVED BY:	JOB NO. 60d5497
DRAWN BY: JDB	CHECKED BY:	SCALE: N/A

SURFACE USE PLAN

NAVAJO REFINING COMPANY PROPOSED WDW-3 790' FSL, 2250' FWL, 1-T 18S-R27E EDDY COUNTY, NEW MEXICO

1. Existing Roads: Existing roads that lead to the proposed drillsite are shown on Exhibit A.
2. Access Roads To Be Constructed: No new access road is proposed.
3. Location of Existing Wells: Existing wells within one mile of proposed WDW-3 are shown on Exhibit B.
4. Location of Proposed Facilities If Well Is Completed: The well will be shut in after completion and testing.
5. Location and Type of Water Supply: Water for reentry, testing, and completion operations will be purchased from a commercial water hauler.
6. Source of Construction Materials: No construction materials will be required.
7. Methods of Handling Waste Disposal:
 - A. Drill cuttings will be disposed of in the drilling pits.
 - B. Drilling fluids will be allowed to evaporate in the drilling pits until the pits are dry.
 - C. Water produced during tests will be disposed of in the drilling pits.
 - D. Trash, waste paper, garbage, and junk will be buried in a trash pit and covered with a minimum of 24 inches of dirt. All waste material will be contained to prevent scattering by the wind.
 - E. All trash and debris will be buried or removed from the wellsite after finishing drilling and/or completion operations.

8. Ancillary Facilities: None anticipated.

9. Wellsite Layout:

- A. The existing well pad will be leveled to accommodate a workover rig, pump, tanks, and ancillary equipment.
- B. Existing topsoil to a depth of 6 inches will be lifted and stockpiled at the uphill end of the well pad. The stockpiled topsoil will be located uphill to avoid mixing with subsurface materials.
- C. The well pad will be surfaced with material found in place.
- D. A small working pit will be constructed to hold drilling fluids and cuttings. The approximate dimensions of the pit will be 30 feet x 30 feet x 3 feet.
- E. The working pit for drilling fluids and cuttings will be lined with 6-mil plastic.

10. Plans for Restoration of Surface:

- A. After completion of drilling and/or completion operations, all equipment and other material not needed for operations will be removed. Pits will be filled and the location cleaned of all trash and junk.
- B. Any unguarded pits containing fluids will be fenced until they are filled.
- C. After abandonment, all equipment, trash, and junk will be removed and the location cleaned.
- D. The stockpiled topsoil will be spread over the surface of the location.

11. Surface Ownership: U.S. Department of Interior, Bureau of Land Management.

12. Archaeological Survey: Navajo Refining Company is conducting an archeological survey. The report of the survey will be submitted by Navajo under separate cover.

13. Operator's Representatives: Representatives responsible for assuring compliance with the approved Surface Use Plan:

Mr. Darrell Moore
Navajo Refining Company
Post Office Box 159
Artesia, New Mexico 88211
505/748-3311

Mr. Jim Bundy
Subsurface Technology, Inc.
7020 Portwest Drive, Suite 100
Houston, Texas 77024
713/880-4640

Exhibits

- A. Topographic Map
- B. Oil and Gas Map

14. Certification:

I hereby certify that I, or persons under my direct supervision, have inspected the proposed drillsite and access route; that I am familiar with the conditions that exist; that the statements made in this plan are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed by Navajo Refining Company and its contractors and subcontractors in conformity with this plan and the terms and conditions under which it is approved.

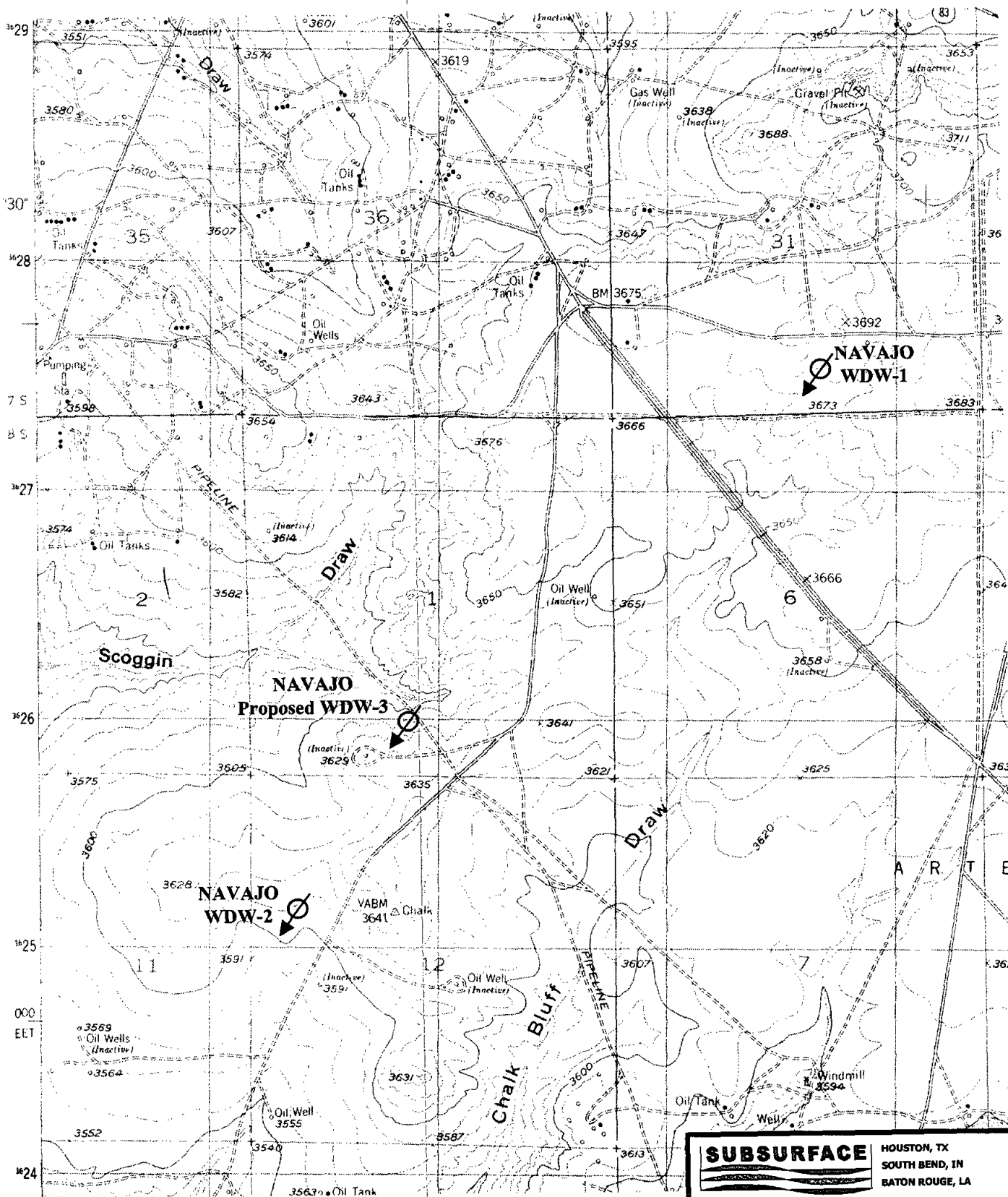
Date

Signature

Name

Title

Navajo Refining Company
Company



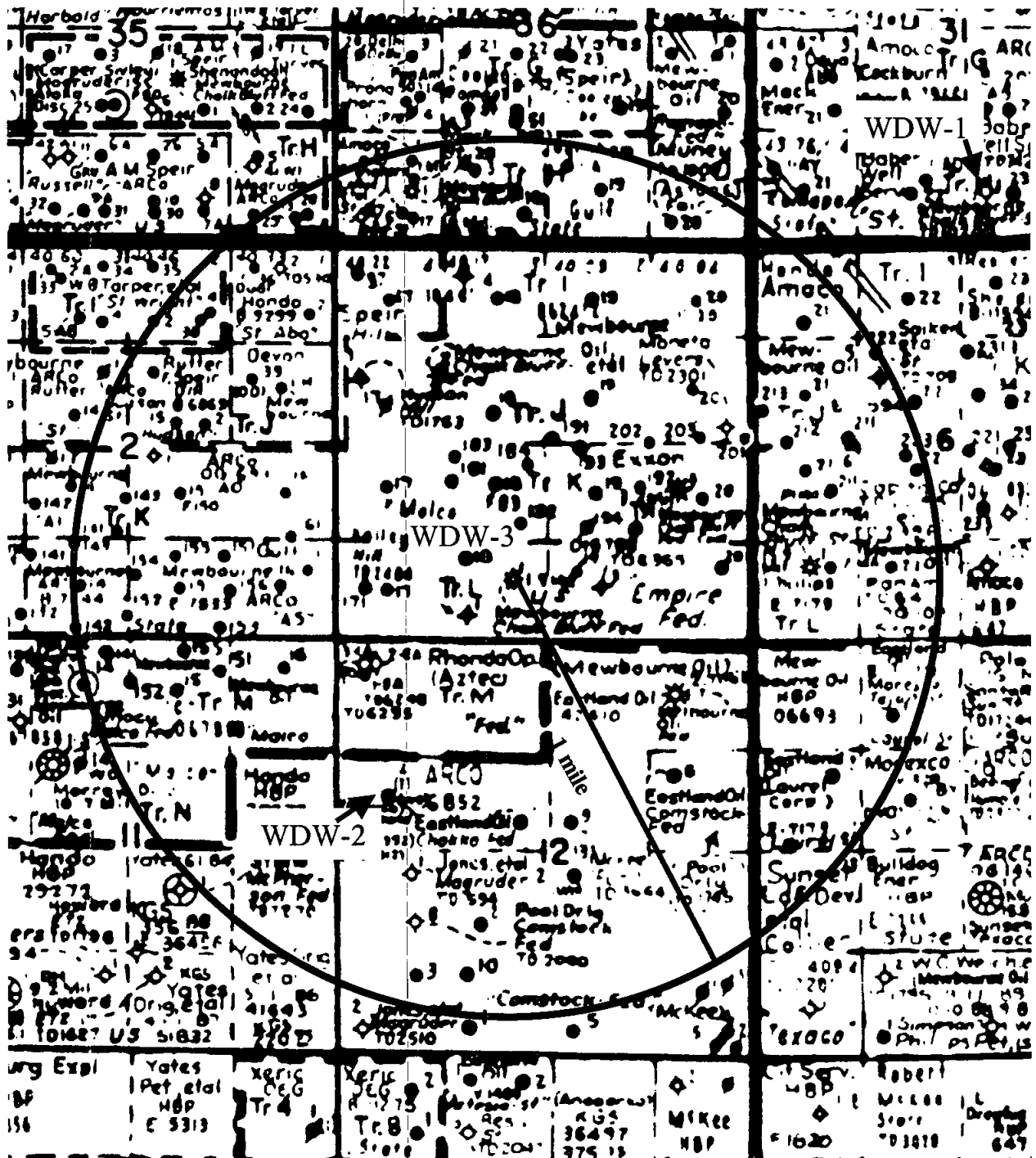
USGS Topographic Map
Red Lake Quadrangle, Eddy County, NM

Section corners marked with +

SUBSURFACE		HOUSTON, TX SOUTH BEND, IN BATON ROUGE, LA
EXHIBIT A NAVAJO REFINING COMPANY PROPOSED WDW-3 790' FSL, 2250' FWL 1-18S-27E		
DATE: 7/28/03	APPROVED BY: NLN	JOB NO: 6005497
DRAWN BY:	CHECKED BY:	SCALE: 1"=2000'

T17S - R27E

T17S - R28E



T18S - R27E
EDDY COUNTY, NM

SUBSURFACE

HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

EXHIBIT B
WELLS WITHIN 1 MILE OF
NAVAJO REFINING COMPANY
PROPOSED WDW-3

DATED: 7/28/03	APPROVED BY: NLN	JOB NO. 60D5497
DRAWN BY:	CHECKED BY:	SCALE: N/A

Map courtesy of Midland Map Company

APPLICATION FOR AUTHORIZATION TO INJECT

PURPOSE: _____ Secondary Recovery _____ Pressure Maintenance X Disposal _____ Storage _____
Application qualifies for administrative approval? _____ Yes X No

II. OPERATOR: Navajo Refining Company

ADDRESS: P.O. Box 159, Highway 82 East, Artesia, NM 88211

CONTACT PARTY: Darrell Moore, Environmental Manager-Water and Waste PHONE: 505-748-3311

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? X Yes _____ No **Revise WDW-3 location.**
If yes, give the Division order number authorizing the project: Discharge Plan Permit UIC-CL1-008-1

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 geologic data on the injection zone including appropriate lithologic detail, geologic 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 sources 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 sources 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: Darrell Moore

TITLE: Env. Mgr. for Water & Waste

SIGNATURE: Darrell Moore

DATE: 9/17/03

E-MAIL ADDRESS: darrell@navajo-refining.com

* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be resubmitted. Please show the date and circumstances of the earlier submittal: _____

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

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 the 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, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505, 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.

I. PURPOSE

Navajo Refining Company (Navajo) submits this application to construct and operate three nonhazardous Class I effluent disposal wells. The waste stream proposed for injection is exempt and nonexempt nonhazardous oilfield wastes that are generated exclusively by Navajo at its refinery in Artesia, New Mexico. The waste water will be transported to the injection wellsites by pipeline.

In February 1998, Navajo submitted an application to the New Mexico Oil Conservation Division (OCD) for permission to reenter, test, and complete the Mewbourne Oil Company's Chalk Bluff 31 State No. 1 well, which is located in Section 31, T17S, R28E, Unit Letter O, in Eddy County, New Mexico. Approval for the reentry and testing was granted by the OCD by letter dated May 21, 1998. The reentry and testing was completed on August 4, 1998. The reentry and completion report for Navajo's WDW-1 was prepared by Subsurface Technology, Inc. (Subsurface), formerly Envirocorp Services & Technology, Inc., and submitted to the OCD in September 1998.

On May 1, 1998, Navajo submitted the original version of this discharge plan application and application for authorization to inject. On July 14, 1998, OCD wrote "Approval of Discharge Plan UIC-CLI-008-1" for Navajo's proposed wells. The approval was revised by OCD on August 4, 1998.

In April 1999, Navajo requested a modification of the discharge plan to revise the location of proposed WDW-2. The location of proposed WDW-2 that was approved on July 14, 1998, was 2310 feet FNL and 1500 feet FWL of Section 6, T18S, and R28E. Instead, Navajo proposed to convert an existing well to proposed WDW-2, Eastland Oil Company's Chukka Federal No. 2 well (formerly Fred Pool Drilling, Inc., originally the Amoco Production Diamond Federal Gas Com. No. 1). The well is located 1980 feet FNL and 660 feet FWL of Section 12, T18S, R27E.

The permit modification to change the location of WDW-2 was approved by the OCD on May 3, 1999. In May and June 1999, Navajo recompleted WDW-2. The reentry and completion report for Navajo's WDW-2 was prepared by Subsurface and submitted to the OCD in July 1999.

Navajo now requests a modification of the discharge plan to revise the location of proposed WDW-3. The original permitted location of proposed WDW-3 is 778 feet FNL and 995 feet FWL of Section 6, T18S, R28E. Instead, Navajo proposes to convert an existing well to proposed WDW-3. The well is the Navajo Chalk Bluff Federal Com. No. 1 well (originally operated by Mewbourne Oil Company). The well is located 790 feet FSL and 2250 feet FWL of Section 1, T18S, R27E. The total depth of the well is 10,120 feet.

The injection zone consists of porous intervals in the lower Wolfcamp Formation and the Cisco and Canyon Formations between 7450 feet and 9016 feet below the kelly bushing (KB) elevation in WDW-1, between 7270 feet and 8894 feet below the KB elevation in WDW-2, and between 7303 feet and 8894 feet below KB in proposed WDW-3.

ATTACHMENT III-2
WDW-2 INJECTION WELL DATA SHEET
AND WELL SCHEMATIC



ATTACHMENT III-2

INJECTION WELL DATA SHEET

OPERATOR: Navajo Refining Company

LEASE: WDW-2

1980' FNL, 650' FWL	12	T18S	R27E
Footage	Section	Township	Range

WELL CONSTRUCTION DATA

Surface Casing

Size	<u>8-5/8"</u>	Cemented with	<u>800 sx</u>
TOC	<u>Surface</u>	feet determined by	<u>Circulated 200 sacks to surface</u>
Hole Size	<u>11"</u>	Set at	<u>1995 feet</u>

Long String

Size	<u>5-1/2"</u>	Cemented with	<u>1570 sx</u>
TOC	<u>Surface</u>	feet determined by	<u>Cement bond log (5/28/99)</u>
Hole Size	<u>7-7/8"</u>	Set at	<u>8869 feet</u>
Total Depth	<u>10,372', Plugged back to 8770'</u>		

Injection Interval

7270 feet to 8894 feet, perforated
(perforated or open-hole; indicate which)

Perforations

Zone 1: 7570'-7620'; 7676'-7736'

Zone 2: 7826'-7834'; 7858-7880'; 7886-7904'; 7916'-7936'; 7944-7964'; 7990'-8042'; 8096'-8116'; 8191'-8201';
8304'-8319'; 8395'-8399'

Tubing size 3-1/2" lined with not lined set in a retrievable packer at 7528 feet. Other type of tubing/casing seal if applicable not applicable.



ATTACHMENT III-2 (Continued)

OTHER DATA

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

If no, for what purpose was the well originally drilled? The well was drilled in 1973 as an exploratory well.

2. Name of the injection formation: Lower Wolfcamp, Cisco, and Canyon Formations

3. Name of Field or Pool (if applicable): Navajo Injection; Permo-Penn

4. Has the well ever been perforated in any other zones(s)? List all such perforated intervals and give plugging detail, i.e., sacks of cement or plug(s) used. Yes. 1446 feet to 1456 feet, 1459 feet to 1462 feet. Perforations were squeezed on May 5-8, 1999, when Navajo recompleted the well.

5. Give the names and depths of any over or underlying oil or gas zones (pools) in the area:

Within one mile: Queen and Grayburg (1450 feet to 2000 feet), San Andres (200 feet to 3600 feet),
Abo (5400 feet to 6300 feet), and Morrow (9900 feet)

ATTACHMENT III-3

INJECTION WELL DATA SHEET

OPERATOR: Navajo Refining Company

LEASE: WDW-3 (Proposed)

790' FSL, 2250' FWL 1-T18S-R27E
Footage Location Section Township Range

WELL CONSTRUCTION DATA

Surface Casing

Size 13-3/8" Cemented with 425 sacks + 200 sacks by 1" line
TOC Surface feet determined by Cementing through 1" line
Hole Size 17-1/2" Set at 400 feet

Intermediate Casing

Size 9-5/8" Cemented with 1025 sacks
TOC Surface feet determined by Circulating to surface
Hole Size 12-1/4" Set at 2604 feet

Long String

Size 7" Cemented with 1350 sacks
TOC 1547 feet determined by Calculation
Hole Size 8-1/2" Set at 9450 feet

Liner

Size 4-1/2" Cemented with 175 sacks
TOC 9051 feet determined by Calculation
Hole Size 6" Set at 9051 to 10119 feet
Total Depth 10120 feet

Injection Interval

7270 feet KB to 8890 feet KB, perforated
(perforated or open-hole; indicate which)

Tubing size 4-1/2 lined with not lined set in a retrievable packer at approximately 6600 feet. Other type of tubing/casing seal if applicable latch-in seal assembly



ATTACHMENT III-3 (Continued)

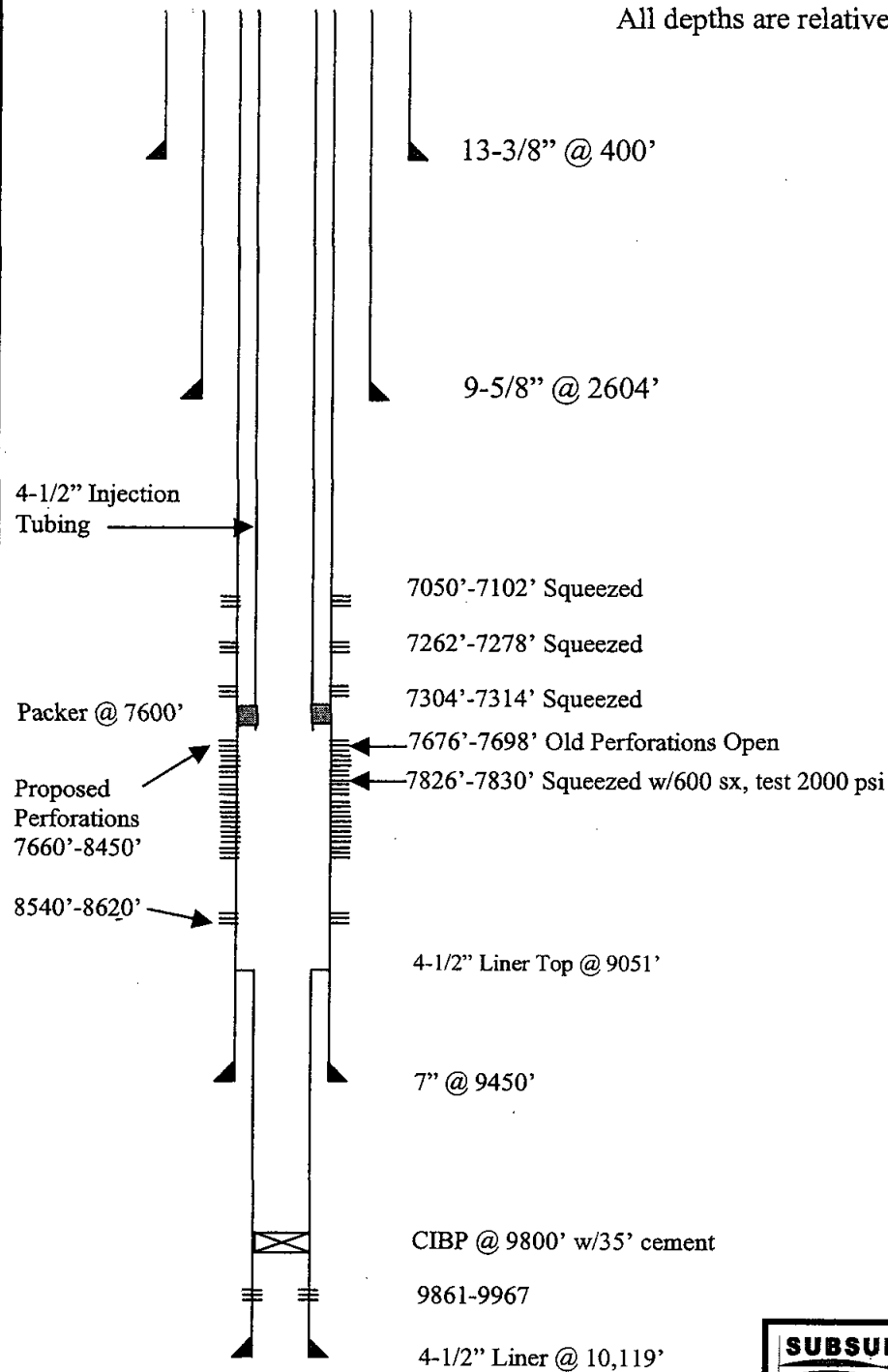
INJECTION WELL DATA SHEET

OTHER DATA

1. Is this a new well drilled for injection? ____ Yes X No
2. Name of the injection formation: Lower Wolfcamp, Cisco, and Canyon Formations
3. Name of Field or Pool (if applicable): Navajo Injection; Permo-Penn
4. Has the well ever been perforated in any other zones(s)? List all such perforated intervals and give plugging detail, i.e., sacks of cement or plug(s) used. 9861' - 9882', CIBP at 9800' with 35' of cement; 7826' - 7830', squeezed with 600 sacks; 7676' - 7678', CIBP at 7600' with 35' of cement; 7304' - 7314', CIBP at 7294'; 7262' - 7278', CIBP at 7208'; 7050' - 7102', CIBP at 7010'
5. Give the names and depths of any over or underlying oil or gas zones (pools) in the area:
Within one mile: Yates (500 feet), Seven Rivers (600 feet), Grayburg (1600 feet to 1900 feet), San Andres (2000 feet), Abo (5400 feet to 6200 feet), and Morrow (9900 feet)



All depths are relative to kelly bushing



Not to Scale



HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

Navajo Refining Company
Proposed WDW-3
orig. Chalk Bluff Federal Com 1

DATED: 07/24/03	APPROVED BY:	JOB NO. 60d5497
DRAWN BY: JDB	CHECKED BY:	SCALE: N/A

IV. EXISTING PROJECT

Navajo recompleted and tested WDW-1 in July and August 1998 in the Cisco portion of the injection zone. Navajo began injecting into WDW-1 on September 23, 1999.

Navajo recompleted and tested WDW-2 in May and June 1999, in the Lower Wolfcamp and Cisco portions of the injection zone. Injection into WDW-2 began on September 23, 1999.

Navajo intends to reenter, test, and recomplete a currently temporarily abandoned well, the Navajo Chalk Bluff Federal Com. No. 1 (formerly operated by Mewbourne Oil Company). Pending successful tests, Navajo proposes to convert the well to its effluent disposal well WDW-3.

VII. PROPOSED OPERATIONS

1. Proposed Injection Rate and Volume

The proposed maximum injection rate for WDW-1, WDW-2, and proposed WDW-3 combined is 1000 gpm or 34,286 bpd. The proposed maximum injection volume in any given month is that volume calculated by multiplying 1000 gpm by 60 minutes per hour by 24 hours per day by the number of days in the month.

The proposed maximum rate of injection into any one well is 500 gpm.

2. Whether the System Is Open or Closed

The operations for the proposed Class I wells will be restricted to injection from a closed system. Fluids to be injected will be generated on site at Navajo's refineries in Artesia and Lovington and will be transported to the injection wells by pipeline.

3. Proposed Surface Injection Pressure

The maximum injection pressure at the wellhead will not exceed 0.2 psi per foot of depth to the top of the injection zone, as required by OCD Proposed Rule 21.B(7), dated October 6, 1997. The maximum injection pressure at the wellhead may vary, depending on the depth of the injection formation. For example, if WDW-1 is completed at the top of the injection zone at 7450 feet, then the requested maximum surface injection pressure is 1490 psi, as calculated below:

Maximum Surface Injection Pressure

$$\begin{aligned} &= \text{Depth of Top of the Injection Zone} \times 0.2 \text{ psi/ft} \\ &= 7450 \text{ feet} \times 0.2 \text{ psi/ft} \\ &= 1490 \text{ psi} \end{aligned}$$

If the top of the injection formation coincides with the top of the Cisco or Canyon Formations, both of which are deeper than the Wolfcamp Formation, then the proposed injection pressure will be higher. The proposed injection pressure for each injection formation is summarized in the following table:

PROPOSED INJECTION PRESSURE			
Injection Formation	Top of Injection Formation	Maximum Injection Pressure Gradient	Proposed Injection Pressure
WDW-1			
Wolfcamp	7450 feet	0.2 psi/ft	1490 psi
Cisco	7816 feet	0.2 psi/ft	1563 psi
Canyon	8475 feet	0.2 psi/ft	1695 psi
WDW-2			
Wolfcamp	7270 feet	0.2 psi/ft	1454 psi
Cisco	7645 feet	0.2 psi/ft	1529 psi
Canyon	8390 feet	0.2 psi/ft	1678 psi
WDW-3			
Wolfcamp	7303 feet	0.2 psi/ft	1461 psi
Cisco	7650 feet	0.2 psi/ft	1530 psi
Canyon	8390 feet	0.2 psi/ft	1678 psi

4. Wastestream Information and Compatibility with the Injection Zone

Navajo proposes to inject exempt and nonexempt nonhazardous oilfield waste that is generated at its refineries in Artesia and Lovington. Waste waters from process units, cooling towers and boilers, streams from water purification units and desalting units, recovered and treated ground water, and general wash waters will be blended to make up the proposed waste stream.

Recent chemical analyses of the waste water are included as Attachment VII-1. Average concentration levels for major constituents are listed in Attachment VII-2, along with the expected pH range and specific gravity.

5. Injection Zone Fluid Analysis

The composition of the native formation fluid in the proposed Wolfcamp, Cisco, and Canyon injection zone is expected to be similar to that in these formations in other parts of southeastern New Mexico. The salinity of Wolfcamp, Cisco, and Canyon formation brines from hydrocarbon producing areas in northern Lea County, to the east of Eddy County, was reported by Meyer (1966, Table 4). Attachment VII-3 summarizes the salinity data reported by Meyer (1966, Table 4) for Wolfcamp, Cisco, and Canyon formation brines from limestones that were deposited in a shelf environment similar to that of the proposed injection site. The salinity of the formation brines range from 67,098 to 119,909 parts per million (ppm). The formation brines were produced from intervals that occur between 9001 feet and 10742 feet below ground. Also listed in Attachment VII-7 are data from Strawn limestones that were deposited in a platform environment and that occur at 7700 feet below ground; the salinity of the Strawn formation brine is 39,374 ppm. DST data from WDW-1 indicate that the salinity of fluid recovered from the Cisco Formation in DST No. 5 is 25,000 ppm (Attachment VIII-9).

Formation fluid samples were obtained from the Cisco injection interval upon completion of Navajo's WDW-1 in July 1998. The sample from the lower Cisco perforations (8220 feet to 8476 feet) had a TDS concentration of 33,000 mg/l. The sample from the upper Cisco perforations (7924 feet to 8188 feet) had a TDS concentration of 18,000 mg/l. The report of the chemical analysis is included as Attachment VII-4.

Formation fluid samples were obtained from the Cisco injection interval upon completion of Navajo's WDW-2 in June 1999. The sample from the lower Cisco perforations (7820 feet to 8392 feet) had a specific gravity of 1.0249 and a TDS concentration of 20,000 mg/l. The sample from the Lower Wolfcamp and upper Cisco perforations (7570 feet to 7736 feet) had a specific gravity of 1.0082 and a TDS concentration of 13,000 mg/l.

Navajo will attempt to retrieve a sample of formation brine during the well testing operations of proposed WDW-3. Formation brine samples will be retrieved prior to any stimulation treatments or injection into the wells.

ATTACHMENT III-3

INJECTION WELL DATA SHEET

OPERATOR: Navajo Refining Company

LEASE: WDW-3 (Proposed)

790' ESL, 2250' FWL 1-T18S-R27E
Footage Location Section Township Range

WELL CONSTRUCTION DATA

Surface Casing

Size 13-3/8" Cemented with 425 sacks + 200 sacks by 1" line
TOC Surface feet determined by Cementing through 1" line
Hole Size 17-1/2" Set at 400 feet

Intermediate Casing

Size 9-5/8" Cemented with 1025 sacks
TOC Surface feet determined by Circulating to surface
Hole Size 12-1/4" Set at 2604 feet

Long String

Size 7" Cemented with 1350 sacks
TOC 1547 feet determined by Calculation
Hole Size 8-1/2" Set at 9450 feet

Liner

Size 4-1/2" Cemented with 175 sacks
TOC 9051 feet determined by Calculation
Hole Size 6" Set at 9051 to 10119 feet
Total Depth 10120 feet

Injection Interval

7303 feet KB to 8894 feet KB, perforated
(perforated or open-hole; indicate which)

Tubing size 4-1/2 lined with not lined set in a retrievable packer at approximately 6600 feet. Other type of tubing/casing seal if applicable latch-in seal assembly

ATTACHMENT III-3 (Continued)

INJECTION WELL DATA SHEET

OTHER DATA

1. Is this a new well drilled for injection? ____ Yes X No
2. Name of the injection formation: Lower Wolfcamp, Cisco, and Canyon Formations
3. Name of Field or Pool (if applicable): Navajo Injection; Permo-Penn
4. Has the well ever been perforated in any other zones(s)? List all such perforated intervals and give plugging detail, i.e., sacks of cement or plug(s) used. 9861' - 9882', CIBP at 9800' with 35' of cement; 7826' - 7830', squeezed with 600 sacks; 7676' - 7678', CIBP at 7600' with 35' of cement; 7304' - 7314', CIBP at 7294'; 7262' - 7278', CIBP at 7208'; 7050' - 7102', CIBP at 7010'
5. Give the names and depths of any over or underlying oil or gas zones (pools) in the area:
Within one mile: Yates (500 feet), Seven Rivers (600 feet), Grayburg (1600 feet to 1900 feet), San Andres (2000 feet), Abo (5400 feet to 6200 feet), and Morrow (9900 feet)

X Se c fio

VI. INJECTION ZONE WELLS

VI.A Protocol for Identifying Wells

Search Protocol for Non-Freshwater Artificial Penetrations

As Navajo's agent, Subsurface employed the services of Federal Abstract Company in the research and acquisition of data concerning non-freshwater wells. Federal Abstract understands the necessity for complete records and makes every diligent effort to complete this task. Subsurface and Federal Abstract examined public and private sources of data to identify producing and abandoned oil and gas wells and disposal wells in the AOR.

The Oil Conservation Division (OCD) is the primary agency in which files are researched for oil and gas well records. The OCD is the state repository for oil and gas well and Class II well records, as the state regulatory authority for the oil and gas industry. In order to retrieve well records, the following general procedure is used for researching each well within a given area.

Map Review

Before the retrieval process can begin, it is necessary to know the operator, lease name, county in which the well is located, and the township, range, and section in which the well is found. This information is normally found on commercially prepared oil and gas base maps. Maps are produced by commercial firms, who obtained the data to build the oil and gas bases from "scout" tickets (completion information received from individual oil companies) in the early years and then, in later years, from the OCD itself. The commercial firms continually update the maps by plotting information filed by oil and gas operators with the OCD. Changes in the status of existing wells are noted, as well as information on new wells. Attachment V-1 is a modified version of the oil and gas base map provided by Midland Map Company, a recognized commercial supplier of oil and gas base maps for southeastern New Mexico.

Well Records Review

The OCD filing system is the best source of oil and gas well data in New Mexico. Microfiche and microfilm files of historical well records are searched as well as the hard copy files of well records not yet placed on microfilm. These files are organized by quarter-quarter section, township, and range.

Scout Tickets

Scout tickets were available for the wells in the AOR from IHS Energy Group (formerly Petroleum Information Dwigths LLC). Information about nearly every well in the AOR was available, including some wells for which records were not available from the OCD. Scout tickets were also available from The Subsurface Library, Midland, Texas.

OCD Online

Well information is also available for downloading from the website maintained by the OCD. The spreadsheet of information for wells in the Artesia district, which includes the Navajo vicinity, was used as the source for well API numbers and as a guide to current well status and operator. The specific file used was "artesia030521.xls." The file was downloaded from the OCD's FTP site on July 8, 2003.

VI.B Well Data Tabulations and Well Records

Two hundred ninety-five (295) well locations have been identified within or slightly beyond one mile of WDW-1, WDW-2, and proposed WDW-3. The well locations are shown in Attachment V-1. A tabulation of total depth, status, and drill date for all of the wells in the one-mile AOR is provided in Attachment VI-1. Wells in Attachment VI-1 are identified with Map ID numbers that are keyed to the map in Attachment V-1. Scout tickets for the wells in the AOR for which no records were available from the OCD are presented as Attachment VI-2A.

Well construction data for wells within the one-mile AOR that penetrate the Injection Zone are tabulated in Attachment VI-1A.

Wells That Do Not Penetrate the Injection Zone (264 Wells)

Two hundred sixty-four (264) of the wells are documented to have been drilled to depths of less than 7270 feet, which coincides with the top of the injection zone in WDW-2. The top of the injection zone in WDW-1 and proposed WDW-3 is 7450 feet and 7303 feet, respectively. The wells did not penetrate the proposed injection zone. These wells are:

Map ID Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 82, 84, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 121, 122, 123, 125, 126, 127, 128, 129, 130, 131, 133, 135, 136, 138, 139, 140, 141, 142, 143, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 158, 159, 160, 162, 165, 166, 354, 355, 356, 358, 359, 595, 748, 749, 750, 751, 752, 753, 755, 756, 757, 758, 765, 766, 772, 773, 774, 779, 781, 785, 786, 789, 791, 793, 796, 797, 799, 800, 801, 802, 805, 806, 807, 808, 812, 813, 814, 836, 837, 838, 839, 840, 841, 842, 843, 844, 846, 849, 850, 852, 853, 854, 856, 857, 858, 859, 860, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 888, 895, 896, 897, 901, 910, 912, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 936, 938, 939, 940, and 943.

Mis-Plotted or Duplicate Locations (9 Well Spots)

Nine (9) well locations appear on Attachment V-1 for which well records could not be found in the files of the OCD and for which scout tickets were not available. All of these well locations are mis-plotted or duplicate locations.

Five (5) of these locations (Map ID Nos. 30, 108, 119, 132, and 137) appear only on a commercial base map prepared by the Midland Map Company (Attachment V-1). These locations do not appear on a commercial base map prepared by the Geomap Company or on the lease map prepared by Midland Map Company. A representative of Midland Map Company confirmed that four of the five well locations on the oil and gas base map, Map ID Nos. 108, 119, 132, and 137, are duplicate locations for existing wells. The Midland Map representative stated that the locations will be removed from the map. Map ID No. 30 is the incorrect, duplicate location plotted on the Midland Map base map for Map ID No. 14, the Arco Empire Abo Unit G No. 20 (formerly the Kersey Ramapo No. 5). The correct location of Map ID No. 14 is shown on the Midland Map lease map.

Four (4) well locations (Map ID Nos. 754, 792, 795, and 942) are mis-plotted on Attachment V-1. These mis-plotted locations are incorrect duplicate locations for other wells, as discussed below.

Map ID No. 754 is the incorrect location for Map ID No. 756, the ARCO Permian Empire Abo Unit K No. 17. The well spot on the Midland Map map for Map ID No. 754 is labeled "17." The form "Sundry Notices and Reports on Wells" that was filed on May 18, 1959, for Map ID No. 756 states that the form was "Filed to show change in well location..." A copy of the original "Notice of Intention to Drill" with the originally permitted location was not available from the files of the OCD in Santa Fe. The Midland Map Company's lease and oil and gas base maps show the incorrect location of the well as Map ID No. 754. Subsurface plotted the correct location for this well as Map ID No. 756 on Attachment V-1. A representative of Midland Map Company confirmed that Map ID No. 756 is the correct location for the well. The representative stated that the well will be correctly spotted on the company's new maps and that the well spot for Map ID No. 754 will be removed. Information to support the conclusion that Map ID No. 754 is mis-plotted is included in Attachment VI-2B.

Map ID No. 792 is an incorrect location on the Midland Map oil and gas base map for Map No. 814, the ARCO Permian Empire Abo Unit K No. 141. Midland Map Company's lease map shows Map ID No. 814 but not Map ID No. 792. A

representative of Midland Map Company confirmed that the correct location for the well is the location of Map ID No. 814. The representative said that the well spot for Map ID No. 792 will be removed from the oil and gas base map and that the location for Map ID No. 814 will be added to the oil and gas base map.

Map ID No. 795 is an incorrect location for Map ID No. 765. Midland Map shows the location of Map ID No. 795 on both their lease map and their oil and gas base map. Map ID No. 795 is labeled on Midland Map Company's lease map as Well No. 1. A representative of Midland Map Company concluded after examining their series of historical maps that Map ID No. 795 was permitted sometime between 1959 and 1960. Map ID No. 765 was permitted in 1959 as the William Hudson Hudson-State Abo No. 1. A discrepancy in the location of Map ID No. 765 is evident upon examination of the "Notice of Intention to Drill." The location for Map ID No. 765 was typed in on the "Notice of Intention to Drill" as 990 feet from the South line and 330 feet from the East line of the section, which is the location of Map ID No. 795. On this form, the word South was crossed out, and North was written in by hand. On the plat of the section in the upper left portion of the same form, the well is spotted at the location of Map ID No. 765. Map ID No. 795 was spotted by Midland Map Company on their maps at the typed-in location on the "Notice of Intention to Drill." The same well was also spotted at the correct location, that of Map ID No. 765. Information to support the conclusion that Map ID No. 795 is mis-plotted is included in Attachment VI-2C.

Map ID No. 942 is an incorrect location for Map ID No. 89. Map ID No. 942 is API No. 30-015-06250, included in the well data spreadsheet available on the OCD website on July 8, 2003, "artesia030521.xls." In the spreadsheet, this well is the Arco Oil and Gas Company Empire Abo UT I. No records are found in the OCD's files for this well in this location. The well records on file for Map ID No. 89 (API No. 30-015-02625) are included in Attachment VI-2D. The records include three sundry notices filed for API No. "30-015-0625." Map ID No. 89 was operated by ARCO Permian (and its predecessors and successors) as the Empire Abo Unit "I" No. 23 beginning in 1973. Because of the similarity in the API number, well name, and locations of the two wells, the API number and

location of Map ID No. 942 are considered to be incorrect. Map ID No. 942 is considered to be the same well as Map ID No. 89.

The mis-plotted well locations are:

Map ID Nos. 30, 108, 119, 132, 137, 754, 792, 795, and 942.

Expired Permits and Revised Locations (4 Wells)

Three wells, Map ID Nos. 934, 935, and 944, were permitted and never drilled. The permits were allowed to expire.

Map ID No. 120 is the original proposed location for Navajo's WDW-3. No well has been drilled at this location.

Proposed Locations (2 Wells)

Map ID Nos. 937 and 941 are permitted locations that have not yet been drilled.

Well with No Records (1 Well)

Map ID No. 778 was drilled to the Abo or shallower, and did not penetrate the injection zone. The well is shown as an oil well on the Midland Map. No records for the well are available from the OCD's files. Available information for the well is included in Attachment VI-2E. A representative of Midland Map Company stated that the well was drilled before 1957 by the Rutter & Wilbanks Bros. as the Hudson No. 2. However, the well does not appear on a 1959 location plat submitted for Map ID No. 785 (included in Attachment VI-2E). Rutter & Wilbanks Bros. drilled three wells in the vicinity of Map ID No. 778. Map ID No. 773, the Turner No. 1, was drilled in 1948 to 1742 feet in the Red Lake Queen-Grayburg-San Andres pool. Map ID No. 774, the Hudson No. 1, was drilled in 1948 to 1707 feet in the same pool. Map ID No. 779 was drilled in 1959 to 5884 feet in the Empire Abo pool. Because the well, if it exists, is shown as an oil well drilled by Rutter & Wilbanks Bros. (who drilled Abo and shallower wells nearby) that is surrounded by oil production from the Abo and shallower intervals, the well is not considered to have penetrated the Navajo injection zone.

Injection Zone Penetrations (15 Wells)

Fifteen (15) wells reached total depths of 7270 feet or greater and penetrated the proposed injection zone. Each of these wells is discussed in detail in Sections VI.C through VI.E. The wells that penetrated the injection zone are:

Map ID Nos. 59, 81, 83, 124, 134, 144, 157, 161, 167, 353, 848, 851, 855, 861, and 911.

Attachment VI-1A includes construction details, total depth, status, and drill date for the injection zone penetrations in the AOR. Well records available from the OCD for these wells are provided in Attachment VI-2.

VI.C Well Schematics

Schematics of all wells within one mile of WDW-1, WDW-2, and proposed WDW-3 that penetrate the injection zone are included with the well records in Attachment VI-2.

*Fed EPA
REPORT
w/pen* TOTAL WELLS

VI.D Condition of Artificial Penetrations

Each of the wells that penetrates the injection zone was evaluated to determine if it will allow movement of fluids into or between USDWs. For the purpose of this demonstration, the artificial penetrations may be categorized as follows:

Class I Waste Disposal Well (3 wells): *(2) (NOT counting WDW-3)*

Map ID Nos. 59 and 861 are Navajo's Class I injection wells, WDW-1 and WDW-2. Map ID No. 157 is Navajo's proposed WDW-3.

Class II Saltwater Disposal Wells (1 well):

Map ID No. 83, the I&W Inc., Walter Solt SWD-1, is a Class II saltwater disposal well that is currently active. The well injects into the Wolfcamp in four sets of perforations: 7518 to 7534 feet, 7742 to 7756 feet, 7778 to 7787 feet, and 7810 to

7812 feet. The injection zone coincides with the shallowest formation proposed for injection by the proposed Navajo injection wells. The well has surface and intermediate or production casing set to prevent contamination of the USDW. The casing/formation annulus is cemented across the injection zone, as presented in Attachment VI-3. At the end of the well's useful life, the operator will plug and abandon the well according to OCD regulations with cement plugs set to protect the USDW and with heavy mud left in the wellbore. The Class II well in the AOR is listed below:

Map ID No. 83.

No corrective action is required for this well.

Active Producing Wells (9 wells):

3
+9
12

Active producing wells include producing and temporarily abandoned oil and gas wells. These wells have surface and intermediate or production casing set to prevent contamination of the USDW. In all wells, the casing/formation annulus is cemented across the injection zone. Reported top of cement, where available, or calculated top of cement for each casing string in each well is presented in Attachment VI-3. At the end of the wells' useful lives, the operators will plug and abandon the wells according to OCD regulations with cement plugs set to protect the USDW and with heavy mud left in the wellbore. The active producing wells within the AOR are listed below:

Map ID Nos. 81, 124, 134, 144, 161, 167, 355, 855, and 911.

No corrective action is required for these wells.

Plugged and Abandoned Producing Wells (1 well):

Plugged and abandoned producing wells are former producing wells with surface and intermediate or production casing set that have been plugged with cement plugs and heavy mud. The cement plugs were placed between the injection zone and the

USDWs. The plugged and abandoned producing well within the AOR is listed below:

Map ID No. 848

No corrective action is required for this well.

Plugged and Abandoned Dry Holes (1 well):

Plugged and abandoned dry holes have surface casing and may have intermediate or long-string casing set through the injection zone. Dry holes were plugged with heavy mud and cement plugs. The cement plugs were placed between the requested injection zone and the USDWs. The plugged and abandoned dry hole is listed below:

Map ID No. 851.

No corrective action is required for this well.

VI.E Cone of Influence and Area of Review Determination

The cone of influence is defined here as the area within which increased injection zone pressures caused by injection of wastes would be sufficient to cause fluid movement through any well or other conduit into a USDW. This demonstration shows that the extremely conservative worst-case cone of influence of the proposed injection operations is smaller than the one-mile radius AOR in which artificial penetrations were investigated.

In the worst case, an undocumented abandoned well is imagined to be open to both the injection zone and the base of the USDW. In addition, the well is imagined to be filled to within 100 feet of the ground surface with formation brine from the injection zone and fresh water from the base of the USDW. The cone of influence can be calculated by comparing the hydraulic heads of the injection zone and the lowermost USDW. It is only where the injection zone head is above the USDW head that fluid movement from the injection zone into the USDW could occur. This worst-case

model of the potential effect of injection upon the USDW is extremely conservative, because no wells within one mile of the proposed injection wells are open to both the injection zone and the USDW and filled with brine.

The injection zone for Navajo's proposed injection wells has a native pressure such that the resulting hydraulic head is lower than the head of the lowermost USDW. The pre-injection pressure of the injection interval was measured on July 30, 1998, in Navajo's WDW-1 to be 2928 psia at 7924 feet (7911 feet below ground level, BGL) (Attachment VIII-9B).

A sample of fluid was retrieved from formation fluid swabbed on July 25, 1998, from the perforations of the deeper Cisco interval, from 8220 feet to 8476 feet in Navajo's WDW-1. The total dissolved solids (TDS) concentration of the sample was 33,000 mg/l, and the specific gravity of the sample at room temperature was 1.034. Formation fluid was swabbed on July 29, 1998, from the perforations of the shallower Cisco interval, from 7924 feet to 8188 feet in Navajo's WDW-1. The analysis of a sample of this fluid indicated that the TDS concentration of the sample was 18,000 mg/l, and the specific gravity at room temperature was 1.018. The chemical analysis of the formation fluid samples is included as Attachment VII-4. These values compare favorably with information from the analysis of fluid retrieved during drillstem test (DST) No. 5, which was conducted on August 26, 1993, in WDW-1 (see Attachment VIII-9). The salinity of the formation fluid retrieved during DST No. 5 was reported in Attachment VIII-9 as a chlorides concentration of 25,000 ppm. The formation fluid is therefore assumed to have a sodium chloride concentration of 25,000 ppm. The specific gravity of such a fluid is approximately 1.02.

The pre-injection pressure, P_i , at the top of the injection zone in proposed WDW-2 at 7270 feet BKB (7257 feet BGL) is 2640 psia, as calculated below, based on a formation fluid specific gravity of 1.018. Using the lightest specific gravity in this calculation yields a high P_i , which is conservative.

$$\begin{aligned}
 P_i(7257 \text{ feet}) &= P_i(7911 \text{ feet}) - (7911 \text{ feet} - 7257 \text{ feet}) (0.433 \text{ psi/ft}) (1.018) \\
 &= 2928 \text{ psia} - 288 \text{ psi} \\
 &= 2640 \text{ psia}
 \end{aligned}$$

The head of the lowermost USDW is estimated to be 100 feet BGL. This estimate is reasonably conservative, as it is based on a static water level measurement of 81 feet in Water Well No. 18.28.8.330 (Attachment XI-1). The total depth of the well is unknown.

The critical pressure, P_c , at 7257 feet BGL that would be necessary to raise the hydrostatic head of the injection interval to the head of the lowermost USDW at 100 feet BGL is 3152 psia, as calculated below:

$$\begin{aligned}
 P_c &= (\text{Top of Injection Zone} - \text{Base of USDW}) (0.433 \text{ psi/ft}) (1.018) \\
 &\quad + (\text{Base of USDW} - \text{Head of USDW}) (0.433 \text{ psi/ft}) \\
 &= (7257 \text{ feet} - 473 \text{ feet}) (0.433 \text{ psi/ft}) (1.018) \\
 &\quad + (473 \text{ feet} - 100 \text{ feet}) (0.433 \text{ psi/ft}) \\
 &= 3152 \text{ psia}
 \end{aligned}$$

The critical increase in reservoir pressure, ΔP_c , above the native pressure, that is necessary to raise the hydrostatic head of the injection interval to the head of the lowermost USDW is, therefore, 512 psi, as calculated below:

$$\begin{aligned}
 \Delta P_c &= P_c - P_i \\
 &= 3152 \text{ psia} - 2640 \text{ psia} \\
 &= 512 \text{ psi}
 \end{aligned}$$

An increase in reservoir pressure greater than 512 psi would be sufficient to raise the head of the injection zone above the head of the lowermost USDW. The cone of influence is the area around the injection wells within which the increase in reservoir pressure caused by injection is greater than 512 psi.

Contour plots of the predicted pressure increase in the injection zone (Attachment VI-5) were generated using historical injection rates and the maximum injection rates

permitted for WDW-1, WDW-2, and proposed WDW-3. A Visual Basic program, PREDICTW, was used to calculate the pressure increase throughout the injection zone at the end of 20 years of injection into the wells. The theoretical basis for PREDICTW is discussed in Attachment VI-6. The gridded pressure increases created by PREDICTW are contoured using SURFER, a commercial contouring software package.

Conservative values for reservoir thickness and permeability were used to overestimate the predicted increase in reservoir pressure. The reservoir was assumed to have a thickness of 85 feet. The permeability of the reservoir was assumed to be 250 md. The modeled kh, 21,250 md-ft ($= 250 \text{ md} \times 85 \text{ feet}$), is less than 10% of the kh, 284,839 md-ft, that was determined from the pressure falloff test conducted in Navajo's WDW-1 on July 30, 1998 (See Section VIII and Attachment VIII-9B). Using a low kh will yield a predicted pressure increase that is much greater than expected and a cone of influence that is much larger than expected.

The porosity was assumed to be 10%.

The viscosity of the formation fluid with TDS concentration of 25,000 ppm at 130°F is 0.53 cp (Attachment VI-7). The compressibility of the pore volume of the formation (Canyon Reef as shown on Attachment VI-8), c_r , is $5.5 \times 10^{-6} \text{ psi}^{-1}$. The compressibility of the formation fluid (distilled water as shown on Attachment VI-8), c_w , is $2.9 \times 10^{-6} \text{ psi}^{-1}$. The total compressibility ($c_t = c_r + c_w$) is $8.4 \times 10^{-6} \text{ psi}^{-1}$.

Historical injection data for WDW-1 and WDW-2 were used for the injection period from September 23, 1999 (initial injection into the wells) through June 30, 2003. WDW-1, WDW-2, and proposed WDW-3 are then modeled as injecting from July 1, 2003 through September 22, 2019, at a maximum total rate of 1000 gallons per minute (gpm) distributed among the three wells. The maximum per-well injection rate modeled is 500 gpm.

The I & W, Inc. Walter Solt SWD-1 (Map ID No. 83), a Class II well, injects into the lower Wolfcamp through four sets of perforations between 7518 and 7812 feet. Historical injection records available from the OCD for 1994 through 1997 indicate

that the average injection rate is 17.6 gpm. This rate is used for the historical injection period from June 1, 1988, through September 22, 1999. For the future injection period, from September 23, 1999 through September 22, 2019, the Walter Solt SWD-1 is expected to inject at 58.3 gpm, or 2000 barrels per day (bpd), the maximum rate requested by the original permit application for the Walter Solt SWD-1.

The 512-psi pressure-increase contour, which defines the outline of the worst-case cone of influence, is located less than one mile from WDW-1, WDW-2, and proposed WDW-3, as shown in Attachment VI-5. An improperly abandoned wellbore or other conduit filled with formation fluid that is located farther than one mile from the proposed wells would not transmit sufficient pressure from the injection zone to move fluids into the USDW. Navajo researched public and private sources of information about wells within the one-mile AOR. Only 15 of 295 wells drilled in the AOR penetrated the injection zone. Information was presented in Section VI.D that demonstrates that each of the injection zone penetrations is properly constructed to prevent migration of fluids into the USDW.

ATTACHMENT VI-1 TABULATION OF WELLS WITHIN 1 MILE OF THE INJECTION WELLS

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
1	30-015-00693	ASPEN OIL INC DELHI #001	36 17S 27E A 330N 330E	528	T/A O	8/30/41
2	30-015-00694	DELHI OIL CORP. STATE #013	36 17S 27E A 990N 990E	1993	P&A O	6/24/48
3	30-015-00646	ASPEN OIL INC DELHI #007	36 17S 27E A 990N 330E	540	T/A O	4/21/50
4	30-015-00668	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #010	36 17S 27E G 1650N 2310E	1736	SHUT IN O	12/6/47
5	30-015-00690	ASPEN OIL INC CONKLIN #002	36 17S 27E G 1830N 2205E	532	ACTIVE O	3/6/49
6	30-015-00667	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #011	36 17S 27E G 2310N 2310E	1733	ACTIVE I	3/23/49
7	30-015-00666	ASPEN OIL INC CONKLIN #001	36 17S 27E G 2310N 2310E	533	ACTIVE O	1/10/42
8	30-015-00689	C E LARUE & B M MUNCY JR GATES STATE #001	36 17S 27E H 1650N 330E	557	ACTIVE O	8/4/50
9	30-015-00647	C E LARUE & B M MUNCY JR GATES STATE #002	36 17S 27E H 1650N 990E	551	SHUT IN O	10/10/52
10	30-015-00669	ASPEN OIL INC HOMAN #001	36 17S 27E H 2310N 330E	1804	SHUT IN O	6/20/49
11	30-015-00688	KERSEY & CO RAMAPO #001	36 17S 27E I 2310S 330E	590	P&A O	10/28/41
12	30-015-00670	KERSEY & CO RAMAPO #003	36 17S 27E I 2970N 330E	1857	P&A O	1/3/50
13	30-015-00687	KERSEY & CO RAMAPO #002	36 17S 27E I 2310S 990E	1900	P&A G	5/7/48

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
14	30-015-00685	ARCO OIL & GAS EMPIRE ABO UNIT G #020	36 17S 27E I 1650S 330E	5980	P&A O	7/10/89
15	30-015-00671	ROJO GRANDE COMPANY LLC RAMAPO #003	36 17S 27E J 2310S 2310E	591	ZONE ABAN O	2/13/42 1/24/00
16	30-015-01221	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #023	36 17S 27E J 2300S 2300E	1790	ZONE ABAN O	2/27/48 8/13/02
17		MARTIN YATES III DOOLEY STATE #3	36 17S 27E J	5865		4/22/61
18	30-015-05934	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #019A	36 17S 27E J 1650S 1650E	5970	ACTIVE O	2/26/61
19	30-015-01220	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #022	36 17S 27E K 2310S 2330W	1747	ZONE ABAN O	2/3/49 7/17/02
20	30-015-00674	ROJO GRANDE COMPANY LLC RAMAPO #002	36 17S 27E K 2310S 2310W	514	ACTIVE O	5/15/47
21	30-015-01219	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #021	36 17S 27E K 2310S 1650W	1710	ACTIVE I	1/20/48
22	30-015-23913	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #043	36 17S 27E K 1650S 1650W	1785	ACTIVE O	12/11/81
23		MARTIN YATES III DOOLEY STATE ABO #3	36 17S 27E K	5865	ACTIVE O	4/19/61
24	30-015-00673	ROJO GRANDE COMPANY LLC RAMAPO #001	36 17S 27E K 1650S 2310W	510	ZONE ABAN O	10/16/41 1/24/00
25	30-015-00682	ROJO GRANDE COMPANY LLC RAMAPO #004	36 17S 27E N 990S 1650W	541	ZONE ABAN O	9/29/42 1/24/00
26	30-015-00683	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #028	36 17S 27E N 965S 1650W	1812	ACTIVE I	4/16/48
27	30-015-01218	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #018	36 17S 27E N 330S 2310W	5925	T/A O	2/2/60

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
28	30-015-00684	BURNHAM OIL COMPANY STATE B-6961 NO. 1-A	36 17S 27E O 990S 2310E	1500	P&A O	5/13/47
29	30-015-01251	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #019	36 17S 27E O 660S 1980E	6200	T/A O	9/8/59
30			36 17S 27E I		MISPLLOT OF 14	
31	30-015-00677	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #020	36 17S 27E P 330S 990E	6013	T/A O	5/16/60
32	30-015-01616	C F M OIL CO BLAKE STATE #001	30 17S 28E P 330S 990E	615	ACTIVE O	3/7/53
33	30-015-01638	BEDINGFIELD, MALCO, RESLER STATE NO. 1	31 17S 28E A 330N 990E	2004	P&A O	7/15/52
34	30-015-21594	RODNEY B WEBB DBA WEBB OIL CO POWCO STATE #001	31 17S 28E B 330N 1650E	652	ACTIVE O	11/15/75
35	30-015-01636	BEDINGFIELD, J E DELHI-STATE NO. 1	31 17S 28E C 330N 2310E	637	P&A O	12/23/52
36	30-015-25621	RODNEY B WEBB DBA WEBB OIL CO POWCO STATE #002	31 17S 28E B 980N 1620E	747	ACTIVE O	7/15/86
37	30-015-01633	ASPEN OIL INC ASTON & FAIR A #001	31 17S 28E D 330N 330W	531	SHUT IN O	6/23/42
38	30-015-01634	ASTON & FAIR STATE 31 NO. 1X	31 17S 28E D 350N 345W	525	NO COMPL O	1/5/46
39	30-015-01645	MCLAUGHLIN, C T BEDINGFIELD STATE 1 NO. 1	31 17S 28E F 990N 990W	2307	P&A O	2/16/50
40	30-015-02666	HANSON ENERGY HUDSON SAIKIN STATE #001	31 17S 28E E 2310N 330W	1816	ACTIVE O	5/29/48
41	30-015-24887	HANSON ENERGY HUDSON SAIKIN STATE #002	31 17S 28E E 2310N 990W	1950	ACTIVE O	7/7/84

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
42	30-015-01643	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #022	31 17S 28E F 2310N 2260W	5971	T/A O	6/7/60
43	30-015-01635	ASPEN OIL INC ASTON & FAIR #001Y	31 17S 28E F 2310N 2310W	1926	SHUT IN O	5/8/48
44	30-015-01637	ASPEN OIL INC MALCO STATE #001	31 17S 28E G 2310N 2310E	1852	ACTIVE O	10/12/53
45	30-015-01652	KERSEY & CO BOLING #001	31 17S 28E G 2288N 1625E	6025	ACTIVE O	8/10/60
46	30-015-10537	SDX RESOURCES INC NORTHWEST ARTESIA UNIT #004	31 17S 28E H 2277N 330E	6180	ACTIVE O	9/23/65
47	30-015-10833	SDX RESOURCES INC NORTHWEST ARTESIA UNIT #010	31 17S 28E I 1980S 660E	1945	ACTIVE O	6/17/66
48	30-015-01644	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #024A	31 17S 28E I 1650S 330E	6106	T/A O	4/29/60
49	30-015-01642	HANSON ENERGY STATE FW #001	31 17S 28E J 1650S 2310E	1937	ACTIVE O	12/23/62
50	30-015-01650	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #023A	31 17S 28E J 1650S 1958E	6094	SHUT IN O	3/13/60
51	30-015-01651	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #022B	31 17S 28E K 1650S 2387W	6046	ACTIVE O	4/10/60
52	30-015-01640	HANSON ENERGY RAMPO #002	31 17S 28E L 2310S 330W	1996	ACTIVE O	7/16/55
53	30-015-01648	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #021A	31 17S 28E L 1651S 1089E	5971	ZONE ABAN O	4/29/60 8/24/02
54	30-015-01639	HANSON ENERGY RAMPO #001	31 17S 28E M 990S 330W	1975	ACTIVE O	5/1/48
55	30-015-01647	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #021	31 17S 28E M 660S 660W	6006	T/A O	1/31/60

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
56	30-015-01646	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #022A	31 17S 28E N 660S 2082W	6050	ACTIVE O	1/22/60
57	30-015-10118	HANSON ENERGY STATE FV #001	31 17S 28E N 766S 2188W	1938	ACTIVE O	3/1/63
58	30-015-01653	OTIS A ROBERTS PARKER-STATE NO. 1	31 17S 28E O 990S 1650E	742	P&A O	1/18/42
59	30-015-27592	NAVAJO REFINING CO. PIPELINE DIVISION WDW #001	31 17S 28E 660S 2310E	10200	ACTIVE I	8/4/98
60	30-015-01649	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #023	31 17S 28E O 660S 1939E	6094	ACTIVE O	2/24/60
61	30-015-20042	SDX RESOURCES INC NORTHWEST ARTESIA UNIT #011	31 17S 28E P 990S 660E	2012	ACTIVE O	5/8/67
62	30-015-01641	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #024	31 17S 28E P 660S 660E	6122	ACTIVE O	3/12/60
63	30-015-01654	BEDINGFIELD, J E ASTON-STATE NO. 1	32 17S 28E D 330N 330W	651	P&A O	5/12/53
64	30-015-01671	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #025B	32 17S 28E E 2280N 978W	6013	T/A O	9/13/60
65	30-015-01657	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #026	32 17S 28E F 2280N 1980W	6171	T/A O	8/24/60
66	30-015-10818	SDX RESOURCES INC NORTHWEST ARTESIA UNIT #008	32 17S 28E K 2310S 2105W	2003	ACTIVE O	6/8/66
67	30-015-01661	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #026B	32 17S 28E K 1650S 2310W	6083	ACTIVE O	3/27/60
68	30-015-10795	SDX RESOURCES INC NORTHWEST ARTESIA UNIT #009	32 17S 28E L 2310S 660W	1930	T/A O	5/15/66
69	30-015-01662	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #025A	32 17S 28E L 1650S 990W	6075	ACTIVE O	4/13/60

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
70	30-015-20043	SDX RESOURCES INC NORTHWEST ARTESIA UNIT #012	32 17S 28E M 990S 760W	1998	T/A O	5/9/67
71	30-015-01660	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #025	32 17S 28E M 660S 660W	6132	SHUT IN O	3/5/60
72	30-015-10834	SDX RESOURCES INC NORTHWEST ARTESIA UNIT #013	32 17S 28E N 990S 2030W	1954	ACTIVE O	6/17/66
73	30-015-01659	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #026A	32 17S 28E N 660S 1980W	6172	ACTIVE O	2/14/60
74	30-015-21539	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #261	32 17S 28E N 150S 1400W	6220	ACTIVE O	7/25/75
75	30-015-22009	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #272	32 17S 28E O 330S 2481E	6370	ACTIVE O	7/18/77
76	30-015-02606	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #026E	5 18S 28E C 330N 1941W	6254	T/A O	7/18/60
77	30-015-22697	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #261A	5 18S 28E C 1080N 1914W	6350	ACTIVE O	1/4/79
78	30-015-02607	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #025C	5 18S 28E D 660N 660W	6273	ACTIVE O	3/27/60
79	30-015-22750	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #251	5 18S 28E D 660N 150W	6250	SHUT IN O	1/12/79
80	30-015-02608	CONOCOPHILLIPS COMPANY STATE E A1 #001	5 18S 28E E 1660N 330W	6265	ACTIVE O	5/10/60
81	30-015-24485	CONOCOPHILLIPS COMPANY ILLINOIS CAMP A COM #001	5 18S 28E E 1980N 990W	10450	ACTIVE G	8/10/83
82	30-015-02602	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #026D	5 18S 28E F 1650N 1650W	6265	ACTIVE O	12/30/59
83	30-015-25522	I & W INC WALTER SOLT STATE #001	5 18S 28E L 2240S 400W	8500	ACTIVE S	8/12/83

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
84	30-015-10244	MACK ENERGY CORP STATE AG #001	5 18S 28E L 2310S 330W	6365	ZONE ABAN O	8/25/63 3/27/01
87	30-015-20019	SDX RESOURCES INC NORTHWEST ARTESIA UNIT #016	6 18S 28E A 330N 330E	3280	ACTIVE O	3/14/67
88	30-015-02615	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #024B	6 18S 28E A 660N 660E	6241	ACTIVE O	2/29/60
89	30-015-02625	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #023C	6 18S 28E B 470N 2170E	6194	T/A O	12/21/59
90	30-015-21542	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #231	6 18S 28E B 1260N 1580E	6250	ACTIVE O	11/1/75
91	30-015-02621	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #022E	6 18S 28E C 660N 1980W	6033	ACTIVE O	12/29/59
92	30-015-21626	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #231A	6 18S 28E G 1361N 2531E	6380	SHUT IN O	10/22/75
93	30-015-02613	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #021B	6 18S 28E D 990N 660W	6119	ACTIVE O	12/30/59
94	30-015-23116	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #213	6 18S 28E E 2050N 100W	6225	ACTIVE O	6/2/80
95	30-015-02619	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #021C	6 18S 28E E 1990N 660W	6202	ACTIVE O	10/30/59
96	30-015-22637	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #212	6 18S 28E E 2450N 400W	6267	ACTIVE O	12/28/78
97	30-015-21395	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #211	6 18S 28E E 2630N 1300W	6200	ACTIVE O	2/11/75
98	30-015-22012	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #222	6 18S 28E F 1350N 1572W	6303	ACTIVE O	3/13/77
99	30-015-02626	SARKIN, DAVID C & OLIVER, HENRY F STATE NO. 1	6 18S 28E F 1650N 1650W	705	P&A O	2/21/42

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
100	30-015-10107	HANSON ENERGY STATE FX #001	6 18S 28E F 1874N 1874W	1985	ACTIVE O	8/8/63
101	30-015-02620	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #022D	6 18S 28E F 1990N 2082W	6206	ACTIVE O	11/26/59
102	30-015-22527	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #223	6 18S 28E F 2630N 1930W	6250	ACTIVE O	5/19/78
103	30-015-21746	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #221	6 18S 28E F 2610N 2713W	6305	ACTIVE O	4/23/76
104	30-015-22913	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #235	6 18S 28E G 1750N 1600E	6300	ACTIVE O	7/8/79
105	30-015-22593	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #234	6 18S 28E G 1900N 2441E	6260	SHUT IN O	8/27/78
106	30-015-02614	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #023B	6 18S 28E G 1980N 1980E	6242	ACTIVE O	1/26/60
107	30-015-21737	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #232	6 18S 28E G 2253N 1576E	6345	SHUT IN O	4/13/76
108			6 18S 28E H	MISPLLOT OF 107		
109	30-015-22490	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #233	6 18S 28E G 2550N 2050E	6300	T/A O	6/5/78
110	30-015-02616	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #024C	6 18S 28E H 1650N 990E	6253	ACTIVE O	3/24/60
111	30-015-23547	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #241	6 18S 28E H 1950N 660E	6386	ACTIVE O	4/12/81
112	30-015-02617	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #024K	6 18S 28E I 2310S 990E	6350	ZONE ABAN O	8/24/60 12/12/02
113	30-015-22528	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #232A	6 18S 28E J 2300S 1570E	6350	T/A O	2/5/79

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
114	30-015-02611	BARNEY COCKBURN STATE NO. 1	6 18S 28E J 2310S 2310E	2095	P&A O	8/15/49
115	30-015-02628	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #023D	6 18S 28E J 2260S 2270E	6310	ACTIVE O	5/23/79
116	30-015-22491	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #231B	6 18S 28E J 1700S 2350E	6350	T/A O	8/13/78
117	30-015-02618	MILLER BROS OIL CO CAPITOL STATE NO. 1	6 18S 28E J 1647S 2076E	2396	P&A G	3/21/55
118	30-015-02623	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #022F	6 18S 28E K 2248S 2075W	6210	ACTIVE O	2/22/60
119			6 18S 28E K		MISPLLOT	
120		NAVAJO REFINING COMPANY WDW-2 (ORIGINAL LOCATION)	6 18S 28E L			
121	30-015-02622	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #021D	6 18S 28E L 2219S 660W	6194	ACTIVE O	1/23/60
122	30-015-23548	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #211A	6 18S 28E L 1950S 1000W	6312	ACTIVE O	7/17/80
123	30-015-02627	PENROC OIL CORP STATE M-AI #002	6 18S 28E M 949S 990W	6225	ACTIVE O	10/21/60
124	30-015-26943	MEWBOURNE OIL CO CHALK BLUFF 6 STATE #001	6 18S 28E M 990S 730W	10200	ACTIVE G	4/16/92
125	30-015-02610	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #022C	6 18S 28E N 955S 1750W	6243	ACTIVE O	8/5/60
126	30-015-02624	PAN AMERICAN PETROLEUM CO STATE CD NO. 1	6 18S 28E O 968S 2270E	6412	P&A O	5/1/61
127	30-015-25503	DICKSON PETROLEUM CO KIMBERLY STATE NO. 1	6 18S 28E P 660S 330E	1750	P&A O	12/30/85

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
128	30-015-02612	D & H OIL CO STATE NO. 1	6 18S 28E P 330S 330E	2246	P&A O	5/13/52
129	30-015-01215	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #020D	1 18S 27E A 667N 666E	6118	ACTIVE O	11/5/59
130	30-015-00708	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #019B	1 18S 27E B 660N 1980E	6078	ACTIVE O	7/7/59
131		MALCO REFINERIES HILL #4	1 18S 27E C	1840	P&A	5/10/48
132			1 18S 27E C		MISPLOT	
133	30-015-00710	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #018C	1 18S 27E C 660N 1980W	6173	ACTIVE O	9/16/59
134	30-015-26741	MEWBOURNE OIL CO CHALK BLUFF FEDERAL COM #002	1 18S 27E F 1650N 1350W	10140	ACTIVE G	8/24/91
135	30-015-00706	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #018A	1 18S 27E F 2310N 1980W	6087	ACTIVE O	5/31/59
136	30-015-00709	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #019C	1 18S 27E G 1980N 1980E	6205	ACTIVE O	8/2/59
137			1 18S 27E G		MISPLOT	
138	30-015-21552	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #191	1 18S 27E G 2500N 2500E	6259	ACTIVE O	9/7/75
139	30-015-00711	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #020C	1 18S 27E H 1980N 660E	6218	ACTIVE O	10/13/59
140	30-015-21783	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #202	1 18S 27E H 2490N 1299E	6296	ACTIVE O	5/13/76
141	30-015-22656	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #203	1 18S 27E H 2400N 700E	6225	ACTIVE O	10/10/78

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
142		MANHATTAN OIL CRONIN #1	1 18S 27E H	2900	P&A	4/1/25 7/1/27
143	30-015-21553	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #201	1 18S 27E H 2501N 20E	6225	ACTIVE O	7/19/75
144	30-015-27163	MEWBOURNE OIL CO CHALK BLUFF FEDERAL COM #003	1 18S 27E I 1980S 990E	10150	ACTIVE G	1/16/93
145	30-015-00697	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #020K	1 18S 27E I 1980S 660E	6185	ZONE ABAN O	9/29/59 1/5/03
146	30-015-22657	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #193	1 18S 27E J 2490S 2200E	6225	ACTIVE O	10/26/78
147	30-015-00696	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #019Q	1 18S 27E J 1980S 1980E	6180	ACTIVE O	8/20/59
148	30-015-22560	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #192	1 18S 27E J 220S 1390E	6250	ACTIVE O	6/25/78
149	30-015-21873	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #191A	1 18S 27E J 1526S 1470E	6350	ACTIVE O	9/23/76
150	30-015-22658	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #194	1 18S 27E J 1500S 2130E	6325	ACTIVE O	11/14/78
151	30-015-22559	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #184	1 18S 27E K 2290S 2445W	6200	SHUT IN O	7/25/78
152	30-015-22096	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #183	1 18S 27E K 2370S 1510W	6210	ACTIVE O	7/24/77
153	30-015-21554	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #181	1 18S 27E K 1367S 1440W	6203	ZONE ABAN O	10/30/75 4/17/03
154	30-015-00707	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #018B	1 18S 27E K 1980S 1980W	6163	ACTIVE O	5/22/59
155	30-015-21792	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #182	1 18S 27E K 1533S 2370W	6369	ACTIVE O	6/1/76

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC. TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
156	30-015-00713	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #018D	1 18S 27E N 995S 1644W	6174	T/A	12/5/59
157	30-015-26575	NAVAJO REFINING COMPANY WDW-3 (PROPOSED)	1 18S 27E N 790S 2250W	10120	T/A G	3/7/91
158	30-015-20394	HUMBLE OIL & REFINING CO EMPIRE ABO FEDERAL NO. 5	1 18S 27E O 953S 2197E	6300	P&A O	4/9/71
159	30-015-00698	ARCO PERMIAN EMPIRE ABO UNIT #191	1 18S 27E O 660S 1980E	6365	P&A S	11/8/59
160	30-015-00699	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #020B	1 18S 27E P 940S 330E	6250	ACTIVE O	12/2/61
161	30-015-26404	MEWBOURNE OIL CO FEDERAL T #001	12 18S 27E A 660N 990E	10141	T/A G	9/13/90
162	30-015-25099	EASTLAND OIL CO COMSTOCK FEDERAL #006	12 18S 27E H 1809N 990E	1652	ACTIVE O	9/11/85
165	30-015-25997	EASTLAND OIL CO LAUREL STATE #001	7 18S 28E C 940N 1757W	1690	ACTIVE O	2/23/87
166	30-015-25675	EASTLAND OIL CO LAUREL STATE #002	7 18S 28E E 940N 1757W	1690	ACTIVE O	11/10/88
167	30-015-25236	MOREXCO INC STATE BY #001	7 18S 28E F 1980N 1980W	10400	ACTIVE O	6/10/85
353	30-015-27286	MEWBOURNE OIL CO CHALK BLUFF 36 STATE #001	36 17S 27E M 660S 990W	10060	ACTIVE O	3/30/93
354	30-015-24612	PRONGHORN MANAGEMENT CORP STATE M #001	36 17S 27E M 790S 990W	1451	ACTIVE O	10/11/83
355	30-015-00676	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #017	36 17S 27E M 330N 990W	5797	ACTIVE O	
356	30-015-10184	ASPEN OIL INC STATE #006	36 17S 27E M 330S 920W	1343	ACTIVE O	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
358	30-015-21623	ASPEN OIL INC STATE #007	36 17S 27E M 360S 455W	1366	ACTIVE O	
359	30-015-00662	ACREY, B L & F D STATE NO. 2	36 17S 27E M 330S 330W	592	P&A O	10/15/42
595	30-015-02605	BP AMERICA PRODUCTION UNIT EMPIRE ABO UNIT NO. 27 E	5 18S 28E B 930N 2271E	6261	ACTIVE O	3/30/60
748	30-015-00715	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #037	1 18S 27E D 330N 330W	1835	ACTIVE I	
748	30-015-00701	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT 37 WIW	1 18S 27E D 330N 330W	1835	ACTIVE O	
749	30-015-00712	ARCO OIL & GAS EMPIRE ABO UNIT I NO. 17	1 18S 27E D 647N 667W	5900	P&A O	1/24/87
750		JONES BRINARD	1 18S 27E E 1650N 330W	481	P&A O	5/10/39
751	30-015-00704	ARCO OIL & GAS EMPIRE ABO UNIT J NO. 17	1 18S 27E E 1980N 660W	5960	P&A O	3/26/59
752	30-015-00703	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #017A	1 18S 27E L 1980S 660W	6091	ACTIVE O	5/22/95
753	30-015-22815	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #171	1 18S 27E M 670S 330W	6300	ACTIVE O	5/22/79
754			1 18S 27E M	MISPLOT OF 756		
755	30-015-00714	VALLEY REFINING CO HILL #1	1 18S 27E N	2404	P&A	12/20/43
756	30-015-00705	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #017B	1 18S 27E M 990S 660W	6150	ACTIVE O	6/25/59
757		BRAINARD & GUY STATE 2	2 18S 27E A 330N 610E	530	NO COMPL	1/31/42

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
758	30-015-00721	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #036	2 18S 27E A 330N 990E	1705	SHUT IN O	11/6/47
765	30-015-00724	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #016B	2 18S 27E A 990N 330E	5920	ACTIVE O	
766	30-015-00737	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #038	2 18S 27E B 905N 1601E	1722	ACTIVE O	5/23/48
772	30-015-00745	H & S OIL LLC STATE H #001	2 18S 27E H 1980N 660E	6140	ACTIVE O	3/9/59
773	30-015-00742	S&J OPERATING COMPANY SOUTH RED LAKE GRAYBURG UNIT 39 WIW	2 18S 27E H 1650N 990E	1742	P&A O	4/1/48 2/8/91
774	30-015-00740	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #040	2 18S 27E G 1650N 2197E	1707	P&A I	5/13/48 7/10/02
778		RUTTER & WILBANKS HUDSON #2	2 18S 27E G 2310N 1650E		O	1/1/57
779	30-015-00741	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #015B	2 18S 27E G 2310N 1980E	5880	ACTIVE O	6/6/59
781		MALCO REFINING CO STATE B-2	2 18S 27E J 2310S 2310E	4164	P&A O	1/1/47
785	30-015-00717	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #016	2 18S 27E I 1980S 660E	6114	ACTIVE O	2/6/95
786	30-015-00716	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #015	2 18S 27E J 1980S 1830E	6100	ACTIVE O	3/23/59
789	30-015-22896	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #143A	2 18S 27E K 1820S 2550W	6108	ACTIVE O	5/13/79
791	30-015-22914	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #161	2 18S 27E I 1310S 590E	6225	ACTIVE O	9/13/79
792			2 18S 27E O		MISLOT OF 814	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
793	30-015-22609	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #143	2 18S 27E N 1200S 1900W	6093	ACTIVE O	12/20/78
795			2 18S 27E P		MISPLUG OF 765	
796	30-015-21544	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #151	2 18S 27E O 1110S 1322E	6285	T/A O	11/4/75
797	30-015-22885	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #155	2 18S 27E O 1040S 2025E	6202	T/A O	5/1/79
799	30-015-00722	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #016A	2 18S 27E P 660S 660E	6115	T/A O	1/20/59
800	30-015-22808	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #156	2 18S 27E O 600S 1330E	6225	ACTIVE O	4/12/79
801	30-015-00731	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #015A	2 18S 27E O 660S 1980E	6220	ACTIVE O	11/19/58
802	30-015-22669	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #154	2 18S 27E O 800S 2500E	6200	T/A O	12/4/78
805	30-015-22013	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #153	2 18S 27E O 90S 1456E	6303	T/A O	4/20/77
806	30-015-21825	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #152	2 18S 27E O 320S 2602E	6335	T/A O	6/17/76
807	30-015-22608	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #142	2 18S 27E N 100S 1950W	6200	ACTIVE O	1/12/79
808	30-015-21807	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #132	2 18S 27E M 275S 1243W	6200	ACTIVE O	7/1/76
812	30-015-00730	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #014	2 18S 27E N 660S 1980W	6112	ACTIVE O	10/21/58
813	30-015-00720	BP AMERICA PRODUCTION COMPANY RIVERWOLF UNIT #004	2 18S 27E A 990N 1650E	5881	ACTIVE O	10/21/59

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
814	30-015-22051	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #141A	2 18S 27E K 1370S 2445W	6203	ACTIVE O	5/17/77
836	30-015-00869	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #016C	11 18S 27E A 330N 653E	6211	ACTIVE O	7/1/59
837	30-015-22568	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #151B	11 18S 27E B 400N 1450E	6310	T/A O	8/1/78
838	30-015-22838	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #153B	11 18S 27E B 200N 1925E	6252	T/A O	5/6/79
839	30-015-00868	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #015C	11 18S 27E B 660N 1980E	6260	T/A O	4/6/58
840	30-015-22569	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #152B	11 18S 27E B 560N 2588E	6300	T/A O	8/23/78
841	30-015-22834	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #141B	11 18S 27E C 225N 2280W	6225	SHUT IN O	5/21/79
842	30-015-00864	ARCO OIL & GAS EMPIRE ABO UNIT M NO. 14	11 18S 27E C 660N 1980W	6315	P&A O	9/5/57
843	30-015-22833	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #133B	11 18S 27E D 450N 1175W	6225	T/A O	5/23/79
844	30-015-00867	ARCO OIL & GAS EMPIRE ABO UNIT M NO. 13	11 18S 27E D 660N 660W	6114	P&A O	4/26/58
846	30-015-22556	ARCO OIL & GAS EMPIRE ABO UNIT M NO. 131	11 18S 27E D 1100N 1200W	6325	P&A O	7/10/78
848	30-015-20510	AMOCO PRODUCTION CO MALCO S NO. 1	11 18S 27E F 1650N 1653W	10168	P&A O	10/16/71
849	30-015-00865	ARCO OIL & GAS EMPIRE ABO UNIT N NO. 14	11 18S 27E F 1650N 1980W	6208	P&A O	2/3/61
850	30-015-00866	ARCO OIL & GAS EMPIRE ABO UNIT N NO. 131	11 18S 27E E 1980N 660W	6120	P&A O	3/27/58

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
851	30-015-00870	AMOCO PRODUCTION CO SMITH-MCPHERSON NO. 1	11 18S 27E J 1980S 1980E	7270	P&A O	9/1/56
852	30-015-01201	OSCAR HOWARD AN ETZ #3	11 18S 27E N	1828	P&A	4/15/27
853	30-015-01202	OSCAR HOWARD AN ETZ #2	11 18S 27E O	1827	P&A	2/4/27
854	30-015-00863	B.R. POLK, JR. VICKERS #1	11 18S 27E N	1794	P&A	10/14/49
855	30-015-24857	RICKS EXPLORATION, INC. FEDERAL DH GAS COM #001	11 18S 27E M 700S 990W	11915	ACTIVE G	5/18/84
856	30-015-20535	ROBERT G COX FEDERAL EA 2	12 18S 27E D 330N 455W	6248	P&A O	11/27/71 8/7/73
857	30-015-00871	RHONDA OPERATING CO FEDERAL EA #001	12 18S 27E D 330N 330W	6253	P&A O	7/8/75 4/12/94
858	30-015-23115	RHONDA OPERATING CO FEDERAL EA NO. 3	12 18S 27E D 330N 380W	6295	D&A O	3/16/80
859	30-015-25738	EASTLAND OIL CO COMSTOCK FEDERAL #009	12 18S 27E G 2310N 2310E	1586	ACTIVE O	4/25/87
860	30-015-25270	EASTLAND OIL CO CHUKKA FEDERAL #001	12 18S 27E F 2310N 2310W	1600	ACTIVE O	4/23/85
861	30-015-20894	NAVAJO REFINING COMPANY WDW #002	12 18S 27E E 1980N 660W	10372	ACTIVE I	7/18/73
862	30-015-00874	EASTLAND OIL CO COMSTOCK FEDERAL #007	12 18S 27E J 2310S 2355E	3664	ACTIVE O	6/29/48
863	30-015-00872	MCKEE-JONES MAGRUDER NO. 1	12 18S 27E L 310S 990W	594	D&A O	2/18/43
864	30-015-25201	EASTLAND OIL CO COMSTOCK FEDERAL #002	12 18S 27E K 1650S 1770W	1600	ACTIVE O	3/16/85

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
865	30-015-25649	FRED POOL DRILLING CO COMSTOCK FEDERAL NO. 8	12 18S 27E L 1650S 990W	2000	D&A O	10/10/86
866	30-015-25545	EASTLAND OIL CO COMSTOCK FEDERAL #003	12 18S 27E M 990S 990W	1530	ACTIVE O	5/19/86
867	30-015-00873	R.E. MCKEE ET AL MAGRUDER #2	12 18S 27E M	2510	P&A	2/27/45
868	30-015-26017	EASTLAND OIL CO COMSTOCK FEDERAL #010	12 18S 27E N 990S 1650W	2040	ZONE ABAN O	12/16/89 1/23/03
869	30-015-25100	EASTLAND OIL CO COMSTOCK FEDERAL #001	12 18S 27E N 330S 1650W	2400	ACTIVE O	12/10/84
870	30-015-25202	EASTLAND OIL CO COMSTOCK FEDERAL #005	12 18S 27E O 330S 2310E	1625	ACTIVE O	4/19/85
871	30-015-06171	PILCHER OIL & GAS MICHAEL CRONIN NO. 3	12 18S 27E I 1069S 251E	2200	P&A O	5/20/26
872		PILCHER OIL & GAS MICHAEL CRONIN #1	12 18S 27E P	2002	P&A	2/15/32
873	30-015-00875	CITIES SERVICE OIL CO MAGRUDER NO. B-4	12 18S 27E P 330S 330E	2000	P&A O	7/30/52
874	30-015-00876	ROBERT E MCKEE MAGRUDER NO. 5	12 18S 27E P 100S 500E	1994	P&A O	2/8/54
875	30-015-06170	PILCHER OIL & GAS MICHAEL CRONIN NO. 2	12 18S 27E P 200S 200E	2004	P&A O	2/22/26
876	30-015-01200	HASSENFUSH-DONNELLY STATE NO. 1	13 18S 27E A 0 0	2030	P&A O	1/1/26
877	30-015-06137	EASTLAND OIL CO STATE NO. 2	13 18S 27E A 250N 990E	2696	D&A O	1/1/26
878	30-015-25394	EASTLAND OIL CO ARTESIA STATE #002	13 18S 27E C 330N 2310W	1613	ACTIVE O	9/28/85

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC. TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
879	30-015-25241	EASTLAND OIL CO ARTESIA STATE #001	13 18S 27E C 330N 1650W	1575	ACTIVE O	4/13/85
880	30-015-00884	DALE RESLER STATE NO. 3	13 18S 27E C 990N 1650W	2047	P&A O	1/29/45
881	30-015-25370	CBS OPERATING CORP ARTESIA STATE UNIT #002A	13 18S 27E D 480N 940W	1608	ACTIVE O	8/27/85
882	30-015-00883	CBS OPERATING CORP ARTESIA STATE UNIT #001	13 18S 27E D 990N 990W	1950	ACTIVE O	12/11/44
883	30-015-00880	DALE RESLER - JONES STATE NO. 1	13 18S 27E E 1650N 990W	2353	P&A O	1/26/45
884	30-015-24881	DAVID G HAMMOND ANADARKO 13 FEDERAL #001	13 18S 27E F 1880N 1830W	3020	ACTIVE O	6/18/84
885	30-015-00888	RALPH NIX & JERRY CURTIS PAGE NO. 1	13 18S 27E F 1980N 1650W	2000	P&A O	11/28/54
886	30-015-00879	DALE RESLER JONES-GOVT NO. 1	13 18S 27E F 2310N 1650W	2000	D&A O	3/14/45
888	30-015-25078	DICKSON PETROLEUM, INC ANADARKO 13 FEDERAL NO. 1	13 18S 27E G 1724N 2279E	2150	D&A O	12/30/84
895	30-015-00891	ANADARKO PETROLEUM CORP ARTESIA STATE UNIT TRACT 4 NO. 1	14 18S 27E A 990N 330E	2060	P&A O	6/30/44
896	30-015-00893	RESLER STATE NO. 1	14 18S 27E G 1650N 1650E	2375	D&A O	1/1/00
897	30-015-00895	CBS OPERATING CORP ARTESIA STATE UNIT #001B	14 18S 27E H 1650N 330E	1888	ACTIVE O	2/8/45
901	30-015-00695	WILLIAM & EDWARD HUDSON HILL NO. 1	1 18S 27E L 1650S 330W	1763	D&A O	6/18/48
910	30-015-00744	COMPTON-SMITH STATE 1	2 18S 27E J 2310S 1640E	1080	P&A O	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
911	30-015-31123	SOUTHWESTERN ENERGY PRODUCTION C NO BLUFF 36 STATE COM #002	36 17S 27E H 1980N 760E	10050	ACTIVE G	
912	30-015-31036	C E LARUE & B M MUNCY JR GATES STATE #003	36 17S 27E H 2310N 990E	614	ACTIVE O	
916	30-015-31592	ROJO GRANDE COMPANY LLC RAMAPO #007	36 17S 27E N 330S 2310E	612	P&A O	7/6/01 12/21/01
917	30-015-30784	SDX RESOURCES INC NW STATE #012	31 17S 28E A 330N 480E	3300	ACTIVE O	
918	30-015-30893	SDX RESOURCES INC NW STATE #028	31 17S 28E A 973N 959E	2808	ACTIVE O	
919	30-015-32162	SDX RESOURCES INC ENRON STATE #004	31 17S 28E D 460N 990W	3460	NO COMPL O	4/3/03
920	30-015-30783	SDX RESOURCES INC NW STATE #011	31 17S 28E H 1650N 330E	3205	ACTIVE O	
921	30-015-30849	SDX RESOURCES INC NW STATE #009	31 17S 28E I 2310S 270E	3195	ACTIVE O	
922	30-015-30760	SDX RESOURCES INC NW STATE #010	31 17S 28E P 735S 330E	3210	ACTIVE O	
923	30-015-31920	SDX RESOURCES INC ENRON STATE #002	32 17S 28E D 990N 990W	4030	ACTIVE O	
924	30-015-30781	SDX RESOURCES INC NW STATE #005	32 17S 28E K 1900S 2146W	3190	ACTIVE O	
925	30-015-30777	SDX RESOURCES INC NW STATE #006	32 17S 28E L 2310S 990W	3204	ACTIVE O	
926	30-015-30685	SDX RESOURCES INC NW STATE #007	32 17S 28E M 990S 990W	3220	ACTIVE O	
927	30-015-30815	SDX RESOURCES INC NW STATE #008	32 17S 28E N 1090S 2126W	3310	ACTIVE O	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC. TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
928	30-015-32310	MARBOB ENERGY CORP AAO FEDERAL #004	1 18S 27E A 990N 990E	4000	PROPOSED O	
929	30-015-32309	MARBOB ENERGY CORP AAO FEDERAL #003	1 18S 27E B 330N 1690E	4125	NO COMPL O	4/10/03
930	30-015-32308	MARBOB ENERGY CORP AAO FEDERAL #002	1 18S 27E C 430N 2310W	4150	ACTIVE O	9/19/02
931	30-015-32307	MARBOB ENERGY CORP AAO FEDERAL #001	1 18S 27E D 330N 990W	3851	ACTIVE O	12/10/02
932	30-015-22816	ARCO OIL & GAS EMPIRE ABO UNIT L #192	1 18S 27E O 1120S 1440E	6350	ABAN LOCATION O	6/28/80 6/23/80
933	30-015-20388	ARCO OIL & GAS EMPIRE ABO #5	1 18S 27E N 990S 2297E	6300	SAME AS 158 O	12/31/99
934	30-015-27719	MEWBOURNE OIL CO CHALK BLUFF 12 FED #001	12 18S 27E 1650S 990E		ABAN LOCATION G	
935	30-015-27437	YATES PETROLEUM CORPORATION BEAUREGARD ANP STATE COM #001	14 18S 27E B 660N 1980E	0	ABAN LOCATION G	
936	30-015-31086	MARBOB ENERGY CORP LP STATE #001	5 18S 28E E 1650N 990W	4503	ACTIVE O	
937	30-015-31109	MARBOB ENERGY CORP LP STATE #002	5 18S 28E E 2301N 230W	0	PROPOSED O	
938	30-015-30785	SDX RESOURCES INC NW STATE #015	6 18S 28E A 430N 330E	3225	ACTIVE O	
939	30-015-00264	BARNEY COCKBURN CAPITAL STATE NO. 1	6 18S 28E J 2310S 2310E	2095	SAME AS 114 O	5/23/79
940	30-015-31087	MARBOB ENERGY CORP LP STATE #003	6 18S 28E M 990S 330W	4466	ACTIVE O	7/15/00
941	30-015-31088	MARBOB ENERGY CORP LP STATE #004	6 18S 28E M 330S 990W	0	PROPOSED O	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
942	30-015-06250	SAME AS 89	6 18S 28E O 470S 2170E	0	SAME AS 89 O	1/31/01
943	30-015-31319	EASTLAND OIL CO LAUREL STATE #003	7 18S 28E E 2310N 330W	1630	ACTIVE O	
944		NAVAJO REFINING COMPANY WDW-3 (ORIGINAL LOC.)	6 18S 28E D 778N 995W		ABANDON LOCATION I	

ATTACHMENT VI-1A

CONSTRUCTION DATA FOR WELLS THAT PENETRATE THE INJECTION ZONE WITHIN 1 MILE OF THE INJECTION WELLS

ID NO	OPERATOR/LEASE	TYPE	TOTAL DEPTH (ft)	CASING			DATE COMPLETED OR PLUGGED	PLUGGING		MUD DATA		REMARKS
				DIAMETER (in)	DEPTH (ft)	SX OF CEMENT		DEPTH (ft)	SX OF CEMENT	FILLED (Y/N)	WEIGHT (lb/gal)	
59	Navajo Refining Company WDW-1 31-17S-28E Unit O	Active Class I	10200 PB 9004	13-3/8 9-5/8 7	390 2555 9094	525 1000 1370	9/9/93 Recompleted 8/4/98	9734	45	NA	NA	
81	Phillips Oil Company Illinois Camp A Com No. 1 Empire Penn Gas Field 5-18S-28E Unit E	Active Gas	10450	13-3/8 8-5/8 5-1/2 2-7/8	663 4000 10450 9922	650 1400 2007	8/10/83	NA	NA	NA	NA	Perfs: 10172 - 10184 feet 10070 - 10075 feet
83	Metek Pipe & Supply (original) L&W, Inc. Waller Solt State No. 1 5-18S-28E Unit L	Active SWD	8500	13-3/8 8-5/8 5-1/2 2-7/8	354 1745 8466 7500	350 650 520	8/12/83	NA	NA	NA	NA	Perfs: 7518 - 7534 feet 7632 - 7642 feet (cemented) 7742 - 7756 feet 7778 - 7787 feet 7810 - 7812 feet Perfs: 10084 - 10092 feet
124	Mewbourne Oil Company Chalk Bluff 6 State No. 1 North Illinois Camp Morrow 6-18S-28E Unit M	Active Gas	10200	13-3/8 9-5/8 7 4-1/2	400 2600 9445 9077 - 10198 9990	500 1100 1895 175	4/16/92	NA	NA	NA	NA	
134	Mewbourne Oil Company Chalk Bluff Federal Com No. 2 North Illinois Camp Morrow 1-18S-27E Unit F	Active Gas	10140	13-3/8 9-5/8 5-1/2 2-7/8	416 2610 10148 9939	450 1025 1020	8/24/91	NA	NA	NA	NA	Perfs: 9999 - 10024 feet
144	Mewbourne Oil Company Chalk Bluff Federal Com No. 3 North Illinois Camp Morrow 1-18S-27E Unit I	Active Gas	10150	13-3/8 9-5/8 7 4-1/2 2-3/8	400 2600 8968 8600 - 10150 9972	100 250 1200 200	1/16/93	NA	NA	NA	NA	Perfs: 9950 - 9954 feet 9957 - 9972 feet

ATTACHMENT VI-1A (Continued)

CONSTRUCTION DATA FOR WELLS THAT PENETRATE THE INJECTION ZONE WITHIN 1 MILE OF THE INJECTION WELLS

ID NO	OPERATOR/LEASE	TYPE	TOTAL DEPTH (ft)	CASING			DATE COMPLETED OR PLUGGED	PLUGGING		MUD DATA		REMARKS
				DIAMETER (in)	DEPTH (ft)	SX OF CEMENT		DEPTH (ft)	SX OF CEMENT	FILLED (Y/N)	MUD WEIGHT (lb/gal)	
157	Navajo Refining Company WDW-3 Mewbourne Oil Company (original) Chalk Bluff Fed. Com No. 1 North Illinois Camp Morrow 1-18S-27E Unit N	Proposed Class I	10120	13-3/8 9-5/8 7 4-1/2	400 2604 9450 9051 - 10119	425 1025 1350 175	3/7/91	NA	NA	NA	NA	
161	Mewbourne Oil Company Federal T No. 1 North Illinois Camp Morrow 12-18S-27E Unit A	Active Shut In	10141	13-3/8 8-5/8 5-1/2 4	472 2589 9473 10140 (liner)	450 900 430 80	9/13/90					
167	ARCO Oil & Gas Company Morexco, Inc. State BY No. 1 Artesia Q-GB-SA 7-18S-28E Unit F	Active Oil	10400	13-3/8 8-5/8 5-1/2 2-7/8	418 2600 10400 1706	500 1150 1000	6/10/85 12/20/95 Recompleted to Grayburg	10050 7050 5950 2600	35', CIBP 100' 100' 100'	Y	Unknown	Perfs: 10116 - 10124 feet (cemented) 1627 - 46 feet
353	Mewbourne Oil Company Chalk Bluff 36 State No. 1 36-17S-27E Unit N	Active Gas	10060	13-3/8 9-5/8 7 4-1/2	399 2603 9253 8439- 10057	530 1150 1620 225	3/30/93	8300	NA	NA	NA	Perfs: 7164-7277 feet 8528-8572 feet 9466-9484 feet 9842-9856 feet 9864-9886 feet
848	Amoco Production Company Malco S No. 1 11-18S-27E Unit F	P&A	10168	11-3/4 8-5/8 5-1/2	1000 6348 6277-10138	970 300 855	10/16/71 12/03/85	9495 7863-7613 6995 5350-5250 1050-950 Surface	NA 25 15 40 350 10	Y		Cement plug is present at the top of the liner, which is set above the top of the injection zone.
851	Amoco Production Company Smith-McPherson No. 1 (was Stanolind Oil and Gas Co. Ruth C. McPherson No. 1) 11-18S-27E Unit J	P&A	7270	13-3/8 9-5/8 4-1/2	572 960-1790 2990-4500	700 250 NA	09/01/56 06/06/73	4119-3735 3040-2900 2040-1922 1010-910 602-502 Surface	30 30 40 50 60 10	Y		Injection zone is not cased and is mud-filled.

ATTACHMENT VI-1A (Continued)

CONSTRUCTION DATA FOR WELLS THAT PENETRATE THE INJECTION ZONE WITHIN 1 MILE OF THE INJECTION WELLS

ID NO	OPERATOR/LEASE	TYPE	TOTAL DEPTH (ft)	CASING			DATE COMPLETED OR PLUGGED	PLUGGING		MUD DATA		REMARKS
				DIAMETER (in)	DEPTH (ft)	SX OF CEMENT		DEPTH (ft)	SX OF CEMENT	FILLED (Y/N)	MUD WEIGHT (lb/gal)	
855	Amoco Production Company Federal DH Gas Com. No. 1 11-18S-27E Unit M	Oil	11915	13-3/8 9-5/8 5-1/2	502 2200 11915	700 1400 2720	05/18/84	11610 10700	55 55			Long-string casing is cemented from total depth to above the top of the confining zone.
861	Navajo Refining Company, WDW-2 12-18S-27E Unit E	Active Class I	10372 PB 8770	13-3/8 8-5/8 5-1/2	40 1995 8869	Surface 800 1570	07/18/73 Recompleted 6/8/99	NA	NA	NA	NA	Perfs (Strawn, Morrow): 9295-9308 feet 9789-9846 feet
911	Southwest Energy Production Co. No. Bluff 36 State Comm. No. 2 36-17S-27E Unit H	Active Gas	10050	13-3/8 8-5/8 5-1/2	425 2002 10050	465 650 553	4/28/01	NA	NA	NA	NA	Perfs: 9927-9964 feet

NA - Not applicable

MAP ID NO. 157

**NAVAJO REFINING COMPANY
NO. 1 CHALK BLUFF FEDERAL COM.**

PROPOSED WDW-3



SUBSURFACE

Artificial Penetration Review
Number 157

OPERATOR Navajo Refining Company

LEASE Chalk Bluff Federal Com.

WELL NUMBER 1

DATE DRILLED 3/7/91

DATE PLUGGED

STATUS Active - T/A

DISTANCE FROM INJECTOR (FT)

LOCATION 1-18S-27E Unit N

MUD FILLED BOREHOLE

REPORTED MUD WEIGHT

API NUMBER 30-015-26575

790' FSL, 2250' FWL

Proposed WDW-3

13 3/8" surface casing @ 400' w/ 425 sx.

9 5/8" casing @ 2604' w/ 1025 sx.

CIBP @ 7010'

CIBP @ 7208'

CIBP @ 7294'

CIBP @ 7600' w/ 35' cement

Perfs: 7050'-7102'
7262'-7278'
7304'-7314'
7676'-7678'
7826'-7830'
9861'-9967'

7" casing @ 9450' cemented w/ 1350 sx in 2 stages
circulated to surface

4 1/2" liner 9051'-10119'
w/ 175 sx

TD 10120'

Revised July 2003

OCD - Artesia

3160-5
November, 1994)UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENTFORM APPROVED
OMB No. 1004-0135
Expires July 31, 1996

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on reverse side

1. Type of Well

☐ Oil Well ☐ Gas Well ☐ Other

2. Name of Operator

Navajo Refining Co.

3a. Address

P.O. Drawer 159, Artesia, NM 88211

3b. Phone No. (include area code)

505-748-3311

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

N-1-18s-27e

790' FSL & 2250' FWL

5. Lease Serial No.

NM 0557371

6. If Indian, Allottee or Tribe Name

7. If Unit or CA Agreement, Name and/or No.

8. Well Name and No.

Chalk Bluff Fed. Com. #1

9. API Well No.

30-015-26575

10. Field and Pool, or Exploratory Area

11. County or Parish, State

Eddy

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION

TYPE OF ACTION

☐ Notice of Intent☐ Acidize☐ Deepen☐ Production (Start/Resume)☐ Water Shut-Off☐ Subsequent Report☐ Alter Casing☐ Fracture Treat☐ Reclamation☐ Well Integrity☐ Final Abandonment Notice☐ Casing Repair☐ New Construction☐ Recomplete☐ Other☐ Change Plans☐ Plug and Abandon☒ Temporarily Abandon☐ Convert to Injection☐ Plug Back☐ Water Disposal

Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

This well is temporarily abandoned. We are holding it for future use as a waste water injection well. We ran an MIT on it on March 31, 2003 (chart enclosed) and it passed. This test was witnessed by the New Mexico OCD.

TA Approved For 12 Month Period

Ending 3/31/04

14. I hereby certify that the foregoing is true and correct
Name (Printed/Typed)

Darrell Moore

Title

Env. Mgr. for Water & Waste

Signature

Date

5/13/03

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

JOE B. LARA

Title

Permitting Engineer

Date

6/11/03

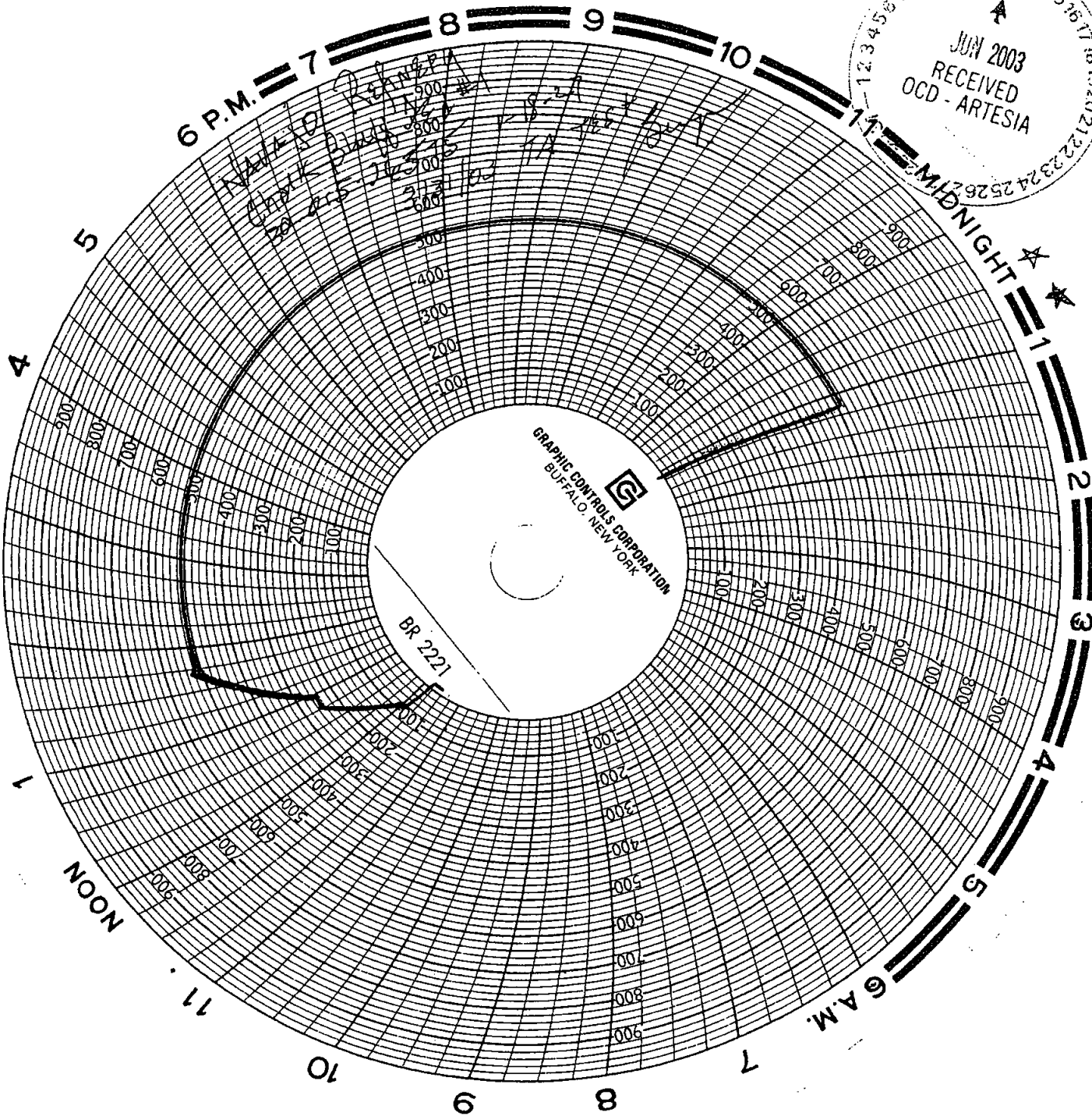
Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office

CFO

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on reverse)



Handwritten notes in the upper left quadrant of the graph:

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District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 South First, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
20 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Form C-104A
August 11, 2000

Oil Conservation Division
2040 South Pacheco
Santa Fe, NM 87505

Submit 1 copy of the final affected wells
list along with 2 copies of this form per
number of wells on that list to
appropriate District Office

Change of Operator

Previous Operator Information:

OGRID: 14744
Name: Mewbourne Oil Company
Address: P. O. Box 7698
Address: _____
City, State, Zip: Tyler, TX 75711

New Operator Information:

Effective Date: 5 October, 2000
New Ogrid: 15694
New Name: Navajo Refining Company
Address: ~~100 Crescent Court, Ste 1600~~
Address: P.O. Box 159
City, State, Zip: ~~Dallas, TX 75201~~
Artesia, NM 88211

I hereby certify that the rules of the Oil Conservation Division have been complied with and that the information on this form and the attached list of wells is true and complete to the best of my knowledge and belief.

New Operator

Signature: Darrell Moore

Printed name: Darrell Moore

Title: Env. Mgr. for Water and Waste

Date: 12/5/00

Phone: 505-748-3311

Previous operator complete below:

Previous
Operator: Mewbourne Oil Company
Previous
OGRID: 14744
Signature: Monty Whetstone
Printed Name: Monty Whetstone

NMOCD Approval

Signature: Jim W. Green

Printed

Name: District Supervisor

District: _____

NOV 27 2000

Date: _____

27021 - property code - Chalk Bluff Federal Corn #1
30-015-26575 - API Number 1-185-27E

SUBSURFACE

Artificial Penetration Review
Number 353

OPERATOR Mewbourne Oil Company

LEASE Chalk Bluff 36 State

WELL NUMBER 1

DATE DRILLED 3/30/93

DATE PLUGGED

STATUS ACTIVE

DISTANCE FROM INJECTOR (FT)

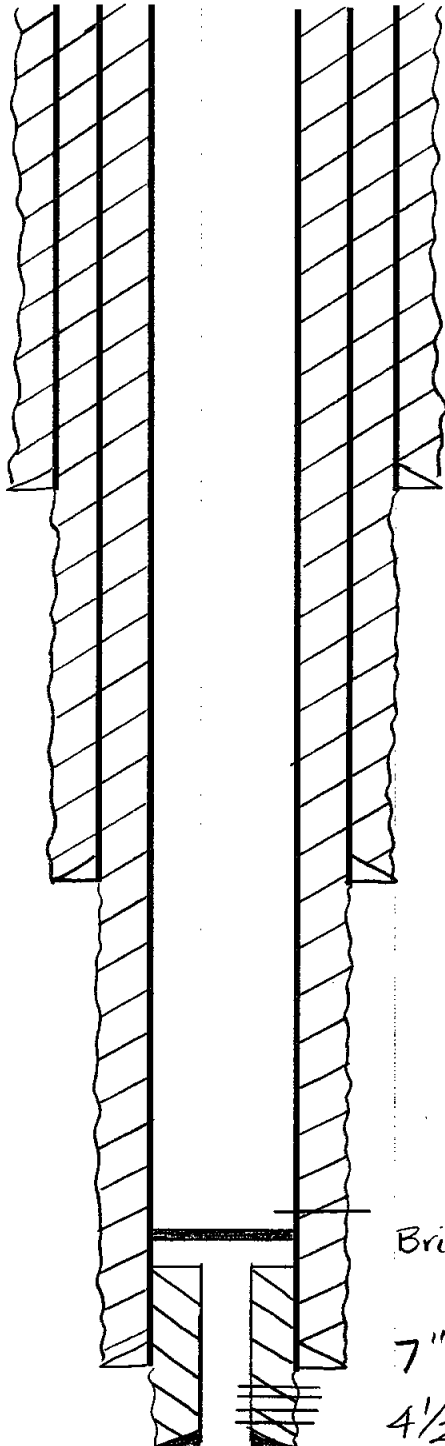
LOCATION 36-17S-27E, N

MUD FILLED BOREHOLE

REPORTED MUD WEIGHT

API NUMBER 30-DIS-27286

660' FSL, 990' FWL



13 3/8" casing at 399', cement to surface,
530 ex

9 5/8" casing at 2603', cement to surface,
1150 ex

Perfs:
7164'-7277'
8528'-8572'
9466'-9484'
9842'-9856'
9864'-9886'

Bridge Plug @ 8300'

7" casing at 9253', cement to surface, 11620 ex
4 1/2" liner 8439'-10057'

TD 10060'

District I
PO Box 1980, Hobbs, NM 88241-1980
District II
811 South First, Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

SV 353 Form C-104
Revised October 18, 1994
Instructions on back
Submit to Appropriate District Office
5 Copies
☐ AMENDED REPORT

I. REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT

¹ Operator name and Address Mewbourne Oil Company PO Box 5270 Hobbs, New Mexico 88241		² OGRID Number 14744
		³ Reason for Filing Code Plug Back/Recompletion
⁴ API Number 30 - 0 15-27286	⁵ Pool Name Logan Draw Wolfcamp.	⁶ Pool Code 96960
⁷ Property Code 7871	⁸ Property Name Chalk Bluff 36 State	⁹ Well Number 1

II. ¹⁰ Surface Location

UI or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South Line	Feet from the	East/West line	County
	36	17S	27E		660	South	990	West	Eddy

¹¹ Bottom Hole Location

UI or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South Line	Feet from the	East/West line	County
¹² Lse Code	¹³ Producing Method Code Pumping	¹⁴ Gas Connection Date 07/17/01	¹⁵ C-129 Permit Number	¹⁶ C-129 Effective Date	¹⁷ C-129 Expiration Date				

III. Oil and Gas Transporters

¹⁸ Transporter OGRID	¹⁹ Transporter Name and Address	²⁰ POD	²¹ O/G	²² POD ULSTR Location and Description
138648	Amoco Pipeline Company Tulsa, Ok	1923810	O	
990	Elkhorn Operating Company Artesia, NM	2829726	G	

Stamp: 1 2 3 4 5 6 7 8 9 10 11 12
SEP 2001
RECEIVED
OCD - ARTESIA

IV. Produced Water

²³ POD	²⁴ POD ULSTR Location and Description
1923850	

V. Well Completion Data

²⁵ Spud Date	²⁶ Ready Date	²⁷ TD	²⁸ PBDT	²⁹ Perforations	³⁰ DHC, DC, MC
02/03/93	07/17/01	10060	8300	7164-7277	
³¹ Hole Size	³² Casing & Tubing Size	³³ Depth Set	³⁴ Sacks Cement		
17 1/2"	13 3/8"	399'	530		
12 1/4"	9 5/8"	2603'	1150		
8 3/4"	7"	9253'	1620		
6 1/8"	4 1/2"	10057'	225		

VI. Well Test Data

³⁵ Date New Oil	³⁶ Gas Delivery Date	³⁷ Test Date	³⁸ Test Length	³⁹ Tbg. Pressure	⁴⁰ Csg. Pressure
07/17/01	07/17/01	07/22/01	24	N/A	35
⁴¹ Choke Size	⁴² Oil	⁴³ Water	⁴⁴ Gas	⁴⁵ AOF	⁴⁶ Test Method
N/A	88	78	88		Pumping

⁴⁷ I hereby certify that the rules of the Oil Conservation Division have been complied with and that the information given above is true and complete to the best of my knowledge and belief.

Signature: *N.M. Young*
Printed name: N.M. Young
Title: District Manager
Date: 08/24/01

OIL CONSERVATION DIVISION
Approved by: *Jim W. Seem*
Title: District Supervisor
Approval Date: SEP 2001

⁴⁸ If this is a change of operator fill in the OGRID number and name of the previous operator

Previous Operator Signature	Printed Name	Title	Date

Submit to Appropriate
District Office,
State Lease - 6 copies
Fee Lease - 5 copies
DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-105
Revised 1-1-89

51
354

OIL CONSERVATION DIVISION

2040 Pacheco St.
Santa Fe, NM 87505

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd, Aztec, NM 87410

WELL API NO. 30-015-27286
5. Indicate Type of Lease STATE <input checked="" type="checkbox"/> FEE <input type="checkbox"/>
6. State Oil & Gas Lease No. E-379-4
7. Lease Name or Unit Agreement Name Chalk Bluff 36 State
8. Well No. 1
9. Pool name or Wildcat Logan Draw Wolfcamp

WELL COMPLETION OR RECOMPLETION REPORT AND LOG					
1a. Type of Well: OIL WELL <input checked="" type="checkbox"/> GAS WELL <input type="checkbox"/> DRY <input type="checkbox"/> OTHER <input type="checkbox"/>					
b. Type of Completion: NEW WELL <input type="checkbox"/> WORK OVER <input type="checkbox"/> DEEPEN <input type="checkbox"/> PLUG BACK <input checked="" type="checkbox"/> DIFF RESVR <input type="checkbox"/> OTHER <input type="checkbox"/>					
2. Name of Operator Mewbourne Oil Company					
3. Address of Operator PO Box 5270, Hobbs, New Mexico 88241					
4. Well Location Unit Letter <u>M</u> : <u>660</u> Feet From The <u>South</u> Line and <u>990</u> Feet From The <u>West</u> Line Section <u>36</u> Township <u>17S</u> Range <u>28E</u> NMPM Eddy County					
10. Date Spudded 02/03/93	11. Date T.D. Reached 03/19/93	12. Date Compl. (Ready to Prod.) 07/17/01	13. Elevations (DF & RKB, RT, GR, etc.) 3635' GL	14. Elev. Casinghead 3635'	
15. Total Depth 10060	16. Plug Back T.D. 8300	17. If Multiple Compl. How Many Zones?	18. Intervals Drilled By all	Rotary Tools	Cable Tools
19. Producing Interval(s), of this completion - Top, Bottom, Name 7164-7277					20. Was Directional Survey Made No
21. Type Electric and Other Logs Run CBL, DN & DLL					22. Was Well Cored No

CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB/FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13 3/8"	48#	399'	17 1/2"	530 sks	N/A
9 5/8"	36#	2603'	12 1/4"	1150 sks	N/A
7"	26#	9253	8 3/4"	1620 sks	N/A

24. LINER RECORD					25. TUBING RECORD		
SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN	SIZE	DEPTH SET	PACKER SET
4 1/2"	8439'	10057'	225		2 7/8"	7352	TAC @ 7190'

26. Perforation record (interval, size, and number) 7164-7277'. 58 .38" diameter holes	27. ACID, SHOT, FRACTURE, CEMENT, SQUEEZE, ETC.	
	DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
	7164-7277	5000 gals 20% Ne-Fe & ball sealers

28. PRODUCTION							
Date First Production 07/17/01		Production Method (Flowing, gas lift, pumping - Size and type pump) Pumping. 2" x 1 1/2" x 24'				Well Status (Prod. or Shut-in) Producing	
Date of Test 07/22/01	Hours Tested 24	Choke Size N/A	Prod'n For Test Period	Oil - BbL. 88	Gas - MCF 88	Water - BbL. 78	Gas - Oil Ratio 1000
Flow Tubing Press. N/A	Casing Pressure 35	Calculated 24-Hour Rate	Oil - BbL. 88	Gas - MCF 88	Water - BbL. 78	Oil Gravity - API - (Corr.) 38	

29. Disposition of Gas (Sold, used for fuel, vented, etc.) Sold	Test Witnessed By J. Capps
--	-------------------------------

30. List Attachments C-103 & C104.

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

Signature A. M. Young Printed Name N.M. Young Title District Manager Date 08/24/01

This form is to be filed with the appropriate District Office of the Division not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all specific tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 25 through 29 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

Southeastern New Mexico

Northwestern New Mexico

T. Anhy _____	T. Canyon _____ 8327.0	T. Ojo Alamo _____	T. Penn. "B" _____
T. Salt _____	T. Strawn _____ 8820.0	T. Kirtland-Fruitland _____	T. Penn. "C" _____
B. Salt _____	T. Atoka _____ 9380.0	T. Pictured Cliffs _____	T. Penn. "D" _____
T. Yates _____ 328.0	T. Miss _____ 10040.0	T. Cliff House _____	T. Leadville _____
T. 7 Rivers _____ 464.0	T. Devonian _____	T. Menefee _____	T. Madison _____
T. Queen _____ 1008.0	T. Silurian _____	T. Point Lookout _____	T. Elbert _____
T. Grayburg _____ 1360.0	T. Montoya _____	T. Mancos _____	T. McCracken _____
T. San Andres _____ 1785.0	T. Simpson _____	T. Gallup _____	T. Ignacio Otzte _____
T. Glorieta _____ 3155.0	T. McKee _____	Base Greenhorn _____	T. Granite _____
T. Paddock _____	T. Ellenburger _____	T. Dakota _____	T. _____
T. Blinebry _____	T. Gr. Wash _____	T. Morrison _____	T. _____
T. Tubb _____ 4025.0	T. Delaware Sand _____	T. Todilto _____	T. _____
T. Drinkard _____ 4855.0	T. Bone Springs _____	T. Entrada _____	T. _____
T. Abo _____ 5120.0	T. Morrow _____ 9494.0	T. Wingate _____	T. _____
T. Wolfcamp _____ 6702.0	T. _____	T. Chinle _____	T. _____
T. Penn _____ 8210.0	T. _____	T. Permian _____	T. _____
T. Cisco (Bough C) _____	T. _____	T. Penn. "A" _____	T. _____

OIL OR GAS SANDS OR ZONES

No. 1, from _____ to _____

No. 2, from _____ to _____

No. 3, from _____ to _____

No. 4, from _____ to _____

IMPORTANT WATER SANDS

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

No. 1, from to feet

No. 2, from to feet

No. 3, from to feet

LITHOLOGY RECORD (Attach additional sheet if necessary)[illegible]

OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

☐ AMENDED REPORT

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

Operator Name and Address Mewbourne Oil Company PO Box 5270 Hobbs, N.M. 88241 505-393-5905		OGRID Number 14744
Property Name Chalk Bluff 36 State 1		API Number 30 - 015-27286
Property Code 7871	Well No. 1	

Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West Line	County
M	36	17S	26E		660	S	990	W	Eddy

Proposed Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West Line	County
Proposed Pool 1					Proposed Pool 2				

Work Type Code P	Well Type Code G	Cable/Rotary R	Lease Type Code S	Ground Level Elevation 3625
Multiple	Proposed Depth 9400	Formation Canyon/Wolfcamp	Contractor TBA	Spud Date

Proposed Casing and Cement Program

Hole Size	Casing Size	Casing weight/foot	Setting Depth	Sacks of Cement	Estimated TOC

Describe the proposed program. If this application is to DEEPEN or PLUG BACK give the data on the present productive zone and proposed new productive zone. Describe the blowout prevention program, if any. Use additional sheets if necessary.

This well has been producing from the Morrow & Atoka formations. Mewbourne Oil Company would like to set a CIBP 100' above top perforations. Cap CIBP w/ 35' cement. Attempt a completion in the Canyon @ +/- 8550'. If results warrant, Mewbourne Oil Company would like to test the Wolfcamp @ +/- 7200'.

During operations of plugback & testing, a 7 1/16 x 3000 psi BOP w/ 2 3/8" rams & blinds will be used.

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

Signature:

Printed name:

N.M. Young

Title: District Manager

OIL CONSERVATION DIVISION

Approved By:

Title:

Approval Date:

AUG 29 2001

Expiration Date:

AUG 29 2002

OIL CONSERVATION DIVISION

P.O. Box 2088

Santa Fe, New Mexico 87504-2088

DISTRICT I

P.O. Box 1980, Hobbs, NM 88240

DISTRICT II

P.O. Drawer DD, Artesia, NM 88210

DISTRICT III

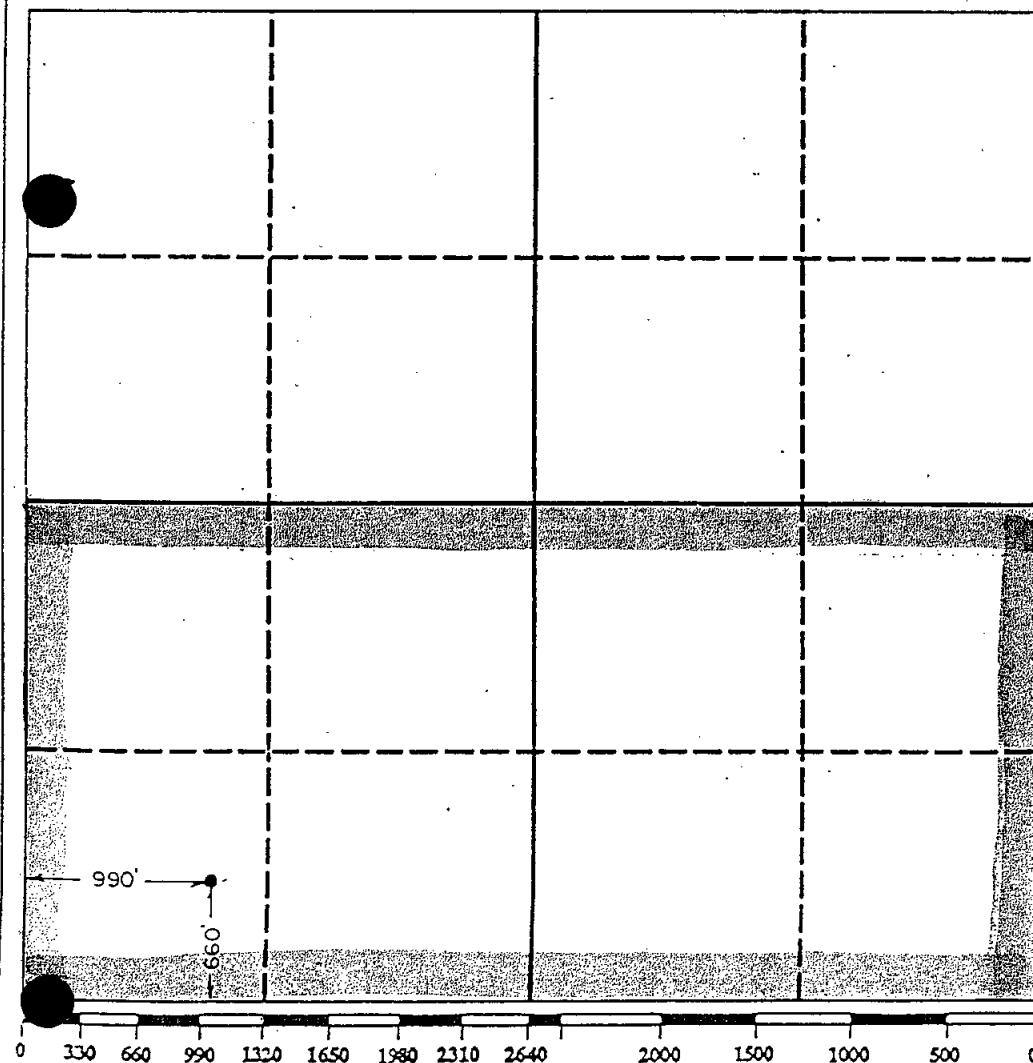
1000 Rio Brazos Rd., Aztec, NM 87410

WELL LOCATION AND ACREAGE DEDICATION PLAT

All Distances must be from the outer boundaries of the section

Operator MEWBOURNE OIL COMPANY			Lease CHALK BLUFF 36 STATE		Well No. 1
Unit Letter M	Section 36	Township 17 SOUTH	Range 27 EAST	NMPM	County EDDY
Actual Footage Location of Well: 990 feet from the WEST line and 660 feet from the SOUTH line					
Ground level Elev. 3635		Producing Formation Illinois Camp Morrow North		Dedicated Acreage: 320 Acres	

1. Outline the acreage dedicated to the subject well by colored pencil or hatchure marks on the plat below.
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).
3. If more than one lease of different ownership is dedicated to the well, have the interest of all owners been consolidated by communitization, unitization, force-pooling, etc?
☒ Yes ☐ No If answer is "yes" type of consolidation Communitization
If answer is "no" list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary).
No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interest, has been approved by the Division.



OPERATOR CERTIFICATION

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

Signature

Bill Pierce

Printed Name

Bill Pierce

Position

Drilling Superintendent

Company

Mewbourne Oil Company

Date

October 27, 1992

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed

10/19/92

Signature & Seal of
Professional Surveyor

Herschel Jones
Certificate No. 3640

DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

OIL CONSERVATION DIVISION

2040 Pacheco St.
Santa Fe, NM 87505

WELL API NO. 30-015-27286
Indicate Type of Lease STATE <input checked="" type="checkbox"/> FEE <input type="checkbox"/>
State Oil & Gas Lease No. E-379-4

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

Type of Well:
OIL WELL ☐ GAS WELL ☒ OTHER

Name of Operator
Mewbourne Oil Company /

Address of Operator
PO Box 5270, Hobbs, New Mexico 88241

Lease Name or Unit Agreement Name
Chalk Bluff 36 State

Well No.
1

Pool name or Wildcat
Logan Draw Atoka

Well Location
Unit Letter M : 660 Feet From The South Line and 990 Feet From The West Line
Section 36 Township 17S Range R28E NMPM Eddy County

Elevation (Show whether DF, RKB, RT, GR, etc.)
3635' GL

Check Appropriate Box to Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK ☐ PLUG AND ABANDON ☐
TEMPORARILY ABANDON ☐ CHANGE PLANS ☐
PULL OR ALTER CASING ☐
OTHER: ☐

SUBSEQUENT REPORT OF:

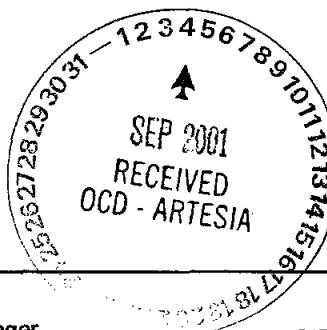
REMEDIAL WORK ☐ ALTERING CASING ☐
COMMENCE DRILLING OPNS. ☐ PLUG AND ANBANDONMENT ☐
CASING TEST AND CEMENT JOB ☐
OTHER: PB Atoka. Test & plug off Canyon. Test & Produce Wolfcamp ☒

Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 1103.

6/28/01... POOH w/ tbg. RIH w/ 4 1/2" CIBP & set @ 9400'. Dump 35' cement on plug. New PBTD @ 9365'. Test to 1000 psi. OK. Perforate Canyon @ 8528-72' (12'. 2 spf. 24 holes). Acidize w/ 2100 gals 20% Ne-Fe & ball sealers. Swab test.

7/05/01...POOH. RIH & set 7" RBP @ 8300'. Load & test to 1000 psi. OK. New PBTD @ 8300'. Perforate Wolfcamp @ 7164-7277' (29'. 2 spf. 58 holes). GIH w/ tbg. Acidize perms w/ 5000 gals 20% Ne-Fe & ball sealers. Swab test.

7/16/01...POOH w/ test equipment. Run tbg & rods & put well on production.



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

SIGNATURE N.M. Young
TYPE OR PRINT NAME N.M. Young

TITLE District Manager

DATE 08-24-01

TELEPHONE NO. 505-393-5905

(This space for State Use)

APPROVED BY

Jim W. Gunn

TITLE

District Supervisor

DATE

SEP 6 2001

CONDITIONS OF APPROVAL, IF ANY:



NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
DISTRICT II ARTESIA
811 S. FIRST ST. ARTESIA, NM 88210
(505) 748-1283
FAX (505) 748-9720

Jennifer A. Salisbury
CABINET SECRETARY

January 28, 2000

Mewbourne Oil Company
P.O. Box 5270
Hobbs, NM 88241

Re: **Well Placed In Pool**

Gentlemen/Madams:

As the result of Division Order 11300, the following described gas well has been placed in the pool shown below. This change in nomenclature has been made in our files. Please change your records to reflect the proper pool name. All subsequent reports must show this nomenclature until further notice.

Logan Draw; Atoka, Southeast Gas Pool
Chalk Bluff '36' State #1
Unit M, Section 36, Township 17 South, Range 27 East, NMPM
Poolcode: 96979

Transporters are advised by copy of this letter, to change their records to reflect the pool name as established by this order, effective October 1, 1999.

Sincerely,

Bryan Arrant
District Geologist

Cc: Amoco Pipeline Company
Transwestern Pipeline Company
Santa Fe
Mae
Well File

Submit in duplicate to
appropriate district office
See Rule 401 & Rule 1122

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-122
Revised 4-1-91

OIL CONSERVATION DIVISION

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

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Operator <input checked="" type="checkbox"/> Mewbourne Oil Company				Lease or Unit Name Chalk Bluff 36 State			
Type Test <input checked="" type="checkbox"/> Initial <input type="checkbox"/> Annual <input type="checkbox"/> Special				Test Date 10/27/99		Well No. 1	
Completion Date 10/16/99		Total Depth 10060		Plug Back TD 9780		Elevation 3563' GL	
Csg. Size 4 1/2		Wt. 11.35		d 4.000		Set At 10060	
Tbg. Size 2 3/8		Wt. 4.6		d 1.995		Set At 9385	
Type Well - Single - Bradenhead - G.G. or G.O. Multiple Single				Packer Set At 9385		Formation Atoka	
Producing Thru Tbg		Reservoir Temp. °F 60		Mean Annual Temp. °F 60		Baro. Press - P 13.2	
L 9385		H 9385		Gg 0.696		% CO ₂ 4.586	
				% N ₂ 0.788		% H ₂ S	
				Prover		Meter Run 3.068	
						Taps FLG	

FLOW DATA						TUBING DATA		CASING DATA		Duration of Flow
NO.	Prover Line Size	X Orifice Size	Press. p.s.i.g.	Diff. h _w	Temp. °F	Press. p.s.i.g.	Temp. °F	Press. p.s.i.g.	Temp. °F	
SI						1385		PACKER		24 hrs
1.	3.068	x 0.875	28	10.00	60	1319		"		1 hr
2.	3.068	x 0.875	27	32.00	70	1249		"		1 hr
3.	3.068	x 0.875	27	60.00	77	1165		"		1 hr
4.	3.068	x 0.875	29	95.00	68	1055		"		1 hr
5.										

RATE OF FLOW CALCULATIONS							
NO.	COEFFICIENT (24 HOUR)	$h_w P_m$	Pressure P _m	Flow Temp. Factor Ft.	Gravity Factor Fg.	Super Compress. Factor, F _{pv}	Rate of Flow Q, Mcfd
1.	3.650	20.30	41.2	1.000	1.199	1.004	89
2.	3.650	35.87	40.2	.9905	1.199	1.004	156
3.	3.650	49.11	40.2	.9840	1.199	1.004	212
4.	3.650	63.32	42.2	.9924	1.199	1.004	276
5.							

NO.	P _r	Temp. °R	T _r	Z	Gas Liquid Hydrocarbon Ratio	Dry Gas	Mcf/bbl.
1.	.06	520	1.36	.993	A.P. I. Gravity of Liquid Hydrocarbons	Dry	Deg.
2.	.06	530	1.39	.993	Specific Gravity Separator Gas	.696	XXXXXXXXXX
3.	.06	537	1.40	.993	Specific Gravity Flowing Fluid	XXXXXX	
4.	.06	528	1.38	.993	Critical Pressure * 652	P.S.I.A.	P.S.I.A.
5.					Critical Temperature * 381	R	R

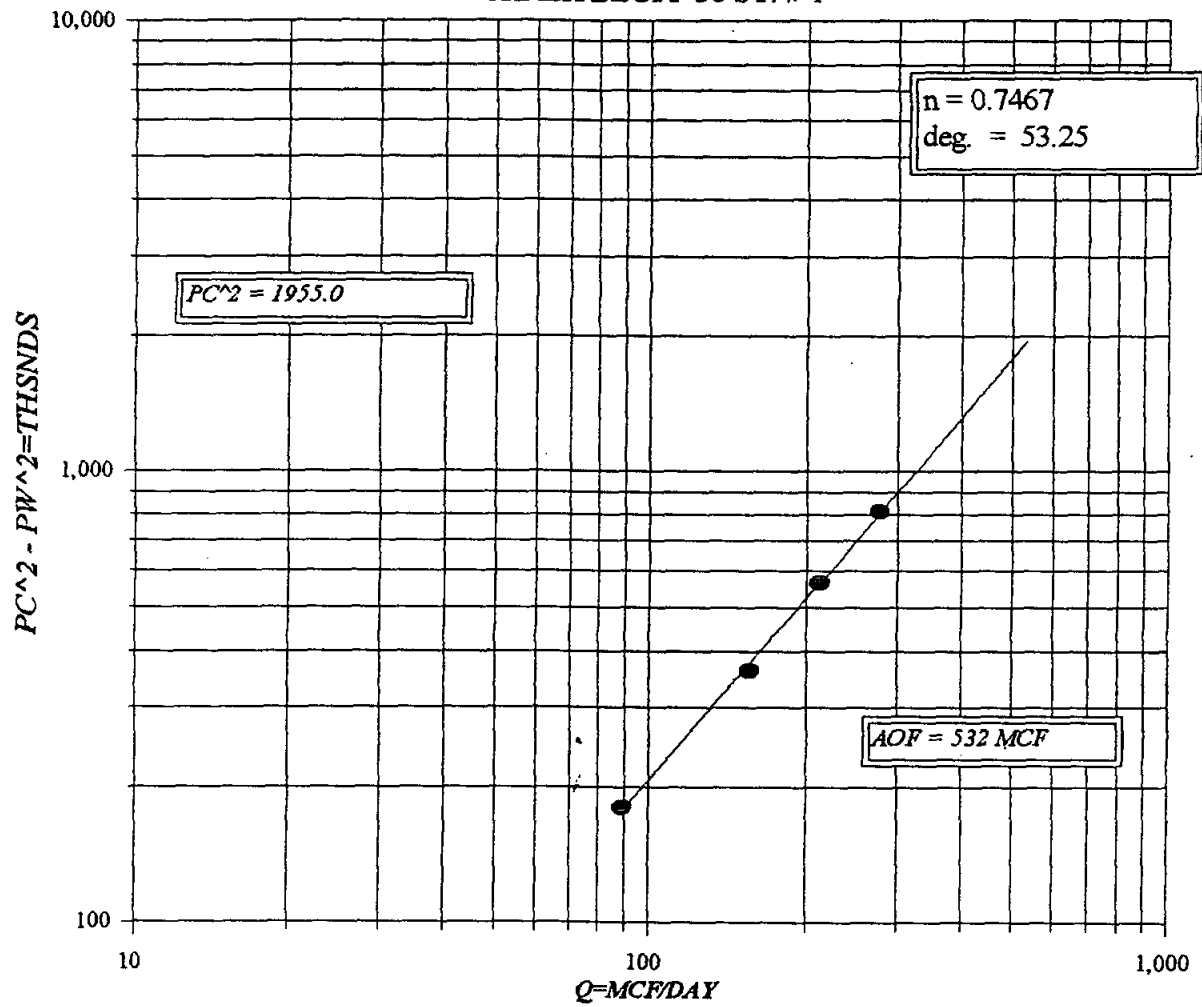
P _c 1398.2	P _c 1955.00						
NO.	P _i ²	P _w	P _w ²	P _c ² - P _w ²	1) $\frac{P_c^2}{P_c^2 - P_w^2} = 2.409$	(2) $\left[\frac{P_c^2}{P_c^2 - P_w^2} \right]^n = 1.928$	
1.		1332.3	1775.0	180.0			
2.		1262.5	1593.9	361.1			
3.		1178.8	1389.5	565.5			
4.		1069.3	1143.4	811.6			
5.							

Absolute Open Flow 532	Mcf @ 15.025	Angle of Slope θ 53.25	Slope, n .7467
------------------------	--------------	------------------------	----------------

Remarks: Well produced no fluid
* Corrected to 4.586% CO₂

Approved By Division	Conducted By: Jarrel Services, Inc.	Calculated By: Bob Murray	Checked By: Bob Murray
----------------------	-------------------------------------	---------------------------	------------------------

MEWBOURNE OIL COMPANY
CHALK BLUFF 36 ST. # 1



UNIT : M		SECTION : 36		TOWNSHIP : 17		Pc = 1398.2		Pc2 = 1955.0 *	
L :	9385	H :	9385	L/H :	1	G/GMIX :	0.696	Pt2 = 1774.8	Pw = 1332.3 *
%CO2 :	4.586	%N2 :	0.788	H2S :		DATE :	10 27 99	1593.1	1262.5 *
d :	1.995	Fr :	0.018231	GH :	6532.0	RANGE :	27	1388.2	1178.8 *
								1141.1	1069.3 *
									*
VOL 1 :	89	PSIA 1 :	1332.2	RESV.TEMP	167.9	Pc2-Pw2=	180.0	Pw2 =	1775.0 *
VOL 2 :	156	PSIA 2 :	1262.2				361.1		1593.9 *
VOL 3 :	212	PSIA 3 :	1178.2	SHUT-IN PR=	1398.2		565.5		1389.5 *
VOL 4 :	276	PSIA 4 :	1068.2				811.6		1143.4 *
									*
								n =	0.747
									*
								Pc2/(Pc2-Pw2) =	10.862
									5.414
									3.457
									2.409 ✓
									*
								[Pc2/Pc2-Pw2]n =	5.936
									3.529
									2.525
									1.928 ✓
									*
								AOF= Q	0.528
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DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

OIL CONSERVATION DIVISION

2040 Pacheco St.
Santa Fe, NM 87505

WELL API NO.

30-015-27286

Indicate Type of Lease

STATE ☒

FEE ☐

State Oil & Gas Lease No.

E-379-4

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A
DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT"
(FORM C-101) FOR SUCH PROPOSALS.)

Lease Name or Unit Agreement Name

Chalk Bluff 36 State

Type of Well:

OIL

WELL ☐

GAS

WELL ☒

OTHER

Name of Operator

Mewbourne Oil Company

Well No.

1

Address of Operator

PO Box 5270, Hobbs, New Mexico 88240

Pool name or Wildcat

Wildcat Atoka

Well Location

Unit Letter M 660 Feet From The South Line and 990 Feet From The West Line

Section 36 Township 17s Range 27e NMPM Eddy County

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

3625 GL

11

Check Appropriate Box to Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK ☐

PLUG AND ABANDON ☐

TEMPORARILY ABANDON ☐

CHANGE PLANS ☐

PULL OR ALTER CASING ☐

OTHER: ☐

SUBSEQUENT REPORT OF:

REMEDIAL WORK ☐

ALTERING CASING ☐

COMMENCE DRILLING OPNS. ☐

PLUG AND ANBANDONMENT ☐

CASING TEST AND CEMENT JOB ☐

OTHER: Test Atoka ☒

Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 1103.

9-21-99...POOH w/ Tbg.

9-22-99...Set RBP over Morrow perms. Perforate Atoka perms @ 9466-84. GIH w/ Pkr & tbg.

9-24-99...Acidize new Atoka perms w/ 3000 gals 7 1/2% HCL adding N2 w/ Ball Sealers. Swab & Flow test.

10-16-99...Frac Atoka perms w/ 30,000 gals 70 Quality Foam using 10,000 lbs 20/40 Interprop. Flow back & clean-up

10-19-99...Turn to sales.



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

SIGNATURE

TITLE

DATE 11-01-99

TYPE OR PRINT NAME

NM Young

TELEPHONE NO. 393-5405

(This space for State Use)

APPROVED BY

TITLE

DATE

11-5-99

CONDITIONS OF APPROVAL, IF ANY:

District I
PO Box 1980, Hobbs, NM 88241-1980

District II
811 South First, Artesia, NM 88210

District III
1000 Rio Brazos Rd., Aztec, NM 87410

District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

354
SP
Form C-10
Revised October 18, 199
Instructions on back
Submit to Appropriate District Office
5 Copies
☒ AMENDED REPORT

I. REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT

¹ Operator name and Address Mewbourne Oil Company ✓ P. O. Box 5270 Hobbs, NM 88241		² OGRID Number 14744
		³ Reason for Filing Code Plug Back
⁴ API Number 30 - 0 15-27286	⁵ Pool Name Wildcat Aroka Gas Pool Logan Draw, Aroka, SE	⁶ Pool Code 96979
⁷ Property Code 7871	⁸ Property Name Chalk Bluff "36" State	⁹ Well Number 1

II. ¹⁰ Surface Location

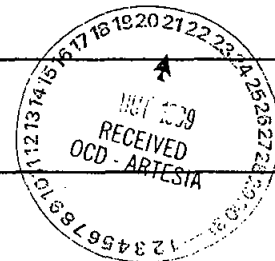
UI or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South Line	Feet from the	East/West line	County
M	36	17S	27E		660	South	990	West	Eddy

¹¹ Bottom Hole Location

UI or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South Line	Feet from the	East/West line	County
¹² Lse Code	¹³ Producing Method Code Flowing	¹⁴ Gas Connection Date 10/24/94	¹⁵ C-129 Permit Number	¹⁶ C-129 Effective Date	¹⁷ C-129 Expiration Date				

III. Oil and Gas Transporters

¹⁸ Transporter OGRID	¹⁹ Transporter Name and Address	²⁰ POD	²¹ O/G	²² POD ULSTR Location and Description
138648	Amoco Pipeline Company Tulsa, OK	1923810	O	
000990	Transwestern Pipeline Company Houston, TX	2819523	G	



IV. Produced Water

²³ POD	²⁴ POD ULSTR Location and Description
1923850	

V. Well Completion Data

²⁵ Spud Date	²⁶ Ready Date	²⁷ TD	²⁸ PBTD	²⁹ Perforations	³⁰ DHC, DC, MC
02/03/93	09/24/99	10060	9780	9466-9484'	
³¹ Hole Size	³² Casing & Tubing Size	³³ Depth Set	³⁴ Sacks Cement		
17-1/2"	13-3/8"	399'	530		
12-1/4"	9-5/8"	2603'	1150		
8-3/4"	7"	9253'	1620		
6-1/8"	4-1/2"	10057'	225		

VI. Well Test Data

³⁵ Date New Oil	³⁶ Gas Delivery Date	³⁷ Test Date	³⁸ Test Length	³⁹ Tbg. Pressure	⁴⁰ Csg. Pressure
09/24/99	09/24/99	10/18/99	24 hours	45	Packer
⁴¹ Choke Size	⁴² Oil	⁴³ Water	⁴⁴ Gas	⁴⁵ AOF	⁴⁶ Test Method
24/64"	2	2	317		Sold

⁴⁷ I hereby certify that the rules of the Oil Conservation Division have been complied with and that the information given above is true and complete to the best of my knowledge and belief.		OIL CONSERVATION DIVISION	
Signature: <i>Jeffrey Elgin</i>		Approved by: <i>Jim W. Green</i>	
Printed name: Jeff Elgin		Title: District Supervisor	
Title: District Manager		Approval Date: 10-27-99	
Date: 10/20/99	Phone: 505-393-5905		
⁴⁸ If this is a change of operator fill in the OGRID number and name of the previous operator			
Previous Operator Signature	Printed Name	Title	Date

Submit to Appropriate
District Office
State Lease - 6 copies
Fee Lease - 5 copies
DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-105
Revised 1-1-89

SF

OIL CONSERVATION DIVISION

2040 Pacheco St
Santa Fe, NM 87505

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd, Aztec, NM 87410

WELL API NO.
30-015-27286

5. Indicate Type of Lease
STATE ☒ FEE ☐

6. State Oil & Gas Lease No.
E-379-4

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

1a. Type of Well:
OIL WELL ☐ GAS WELL ☒ DRY ☐ OTHER ☐
b. Type of Completion:
NEW WELL ☐ WORK OVER ☐ DEEPEN ☐ PLUG BACK ☒ DIFF RESVR ☐ OTHER ☐

2. Name of Operator
Mewbourne Oil Company

3. Address of Operator
P. O. Box 5270, Hobbs, NM 88241

4. Well Location
Unit Letter M 660 Feet From The South Line and 990 Feet From The West Line
Section 36 Township 17S Range 27E NMPM Eddy County

10. Date Spudded 02/03/93 11. Date T.D. Reached 03/19/93 12. Date Compl. (Ready to Prod.) 09/24/99 13. Elevations (DF & RKB, RT, GR, etc.) 3635' GR 14. Elev. Casinghead 3635'

15. Total Depth 10060' 16. Plug Back T.D. 9780' 17. If Multiple Compl. How Many Zones? NA 18. Intervals Drilled By Rotary Tools ☒ Cable Tools ☐

19. Producing Interval(s), of this completion - Top, Bottom, Name
9466-9470' & 9476-9484', Atoka 20. Was Directional Survey Made
No

21. Type Electric and Other Logs Run
DIL 22. Was Well Cored
No

CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB/FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8"	48#	399'	17-1/2"	530 sks Class C	None
9-5/8"	36#	2603'	12-1/4"	1150 sks Class C	None
7"	26#	9253'	8-3/4"	1620 sks Class H	None

LINER RECORD				TUBING RECORD		
SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN	SIZE	DEPTH SET
4-1/2"	8439'	10057'	225		2-3/8"	9407'

26. Perforation record (interval, size, and number) <u>9466-9484', 0.44" entry hole diameter, 56 holes total</u>			27. ACID, SHOT, FRACTURE, CEMENT, SQUEEZE, ETC.		
			DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED	
			<u>9466-9484'</u>	<u>Fracture stimulated with 10000# IP 20/40</u>	

28. PRODUCTION

Date First Production <u>09/24/99</u>		Production Method (Flowing, gas lift, pumping - Size and type pump) <u>Flowing</u>				Well Status (Prod. or Shut-in) <u>Producing</u>	
Date of Test <u>10/18/99</u>	Hours Tested <u>24</u>	Choke Size <u>24/64"</u>	Prod'n For Test Period	Oil - BbL. <u>2</u>	Gas - MCF <u>317</u>	Water - BbL. <u>2</u>	Gas - Oil Ratio <u>158500</u>
Flow Tubing Press. <u>45</u>	Casing Pressure <u>Packer</u>	Calculated 24-Hour Rate	Oil - BbL. <u>2</u>	Gas - MCF <u>317</u>	Water - BbL. <u>2</u>	Oil Gravity - API - (Corr.) <u>63.8</u>	

29. Disposition of Gas (Sold, used for fuel, vented, etc.)
Sold Test Witnessed By
Mr. Miller

30. List Attachments

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

Signature

Jerry Elgin

Printed Name

Jerry Elgin

Title

District Manager

Date

10/19/99

District I
PO Box 1980, Hobbs, NM 88241-1980

District II
811. South First, Artesia, NM 88210

District III
1000 Rio Brazos Rd., Aztec, NM 87410

District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department

Form C-101
Revised October 18, 1994
Instructions on back
Submit to Appropriate District Office
State Lease - 6 Copies
Fee Lease - 5 Copies

OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

☒ AMENDED REPORT

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUG BACK, OR ADD A ZONE

Operator Name and Address Mewbourne Oil Company P. O. Box 5270 Hobbs, NM 88241		OGRID Number 14744
Property Code 7871		API Number 30 - 015-27286
Property Name Chalk Bluff "36" State		Well No. 1

Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West Line	County
M	36	17S	27E		660	South	990	West	Eddy

Proposed Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West Line	County
Proposed Pool 1 Atoka Gas Pool					Proposed Pool 2				

Work Type Code P	Well Type Code G	Cable/Rotary R	Lease Type Code S	Ground Level Elevation 3635
Multiple No	Proposed Depth 10060	Formation Atoka	Contractor Key Energy Services	Spud Date 09-15-99

Proposed Casing and Cement Program

Hole Size	Casing Size	Casing weight/foot	Setting Depth	Sacks of Cement	Estimated TOC
17-1/2"	13-3/8"	48#	399	530	Surface
12-1/4"	9-5/8"	36#	2603	1150	Surface
8-3/4"	7"	26#	9253	1620	Surface
6"	4-1/2" Liner	11.6#	10057	225	TOL @ 8439'

Describe the proposed program. If this application is to DEEPEN or PLUG BACK give the data on the present productive zone and proposed new productive zone. Describe the blowout prevention program, if any. Use additional sheets if necessary.

- Temporarily abandon Morrow perforations 9842-9856' and 9864-9886' by setting a cast iron bridge plug at 9800' and dumping 20' cement plug on top.
- Test the Atoka Formation through perforations 9442-9446' and 9452-9464'.
- File for commingling permit if well conditions warrant.

6" 5000 psi WP dual hydraulic BOP's will be utilized on this project. Any produced fluids will be diverted through a 5000 psi WP adjustable choke to a steel tank via 2" steel lines

I hereby certify that the information given above is true and complete to the best of my knowledge and belief. Signature: <i>Jerry Elgin</i> Printed name: Jerry Elgin Title: District Manager		OIL CONSERVATION DIVISION Approved By: <i>Jim W. Gurn</i> Title: District Supervisor Approval Date: 8-17-99 Expiration Date: 8-17-00	
---	--	--	--

District I
PO Box 1980, Hobbs, NM 88241-1980

District II
811 South First, Artesia, NM 88210

District III
1000 Rio Brazos Rd., Aztec, NM 87410

District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

Form C-102
Revised October 18, 1994
Instructions on back
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

☒ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number 30-015-27286	2 Pool Code	3 Pool Name North Illinois Camp Atoka Gas Pool
4 Property Code	5 Property Name Chalk Bluff "36" State	6 Well Number 1
7 OGRID No. 14744	8 Operator Name Mewbourne Oil Company	9 Elevation 3635

10 Surface Location

UL or lot no. M	Section 36	Township 17S	Range 27E	Lot Idn	Feet from the 660	North/South line South	Feet from the 990	East/West Line West	County Eddy
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11 Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West Line	County
12 Dedicated Acres 320.00	13 Joint or Infill	14 Consolidation Code C	15 Order No.						

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

16	17 OPERATOR CERTIFICATION I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief Signature <u>Jerry Elgin</u> Printed Name Jerry Elgin Title District Manager Date 08-13-99
18 SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. 10-19-92 Date of Survey Signature and Seal of Professional Surveyer: Original signed by Herschel Jones Certificate Number	

Submit 3 Copies
Appropriate District Office
DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

Oil Conservation Division

State of New Mexico

Energy, Minerals and Natural Resources Department

Oil Conservation Division

P.O. Box 2088

Santa Fe, New Mexico 87504-2088

Form C-104
Revised 1-1-89
See Instructions
at Bottom of Page

REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT OIL AND NATURAL GAS

Operator Mewbourne Oil Company	Well APN No. 30-015-27286
Address P.O. Box 5270 Hobbs, New Mexico 88241	
Reason(s) for Filing (Check proper box) <input type="checkbox"/> Other (Please explain)	
New Well <input checked="" type="checkbox"/>	Change in Transporter of: Oil <input type="checkbox"/> Dry Gas <input type="checkbox"/> Casinghead Gas <input type="checkbox"/> Condensate <input type="checkbox"/>
Recompletion <input type="checkbox"/>	
Change in Operator <input type="checkbox"/>	

If change of operator give name
and address of previous operator

II. DESCRIPTION OF WELL AND LEASE

Lease Name Chalk Bluff "36" State	Well No. 1	Pool Name, Including Formation N. Illinois Camp Morrow	Kind of Lease State, 700000000000	Lease No. E-379-4
Location Unit Letter M, 990 Feet From The West Line and 660 Feet From The South Line Section 36 Township 17S Range 27E, NMPM, Eddy County				

III. DESIGNATION OF TRANSPORTER OF OIL AND NATURAL GAS

Name of Authorized Transporter of Oil <input type="checkbox"/> or Condensate <input checked="" type="checkbox"/> Amoco Pipeline ICT	Address (Give address to which approved copy of this form is to be sent) Oil Tender Dept. Box 702068 Tulsa, Ok 74170-2068					
Name of Authorized Transporter of Casinghead Gas <input type="checkbox"/> or Dry Gas <input checked="" type="checkbox"/> Transwestern Pipeline Company	Address (Give address to which approved copy of this form is to be sent) P.O. Box 1188 Houston, Texas 77251					
If well produces oil or liquids, give location of tanks.	Unit M	Sec. 36	Twp. 17S	Rge. 27E	Is gas actually connected? Yes	When? 03/30/93

If this production is commingled with that from any other lease or pool, give commingling order number:

IV. COMPLETION DATA

Designate Type of Completion - (X)	Oil Well	Gas Well	New Well	Workover	Deepen	Plug Back	Same Res'v	Diff Res'v
		X	X					
Date Spudded 02/02/93	Date Compl. Ready to Prod. 03/30/93		Total Depth 10,060'		P.B.T.D. 10,012'			
Elevations (DF, RKB, RT, GR, etc.) 3650' KB 3635' GR	Name of Producing Formation Morrow		Top Oil/Gas Pay 9,842'		Tubing Depth 9,803'			
Perforations 9842'-9856', 9864'-9886'					Depth Casing Shoe			

TUBING, CASING AND CEMENTING RECORD

HOLE SIZE	CASING & TUBING SIZE	DEPTH SET	SACKS CEMENT
17-1/2"	13-3/8"	399'	530 sx. Class "C"
12-1/4"	9-5/8"	2603'	1150 sx. Class "C"
8-3/4"	7"	9253'	1620 sx. Class "C"
6"	4-1/2" Liner	10057'	225 sx. Class "H"

V. TEST DATA AND REQUEST FOR ALLOWABLE

OIL WELL (Test must be after recovery of total volume of load oil and must be equal to or exceed top allowable for this depth or be for full 24 hours.)

Date First New Oil Run To Tank	Date of Test	Producing Method (Flow, pump, gas lift, etc.)	
Length of Test	Tubing Pressure	Casing Pressure	Choke Size
Actual Prod. During Test	Oil - Bbls.	Water - Bbls.	Gas - MCF

GAS WELL

Actual Prod. Test - MCF/D 1500	Length of Test 24 Hours	Bbls. Condensate/MMCF 6.6	Gravity of Condensate 55
Testing Method (pilot, back pr.) Back Pressure	Tubing Pressure (Shut-in) 2700#	Casing Pressure (Shut-in) Packer	Choke Size 1/4"

VI. OPERATOR CERTIFICATE OF COMPLIANCE

I hereby certify that the rules and regulations of the Oil Conservation Division have been complied with and that the information given above is true and complete to the best of my knowledge and belief.

Signature Erick W. Nelson Engineer
Printed Name Erick W. Nelson Title
Date 04/02/93 (505) 393-5905
Date April 5, 1993 Telephone No.

OIL CONSERVATION DIVISION

APR 26 1993

Date Approved _____
By ORIGINAL SIGNED BY
MIKE WILLIAMS
Title SUPERVISOR, DISTRICT II

INSTRUCTIONS: This form is to be filed in compliance with Rule 1104

- 1) Request for allowable for newly drilled or deepened well must be accompanied by tabulation of deviation tests taken in accordance with Rule 111.
- 2) All sections of this form must be filled out for allowable on new and recompleted wells.
- 3) Fill out only Sections I, II, III, and VI for changes of operator, well name or number, transporter, or other such changes.
- 4) Separate Form C-104 must be filed for each pool in multiply completed wells.

Submit to Appropriate
District Office
State Lease - 6 copies
Fee Lease - 5 copies

DISTRICT I
P.O. Box 1980, Hobbs, NM, 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-105
Revised 1-1-89

RECEIVED
OIL CONSERVATION DIVISION
P.O. Box 2088
Santa Fe, New Mexico 87504-2088
APR 15 1993

WELL API NO.

30-015-27286

5. Indicate Type of Lease

STATE ☒

FEE ☐

6. State Oil & Gas Lease No.

E-379-4

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

1a. Type of Well:

OIL WELL ☐

GAS WELL ☒

DRY ☐

OTHER ☐

b. Type of Completion:

NEW
WELL ☒

WORK
OVER ☐

DEEPEN ☐

PLUG
BACK ☐

DIFF
RESVR ☐

OTHER ☐

7. Lease Name or Unit Agreement Name

Chalk Bluff "36" State

2. Name of Operator

Mewbourne Oil Company

3. Address of Operator

P.O. Box 5270 Hobbs, New Mexico 88241

4. Well Location

Unit Letter M : 990 Feet From The West Line and 660 Feet From The South Line

Section 36

Township 17S

Range 27E

NMPM

Eddy

County

10. Date Spudded

02/02/93

11. Date T.D. Reached

03/17/93

12. Date Compl. (Ready to Prod.)

03/30/93

13. Elevations (DF& RKB, RT, GR, etc.)

3650' KB 3635' GR

14. Elev. Casinghead

3635' GR

15. Total Depth

10,060'

16. Plug Back T.D.

10,012'

17. If Multiple Compl. How
Many Zones?

2

18. Intervals
Drilled By

X

Cable Tools

19. Producing Interval(s), of this completion - Top, Bottom, Name

9842'-9886'; Lower Morrow

20. Was Directional Survey Made

Yes

21. Type Electric and Other Logs Run

SDI-DSN, DII-MSFI-GR, Sonic, CBL

22. Was Well Cored

No

CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB/FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8"	48#/ft.	399'	17-1/2"	530 sx. Class "C"	Circulated
9-5/8"	36#/ft.	2603'	12-1/4"	1150 sx. Class "C"	Circulated
7"	26#/ft.	9253'	8-3/4"	1620 sx. Class "H"	Circulated

24.

LINER RECORD

25. TUBING RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN	SIZE	DEPTH SET	PACKER SET
4-1/2"	8439'	10,057'	225 sx.		2-7/8-2-3/8"	9803'	9702'

26. Perforation record (interval, size, and number)

9842'-9856' 14' 4 spf 49 holes
9864'-9886' 22' 4 spf 80 holes

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

DEPTH INTERVAL AMOUNT AND KIND MATERIAL USED

28.

PRODUCTION

Date First Production

03/30/93

Production Method (Flowing, gas lift, pumping - Size and type pump)

Flowing

Well Status (Prod. or Shut-in)

Producing

Date of Test

03/31/93

Hours Tested

24 Hours

Choke Size

1/4"

Prod'n For
Test Period

10

Oil - Bbl.

1500

Gas - MCF

0

Water - Bbl.

150 MCF/BBL

Gas - Oil Ratio

55.0

Flow Tubing Press.

1500#

Casing Pressure

Packer

Calculated 24-
Hour Rate

10

Gas - MCF

1500

Water - BBL

0

Oil Gravity - API - (Corr.)

55.0

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

Sold

Test Witnessed By

Erick W. Nelson

30. List Attachments

Logs

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

Signature

Erick W. Nelson

Printed
Name

Erick W. Nelson

Title

Engineer

Date

04/05/93

Submit to Appropriate
District Office
State Lease - 6 copies
Fee Lease - 5 copies

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-101
Revised 1-1-89

DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

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

API NO. (assigned by OCD on New Wells)

39-316-2743-4

5. Indicate Type of Lease

STATE ☒

FEE ☐

6. State Oil & Gas Lease No.

E-379-4

7. Lease Name or Unit Agreement Name

Chalk Bluff "36" State

8. Well No.

1

9. Pool name or Wildcat

Illinois Camp Morrow North

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. Type of Work:

DRILL ☒

RE-ENTER ☐

DEEPEN ☐

PLUG BACK ☐

b. Type of Well:

OIL
WELL ☐

GAS
WELL ☒

OTHER

SINGLE
ZONE ☒

MULTIPLE
ZONE ☐

2. Name of Operator

Mewbourne Oil Company

3. Address of Operator

P.O. Box 5270 Hobbs, New Mexico 88241

4. Well Location

Unit Letter M : 990 Feet From The West Line and 660 Feet From The South Line

Section 36

Township 17S

Range 27E

NMPM

Eddy

County

10. Proposed Depth

10,300'

11. Formation

Morrow

12. Rotary or C.T.

Rotary

13. Elevations (Show whether DF, RT, GR, etc.)

3635' G.R.

14. Kind & Status Plug. Bond

Blanket on file

15. Drilling Contractor

WEK Drilling

16. Approx. Date Work will start

Jan. 31, 1993

17.

PROPOSED CASING AND CEMENT PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS OF CEMENT	EST. TOP
17-1/2"	13-3/8"	48#	400'±	400 sks.	Circ.
12-1/4"	9-5/8"	36#	2,600'±	700 sks.	Tie back into s
8-3/4"	5-1/2"	17#	10,300'±	600 sks.	Bring above top of Abo

Mud Program:

0' - 400' Spud mud w/fresh water gel, LCM as needed.
400' - 2,600' Fresh water gel & lime. LCM as needed.
2,600' - 9,200' Cut brine with lime for pH control. WL-NC.
9,200' - 10,300' Cut brine w/Drispac, salt gel, lime, soda ash and starch. Wt. 9.2-9.6 ppg, WL 10 cc or less, Vis. 32-36. Raise wt. accordingly if abnormal pressures are encountered.

BOP Program:

1500 Series Double Ram Hydraulic BOP w/900 Series Hydril from Intermediate csg. to T.D. 900 Series Hydril on Surface csg. to Intermediate csg. point. PVT system, mud-gas separator, rotating head from Wolfcamp to T.D.

Gas is not dedicated.

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: IF PROPOSAL IS TO DEEPEN OR PLUG BACK, GIVE DATA ON PRESENT PRODUCTIVE ZONE AND PROPOSED NEW PRODUCTIVE ZONE. GIVE BLOWOUT PREVENTER PROGRAM, IF ANY.

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

SIGNATURE

Bill Pierce

TITLE

Drilling Superintendent

DATE

01/18/93

TYPE OR PRINT NAME

Bill Pierce

(505)

TELEPHONE NO. 393-5905

(This space for State Use)

APPROVED BY

Mark R. H. /

TITLE

Geologist

DATE

1-19-93

CONDITIONS OF APPROVAL, IF ANY:

NOTIFY N.M.O.C.D. IN SUFFICIENT
TIME TO WITNESS CELEBRATING THE

APPROVAL VALID FOR 18 DAYS
PERMIT EXPIRES
ELECTRONIC OVERLAY

Submit to Appropriate
District Office
State Lease - 4 copies
Fee Lease - 3 copies

State of New Mexico
Energy, Minerals and Natural Resources Department

Form O-111
Revised 1-1-88

OIL CONSERVATION DIVISION

DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

P.O. Box 2088

Santa Fe, New Mexico 87504-2088

DISTRICT II
Drawer DD, Artesia, NM 88210

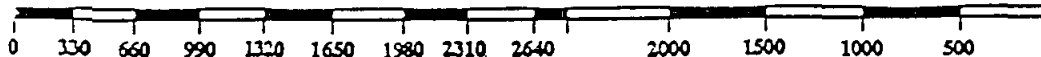
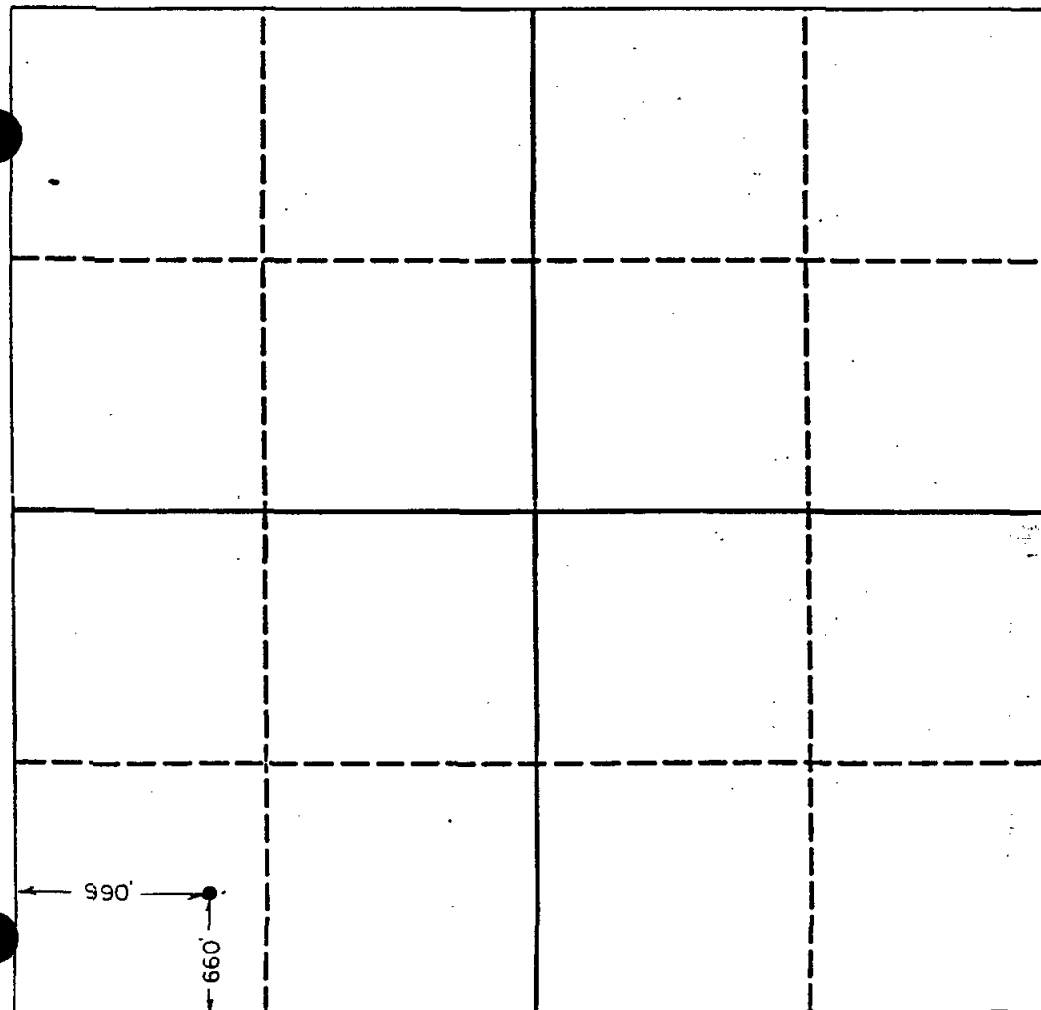
DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

WELL LOCATION AND ACREAGE DEDICATION PLAT

All Distances must be from the outer boundaries of the section

Operator MEWBOURNE OIL COMPANY			Lease CHALK BLUFF 36 STATE		Well No. 1
Unit Letter M	Section 36	Township 17 SOUTH	Range 27 EAST	County EDDY	
Actual Footage Location of Well: 990 feet from the WEST line and 660 feet from the SOUTH line					
Ground level Elev. 3635	Producing Formation Morrow		Pool Illinois Camp Morrow North		Dedicated Acreage: 320 Acres

1. Outline the acreage dedicated to the subject well by colored pencil or hatchure marks on the plat below.
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).
3. If more than one lease of different ownership is dedicated to the well, have the interest of all owners been consolidated by communitization, unitization, force-pooling, etc.?
☒ Yes ☐ No If answer is "yes" type of consolidation Communitization
If answer is "no" list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary.)
No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interest, has been approved by the Division.



OPERATOR CERTIFICATION

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

Signature

Bill Pierce

Printed Name

Bill Pierce

Position

Drilling Superintendent

Company

Mewbourne Oil Company

Date

October 27, 1992

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed

10/19/92

Signature & Seal of
Professional Surveyor

[Signature]

Certificate No. 3640

MAP ID NO. 861

NAVAJO REFINING COMPANY, WDW-2

**SEE DIVIDER LABELED
"WDW-2: OCD AND BLM FORMS"**



SUBSURFACE

Artificial Penetration Review
Number 911

OPERATOR Southwest Energy Production Co.

STATUS Active

LEASE No. Bluff 36 State Conn

DISTANCE FROM INJECTOR (FT)

WELL NUMBER 2

LOCATION 36-17S-27E, H

DATE DRILLED 4/28/01

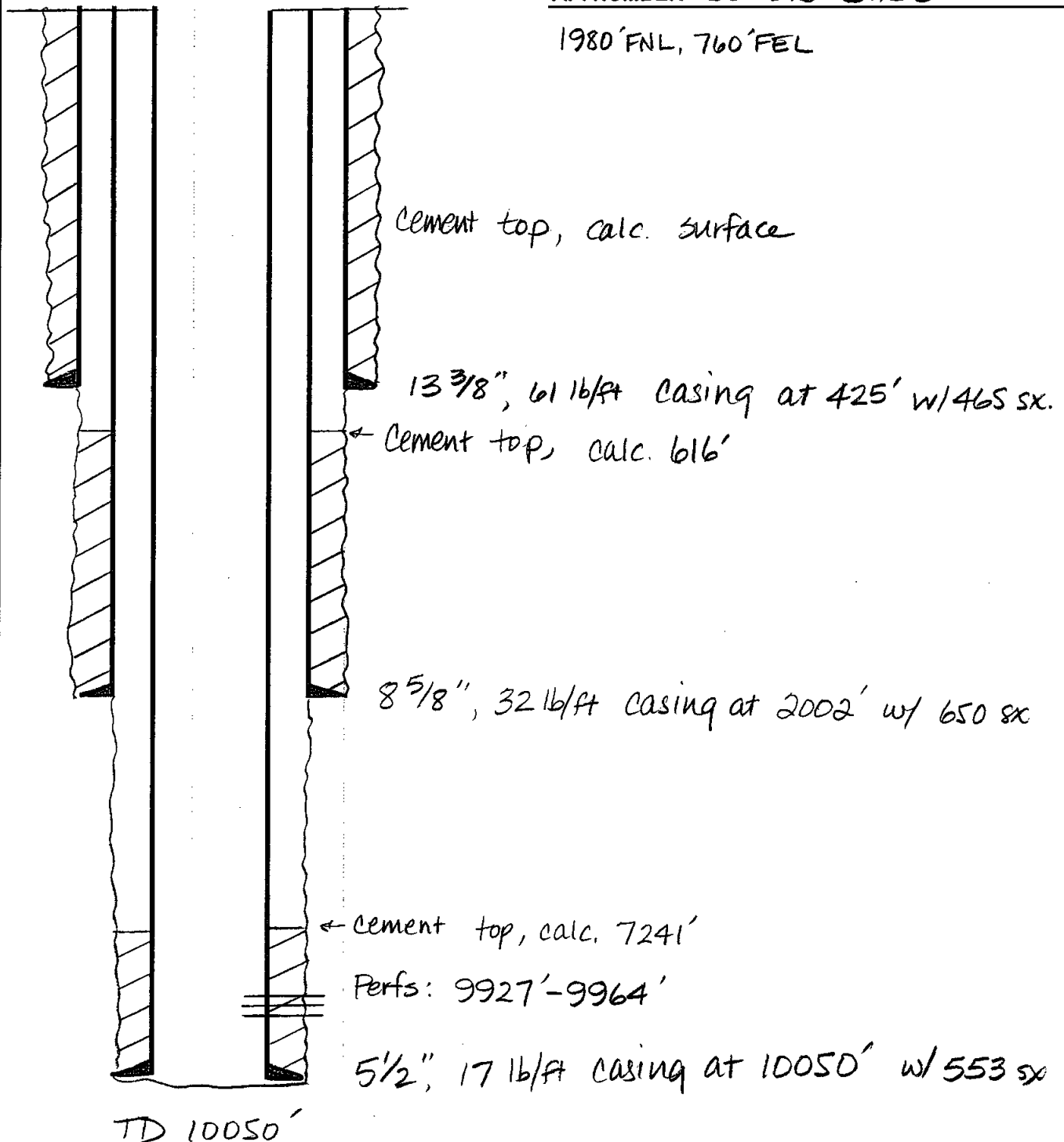
MUD FILLED BOREHOLE

DATE PLUGGED

REPORTED MUD WEIGHT

API NUMBER 30-015-31123

1980' FNL, 760' FEL



District I

1625 N. French Dr., Hobbs, NM 88240

District II

811 South First, Artesia, NM 88210

District III

1000 Rio Brazos Road, Aztec, NM 87410

District IV

2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division

2040 South Pacheco

Santa Fe, NM 87505

Form C-101

Revised March 17, 1999

Submit to appropriate District Office

State Lease - 6 Copies

Fee Lease - 5 Copies

☒ AMENDED REPORT**APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE**

¹ Operator Name and Address Southwestern Energy Production Company 2350 North Sam Houston Parkway East, Suite 300 Houston, TX 77032		² OGRID Number 148111
		³ API Number 30 - 015 - 31123
³ Property Code 25858	⁵ Property Name No Bluff "36" State Com.	⁶ Well No. 2

⁷ Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
64	36	17S	27E		1980	North	760	East	Eddy

⁸ Proposed Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
⁹ Proposed Pool 1 Wildcat (Mississippian)						¹⁰ Proposed Pool 2			

¹¹ Work Type Code N	¹² Well Type Code G	¹³ Cable/Rotary R	¹⁴ Lease Type Code S	¹⁵ Ground Level Elevation 3634
¹⁶ Multiple N	¹⁷ Proposed Depth 10,050'	¹⁸ Formation Mississippian	¹⁹ Contractor UTI	²⁰ Spud Date 04/01/01 (est.)

²¹ Proposed Casing and Cement Program

Hole Size	Casing Size	Casing weight/foot	Setting Depth	Sacks of Cement	Estimated TOC
26"	20"		40'	Ready Mix	Surface
17 - 1/2"	13 - 3/8"	61#	425'	1500	Surface
12 - 1/4"	8 5/8"	32#	2,000'	1,495	Surface
7 7/8"	5 1/2"	17#	10,100'	860	8,000'

²² Describe the proposed program. If this application is to DEEPEN or PLUG BACK, give the data on the present productive zone and proposed new productive zone. Describe the blowout prevention program, if any. Use additional sheets if necessary.

SEE ATTACHMENT

NOTE: SL changed from 1980' FNL, 660' FEL to 1980' FNL, 760' FEL

²³ I hereby certify that the information given above is true and complete to the best of my knowledge and belief. Signature: <i>Cathy Rowan</i>		OIL CONSERVATION DIVISION 1300	
Printed name: Cathy Rowan		Approved by: ORIGINAL SIGNED BY TIM W. GUM DISTRICT II SUPERVISOR	
Title: Sr. Engineering Technician		Approval Date: MAR - 8 2001	Expiration Date: MAR - 8 2002
Date: March 1, 2001	Phone: 281- 618 - 4733	Conditions of Approval: Attached <input type="checkbox"/>	

GENERAL DRILLING PROGRAM- Attachment to Form C-101

Southwestern Energy Production Company- No Bluff "36" State Com. #2
1980' FNL 760' FEL Section 36-T17S-R27E
Eddy County, New Mexico

Elevation: 3630' GR

Proposed Total Depth: 10,100'

Estimated Formation Tops

Yates	320'
7 Rivers	460'
Queen	1000'
Grayburg	1300'
San Andres 'D'	1784'
Glorieta	3160'
Wolfcamp	6470'
Strawn	8870'
Atoka	9430'
Morrow Lime	9544'
Morrow Clastics	9724'
Missippian	10,040'

Casing/Cement Program

<u>Hole Size</u>	<u>Casing Size/Weight/Grade</u>	<u>Setting Depth</u>	<u>Cement</u>	<u>Est. TOC</u>
	20" Conductor pipe	40'	ready mix	surface
17-1/2"	13-3/8" 61# J-55 ST&C	425'	550 sx 15:85 Poz: Class C + 0.25 pps D29+2% S1+2% D20	surface
12-1/4"	8-5/8" 32# J-55 ST&C	1900'	Lead: 700 sx 35:65 Poz: Class C + 6% D20+ 0.25 pps D29 Tail: 235 sx Class C+ 2% S1 +0.25 pps D29	surface
7-7/8"	5-1/2" 17# N-80 LT&C	10,050'	860 sx 50:50 Poz: Class H + 6% D44 +2% D20+0.4% D59	8000'

Drilling Fluids Program

<u>Depth</u>	<u>Mud Weight</u>	<u>Viscosity</u>	<u>Fluid Loss</u>	<u>Comments</u>
0-425'	8.4-8.6	32-34	NC	spud mud
425'-1900'	9.0-9.2	28-29	NC	cut brine water,paper,caustic
1900'-9300'	8.4-9.3	28-29	NC	cut brine,caustic,paper
9300'-10,050'	9.3-9.6	34-38	<15 cc	xantham gum, starch

Blowout Prevention Program- Attachment to Form C-101

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 South First, Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources
OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

Form C-104
Revised March 25, 1999

Submit to Appropriate District Office
5 Copies

☐ AMENDED REPORT

I. REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT

Operator name and Address Southwestern Energy Production Company 2350 N. Sam Houston Parkway East, Suite 300 - Houston, TX 77032		OGRID Number 14811
		Reason for Filing Code NW
API Number 30 - 015-31123	Pool Name Illinois Camp Illinois Camp	Pool Code 78890
Property Code 25858	Property Name No Bluff State Com.	Well Number 2

II. Surface Location

UL or lot no. H	Section 36	Township 17S	Range 27E	Lot Idn	Feet from the 1980	North/South Line North	Feet from the 760	East/West line East	County Eddy
---------------------------	----------------------	------------------------	---------------------	---------	------------------------------	----------------------------------	-----------------------------	-------------------------------	-----------------------

Bottom Hole Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
Lse Code S	Producing Method Code Flowing	Gas Connection Date 5/17/01	C-129 Permit Number	C-129 Effective Date	C-129 Expiration Date				

III. Oil and Gas Transporters

Transporter OGRID 36785	Transporter Name and Address Duke Energy Field Services	POD 2829076	O/G G	POD ULSTR Location and Description

IV. Produced Water

POD	POD ULSTR Location and Description
-----	------------------------------------

V. Well Completion Data

Spud Date 3/19/01	Ready Date 4/28/01	TD 10,050'	PBTD 10,015'	Perforations 9,927' - 9,964'	DHC, MC
Hole Size 17 1/2"	Casing & Tubing Size 13 3/8", 61#	Depth Set 425'	Sacks Cement 465		
12 1/2"	8 5/8", 32#	2,002'	650		
7 7/8"	5 1/2", 17#	10,050'	553		
	2 7/8" TBC	9,925'			

VI. Well Test Data

Date New Oil n/a	Gas Delivery Date 5/17/01	Test Date 5/19/01	Test Length 24 HRS	Tbg. Pressure 4	Csg. Pressure 0
Choke Size open	Oil 0	Water 0	Gas 250 MCF	AOF	Test Method F

I hereby certify that the rules of the Oil Conservation Division have been complied with and that the information given above is true and complete to the best of my knowledge and belief.

Signature: *Cathy Rowan*
Printed name: **Cathy Rowan**

Title: **Sr. Engineering Technician**

Date: **05/21/01**

Phone: **(281) 618-4733**

OIL CONSERVATION DIVISION

Approved by:

ORIGINAL SIGNED BY TIM W. GUM
DISTRICT II SUPERVISOR

Title:

Approval Date:

JUL 05 2001

If this is a change of operator fill in the OGRID number and name of the previous operator

Previous Operator Signature	Printed Name	Title	Date
-----------------------------	--------------	-------	------

Arrant, Bryan

From: Arrant, Bryan
Sent: Monday, July 15, 2002 1:37 PM
To: Jones, William V
Cc: Gum, Tim
Subject: RE: No Bluff "36" State Com Well No. 2 API: 30-015-31123

Will,

I briefly looked into the area surrounding the Bluff 36 State Com. #2 well and I see that there is Abo production immediately to the south of this well.

The operator should had brought cement to cover the Abo. As you indicated with operators permitting Glorieta-Yeso wells in this area, possibly cement up though these formations also. Once you issue an order, we will take steps and have SW Energy perf and squeeze their production casing to meet OCD requirements. If you have other plans or concerns, please advice.

Bryan

-----Original Message-----

From: Jones, William V
Sent: Thursday, July 11, 2002 8:50 AM
To: Gum, Tim
Cc: Arrant, Bryan; Catanach, David
Subject: No Bluff "36" State Com Well No. 2 API: 30-015-31123

Hello Tim:

I thought I would send an email with all the facts as I have found them:

This well was drilled and 5.5 inch set to 10050' (to the Mississippian) on 4/16/01. They only used 553 sx of cement and calc cement top at 7,350'. Many operators in this area to this depth have used 2 stage tools and cemented 2000 sacks total in 3 stages. I see OCD instructions in the file 5/3/2000 for the operator (Southwestern Energy Production Company) to "cover all oil, gas, and water bearing zones".

I think there are other productive zones. For instance, the Jeffers 36 St #003 (api: 30-015-31541) and other wells have been permitted to 4000' in this area with the Glorieta or SA as the objective. There is also some 500' shallow Yates production that is played out already.

The reason I found this:

I am looking at an SWD application from Mack Energy. They have drilled a new well and want to complete the Beech Federal #003 for SWD in the Abo at 5000'. The No Bluff 36 State Com #2 is in the Area of Review with cement top below the Abo.

Please let me know what action you will take on this - so I can determine how to proceed with Mack's application.

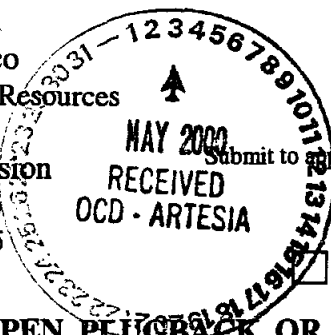
Regards,

Will Jones

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 South First, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
2040 South Pacheco
Santa Fe, NM 87505



SF 911
Form C-101
Revised March 17, 1999
Submit to appropriate District Office
State Lease - 6 Copies
Fee Lease - 5 Copies
☐ AMENDED REPORT

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUG BACK, OR ADD A ZONE

¹ Operator Name and Address Southwestern Energy Production Company 2350 North Sam Houston Parkway East, Suite 300 Houston, TX 77032		² OGRID Number 148111
		³ API Number 30 - 015 - 31123
³ Property Code 25858	⁵ Property Name No Bluff "36" State Com.	⁶ Well No. 2

⁷ Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
G	36	17S	27E		1980	North	1980	East	Eddy

⁸ Proposed Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
⁹ Proposed Pool 1 Wildcat (Mississippian)					¹⁰ Proposed Pool 2				

¹¹ Work Type Code N	¹² Well Type Code G	¹³ Cable/Rotary R	¹⁴ Lease Type Code S	¹⁵ Ground Level Elevation 3639
¹⁶ Multiple N	¹⁷ Proposed Depth 10,100'	¹⁸ Formation Mississippian	¹⁹ Contractor Patterson	²⁰ Spud Date 5/25/00 (est.)

²¹ Proposed Casing and Cement Program

Hole Size	Casing Size	Casing weight/foot	Setting Depth	Sacks of Cement	Estimated TOC
26"	20"	Minimum WOC	time 4 hrs.	Ready Mix	Surface
17 - 1/2"	13 - 3/8"	61#	425'	1500	Surface
12 - 1/4"	8 5/8"	32#	2,000'	1,495	Surface
7 7/8"	5 1/2"	17#	10,100'	860	2,000' *
* Oper. To cover all oil, gas, water bearing zones					

22 Describe the proposed program. If this application is to DEEPEN or PLUG BACK, give the data on the present productive zone and proposed new productive zone. Describe the blowout prevention program, if any. Use additional sheets if necessary.

SEE ATTACHMENT

Notify OCD at SPUD & TIME
to witness cementing the
13718" casing.

²³ I hereby certify that the information given above is true and complete to the best of my knowledge and belief. Signature: <i>Cathy Rowan</i>	OIL CONSERVATION DIVISION	
Printed name: Cathy Rowan	Approved by: <i>Jim W. Burn</i> BGA	
Title: Drilling Technician	Approval Date: MAY 03 2000	Expiration Date: MAY 03 2001
Date: May 2, 2000	Phone: 281-618-4733	Conditions of Approval: Attached <input type="checkbox"/>

GENERAL DRILLING PROGRAM- Attachment to Form C-101

Southwestern Energy Production Company- No Bluff "36" State Com. #2
1980' FNL 1980' FEL Section 36-T17S-R27E
Eddy County, New Mexico

Elevation: 3639' GR

Proposed Total Depth: 10,100'

Estimated Formation Tops

San Andres	1851'
Glorietta	3355'
Wolfcamp	6670'
Strawn	9030'
Morrow Clastics	9770'
Missippian	10,000'

Casing/Cement Program

<u>Hole Size</u>	<u>Casing Size/Weight/Grade</u>	<u>Setting Depth</u>	<u>Cement</u>	<u>Est. TOC</u>
	20" Conductor pipe	40'	ready mix	surface
17-1/2"	13-3/8" 61# J-55 ST&C	425'	1500 sx 15:85 Poz: Class C + 0.25 pps D29+2% S1+2% D20	surface
12-1/4"	8-5/8" 32# J-55 ST&C	2000'	Lead: 1260 sx 35:65 Poz: Class C + 6% D20+ 0.25 pps D29 Tail: 235 sx Class C+ 2% S1 +0.25 pps D29	surface
7-7/8"	5-1/2" 17# N-80 LT&C	10,100'	860 sx 50:50 Poz: Class H + 6% D44 +2% D20+0.4% D59	8000'

Drilling Fluids Program

<u>Depth</u>	<u>Mud Weight</u>	<u>Viscosity</u>	<u>Fluid Loss</u>	<u>Comments</u>
0-425'	8.4-8.6	32-34	NC	spud mud
425'-2000'	9.0-9.2	28-29	NC	cut brine water, paper, caustic
2000'-9300'	8.4-9.3	28-29	NC	cut brine, caustic, paper
9300'-10,100'	9.3-9.6	34-38	<15 cc	xanthan gum, starch

Blowout Prevention Program- Attachment to Form C-101

0'-425'	None
425'-2000'	20" 2000# annular preventer system.

2000'-10,100' 13-5/8" 5000# double ram type preventers, 5000# annular preventer and rotating head body. Test all rams choke manifold, kill line upper and lower kelly valves to 3000 psi. A choke manifold and 120 gallon accumulator with floor and remote operating stations and auxiliary power system.

Any equipment failing to test satisfactorily, will be repaired or replaced. Results of the BOP test will be recorded in the Driller's Log.

The BOP's will be maintained ready for use until drilling operations are completed. BOP drills will be conducted as necessary to assure that equipment is operational and each crew is properly trained to carry out emergency duties.

Accumulator shall maintain a pressure capacity reserve at all times to provide for the close-open-close sequence of the blind and pipe rams of the hydraulic preventers.

DISTRICT I
P.O. Box 1880, Hobbs, NM 88241-1880

DISTRICT II
P.O. Drawer 100, Artesia, NM 88211-0719

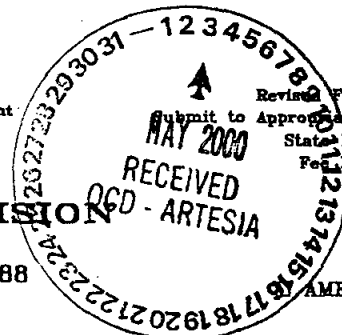
DISTRICT III
P.O. Box 100, Rio Brazos Rd., Aztec, NM 87410

DISTRICT IV
P.O. Box 2088, Santa Fe, N.M. 87504-2088

State of New Mexico
Energy, Minerals and Natural Resources Department

OIL CONSERVATION DIVISION

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



Form C-102
Revised February 10, 1994
Submit to Appropriate District Office
State Release - 4 Copies
Fee Release - 3 Copies

AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
Property Code	Property Name NO BLUFF "36" STATE COM.	Well Number 2
OGRID No.	Operator Name SOUTHWESTERN ENERGY PRODUCTION CO.	Elevation 3639

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
G	36	17 S	27 E		1980	NORTH	1980	EAST	EDDY

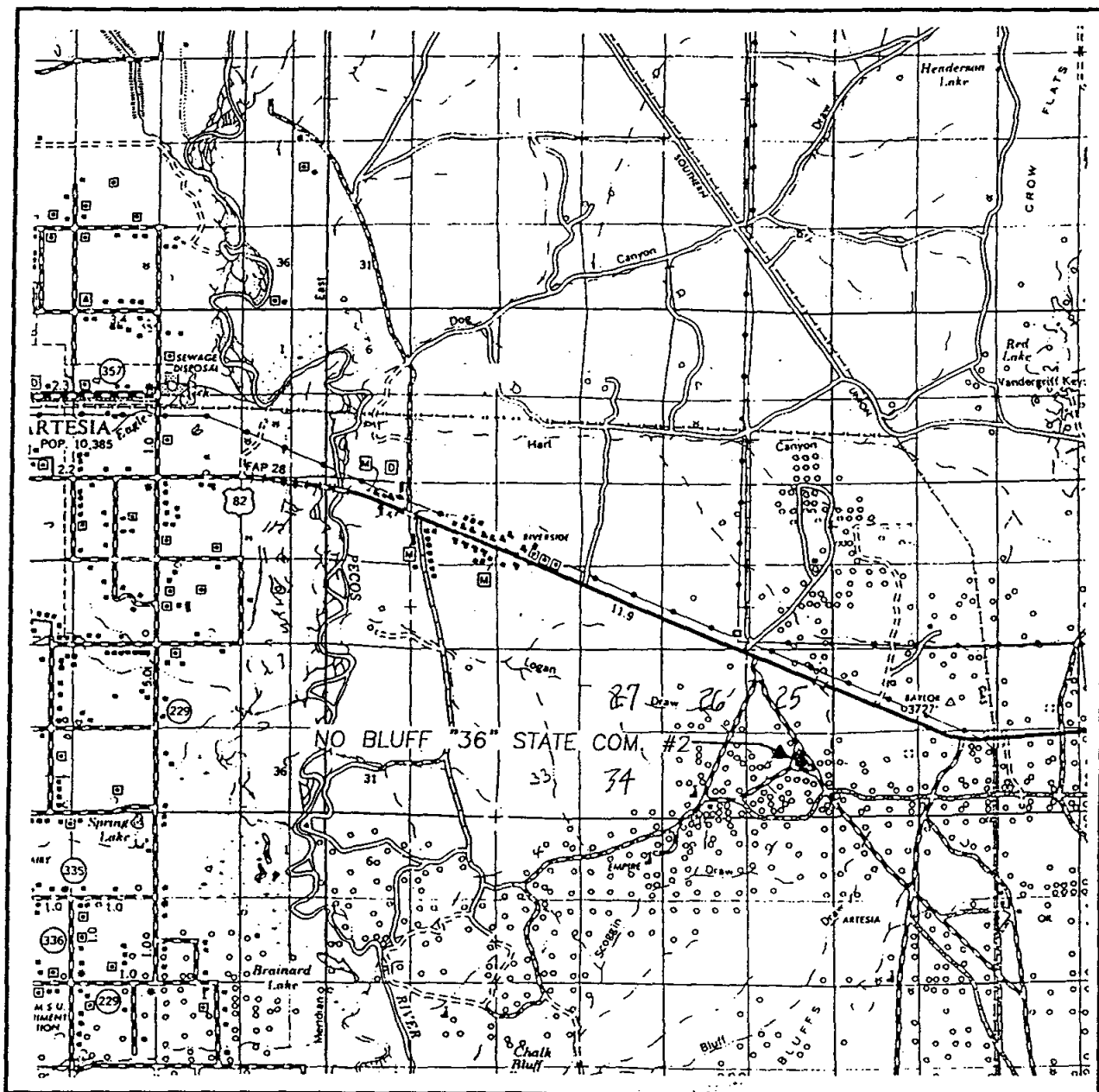
Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
Dedicated Acres	Joint or Infill	Consolidation Code	Order No.						
320									

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

	OPERATOR CERTIFICATION I hereby certify the the information contained herein is true and complete to the best of my knowledge and belief. Signature Cathy Rowan Printed Name Drilling Technician Title May 2, 2000 Date
	SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. APRIL 19, 2000 Date Surveyed Signature & Seal of Professional Surveyor Certificate No. RONALD L. EDSON 3239 GARY EDSON 12641 MACON McDONALD 12185

VICINITY MAP



SCALE: 1" = 2 MILES

SEC. 36 TWP. 17-S RGE. 27-E

SURVEY N.M.P.M.

COUNTY EDDY

DESCRIPTION 1980' FNL & 1980' FEL

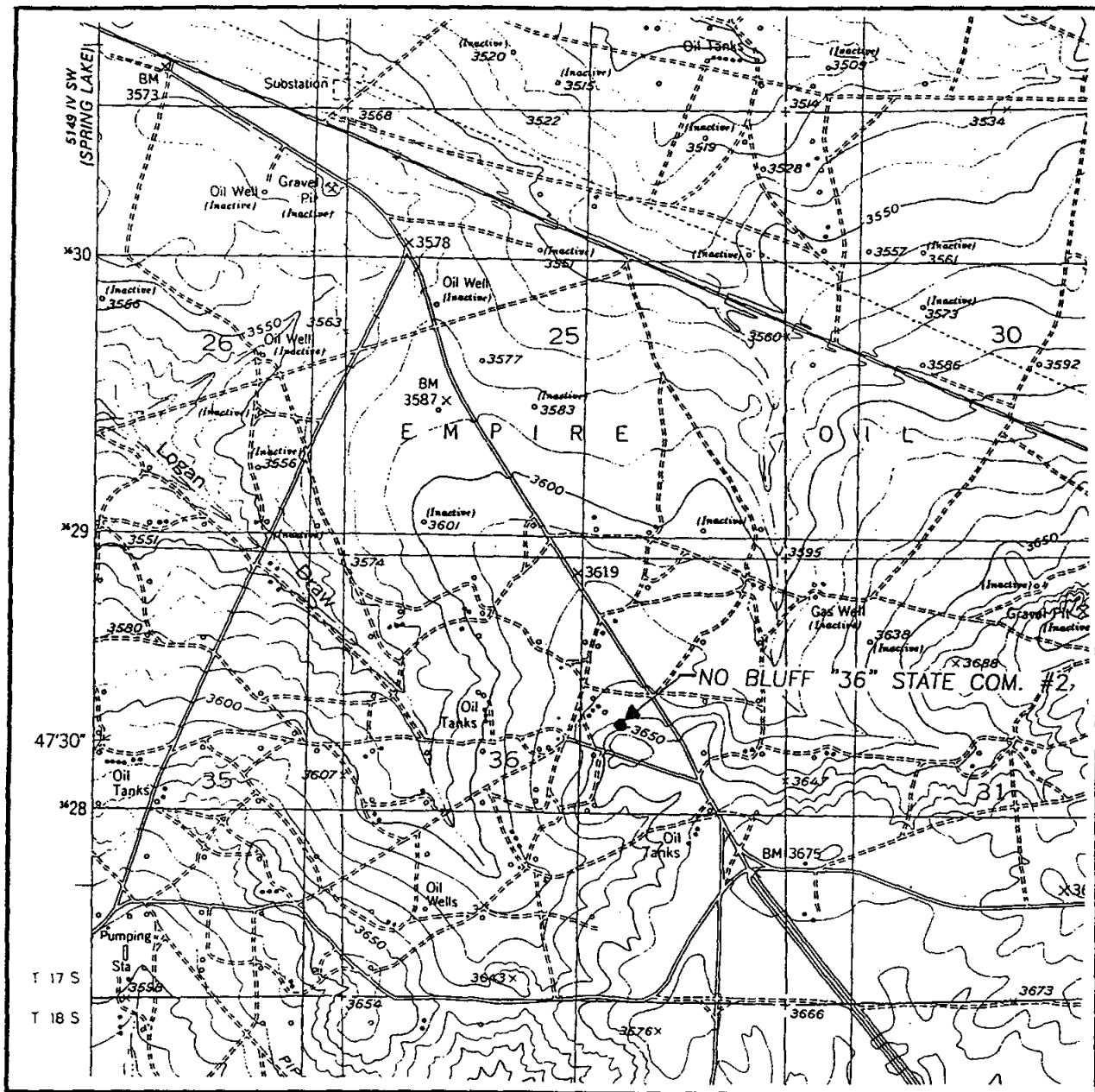
ELEVATION 3639

OPERATOR SOUTHWESTERN ENERGY PRODUCTION CO.

LEASE NO BLUFF "36" STATE COM.

JOHN WEST SURVEYING
HOBBS, NEW MEXICO
(505) 393-3117

LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL:
RED LAKE, N.M. - 10'

SEC. 36 TWP. 17-S RGE. 27-E

SURVEY N.M.P.M.

COUNTY EDDY

DESCRIPTION 1980' FNL & 1980' FEL

ELEVATION 3639

OPERATOR SOUTHWESTERN ENERGY
PRODUCTION CO.

LEASE NO BLUFF "36" STATE COM.

U.S.G.S. TOPOGRAPHIC MAP
RED LAKE, N.M.

JOHN WEST SURVEYING
HOBBS, NEW MEXICO
(505) 393-3117

ATTACHMENT VI-2D

MAP ID NO. 942
(Same as Map ID No. 89)

RECORDS FOR MAP ID NO. 89



District I
PO Box 1900, Hobbs, NM 88241-1900
District II OIL CONSERVATION DIVISION
PO Drawer DD, Artesia, NM 88211-4719
District III
1000 Rio Grande Blvd., Alamogordo, NM 87410
District IV
PO Box 2088, Santa Fe, NM 87504-2088

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION

PO Box 2088
Santa Fe, NM 87504-2088

89 Form C-104
Revised February 10, 1994
Instructions on back
Submit to Appropriate District Office
5 Copies

☐ AMENDED REPORT

I. REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT

Operator name and Address ARCO Permian A Unit of Atlantic Richfield Co. P.O. Box 1710 Hobbs, NM 88240		OGRID Number 000990
		Reason for Filing Code 6-1-94 CH
API Number 30 - 015-02625	Pool Name EMPIRE ABO	Pool Code 22040
Property Code 001472	Property Name Empire ABO Unit "I"	Well Number 23

II. Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South Line	Feet from the	East/West Line	County
B	06	18S	29E		470	N	2170	E	EDDY

" Bottom Hole Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South Line	Feet from the	East/West Line	County
S									
Lee Code S	Producing Method Code Injection	Gas Connection Date	C-129 Permit Number	C-129 Effective Date	C-129 Expiration Date				

III. Oil and Gas Transporters

Transporter OGRID	Transporter Name and Address	POD	O/G	POD ULSTR Location and Description
000734	AMOCO Pipeline 502 NW Avenue Levelland, TX 79336		O	
000756	Amoco Production Co. P.O. Box 68 Hobbs, NM 88240		G	
009171	GPM Gas Corporation 4001 Penbrook Odessa, TX 79760		G	

IV. Produced Water

POD	POD ULSTR Location and Description

V. Well Completion Data

Spud Date	Ready Date	TD	PSTD	Perforations

Hole Size	Casing & Tubing Size	Depth Set	Sacks Cement

VI. Well Test Data

Date New OG	Gas Delivery Date	Test Date	Test Length	Thg. Pressure	Csg. Pressure
Choke Size	OG	Water	Gas	AOP	Test Method

" I hereby certify that the rules of the Oil Conservation Division have been complied with and that the information given above is true and complete to the best of my knowledge and belief.

Signature: *Kellie D. Murrish*

Printed name: Kellie D. Murrish

Title: Records Clerk II

Date: 6-1-94 Phone: 505-391-1649

OIL CONSERVATION DIVISION

Approved by: SUPERVISOR, DISTRICT II

Title:

Approval Date: JUL 27 1994

" If this is a change of operator fill in the OGRID number and name of the previous operator

Previous Operator Signature	Printed Name	Title	Date

DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

OIL CONSERVATION DIVISION

P.O. Box 2088

Santa Fe, New Mexico 87504-2088

RECEIVED

94 APR 14 AM 8 50

WELL API NO.

30-015-0625

5. Indicate Type of Lease

STATE ☒

FEE ☐

6. State Oil & Gas Lease No.

7. Lease Name or Unit Agreement Name

Empire Abo Unit "I"

8. Well No.

23

9. Pool name or Wildcat

Empire Abo

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A
DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT"
(FORM C-101) FOR SUCH PROPOSALS.)

1. Type of Well:

OIL
WELL ☐

GAS
WELL ☐

X OTHER Gas Injection

2. Name of Operator

ARCO OIL AND GAS COMPANY

3. Address of Operator

P.O. 1710 HOBBS N.M. 88240

4. Well Location

Unit Letter B : 470 Feet From The North Line and 2170 Feet From The East Line

Section 6 Township 18S Range 28E NMPM Eddy County

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

3669.6 GL

11. Check Appropriate Box to Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK ☐

PLUG AND ABANDON ☐

TEMPORARILY ABANDON ☐

CHANGE PLANS ☐

PULL OR ALTER CASING ☐

OTHER: ☐

SUBSEQUENT REPORT OF:

REMEDIAL WORK ☐

ALTERING CASING ☐

COMMENCE DRILLING OPNS. ☐

PLUG AND ABANDONMENT ☐

CASING TEST AND CEMENT JOB ☐

OTHER: Convert to gas injection ☒

12. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 1103.

TD 6194'

PERFS 5985-6130'

PBD 6184

03/10/94: Add perfs 5985-6080, set pkr @ 5943.85'. Acidize 5985-6130' w/3000 gals 15% NEFE acid.

03/19/94: Load casing w/1 bbl 8.6# brine w/TH-377 chemical. Pressure test to 640#, held for 30 mins. Test chart attached.

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

SIGNATURE

Kellie D. Murrish

TITLE

Records Clerk II

DATE

03/29/94

TYPE OR PRINT NAME

Kellie D. Murrish

TELEPHONE NO. 391-1649

(This space for State Use)

APPROVED BY

[Signature]

TITLE

SUPERVISOR, DISTRICT II

DATE

APR 8 1994

CONDITIONS OF APPROVAL, IF ANY:

Submit 3 Copies
to Appropriate
District Office

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-103
Revised 1-1-89

DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

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

SEP 20 1993

WELL API NO.
30-015-0625

5. Indicate Type of Lease
STATE ☒ FEE ☐

6. State Oil & Gas Lease No.

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A
DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT"
(FORM C-101) FOR SUCH PROPOSALS.)

1. Type of Well:
OIL WELL ☐ GAS WELL ☐ OTHER GAS INJECTION

2. Name of Operator
ARCO OIL AND GAS COMPANY

3. Address of Operator
P.O. 1710 HOBBS N.M. 88240

4. Well Location
Unit Letter B : 470 Feet From The NORTH Line and 2170 Feet From The EAST Line
Section 6 Township 18S Range 28E NMPM EDDY County

10. Elevation (Show whether DF, RKB, RT, GR, etc.)
3669.6 GL

11. Check Appropriate Box to Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:

SUBSEQUENT REPORT OF:

PERFORM REMEDIAL WORK ☐ PLUG AND ABANDON ☐
TEMPORARILY ABANDON ☐ CHANGE PLANS ☐
PULL OR ALTER CASING ☐
OTHER: CONVERT TO GAS INJECTION ☒

REMEDIAL WORK ☐ ALTERING CASING ☐
COMMENCE DRILLING OPNS. ☐ PLUG AND ABANDONMENT ☐
CASING TEST AND CEMENT JOB ☐
OTHER: ☐

12. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 1103.

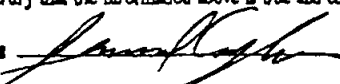
TD 6194, PBD 6182, PERFS 6120-30, PKR 6025

NOTIFY NMOC D PRIOR TO STARTING WORK.

LOAD CSG W/TREATED FLUID, TEST CSG TO 500# FOR 20 MIN, AND START GAS INJECTION.

IF GAS INJECTION LESS THAN 2 MMCFPD ADD PERFS WITHIN ABO INTERVAL 6070-6120

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

SIGNATURE 
TYPE OR PRINT NAME JAMES COGBURN

TITLE OPERATION COORDINATOR DATE 9-16-93

TELEPHONE NO. 391-1621

(This space for State Use)

ORIGINAL SIGNED BY
MIKE WILLIAMS
SUPERVISOR, DISTRICT II

APPROVED BY DATE

CONDITIONS OF APPROVAL, IF ANY:

OCT 19 1993

Submit 3 Copies
to Appropriate
District Office

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-103
Revised 1-1-89

DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

OIL CONSERVATION DIVISION

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

MAY 14 1992

O. C. D.

WELL API NO.

30-015-0625

5. Indicate Type of Lease

STATE ☒

FEE ☐

6. State Oil & Gas Lease No.

7. Lease Name or Unit Agreement Name

EMPIRE ABO UNIT "I"

8. Well No.

23

9. Pool name or Wildcat
EMPIRE ABO

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A
DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT"
(FORM C-101) FOR SUCH PROPOSALS.)

1. Type of Well:

OIL

WELL ☒

GAS

WELL ☐

OTHER ☐

2. Name of Operator

ARCO OIL AND GAS COMPANY ✓

3. Address of Operator

BOX 1710, HOBBS, NEW MEXICO 88240

4. Well Location

Unit Letter B : 470 Feet From The NORTH Line and 2170 Feet From The EAST Line

Section 6 Township 18S Range 28E NMPM HDDY County

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

3669.6' GL

11. Check Appropriate Box to Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK ☐

PLUG AND ABANDON ☐

TEMPORARILY ABANDON ☐

CHANGE PLANS ☐

PULL OR ALTER CASING ☐

OTHER: ☐

SUBSEQUENT REPORT OF:

REMEDIAL WORK ☐

ALTERING CASING ☐

COMMENCE DRILLING OPNS. ☐

PLUG AND ABANDONMENT ☐

CASING TEST AND CEMENT JOB ☐

OTHER: TEMPORARILY ABANDON ☒

12. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 1103.

TA & HOLD WELL BORE FOR BHP MONITOR

TD 6194'; PBD 6182'; PERFS: 6120-6130'

4/29/92 SET PKR w/13000# COMPRESSION. LOAD & PRESSURE CSG TO 500# w/8.6# BRINE & WT-675 CHEMICAL. HELD FOR 25 MIN. OK. PKR SET @ 6025.83'. WELL TA 4/29/92. CHART ATTACHED.

This Approval of Temporary
Abandonment Expires 5/97

This Approval of Temporary
Abandonment Expires

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

SIGNATURE

James D. Cogburn

TITLE Operations Coordinator

DATE 5/13/92

TYPE OR PRINT NAME

James D. Cogburn

TELEPHONE NO. 391-1600

(This space for State Use)

APPROVED BY

John Walker

TITLE

Field Rep

DATE

5/20/92

CONDITIONS OF APPROVAL, IF ANY:

ANTARCTIC	
ILE	
S.G.S.	
AND OFFICE	
TRANSPORTER	OIL
	GAS
OPERATOR	
PRORAT ON OFFICE	

NEW MEXICO OIL CONSERVATION COMMISSION
REQUEST FOR ALLOWABLE
AND
AUTHORIZATION TO TRANSPORT OIL AND NATURAL GAS

Form C-104
Supersedes Old C-104 and
Effective 1-1-65

RECEIVED

SEP 26 1973

I. OPERATOR
Operator
Atlantic Richfield Company ✓
Address
P. O. Box 1710, Hobbs, N.M. 88240
Reason(s) for filing (Check proper box)
New Well ☐ Change in Transporter of:
Recompletion ☐ Oil ☐ Dry Gas ☐
Change in Ownership ☒ Casinghead Gas ☐ Condensate ☐
Other (Please explain)
Included in Empire Abo Unit eff:10/01/
Change in lease name from State #1.
If change of ownership give name and address of previous owner: Resler and Sheldon, Box 2053, S. Padre Island, TX

O. C. C.
ARTESIAN OFFICE

II. DESCRIPTION OF WELL AND LEASE

Lease Name	Well No.	Pool Name, including Formation	Kind of Lease	Lease 1
Empire Abo Unit I	23	Empire Abo	State, Federal or Fee	State
Location				
Unit Letter	R	470 Feet From The	North	Line and 2170 Feet From The East
Line of Section	6	Township	18S	Range 28E, NMPM, Eddy

III. DESIGNATION OF TRANSPORTER OF OIL AND NATURAL GAS

Name of Authorized Transporter of Oil <input checked="" type="checkbox"/> or Condensate	Address (Give address to which approved copy of this form is to be sent)
AMOCO Pipe Line Company	2300 Continental Bk. Bldg. Fort Worth, TX 76102
Name of Authorized Transporter of Casinghead Gas <input checked="" type="checkbox"/> or Dry Gas <input type="checkbox"/>	Address (Give address to which approved copy of this form is to be sent)
Phillips Petroleum Company	Phillips Bldg., 4th & Washington, Odessa, TX 79
If well produces oil or liquids, give location of tanks.	Is gas actually connected? When
Unit B 6 18S 28E	Yes August 1960

If this production is commingled with that from any other lease or pool, give commingling order number:

IV. COMPLETION DATA

Designate Type of Completion - (X)	Oil Well	Gas Well	New Well	Workover	Deepen	Plug Back	Same Res't.	Diff. R
Date Spudded	Date Compl. Ready to Prod.	Total Depth	P.S.T.D.					
Elevations (DF, RKB, RT, GK, etc.)	Name of Producing Formation	Top Oil/Gas Pay	Tubing Depth					
Perforations	Depth Casing Shoe							
TUBING, CASING, AND CEMENTING RECORD								
HOLE SIZE	CASING & TUBING SIZE	DEPTH SET	SACKS CEMENT					

V. TEST DATA AND REQUEST FOR ALLOWABLE OIL WELL

(Test must be after recovery of total volume of load oil and must be equal to or exceed top able for this depth or be for full 24 hours)

Date First New Oil Run To Tanks	Date of Test	Producing Method (Flow, pump, gas lift, etc.)	
Length of Test	Tubing Pressure	Casing Pressure	Choke Size
Actual Prod. During Test	Oil - Bbls.	Water - Bbls.	Gas - MCF

GAS WELL

Actual Prod. Test - MCF/D	Length of Test	Bbls. Condensate/MMCF	Gravity of Condensate
Testing Method (pitot, back pr.)	Tubing Pressure (Shut-in)	Casing Pressure (Shut-in)	Choke Size

VI. CERTIFICATE OF COMPLIANCE

I hereby certify that the rules and regulations of the Oil Conservation Commission have been complied with and that the information given above is true and complete to the best of my knowledge and belief.

A. L. Shackelford
(Signature)

Senior Accounting Clerk

September 26, 1973
(Date)

OIL CONSERVATION COMMISSION

APPROVED SEP 28 1973
BY *W. A. Gussert*
TITLE OIL AND GAS INSPECTOR

This form is to be filed in compliance with RULE 1104.
If this is a request for allowable for a newly drilled or deep well, this form must be accompanied by a tabulation of the dev tests taken on the well in accordance with RULE 111.
All sections of this form must be filled out completely for able on new and recompleted wells.
Fill out only Sections I, II, III, and VI for changes of well name or number, or transporter, or other such change of com.
Separate Forms C-104 must be filed for each pool in m

		0		

AREA 640 ACRES
LOCATE WELL CORRECTLY

NEW MEXICO OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

RECEIVED

MAIN OFFICE OCC

MAIN OFFICE OCC
DEC 20 1959

DEC 28 1959

WELL RECORD

DEC 20 1959

O. C. C.
ARTESIA, OFFICE

Mail to District Office, Oil Conservation Commission, to which Form C-101 was sent not later than twenty days after completion of well. Follow instructions in Rules and Regulations of the Commission. Submit in QUINTUPLICATE. If State Land submit 6 Copies

Resler and Sheldon
(Company or Operator)

State
(Land)

Well No. 1, in NW $\frac{1}{4}$ of NE $\frac{1}{4}$, of Sec. 6, T. 18S, R. 28E, NMPM

Empire Abo Undesignated Pool, Eddy County

Well is 470 feet from north line and 2170 feet from east line of Section 6. If State Land the Oil and Gas Lease No. is B-11594

Drilling Commenced October 8, 1959 Drilling was Completed December 21, 1959

Name of Drilling Contractor Carper Drilling Company

Address 200 Carper Bldg., Artesia, New Mexico

Elevation above sea level at Top of Tubing Head 3668 The information given is to be kept confidential until _____, 19____

OIL SANDS OR ZONES

No. 1, from 5608 to 6120 No. 4, from _____ to _____

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

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

IMPORTANT WATER SANDS

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

No. 1, from _____ to _____ feet

No. 2, from _____ to _____ feet

No. 3, from _____ to _____ feet

No. 4, from _____ to _____ feet

CASING RECORD

SIZE	WEIGHT PER FOOT	NEW OR USED	AMOUNT	KIND OF SEAM	CUT AND PULLED FROM	PERFORATIONS	PURPOSE
8 5/8	24	New	507				
5 1/2	15.5	New	6194				

MUDDING AND CEMENTING RECORD

SIZE OF HOLE	SIZE OF CASING	WHERE SET	NO. BAGS OF CEMENT	METHOD USED	MUD GRAVITY	AMOUNT OF MUD USED
10 1/4	8 5/8	507	450	Pump & Plug		
7 7/8	5 1/2	6194	350	Pump & Plug		

RECORD OF PRODUCTION AND STIMULATION

(Record the Process used, No. of Qm. or Gals. used, interval treated or shot.)

Treated perforations 6070-6120 w/ 500 gallons regular acid

Result of Production Stimulation

Depth Cleaned Out 6160

RECORD OF DRILL-STEM AND SPECIAL TESTS

If drill-stem or other special tests or deviation surveys were made, submit report on separate sheet and attach hereto

TOOLS USED

Rotary tools were used from 2080 feet to 6194 feet, and from _____ feet to _____ feet.
Cable tools were used from 0 feet to 2080 feet, and from _____ feet to _____ feet.

PRODUCTION

Put to Producing December 26, 1959

OIL WELL: The production during the first 24 hours was 456 barrels of liquid of which 100% was oil; _____% was emulsion; _____% water; and _____% was sediment. A.P.I. Gravity _____.

GAS WELL: The production during the first 24 hours was M.C.F. plus _____ barrels of liquid Hydrocarbon. Shut in Pressure _____ lbs.

Length of Time Shut in _____

PLEASE INDICATE BELOW FORMATION TOPS (IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE):

Southeastern New Mexico		Northwestern New Mexico	
T. Anhy _____	T. Devonian _____	T. Ojo Alamo _____	
T. Salt _____	T. Silurian _____	T. Birdland-Fruitland _____	
B. Salt _____	T. Montoya _____	T. Farmington _____	
T. Yates 320	T. Simpson _____	T. Pictured Cliffs _____	
T. 7 Rivers _____	T. McKee _____	T. Mancos _____	
T. Queen 1175	T. Ellenburger _____	T. Point Lookout _____	
T. Grayburg _____	T. Gr. Wash _____	T. Mancos _____	
T. San Andrea 1927	T. Granite _____	T. Dakota _____	
T. Glorieta _____	T. _____	T. Morrison _____	
T. Drinkard _____	T. _____	T. Penn _____	
T. Tubbs _____	T. _____	T. _____	
T. Abo 5470	T. _____	T. _____	
T. Penn _____	T. _____	T. _____	
T. Miss _____	T. _____	T. _____	

FORMATION RECORD

From	To	Thickness in Feet	Formation	From	To	Thickness in Feet	Formation
0	22		Limestone	1490	1570		Anhy
22	130		Red Sand	1570	1700		Anhy & Lime
130	305		Anhy	1700	1920		Lime
305	317		Sand	1920	1950		Sand
317	380		Red Shale	1950	2080		Dolomite
380	942		Anhy	2080	4000		Dolomite
942	950		Red Sand	4000	5470		Black Dolomite
950	1175		Anhy	5470	5608		Buff Dolomite
1175	1210		Red Sand	5608	6120		White Dolomite Reef
1210	1350		Anhy	6120	6194		Buff & Brown Dolomite
1350	1390		Red Sand				
1390	1430		Anhy				
1430	1490		Grey Sand				

OIL CONSERVATION COMMISSION

ARTESIA DISTRICT OFFICE

ATTACH SEPARATE SHEET IF ADDITIONAL SPACE IS NEEDED

I hereby swear or affirm that the information given herewith is a complete and correct record of the well and all work done on it so far as can be determined from available records.

December 28, 1959

(Date)

Company or Operator Realer and Sheldon

Address 302 Carper Bldg., Artesia, New Mexico

Name [Signature]

Position or Title Partner

NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

DECEMBER
Form O-101
Revised (12/1/57)

OCT 8 1959

NOTICE OF INTENTION TO DRILL

Notice must be filed with the District Office of the Oil Conservation Commission and approval obtained before drilling or recompletion begins. If changes in the proposed plan are considered advisable, a copy of this notice showing such changes will be returned to the sender. Submit this notice in **QUINTUPPLICATE**. One copy will be returned following approval. See additional instructions in Rules and Regulations of the Commission. If State Land submit 6 Copies Attach Form O-128 in triplicate to first 3 copies of form O-101

1959 OCT 8 PM
Artesia, New Mexico
(Place)

October 5, 1959
(Date)

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Gentlemen:

You are hereby notified that it is our intention to commence the Drilling of a well to be known as

Realer and Sheldon

(Company or Operator)

State , Well No. 1, in B (Unit) The well is located 470 feet from the north line and 2170 feet from the east line of Section 6, T. 18S, R. 28E, NMPM.
(GIVE LOCATION FROM SECTION LINE) Artesia Pool, Edy County

D	C	(B)	A
E	F	G	H
L	K	J	I
M	N	O	P

If State Land the Oil and Gas Lease is No. B-11594

If patented land the owner is

Address

We propose to drill well with drilling equipment as follows: Cable Tools

The status of plugging bond is Blanket

Drilling Contractor Carl Howell

We intend to complete this well in the Grayburg formation at an approximate depth of 2000 feet.

CASING PROGRAM

We propose to use the following strings of Casing and to cement them as indicated:

Size of Hole	Size of Casing	Weight per Foot	New or Second Hand	Depth	Seals Cement
10	8 5/8	24	New	500	50
8 1/4	5 1/2	14	New	2000	100

If changes in the above plans become advisable we will notify you immediately.

ADDITIONAL INFORMATION (If recompletion give full details of proposed plan of work.)

OCT 7 1959

Approved , 19
Except as follows:

OIL CONSERVATION COMMISSION

By M. L. Armstrong
OIL AND GAS INSPECTOR

Sincerely yours,

Realer and Sheldon

(Company or Operator)

By Vilas P. Sheldon

Position Partner

Send Communications regarding well to

Name Vilas P. Sheldon

Address 302 Carpenter Bldg., Artesia, New Mexico

NEW MEXICO OIL CONSERVATION COMMISSION
WELL LOCATION AND ACREAGE DEDICATION PLAT

SEE INSTRUCTIONS FOR COMPLETING THIS FORM ON THE REVERSE SIDE

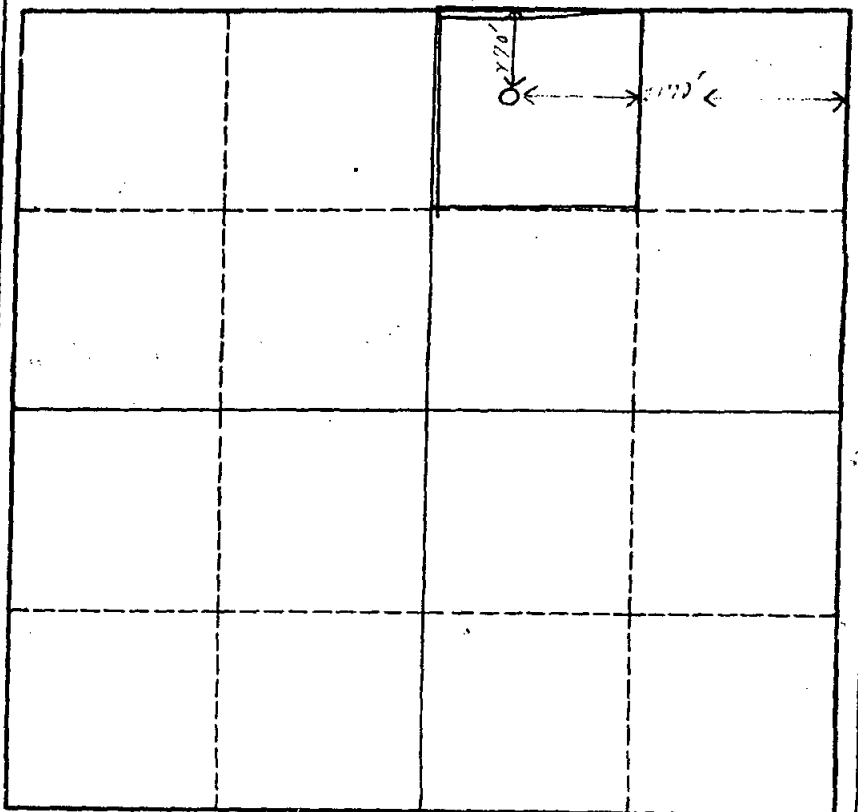
SECTION A

Operator Resler and Sheldon			Lease State		Well No. 1
Unit Letter B	Section 6	Township 18S	Range 28E	County Eddy	
Actual Footage Location of Well: 470 feet from the north line and 2170 feet from the east line					
Ground Level Elev. 470	Producing Formation Grayburg		Pool Artesia	Dedicated Acreage: 40 Acres	

1. Is the Operator the only owner in the dedicated acreage outlined on the plat below? YES ☒ NO ☐ ("Owner" means the person who has the right to drill into and to produce from any pool and to appropriate the production either for himself or for himself and another. (65-3-29 (e) NMSA 1935 Comp.)
2. If the answer to question one is "no," have the interests of all the owners been consolidated by communitization agreement or otherwise? YES ☐ NO ☐ If answer is "yes," Type of Consolidation _____
3. If the answer to question two is "no," list all the owners and their respective interests below:

Owner	Land Description

SECTION B



CERTIFICATION

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

Name **Wesley J. Sheldon**
 Position **Partner**
 Company **Resler and Sheldon**
 Date **October 5, 1959**

I hereby certify that the well location shown on the plat in SECTION B was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed **October 5, 1959**
 Registered Professional Engineer and/or Land Surveyor
Wesley J. Sheldon
 Certificate No. **963**

0 330 660 990 1320 1650 1980 2310 2640 2000 1500 1000 500 0

ATTACHMENT VI-2E

MAP ID NO. 778

**NOTE FROM MIDLAND MAP COMPANY
1959 MAP OF WELLS IN 2-18S-27E**



Midland Map Co.**Fax**

To: NANCY NIEMANN

From: DOREEN DEVORE

Fax: (713) 880-3248

Date: March 12, 1999

Phone:

Pages: 1

Re: EDDY COUNTY WELLS

CC:

☐ Urgent☒ For Review☐ Please Comment☐ Please Reply☐ Please Recycle

Comments: AFTER INVESTIGATING YOUR FAX, I AM ONLY ABLE TO GIVE YOU PART OF THE INFORMATION YOU REQUESTED. AS I TOLD YOU BEFORE, WE DON'T HAVE PERMIT AND COMPLETION INFORMATION FOR NEW MEXICO, SO I CAN ONLY GIVE YOU BASIC INFORMATION ABOUT THE WELLS YOU REQUESTED. I SUGGEST THAT YOU CONTACT EITHER THE SUBSURFACE LIBRARY HERE IN MIDLAND AT (915) 683-5588 (THIS IS WHERE I FOUND YOUR INFORMATION YESTERDAY) OR CALL HERROLD'S AT (915) 682-7773 AND ASK FOR "DOC". I AM NOT CERTAIN WHETHER THEY WILL OR WILL NOT CHARGE YOU FOR THE INFORMATION.

MAP ID NO.
778

1.) 2-18S-27E 2310FN, 1650FE

WELL#: 2, ORIG. OPERATOR: RUTTER & WILBANKS FEE: Hudson

THIS WELL WAS COMPLETED BEFORE 1957

795

2.) 2-18S-27E 990FS, 330FE

WELL#: 1 ORIG. OPERATOR: ATLANTIC RICHFIELD (ARCO) FEE: State "AS"

THIS WELL WAS PERMITTED SOMEWHERE BETWEEN 1959-1960

754

3.) 1-18S-27E 660FS, 660FW

WELL#: 17 ORIG. OPERATOR: HONDO OR PAM AM FEE: Malco

THIS WELL WAS COMPLETED SOMEWHERE AROUND 1975

I WISH YOU LUCK IN YOUR INVESTIGATION.

Well Location and Acreage Dedication Plat

APR 1 1959 785

Date March 25, 1959

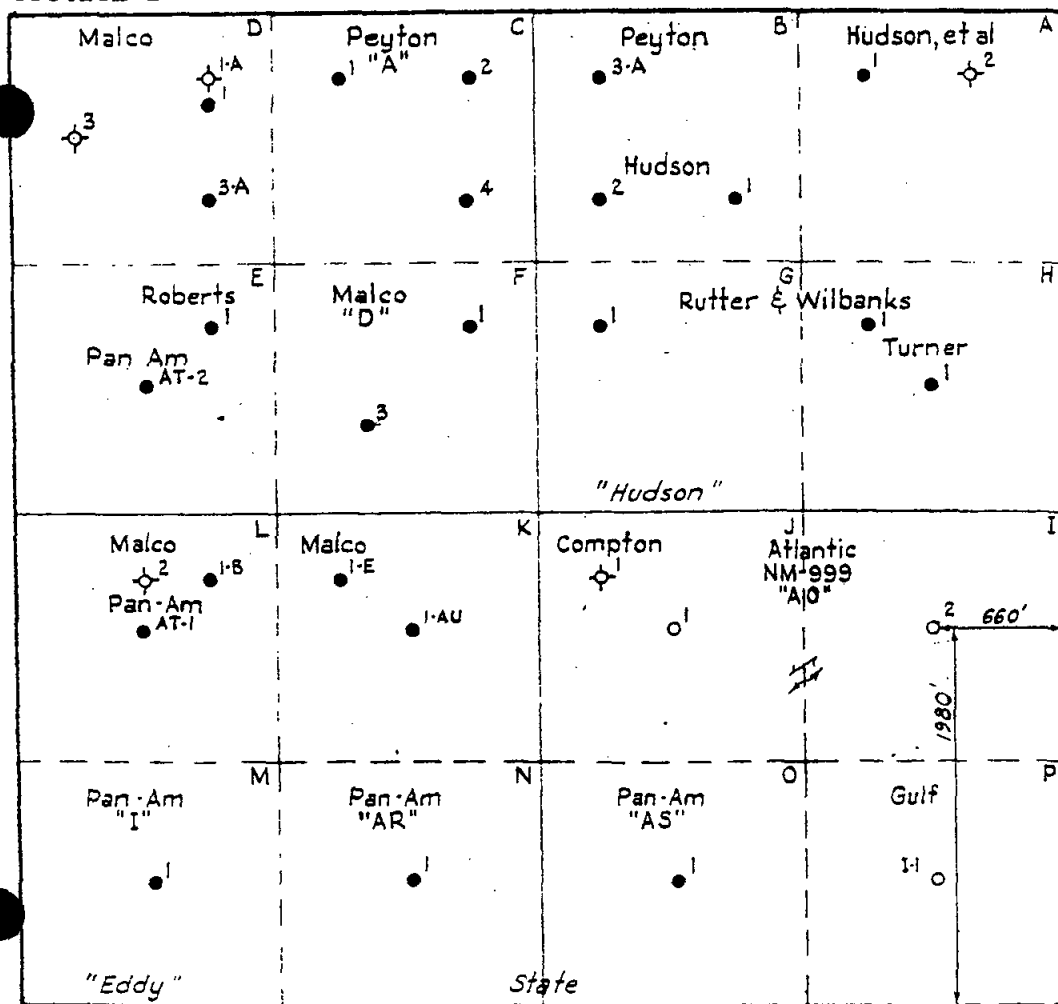
Operator The Atlantic Refining Company Lease State "A0"
 Well No. 2 Unit Letter 1 Section 2 Township 18 South Range 27 East NM
 Located 1980 Feet From the South Line, 660 Feet From the East Li
 County Eddy G. L. Elevation 5659' Dedicated Acreage 40.0 Acr
 Name of Producing Formation Abo Reef Pool Empire

1. Is the operator the only owner* in the dedicated acreage outlined on the plat below?
 Yes X No .
2. If the answer to question one is "no," have the interests of all the owners been consolidated by communitization agreement or otherwise? Yes No . If answer is "yes," Type of Consolidation
3. If the answer to question two is "no," list all the owners and their respective interest below:

Owner

Land Description

Section B



This is to certify that the information in Section A above is true and complete to the best of my knowledge and belief.

The Atlantic Refining Company
 (Operator)

W. J. Stewart
 (Representative)

P.O. Box 2819, Dallas, Tex.
 Address

This is to certify that the well location shown on the plat in Section B was plotted from field notes of actual surveys made by me or under my supervision and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed March 20, 1959

R. A. Waterhouse
 R. A. Waterhouse, Asst. Chief Surveyor
 The Atlantic Refining Company

PA10-698

ATTACHMENT VI-3

TOP OF CEMENT IN INJECTION ZONE WELLS IN THE AREA OF REVIEW

Map ID No.	Casing Diameter (inches)	Setting Depth (feet)	Cement Volume (sacks)	Hole Diameter (inches)	Cement Factor (cu ft/sacks)	Hole Rugosity	Cement Height (feet)	Top of Cement (feet below ground)
81	13.375 8.625 5.5	663 4000 10450	650 1400 2007	17.5 11 7.875	1.1 1.1 1.1	0.8 0.8 0.8	823 4846 10194	Surface Surface 256
83 ¹	13.375 8.625 5.5	354 1745 8466	350 650 520	17.5 11 7.875	1.1 1.1 --	0.8 0.8 --	443 2250 --	Surface Surface 6250 ¹
124 ²	13.375 9.625 7 4.5	400 2600 9445 10198	500 1100 1895 175	17.5 12.25 7.875 6.125	1.1 1.1 1.1 1.1	0.8 0.8 0.8 0.8	633 3091 23491 1635	Surface Surface Surface Top of Liner
134	13.375 9.625 5.5	416 2610 10148	450 1025 1020	17.5 12.25 8.75	1.1 1.1 1.1	0.8 0.8 0.8	570 2880 3554	Surface Surface 6594
144	13.375 9.625 7 4.5	400 2600 8968 10150	100 250 1200 200	17.5 12.25 8.75 6.125	1.1 1.1 1.1 1.1	0.8 0.8 0.8 0.8	127 702 7025 1869	273 1898 1943 Top of Liner
157	13.375 9.625 7 4.5	400 2604 9450 10119	425 1025 1350 175	17.5 12.25 8.75 6.125	1.1 1.1 1.1 1.1	0.8 0.8 0.8 0.8	538 2880 7903 1635	Surface Surface 1547 Top of Liner
161	13.375 8.625 5.5 4.5	472 2589 9473 10140	450 900 430 80	17.5 12.25 7.875 5.5	1.1 1.1 -- 1.1	0.8 0.8 -- 0.8	570 1919 -- 1291	Surface 670 6000 ³ Top of Liner
167	13.375 8.625 5.5	418 2600 10400	500 1150 1000	17.5 11 7.875	1.1 1.1 1.1	0.8 0.8 0.8	633 3981 5079	Surface Surface 5321

ATTACHMENT VI-3 (Continued)

TOP OF CEMENT IN INJECTION ZONE WELLS IN THE AREA OF REVIEW

Map ID No.	Casing Diameter (inches)	Setting Depth (feet)	Cement Volume (sacks)	Hole Diameter (inches)	Cement Factor (cu ft/sacks)	Hole Rugosity	Cement Height (feet)	Top of Cement (feet below ground)
353	13.375	399	530	17.5	1.1	0.8	671	Surface
	9.625	2603	1150	12.25	1.1	0.8	3231	Surface
	7	9253	1620	8.75	1.1	0.8	9483	Surface
	4.5	10057	225	6.125	1.1	0.8	2103	Top of Liner
848	11.75	1000	970	17.5	1.1	0.8	931	69
	8.625	6348	300	12.25	--	--	--	5400 ⁴
	5.5	10138	855	7.875	--	--	--	6850 ⁴
851	13.375	572	700	17.5	1.1	0.8	887	Surface
	9.625	1790	250	12.25	1.1	0.8	702	1088
	5.5	4500	Unknown	6.125	--	--	--	Unknown
855	13.375	502	700	17.5	1.1	0.8	887	Surface
	9.625	2200	1400	12.25	1.1	0.8	3934	Surface
	5.5	11,915	2720	7.875	1.1	0.8	13816	Surface
861 ⁵	8.625	1995	800	11.000	--	--	--	Surface ⁵
	5.5	8869	1570	7.875	--	--	--	Surface ⁵
911	13.375	425	465	17.5	1.1	0.8	589	Surface
	8.625	2002	650	12.25	1.1	0.8	1386	616
	5.5	10050	553	7.875	1.1	0.8	2809	7241

Cement Height = Cement Volume * Cement Factor * Hole Rugosity * $1/(PI * (Hole Radius^2 - Casing Radius^2))$

¹ For Map ID No. 83, cement volume for 5-1/2 inch casing includes squeezes. Top of cement per temperature survey conducted on May 9, 1991.

² For Map ID No. 124, hole diameter for 4-1/2 inch liner was not reported; 6.125 inches is estimated.

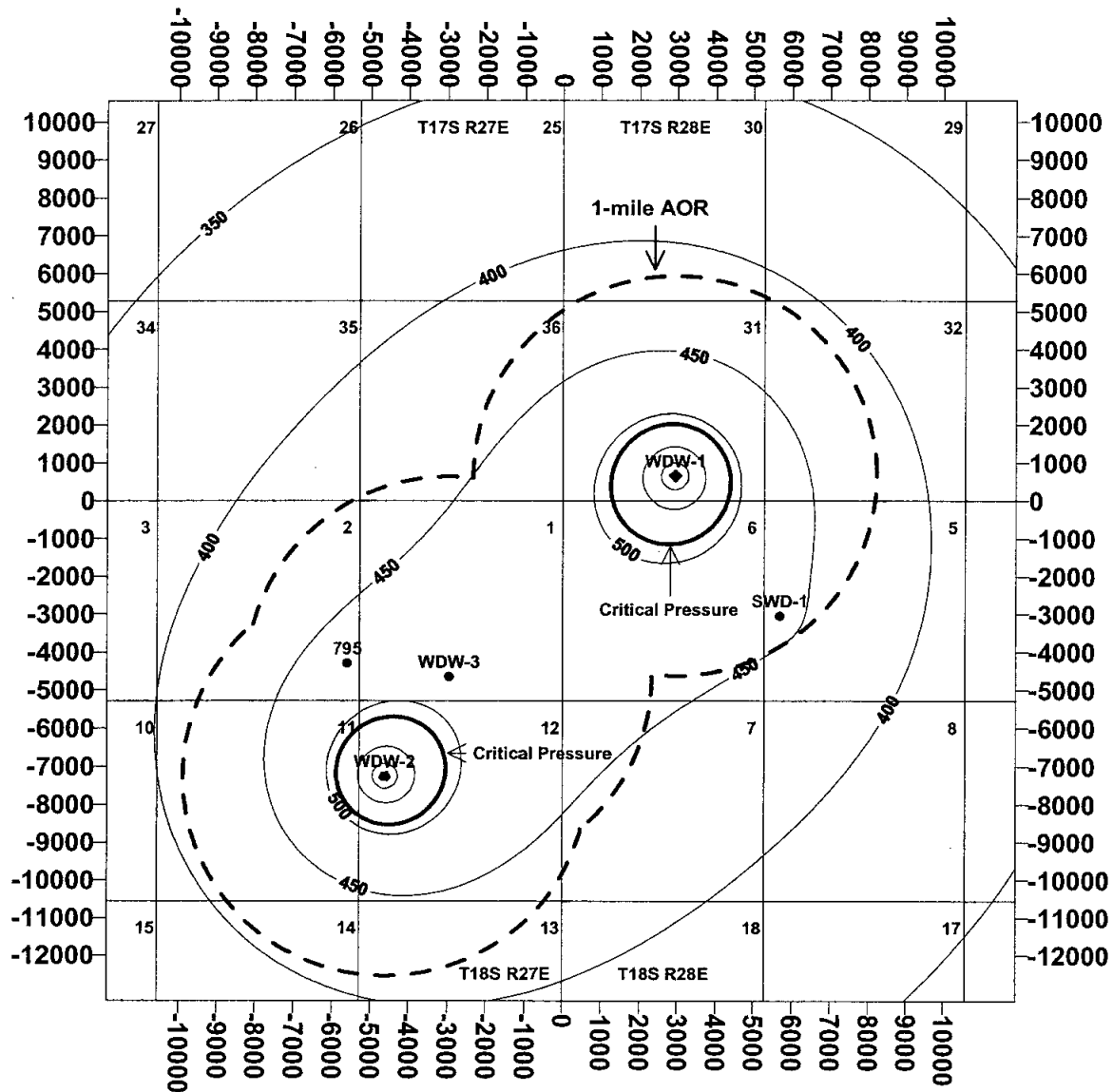
³ For Map ID No. 161, per cement bond log on July 20, 1993. Log is included in Attachment VI-2.

⁴ For Map ID No. 848, top of cement for 8-5/8 inch casing is 5100 feet per operator's well schematic. Top of cement for 5-1/2 inch liner is 6850 feet per operator's well schematic.

⁵ Map ID No. 861 is Navajo's WDW-2. Cement was circulated to the surface per operator.

NAVAJO REFINING COMPANY

PRESSURE INCREASE MODELING RESULTS



Critical Pressure Increase = 512 psi

k = 250 md

h = 85 feet

WDW-1 at Historical Rates 09/23/1999 to 06/30/2003

WDW-1 at 500 gpm 07/01/2003 to 09/22/2019

WDW-2 at Historical Rates 09/23/1999 to 06/30/2003

WDW-2 at 500 gpm 07/01/2003 to 09/22/2019

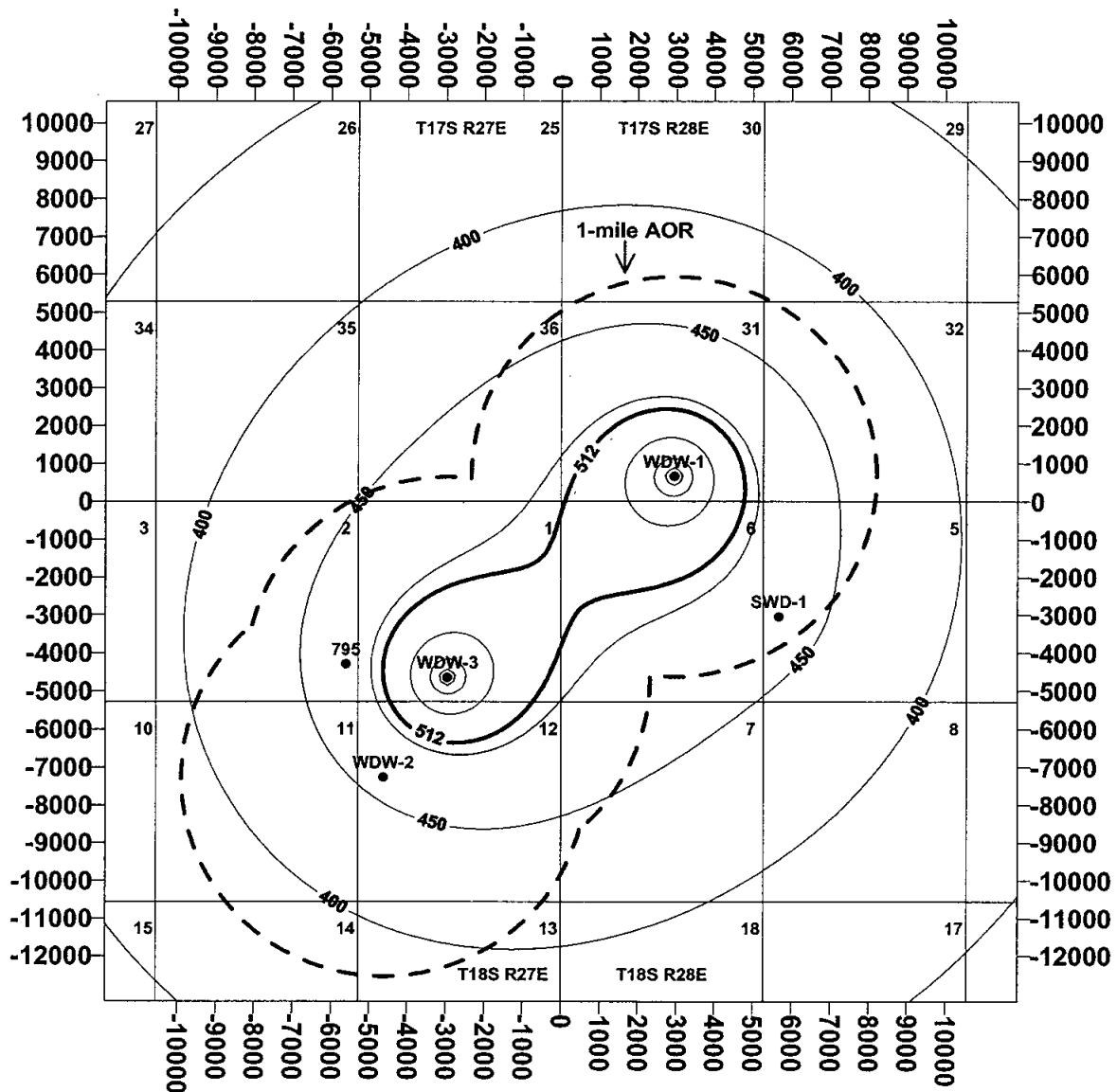
WDW-3 at 0 gpm 07/01/2003 to 09/22/2019

SWD-1 at 17.6 gpm 06/01/1998 to 09/22/1999

SWD-1 at 58.3 gpm 09/23/1999 to 09/22/2019

NAVAJO REFINING COMPANY

PRESSURE INCREASE MODELING RESULTS



Critical Pressure Increase = 512 psi

k = 250 md

h = 85 feet

WDW-1 at Historical Rates 09/23/1999 to 06/30/2003

WDW-1 at 500 gpm 07/01/2003 to 09/22/2019

WDW-2 at Historical Rates 09/23/1999 to 06/30/2003

WDW-2 at 0 gpm 07/01/2003 to 09/22/2019

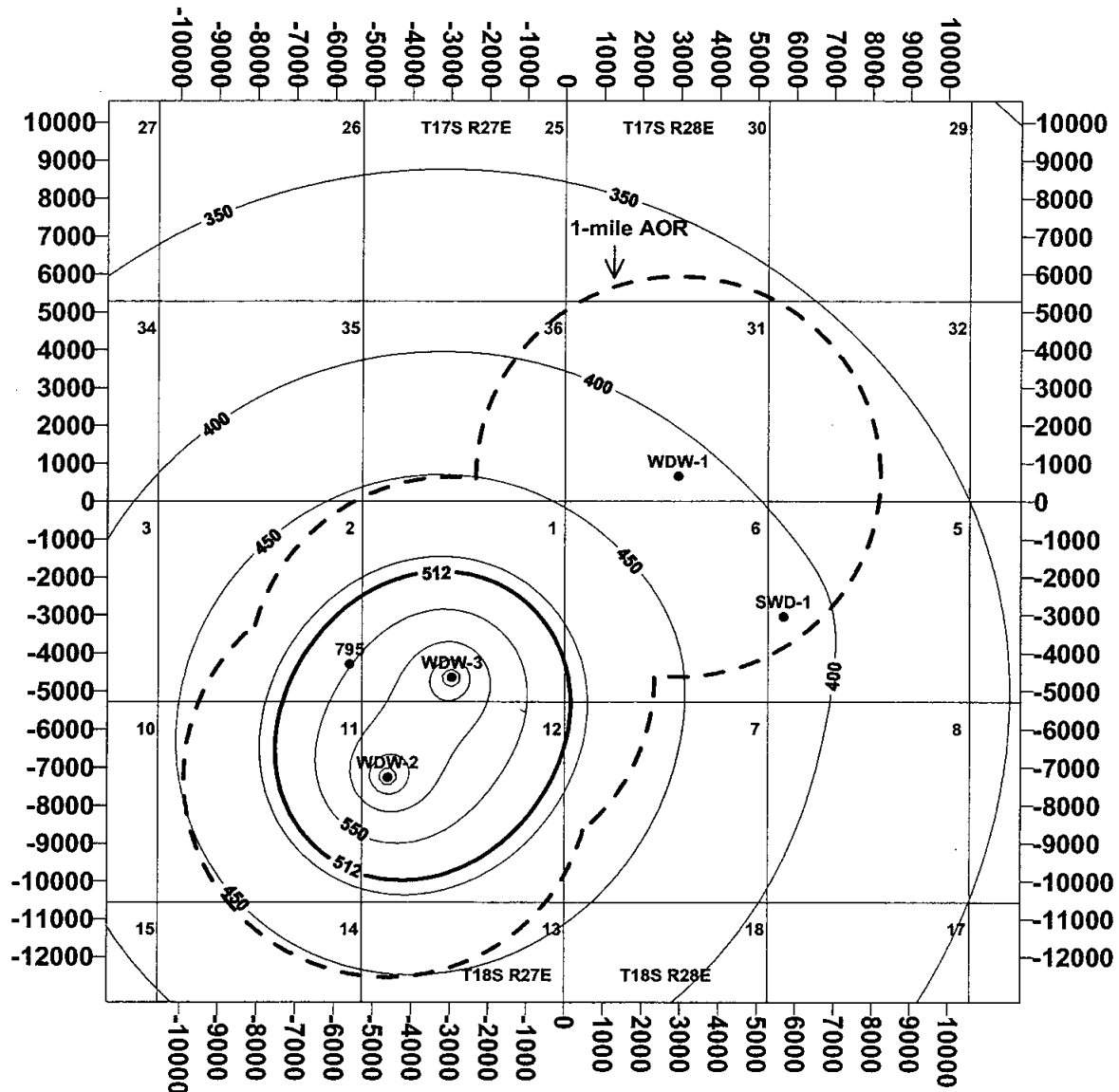
WDW-3 at 500 gpm 07/01/2003 to 09/22/2019

SWD-1 at 17.6 gpm 06/01/1998 to 09/22/1999

SWD-1 at 58.3 gpm 09/23/1999 to 09/22/2019

NAVAJO REFINING COMPANY

PRESSURE INCREASE MODELING RESULTS



Critical Pressure Increase = 512 psi

k = 250 md
h = 85 feet

WDW-1 at Historical Rates 09/23/1999 to 06/30/2003
WDW-1 at 0 gpm 07/01/2003 to 09/22/2019

WDW-2 at Historical Rates 09/23/1999 to 06/30/2003
WDW-2 at 500 gpm 07/01/2003 to 09/22/2019

WDW-3 at 500 gpm 07/01/2003 to 09/22/2019

SWD-1 at 17.6 gpm 06/01/1998 to 09/22/1999
SWD-1 at 58.3 gpm 09/23/1999 to 09/22/2019

Monitored?

VII. PROPOSED OPERATIONS

1. Proposed Injection Rate and Volume

The proposed maximum injection rate for WDW-1, WDW-2, and proposed WDW-3 combined is 1000 gpm or 34,286 bpd. The proposed maximum injection volume in any given month is that volume calculated by multiplying 1000 gpm by 60 minutes per hour by 24 hours per day by the number of days in the month.

The proposed maximum rate of injection into any one well is 500 gpm.

2. Whether the System Is Open or Closed

The operations for the proposed Class I wells will be restricted to injection from a closed system. Fluids to be injected will be generated on site at Navajo's refineries in Artesia and Lovington and will be transported to the injection wells by pipeline.

3. Proposed Injection Pressure

The maximum injection pressure at the wellhead will not exceed 0.2 psi per foot of depth to the top of the injection zone, as required by OCD Proposed Rule 21.B(7), dated October 6, 1997. The maximum injection pressure at the wellhead may vary, depending on the depth of the injection formation. For example, if WDW-1 is completed at the top of the injection zone at 7450 feet, then the requested maximum injection pressure is 1490 psi, as calculated below:

Maximum Injection Pressure at the Top of the Injection Zone

$$\begin{aligned} &= \text{Top of the Injection Zone} \times 0.2 \text{ psi/ft} \\ &= 7450 \text{ feet} \times 0.2 \text{ psi/ft} \\ &= 1490 \text{ psi} \end{aligned}$$

If the top of the injection formation coincides with the top of the Cisco or Canyon Formations, both of which are deeper than the Wolfcamp Formation, then the proposed injection pressure will be higher. The proposed injection pressure for each injection formation is summarized in the following table:

PROPOSED INJECTION PRESSURE			
Injection Formation	Top of Injection Formation	Maximum Injection Pressure Gradient	Proposed Injection Pressure
WDW-1			
Wolfcamp	7450 feet	0.2 psi/ft	1490 psi
Cisco	7816 feet	0.2 psi/ft	1563 psi
Canyon	8475 feet	0.2 psi/ft	1695 psi
WDW-2			
Wolfcamp	7270 feet	0.2 psi/ft	1454 psi
Cisco	7645 feet	0.2 psi/ft	1529 psi
Canyon	8390 feet	0.2 psi/ft	1678 psi
WDW-3			
Wolfcamp	7303 feet	0.2 psi/ft	1461 psi
Cisco	7650 feet	0.2 psi/ft	1530 psi
Canyon	8390 feet	0.2 psi/ft	1678 psi

4. Wastestream Information and Compatibility with the Injection Zone

Navajo proposes to inject exempt and nonexempt nonhazardous oilfield waste that is generated at its refineries in Artesia and Lovington. Waste waters from process units, cooling towers and boilers, streams from water purification units and desalting units, recovered and treated ground water, and general wash waters will be blended to make up the proposed waste stream.

Recent chemical analyses of the waste water are included as Attachment VII-1. Average concentration levels for major constituents are listed in Attachment VII-2, along with the expected pH range and specific gravity.

5. Injection Zone Fluid Analysis

The composition of the native formation fluid in the proposed Wolfcamp, Cisco, and Canyon injection zone is expected to be similar to that in these formations in other parts of southeastern New Mexico. The salinity of Wolfcamp, Cisco, and

Canyon formation brines from hydrocarbon producing areas in northern Lea County, to the east of Eddy County, was reported by Meyer (1966, Table 4). Attachment VII-3 summarizes the salinity data reported by Meyer (1966, Table 4) for Wolfcamp, Cisco, and Canyon formation brines from limestones that were deposited in a shelf environment similar to that of the proposed injection site. The salinity of the formation brines range from 67,098 to 119,909 parts per million (ppm). The formation brines were produced from intervals that occur between 9001 feet and 10742 feet below ground. Also listed in Attachment VII-7 are data from Strawn limestones that were deposited in a platform environment and that occur at 7700 feet below ground; the salinity of the Strawn formation brine is 39,374 ppm. DST data from WDW-1 indicate that the salinity of fluid recovered from the Cisco Formation in DST No. 5 is 25,000 ppm (Attachment VIII-9).

Formation fluid samples were obtained from the Cisco injection interval upon completion of Navajo's WDW-1 in July 1998. The sample from the lower Cisco perforations (8220 feet to 8476 feet) had a TDS concentration of 33,000 mg/l. The sample from the upper Cisco perforations (7924 feet to 8188 feet) had a TDS concentration of 18,000 mg/l. The report of the chemical analysis is included as Attachment VII-4.

Formation fluid samples were obtained from the Cisco injection interval upon completion of Navajo's WDW-2 in June 1999. The sample from the lower Cisco perforations (7820 feet to 8392 feet) had a specific gravity of 1.0249 and a TDS concentration of 20,000 mg/l. The sample from the Lower Wolfcamp and upper Cisco perforations (7570 feet to 7736 feet) had a specific gravity of 1.0082 and a TDS concentration of 13,000 mg/l.

Navajo will attempt to retrieve a sample of formation brine during the well testing operations of proposed WDW-3. Formation brine samples will be retrieved prior to any stimulation treatments or injection into the wells.

ATTACHMENT VII-1

CHEMICAL ANALYSES OF INJECTED WASTE WATER

**RECENT CHEMICAL ANALYSES OF WASTE WATER
FROM NAVAJO'S REFINERY IN LOVINGTON, NM**

Analysts: Eric Vidacovich

Sample ID ASR#	71197 0306A017	Sample Point	Waste Water
Sample Date Log In Log Out	28-May-03 3-Jun-03 12-Jun-03	TESTS RUN	
Na, Total, mg/L	281		
K, Total, mg/L	11		
Mg, Total, mg/L	33		
Ca, Total, mg/L	240		
Mo, Total, mg/L	<0.01		
Fe, Total, mg/L	0.38		
Cu, Total, mg/L	<0.01		
Zn, Total, mg/L	0.09		
Al, Total, mg/L	<0.01		
Ca as CaCO3, Total, mg/L	500		
Mg as CaCO3, Total, mg/L	135.1		
Hardness as CaCO3, Total, mg/L	735.1		
Bicarbonate as HCO3, mg/L	133		
Carbonate as CO3, mg/L	0		
Hydroxide as OH, mg/L	0		
Cl, by FIA, mg/L	686		
NOx as NO3, by FIA, mg/L	<1		
SO4, by FIA, mg/L	210		
Ortho-PO4, by FIA, mg/L	4.4		
B as B(OH)4, by ICP, mg/L	4.5		
Mo as MoO4, by ICP, mg/L	<0.02		
Si as SiO2, Total by ICP, mg/L	45		
P as PO4, Total by ICP, mg/L	8.9		
S as SO4, Total by ICP, mg/L	255		
pH (as received, lab)	6.89		
P Alkalinity as CaCO3, mg/L	0		
T Alkalinity as CaCO3, mg/L	109		
Specific Conductivity, micromhos/cm	3140		
Neutralized Conductivity, micromhos/cm	NA		
TDS, mg/L, Calculated	1506		
TDS/Conductivity	0.48		
TDS/Neutralized Conductivity	0		
Total Cations, meq, Calculated	26.33		
Total Anions, meq, Calculated	26.1		

Report Date: June 27, 2003

Work Order: 3061622

Page Number: 1 of 4
Lovington, NM

Summary Report

Darrell Moore
Navajo Refining
501 E. Main
Artesia, NM 88210

Report Date: June 27, 2003

Work Order: 3061622

Project Location: Lovington, NM

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
10309	Lovington City WW	water	2003-06-13	13:00	2003-06-16

Sample: 10309 - Lovington City WW

Param	Flag	Result	Units	RL
Total Silver		<0.0125	mg/L	0.0125
Total Aluminum		<0.100	mg/L	0.100
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		108	mg/L as CaCo3	4.00
Total Alkalinity		108	mg/L as CaCo3	4.00
Total Arsenic		0.0500	mg/L	0.0100
Total Boron		0.455	mg/L	0.00500
Total Barium		0.204	mg/L	0.0100
Total Beryllium		<0.00250	mg/L	0.00250
Total Cadmium		<0.00500	mg/L	0.00500
Total Cobalt		<0.0200	mg/L	0.0200
Specific Conductance		2830	µMHOS/cm	0.00
Total Chromium		<0.0100	mg/L	0.0100
Total Copper		<0.0250	mg/L	0.0250
Total Iron		0.512	mg/L	0.0500
Total Mercury		<0.000200	mg/L	0.000200
Chloride		660	mg/L	0.500
Sulfate		206	mg/L	0.500
Total Manganese		0.0580	mg/L	0.0250
Total Molybdenum		<0.0500	mg/L	0.0500
Total Nickel		<0.0250	mg/L	0.0250
Total Lead		<0.0100	mg/L	0.0100
pH		7.00	s.u.	0.00
Reactivity	non-reactive			0.00
Hydrogen Sulfide		<10.0	mg/L	10.0
Hydrogen Cyanide		<2.50	mg/L	2.50
Corrosivity	non-corrosive		mm/yr	0.00
pH		7.20	s.u.	0.00
Ignitability	non-ignitable			0.00
Dissolved Calcium		213	mg/L	0.500
Dissolved Magnesium		26.9	mg/L	0.500
Dissolved Potassium		9.32	mg/L	0.500

continued ...

Report Date: June 27, 2003

Work Order: 3061622

Page Number: 2 of 4
Lovington, NM

sample 10309 continued ...

Param	Flag	Result	Units	RL
Dissolved Sodium		269	mg/L	0.500
Total Selenium		0.0700	mg/L	0.0100
Pyridine		<0.00500	mg/L	5.00
n-Nitrosodimethylamine		<0.00500	mg/L	5.00
2-Picoline		<0.00500	mg/L	5.00
Methyl methanesulfonate		<0.00500	mg/L	5.00
Ethyl methanesulfonate		<0.00500	mg/L	5.00
Phenol		<0.00500	mg/L	5.00
Aniline		<0.00500	mg/L	5.00
bis(2-chloroethyl)ether		<0.00500	mg/L	5.00
2-Chlorophenol		<0.00500	mg/L	5.00
1,3-Dichlorobenzene (meta)		<0.00500	mg/L	5.00
1,4-Dichlorobenzene (para)		<0.00500	mg/L	5.00
Benzyl alcohol		<0.00500	mg/L	5.00
1,2-Dichlorobenzene (ortho)		<0.00500	mg/L	5.00
2-Methylphenol		<0.00500	mg/L	5.00
bis(2-chloroisopropyl)ether		<0.00500	mg/L	5.00
4-Methylphenol / 3-Methylphenol		<0.00500	mg/L	5.00
n-Nitrosodi-n-propylamine		<0.00500	mg/L	5.00
Hexachloroethane		<0.00500	mg/L	5.00
Acetophenone		<0.00500	mg/L	5.00
Nitrobenzene		<0.00500	mg/L	5.00
n-Nitrosopiperidine		<0.00500	mg/L	5.00
Isophorone		<0.00500	mg/L	5.00
2-Nitrophenol		<0.00500	mg/L	5.00
2,4-Dimethylphenol		<0.00500	mg/L	5.00
bis(2-chloroethoxy)methane		<0.00500	mg/L	5.00
2,4-Dichlorophenol		<0.00500	mg/L	5.00
1,2,4-Trichlorobenzene		<0.00500	mg/L	5.00
Benzoic acid		<0.00500	mg/L	5.00
Naphthalene		<0.00500	mg/L	5.00
a,a-Dimethylphenethylamine		<0.00500	mg/L	5.00
4-Chloroaniline		<0.00500	mg/L	5.00
2,6-Dichlorophenol		<0.00500	mg/L	5.00
Hexachlorobutadiene		<0.00500	mg/L	5.00
n-Nitroso-di-n-butylamine		<0.00500	mg/L	5.00
4-Chloro-3-methylphenol		<0.00500	mg/L	5.00
2-Methylnaphthalene		<0.00500	mg/L	5.00
1-Methylnaphthalene		<0.00500	mg/L	5.00
1,2,4,5-Tetrachlorobenzene		<0.00500	mg/L	5.00
Hexachlorocyclopentadiene		<0.00500	mg/L	5.00
2,4,6-Trichlorophenol		<0.00500	mg/L	5.00
2,4,5-Trichlorophenol		<0.00500	mg/L	5.00
2-Chloronaphthalene		<0.00500	mg/L	5.00
1-Chloronaphthalene		<0.00500	mg/L	5.00
2-Nitroaniline		<0.00500	mg/L	5.00
Dimethylphthalate		<0.00500	mg/L	5.00
Acenaphthylene		<0.00500	mg/L	5.00
2,6-Dinitrotoluene		<0.00500	mg/L	5.00
3-Nitroaniline		<0.00500	mg/L	5.00
Acenaphthene		<0.00500	mg/L	5.00
2,4-Dinitrophenol		<0.00500	mg/L	5.00
Dibenzofuran		<0.00500	mg/L	5.00
Pentachlorobenzene		<0.00500	mg/L	5.00
4-Nitrophenol		<0.00500	mg/L	5.00
2,4-Dinitrotoluene		<0.00500	mg/L	5.00

continued ...

Report Date: June 27, 2003

Work Order: 3061622

Page Number: 3 of 4
Lovington, NM

sample 10309 continued ...

Param	Flag	Result	Units	RL
1-Naphthylamine		<0.00500	mg/L	5.00
2,3,4,6-Tetrachlorophenol		<0.00500	mg/L	5.00
2-Naphthylamine		<0.00500	mg/L	5.00
Fluorene		<0.00500	mg/L	5.00
4-Chlorophenyl-phenylether		<0.00500	mg/L	5.00
Diethylphthalate		<0.00500	mg/L	5.00
4-Nitroaniline		<0.00500	mg/L	5.00
Diphenylhydrazine		<0.00500	mg/L	5.00
4,6-Dinitro-2-methylphenol		<0.00500	mg/L	5.00
Diphenylamine		<0.00500	mg/L	5.00
4-Bromophenyl-phenylether		<0.00500	mg/L	5.00
Phenacetin		<0.00500	mg/L	5.00
Hexachlorobenzene		<0.00500	mg/L	5.00
4-Aminobiphenyl		<0.00500	mg/L	5.00
Pentachlorophenol		<0.00500	mg/L	5.00
Anthracene		<0.00500	mg/L	5.00
Pentachloronitrobenzene		<0.00500	mg/L	5.00
Pronamide		<0.00500	mg/L	5.00
Phenanthrene		<0.00500	mg/L	5.00
Di-n-butylphthalate		<0.00500	mg/L	5.00
Fluoranthene		<0.00500	mg/L	5.00
Benzidine		<0.00500	mg/L	5.00
Pyrene		<0.00500	mg/L	5.00
p-Dimethylaminoazobenzene		<0.00500	mg/L	5.00
Butylbenzylphthalate		<0.00500	mg/L	5.00
Benzo(a)anthracene		<0.00500	mg/L	5.00
3,3-Dichlorobenzidine		<0.00500	mg/L	5.00
Chrysene		<0.00500	mg/L	5.00
bis(2-ethylhexyl)phthalate		<0.00500	mg/L	5.00
Di-n-octylphthalate		<0.00500	mg/L	5.00
Benzo(b)fluoranthene		<0.00500	mg/L	5.00
Benzo(k)fluoranthene		<0.00500	mg/L	5.00
7,12-Dimethylbenz(a)anthracene		<0.00500	mg/L	5.00
Benzo(a)pyrene		<0.00500	mg/L	5.00
3-Methylcholanthrene		<0.00500	mg/L	5.00
Dibenzo(a,j)acridine		<0.00500	mg/L	5.00
Indeno(1,2,3-cd)pyrene		<0.00500	mg/L	5.00
Dibenzo(a,h)anthracene		<0.00500	mg/L	5.00
Benzo(g,h,i)perylene		<0.00500	mg/L	5.00
Total Dissolved Solids		1702	mg/L	10.00
Total Uranium		<0.0200	mg/L	0.0200
Total Vanadium		<0.0250	mg/L	0.0250
Bromochloromethane		<1.00	µg/L	1.00
Dichlorodifluoromethane		<1.00	µg/L	1.00
Chloromethane (methyl chloride)		<1.00	µg/L	1.00
Vinyl Chloride		<1.00	µg/L	1.00
Bromomethane (methyl bromide)		<5.00	µg/L	5.00
Chloroethane		<1.00	µg/L	1.00
Trichlorofluoromethane		<1.00	µg/L	1.00
Acetone		<10.0	µg/L	10.0
Iodomethane (methyl iodide)		<5.00	µg/L	5.00
Carbon Disulfide		1.08	µg/L	1.00
Acrylonitrile		<1.00	µg/L	1.00
2-Butanone (MEK)		<5.00	µg/L	5.00
4-Methyl-2-pentanone (MIBK)		<5.00	µg/L	5.00
2-Hexanone		<5.00	µg/L	5.00

continued ...

Report Date: June 27, 2003

Work Order: 3061622

Page Number: 4 of 4
Lovington, NM

sample 10309 continued ...

Param	Flag	Result	Units	RL
trans 1,4-Dichloro-2-butene		<10.0	µg/L	10.0
1,1-Dichloroethene		<1.00	µg/L	1.00
Methylene chloride		<5.00	µg/L	5.00
MTBE		<1.00	µg/L	1.00
trans-1,2-Dichloroethene		<1.00	µg/L	1.00
1,1-Dichloroethane		<1.00	µg/L	1.00
cis-1,2-Dichloroethene		<1.00	µg/L	1.00
2,2-Dichloropropane		<1.00	µg/L	1.00
1,2-Dichloroethane (EDC)		<1.00	µg/L	1.00
Chloroform		<1.00	µg/L	1.00
1,1,1-Trichloroethane		<1.00	µg/L	1.00
1,1-Dichloropropene		<1.00	µg/L	1.00
Benzene		<1.00	µg/L	1.00
Carbon Tetrachloride		<1.00	µg/L	1.00
1,2-Dichloropropane		<1.00	µg/L	1.00
Trichloroethene (TCE)		<1.00	µg/L	1.00
Dibromomethane (methylene bromide)		<1.00	µg/L	1.00
Bromodichloromethane		<1.00	µg/L	1.00
2-Chloroethyl vinyl ether		<5.00	µg/L	5.00
cis-1,3-Dichloropropene		<1.00	µg/L	1.00
trans-1,3-Dichloropropene		<1.00	µg/L	1.00
Toluene		<1.00	µg/L	1.00
1,1,2-Trichloroethane		<1.00	µg/L	1.00
1,3-Dichloropropane		<1.00	µg/L	1.00
Dibromochloromethane		<1.00	µg/L	1.00
1,2-Dibromoethane (EDB)		<1.00	µg/L	1.00
Tetrachloroethene (PCE)		<1.00	µg/L	1.00
Chlorobenzene		<1.00	µg/L	1.00
1,1,1,2-Tetrachloroethane		<1.00	µg/L	1.00
Ethylbenzene		1.36	µg/L	1.00
m,p-Xylene		<1.00	µg/L	1.00
Bromoform		<1.00	µg/L	1.00
Styrene		<1.00	µg/L	1.00
o-Xylene		1.17	µg/L	1.00
1,1,2,2-Tetrachloroethane		<1.00	µg/L	1.00
2-Chlorotoluene		<1.00	µg/L	1.00
1,2,3-Trichloropropane		<1.00	µg/L	1.00
Isopropylbenzene		<1.00	µg/L	1.00
Bromobenzene		<1.00	µg/L	1.00
n-Propylbenzene		<1.00	µg/L	1.00
1,3,5-Trimethylbenzene		<1.00	µg/L	1.00
tert-Butylbenzene		<1.00	µg/L	1.00
1,2,4-Trimethylbenzene		<1.00	µg/L	1.00
1,4-Dichlorobenzene (para)		<1.00	µg/L	1.00
sec-Butylbenzene		<1.00	µg/L	1.00
1,3-Dichlorobenzene (meta)		<1.00	µg/L	1.00
p-Isopropyltoluene		<1.00	µg/L	1.00
4-Chlorotoluene		<1.00	µg/L	1.00
1,2-Dichlorobenzene (ortho)		<1.00	µg/L	1.00
n-Butylbenzene		<1.00	µg/L	1.00
1,2-Dibromo-3-chloropropane		<5.00	µg/L	5.00
1,2,3-Trichlorobenzene		<5.00	µg/L	5.00
1,2,4-Trichlorobenzene		<5.00	µg/L	5.00
Naphthalene		<5.00	µg/L	5.00
Hexachlorobutadiene		<5.00	µg/L	5.00
Total Zinc		0.173	mg/L	0.0250



**DISCHARGE PLAN APPLICATION AND
APPLICATION FOR AUTHORIZATION TO INJECT,
PER OIL CONSERVATION DIVISION FORM C-108,
INTO CLASS I WELLS WDW-1, WDW-2
AND PROPOSED WDW-3**

**VOLUME II
SECTIONS VIII THROUGH REFERENCES**

**NAVAJO REFINING COMPANY
Artesia, New Mexico**

Subsurface Project No. 60D5497

September 2003

Prepared By:

**SUBSURFACE TECHNOLOGY, INC.
Houston, Texas**

TABLE OF CONTENTS

VOLUME II

VIII. GEOLOGY	VIII-1
VIII.A Injection Zone Lithology, Depth, Thickness, Porosity, and Permeability	VIII-1
VIII.B Confining Zone	VIII-4
VIII.C Structure	VIII-6
VIII.D Underground Sources of Drinking Water.....	VIII-7
VIII.E Compatibility Issues.....	VIII-8

ATTACHMENTS

ATTACHMENT VIII-1: Resistivity Log of WDW-1
ATTACHMENT VIII-1A: Porosity Log of WDW-1
ATTACHMENT VIII-2: Resistivity Log of Proposed WDW-2
ATTACHMENT VIII-2A: Porosity Log of Proposed WDW-2
ATTACHMENT VIII-2B: Resistivity Log of Proposed WDW-3
ATTACHMENT VIII-2C: Porosity Log of Proposed WDW-3
ATTACHMENT VIII-3: Dip Structure Cross Section A-A'
ATTACHMENT VIII-4: Strike Structural Cross Section B-B'
ATTACHMENT VIII-5: Thickness of the Wolfcamp Porous Interval
ATTACHMENT VIII-6: Thickness of the Cisco Porous Interval

TABLE OF CONTENTS (Continued)

ATTACHMENT VIII-7:	Permeability, Porosity, and Thickness of Hydrocarbon-Producing Intervals in the Wolfcamp, Cisco, and Canyon Formations in Eddy and Lea Counties	
ATTACHMENT VIII-8:	Drilling Report from Proposed WDW-1	
ATTACHMENT VIII-9:	Drillstem Test Data from Proposed WDW-1	
ATTACHMENT VIII-9A:	Calculation of Permeability from DST No. 5 in WDW-1	
ATTACHMENT VIII-9B:	WDW-1 Pressure Falloff Test Analysis, July 30-31, 1998	
ATTACHMENT VIII-10:	Structure Map of the Top of the Rio Bonito Member of the San Andres Formation	
ATTACHMENT VIII-11:	Structure Map of the Strawn Formation	
ATTACHMENT VIII-12:	Local Structure Map of the Wolfcamp Formation	
ATTACHMENT VIII-13:	Local Structure Map of the Cisco Formation	
ATTACHMENT VIII-14:	Local Structure Map of the Canyon Formation	
ATTACHMENT VIII-15:	Local Structure Map of the Strawn Formation	
ATTACHMENT VIII-16:	Map Showing the Altitude of the 10-g/l Isosaline Surface	
IX.	PROPOSED STIMULATION PROGRAM.....	IX-1
X.	LOGGING AND TESTING	X-1
XI.	FRESHWATER CHEMISTRY	XI-1

ATTACHMENTS

ATTACHMENT XI-1:	Freshwater Wells in the Vicinity of the Proposed Injection Wells (Table)	
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TABLE OF CONTENTS (Continued)

ATTACHMENT XI-2:	Chemical Analysis of Samples from Water Well ID No. 18.28.7.430 in Section 7, T18S, R28E
ATTACHMENT XI-3:	Water Wells in the Vicinity of the Proposed Wells (Data from the State Engineer Office Water Well Database from March 1999)
ATTACHMENT XI-4:	Records on File with the State Engineer Office for Water Wells in the Vicinity of the Proposed Wells
XII.	FAULTING AND OTHER HYDRAULIC CONNECTIONS BETWEEN THE INJECTION ZONE AND THE USDWs.....XII-1
REFERENCES	

VIII. GEOLOGY

VIII.A Injection Zone Lithology, Depth, Thickness, Porosity, and Permeability

The proposed injection zones are porous carbonates of the lower portion of the Wolfcamp Formation and the Cisco and Canyon Formations. These formations occur in WDW-1, WDW-2, and proposed WDW-3 at the depths shown in the table below. The injection zone is shown on the logs of WDW-1, WDW-2, and proposed WDW-3 in Attachments VIII-1, VIII-1A, VIII-2, and VIII-2A, VIII-2B, and VIII-2C, and in cross sections in Attachments VIII-3 and VIII-4.

Injection Zone Formation	WDW-1 (KB height = 3693 feet)		WDW-2 (KB height = 3623 feet)		PROPOSED WDW-3 (KB height = 3625 feet)	
	Measured Depth below KB (feet)	Subsea Depth (feet)	Measured Depth below KB (feet)	Subsea Depth (feet)	Measured Depth below KB (feet)	Subsea Depth (feet)
Lower Wolfcamp	7450	-3757	7270	-3647	7303	-3678
Cisco	7816	-4123	7645	-4022	7650	-4025
Canyon	8475	-4782	8390	-4767	8390	-4765
Base of Injection Zone (base of Canyon)	9016	-5323	8894	-5271	8894	-5269

The lower portion of the Wolfcamp Formation (the Lower Wolfcamp) is the shallowest porous unit in the proposed injection interval. The Wolfcamp Formation (Permian - Wolfcampian age) consists of light brown to tan, fine- to medium-grained, fossiliferous limestones with variegated shale interbeds (Meyer, 1966, page 69). The top of the Wolfcamp Formation was correlated for this study to be below the base of the massive, dense dolomites of the overlying Abo Formation. The base of the Wolfcamp coincides with the top of the Cisco Formation. Attachment VIII-5 shows that the thickness of log porosity greater than 5% in the entire Wolfcamp Formation ranges from 0 feet to 295 feet in a band 3 miles wide that trends northeast-southwest across the study area. Attachment VIII-5 indicates that the

Wolfcamp will have porosity at proposed WDW-3 that is similar to that at Navajo's WDW-1 and WDW-2.

The upper portion of the Wolfcamp Formation from 6890 feet to 7450 feet in WDW-1, has low permeability, as indicated by DSTs run in WDW-1 in 1993 (see Section VIII.B). Logs of the upper portion of the Wolfcamp in proposed WDW-2 show that it includes bands of low porosity, such as the interval from 7120 feet to 7180 feet. The upper portion of the Wolfcamp Formation is not included in the proposed injection zone.

The Lower Wolfcamp is the same interval used for injection in the I&W, Inc., Walter Solt SWD-1 (Map ID No. 83), which is completed between 7518 feet and 7812 feet in that well. The caliper log run in WDW-1 in 1993 in the Lower Wolfcamp (Attachment VIII-1A) shows several intervals of hole enlargement in carbonates, for example from 7640 feet to 7670 feet. These intervals may have sufficient permeability and lateral extent to accept injected fluids. In WDW-2, the lower 80 feet of the Lower Wolfcamp, from 7565 feet to 7645 feet, is porous carbonate that is similar in log character to the underlying Cisco Formation. Navajo has demonstrated that the Cisco Formation has injection capacity in WDW-1.

The Cisco Formation (Pennsylvanian - Virgilian age) of the Northwest Shelf is described by Meyer (1966, page 59) as consisting of uniform, light-colored, chalky, fossiliferous limestones interbedded with variegated shales. Meyer (1966, page 59) also describes the Cisco at the edge of the Permian Basin as consisting of biohermal (mound) reefs composed of thick, porous, coarse-grained dolomites. Locally, the Cisco consists of porous dolomite that is 745 feet thick in WDW-2, 659 feet thick in WDW-1, and 720 feet in proposed WDW-3. The total thickness of intervals with log porosity greater than 5% is approximately 310 feet in WDW-1, 580 feet in WDW-2, and 572 feet in proposed WDW-3. The total thickness with log porosity greater than 10% is approximately 100 feet in WDW-1, 32 feet in WDW-2, and 65 feet in proposed WDW-3. Attachment VIII-6 shows that the thickness of the porous intervals in the Cisco ranges from 0 feet in the northwestern part of the study area to nearly 700 feet in a band 3 miles wide that trends northeast-southwest.

The Canyon Formation (Pennsylvanian - Missourian age) consists of white to tan to light brown fine-grained, chalky, fossiliferous limestone with gray and red shale interbeds (Meyer, 1966, page 53). Locally, the Canyon occurs between the base of the Cisco dolomites and the top of the Strawn Formation of Pennsylvanian (Desmoinesian) age. The total thickness of intervals with log porosity greater than 5% is 34 feet in WDW-1, 30 feet in WDW-2, and 10 feet in proposed WDW-3. No intervals appear to have log porosity greater than 10% in any of the three injection wells.

Permeability measurements that range from less than 100 md to 2733 md are available for the Lower Wolfcamp-Cisco-Canyon injection zone. Permeability measurements from hydrocarbon-producing intervals in the Wolfcamp, Cisco, and Canyon from Meyer (1966, Table 4) are summarized in Attachment VIII-7. Meyer reported permeabilities in the Cisco of up to 114 millidarcies (md), up to 38 md in the Canyon, and up to 200 md in the Wolfcamp.

Permeability was estimated to be 597 md from DST No. 5 conducted in WDW-1 on August 26, 1993. DST No. 5 was conducted near the top of the Cisco Formation from 7817 feet to 7851 feet. Test data for DST No. 5 and calculation of permeability are included in Attachments VIII-9 and VIII-9A, respectively.

A pressure buildup/pressure falloff test was conducted in WDW-1 on July 30 and 31, 1998, after WDW-1 was recompleted to the Cisco injection zone. The transmissibility (kh, or product of permeability and thickness) determined from the pressure falloff test data was 284,839 md-ft. The average permeability of the Cisco injection zone is determined by dividing kh by the thickness of the interval that was perforated, as shown below:

$$\begin{aligned} k &= \frac{k h}{h} \\ &= \frac{284,839 \text{ md-ft}}{253 \text{ feet}} \\ &= 1126 \text{ md} \end{aligned}$$

where,

k = permeability

kh = transmissibility from pressure falloff test

h = thickness of perforated interval

The WDW-1 pressure buildup/pressure falloff test data and analysis are included as Attachment VIII-9B.

A pressure buildup/pressure falloff test was conducted in WDW-2 on June 4 and 5, 1999, after WDW-2 was recompleted to the Lower Wolfcamp and Cisco injection zone. The transmissibility (kh, or product of permeability and thickness) determined from the pressure falloff test data was 817,018 md-ft. The average permeability of the injection zone was determined by dividing kh by the thickness of the interval that was perforated, 299 feet, to be 2733 md.

In summary, permeability values in the proposed injection zone from producing fields in the region range up to 200 md, as discussed above. Based on test data for WDW-1 and WDW-2, however, permeability values as high as 2733 md or higher occur in intervals in the injection zone. Permeabilities of 250 md and greater are also expected in the injection zone in proposed WDW-3.

VIII.B Confining Zone

The confining zone extends from 4000 feet to 7450 feet in WDW-1, from 4120 feet to 7270 feet in WDW-2, and from 4030 feet KB to 7303 feet KB in proposed WDW-3. The confining zone includes massive low-porosity carbonate beds and layers of shale in the Upper Wolfcamp, Abo, and Yeso Formations that will confine the injected fluids to the proposed injection zone (Lower Wolfcamp, Cisco, and Canyon Formations). The formations that comprise the confining zone are described below. The confining zone extends throughout the AOR, as shown in the cross sections in Attachments VIII-3 and VIII-4.

The proposed injection zone is directly overlain by the confining layers of the upper portion of the Wolfcamp Formation. Three (3) DSTs were conducted in the upper portion of the Wolfcamp in WDW-1, in the interval from 7016 feet to 7413 feet, that indicate that the interval has low permeability and can confine injected fluids to the injection zone. The DSTs, DST Nos. 2, 3, and 4, are summarized in the daily drilling reports in Attachment VIII-8. Reports of the data from DST Nos. 3 and 4 are presented in Attachment VIII-9. Although the data from DST No. 4 are not analyzable, an average permeability of 0.36 md was calculated from the data from DST No. 3, as shown below:

$$\begin{aligned}
 k &= 162.6 \frac{q B \mu}{mh} \\
 &= 162.6 \frac{(20 \text{ bbl}/89 \text{ min} \times 1440 \text{ min/day})(1)(0.53 \text{ cp})}{(570.883 \text{ psi/cycle})(7382 \text{ feet} - 7230 \text{ feet})} \\
 &= 162.6 \frac{(323.6 \text{ bpd})(1)(0.53 \text{ cp})}{(570.883 \text{ psi/cycle})(152 \text{ feet})} \\
 &= 0.36 \text{ md}
 \end{aligned}$$

A permeability on the order of 0.1 md is at the low end of the permeability range for carbonates, and is at the high end of the permeability range for shales, according to Freeze and Cherry (1979, p. 29). Therefore, the low-permeability carbonates of the upper Wolfcamp will provide the first level of confinement for the injection zone.

The Abo Formation overlies the Wolfcamp and extends from 5400 feet to 6890 feet in WDW-1, from 5506 feet to 6728 feet in WDW-2, and from 5380 feet KB to 6745 feet KB in proposed WDW-3. Although the Abo is well known as a major oil producer in the AOR, the producing intervals lie in the upper Abo, whose equivalents are above 6100 feet in WDW-1 and above 6200 feet in proposed WDW-2. The deepest Abo test well in the AOR, Map ID No. 126, located 6000 feet east (downdip) of proposed WDW-3, was drilled to 6412 feet. No Abo production in the AOR has been established below 6298 feet, the producing interval in Map ID No. 112, located 3800 feet southeast (downdip) of WDW-1. The base of

the producing interval within the Abo Formation in the AOR, therefore, is over 900 feet above the top of the proposed injection zone. The lower 600 feet of the Abo Formation (below the deepest producing interval in the AOR), consisting primarily of dolomite with average porosity less than 5% and interbedded shale, will serve as the secondary confining layer above the proposed injection zone.

The Yeso Formation, which will provide additional confining capabilities, directly overlies the Abo Formation. The top of the Yeso is not consistently identified in the AOR, according to well records submitted to the OCD and available scout tickets. However, the top of the confining zone can be considered to extend to the top of the low-porosity limestone interval below the higher-porosity dolomites below the Glorieta Member of the San Andres Formation (at 4000 feet in WDW-1, 4120 feet in WDW-2, and 4030 feet KB in proposed WDW-3). The Yeso consists of low-porosity carbonates and clastic beds. The Tubb shale, a shale interval that is up to 150 feet thick in some wells in the study area, also occurs in this interval. Although no faults are known to exist in the confining zone within the AOR, the Tubb shale will serve to prevent movement of fluids through a hypothetical unknown fault.

VIII.C Structure

The proposed injection well is located on the southern flank of the Artesia-Vacuum anticline (also called the Vacuum Arch), which trends east-west across the study area. The Vacuum Arch is shown clearly on Attachment VIII-10, a structure map drawn on the Rio Bonito member of the San Andres Formation. The top of the Rio Bonito member occurs at approximately 2260 feet in WDW-1 and at 2320 feet in WDW-2, or 300 feet to 320 feet below the top of the San Andres Formation, and over 4600 feet above the top of the proposed injection interval (Lower Wolfcamp, Cisco, and Canyon Formations). The general structure of the injection zone is shown on Attachment VIII-11, a regional structure map of the Strawn Formation, drawn on a horizon that is approximately 375 feet below the top of the Strawn (base of the proposed injection zone), as it is recognized in records and scout tickets for wells in the local study area. The top of the proposed injection zone is conformable with the structure of the Strawn Formation. Attachment VIII-11 shows the trend of the Vacuum arch, as well as the southeasterly dip of the beds at approximately 100 feet per mile in the vicinity of the proposed injection wells. No faults exist in the

USDWs. The plugged and abandoned producing well within the AOR is listed below:

Map ID No. 848

No corrective action is required for this well.

Plugged and Abandoned Dry Holes (1 well):

Plugged and abandoned dry holes have surface casing and may have intermediate or long-string casing set through the injection zone. Dry holes were plugged with heavy mud and cement plugs. The cement plugs were placed between the requested injection zone and the USDWs. The plugged and abandoned dry hole is listed below:

Map ID No. 851.

No corrective action is required for this well.

VI.E Cone of Influence and Area of Review Determination

The cone of influence is defined here as the area within which increased injection zone pressures caused by injection of wastes would be sufficient to cause fluid movement through any well or other conduit into a USDW. ~~This demonstration shows that the extremely conservative worst-case cone of influence of the proposed injection operations is smaller than the one-mile radius AOR in which artificial penetrations were investigated.~~

In the worst case, ~~an undocumented abandoned well is imagined to be open to both~~ the injection zone and the base of the USDW. In addition, the well is imagined to be filled to within 100 feet of the ground surface with formation brine from the injection zone and fresh water from the base of the USDW. The cone of influence can be calculated by comparing the hydraulic heads of the injection zone and the lowermost USDW. ~~It is only where the injection zone head is above the USDW head that fluid movement from the injection zone into the USDW could occur.~~ This worst-case

model of the potential effect of injection upon the USDW is extremely conservative, because no wells within one mile of the proposed injection wells are open to both the injection zone and the USDW and filled with brine.

The injection zone for Navajo's proposed injection wells has a native pressure such that the resulting hydraulic head is lower than the head of the lowermost USDW. The pre-injection pressure of the injection interval was measured on July 30, 1998, in Navajo's WDW-1 to be 2928 psia at 7924 feet (7911 feet below ground level, BGL) (Attachment VIII-9B).

A sample of fluid was retrieved from formation fluid swabbed on July 25, 1998, from the perforations of the deeper Cisco interval, from 8220 feet to 8476 feet in Navajo's WDW-1. The total dissolved solids (TDS) concentration of the sample was 33,000 mg/l, and the specific gravity of the sample at room temperature was 1.034. Formation fluid was swabbed on July 29, 1998, from the perforations of the shallower Cisco interval, from 7924 feet to 8188 feet in Navajo's WDW-1. The analysis of a sample of this fluid indicated that the TDS concentration of the sample was 18,000 mg/l, and the specific gravity at room temperature was 1.018. The chemical analysis of the formation fluid samples is included as Attachment VII-4. These values compare favorably with information from the analysis of fluid retrieved during drillstem test (DST) No. 5, which was conducted on August 26, 1993, in WDW-1 (see Attachment VIII-9). The salinity of the formation fluid retrieved during DST No. 5 was reported in Attachment VIII-9 as a chlorides concentration of 25,000 ppm. The formation fluid is therefore assumed to have a sodium chloride concentration of 25,000 ppm. The specific gravity of such a fluid is approximately 1.02.

The pre-injection pressure, P_i , at the top of the injection zone in proposed WDW-2 at 7270 feet BKB (7257 feet BGL) is 2640 psia, as calculated below, based on a formation fluid specific gravity of 1.018. Using the lightest specific gravity in this calculation yields a high P_i , which is conservative.

$$\begin{aligned}
 P_i(7257 \text{ feet}) &= P_i(7911 \text{ feet}) - (7911 \text{ feet} - 7257 \text{ feet}) (0.433 \text{ psi/ft}) (1.018) \\
 &= 2928 \text{ psia} - 288 \text{ psi} \\
 &= 2640 \text{ psia}
 \end{aligned}$$

The head of the lowermost USDW is estimated to be 100 feet BGL. This estimate is reasonably conservative, as it is based on a static water level measurement of 81 feet in Water Well No. 18.28.8.330 (Attachment XI-1). The total depth of the well is unknown.

The critical pressure, P_c , at 7257 feet BGL that would be necessary to raise the hydrostatic head of the injection interval to the head of the lowermost USDW at 100 feet BGL is 3152 psia, as calculated below:

$$\begin{aligned}
 P_c &= (\text{Top of Injection Zone} - \text{Base of USDW}) (0.433 \text{ psi/ft}) (1.018) \\
 &\quad + (\text{Base of USDW} - \text{Head of USDW}) (0.433 \text{ psi/ft}) \\
 &= (7257 \text{ feet} - 473 \text{ feet}) (0.433 \text{ psi/ft}) (1.018) \\
 &\quad + (473 \text{ feet} - 100 \text{ feet}) (0.433 \text{ psi/ft}) \\
 &= 3152 \text{ psia}
 \end{aligned}$$

The critical increase in reservoir pressure, ΔP_c , above the native pressure, that is necessary to raise the hydrostatic head of the injection interval to the head of the lowermost USDW is, therefore, 512 psi, as calculated below:

$$\begin{aligned}
 \Delta P_c &= P_c - P_i \\
 &= 3152 \text{ psia} - 2640 \text{ psia} \\
 &= 512 \text{ psi}
 \end{aligned}$$

An increase in reservoir pressure greater than 512 psi would be sufficient to raise the head of the injection zone above the head of the lowermost USDW. The cone of influence is the area around the injection wells within which the increase in reservoir pressure caused by injection is greater than 512 psi.

Contour plots of the predicted pressure increase in the injection zone (Attachment VI-5) were generated using historical injection rates and the maximum injection rates

permitted for WDW-1, WDW-2, and proposed WDW-3. A Visual Basic program, PREDICTW, was used to calculate the pressure increase throughout the injection zone at the end of 20 years of injection into the wells. The theoretical basis for PREDICTW is discussed in Attachment VI-6. The gridded pressure increases created by PREDICTW are contoured using SURFER, a commercial contouring software package.

Conservative values for reservoir thickness and permeability were used to overestimate the predicted increase in reservoir pressure. The reservoir was assumed to have a thickness of 85 feet. The permeability of the reservoir was assumed to be 250 md. The modeled kh, 21,250 md-ft (= 250 md x 85 feet), is less than 10% of the kh, 284,839 md-ft, that was determined from the pressure falloff test conducted in Navajo's WDW-1 on July 30, 1998 (See Section VIII and Attachment VIII-9B). Using a low kh will yield a predicted pressure increase that is much greater than expected and a cone of influence that is much larger than expected.

The porosity was assumed to be 10%.

The viscosity of the formation fluid with TDS concentration of 25,000 ppm at 130°F is 0.53 cp (Attachment VI-7). The compressibility of the pore volume of the formation (Canyon Reef as shown on Attachment VI-8), c_r , is 5.5×10^{-6} psi⁻¹. The compressibility of the formation fluid (distilled water as shown on Attachment VI-8), c_w , is 2.9×10^{-6} psi⁻¹. The total compressibility ($c_t = c_r + c_w$) is 8.4×10^{-6} psi⁻¹.

Historical injection data for WDW-1 and WDW-2 were used for the injection period from September 23, 1999 (initial injection into the wells) through June 30, 2003. WDW-1, WDW-2, and proposed WDW-3 are then modeled as injecting from July 1, 2003 through September 22, 2019, at a maximum total rate of 1000 gallons per minute (gpm) distributed among the three wells. The maximum per-well injection rate modeled is 500 gpm.

The I & W, Inc. Walter Solt SWD-1 (Map ID No. 83), a Class II well, injects into the lower Wolfcamp through four sets of perforations between 7518 and 7812 feet. Historical injection records available from the OCD for 1994 through 1997 indicate

that the average injection rate is 17.6 gpm. This rate is used for the historical injection period from June 1, 1988, through September 22, 1999. For the future injection period, from September 23, 1999 through September 22, 2019, the Walter Solt SWD-1 is expected to inject at 58.3 gpm, or 2000 barrels per day (bpd), the maximum rate requested by the original permit application for the Walter Solt SWD-1.

The 512-psi pressure-increase contour, which defines the outline of the worst-case cone of influence, is located less than one mile from WDW-1, WDW-2, and proposed WDW-3, as shown in Attachment VI-5. An improperly abandoned wellbore or other conduit filled with formation fluid that is located farther than one mile from the proposed wells would not transmit sufficient pressure from the injection zone to move fluids into the USDW. Navajo researched public and private sources of information about wells within the one-mile AOR. ~~Only 15 of 295 wells drilled in the AOR penetrated the injection zone. Information was presented in Section VI.D that demonstrates that each of the injection zone penetrations is properly constructed to prevent migration of fluids into the USDW.~~

study area, and faulting occurs no closer than 16 miles to the proposed injection wells. The nearest fault is the K-M fault, which is located 6 miles northwest of Artesia and trends northeast-southwest, as shown on Attachment VIII-10. Attachments VIII-12, VIII-13, VIII-14, and VIII-15 are local structure maps drawn on the Wolfcamp, Cisco, Canyon, and Strawn Formations.

VIII.D Underground Sources of Drinking Water (USDWs)

The base of the USDWs, in which the total dissolved solids (TDS) concentration of the formation water is less than 10,000 milligrams/liter (mg/l) or the equivalent, 10 g/l, occurs at approximately 3200 feet above sea level at WDW-1 and 3150 feet above sea level at WDW-2 and proposed WDW-3, as shown on Attachment VIII-16. In WDW-1, the base of the USDWs occurs at a measured depth of 493 feet below kelly bushing (KB; 493 feet KB = 3693 feet - 3200 feet, where 3693 feet is the elevation of the kelly bushing of WDW-1), or the base of the Tansill Formation (Permian - Guadalupian age). In WDW-2, the base of the USDWs occurs at a measured depth of 473 feet below KB (473 feet KB = 3623 feet - 3150 feet). In proposed WDW-3, the base of the Tansill Formation occurs at 420 feet KB. In the eastern part of the study area, at depth, the Tansill Formation is overlain by the Salado Formation (Permian - Ochoan age). The Salado consists of halite, polyhalite, anhydrite, and potassium salts, which are soluble. The Salado is overlain by the Rustler Formation (Permian - Ochoan age). In the AOR, which straddles the outcrop area of the Salado, and to the east, the Salado has been removed by solution by ground water flowing through the Rustler.

To the east, where the Rustler is present, the Rustler is the USDW. To the west, where the Rustler has been removed by erosion and the Salado has been removed by solution, the Tansill is the USDW. The Tansill Formation and the underlying Yates Formation comprise the Three Twins Member of the Chalk Bluff Formation known in outcrops in the region (Hendrickson and Jones, 1952, page 20), and listed as a freshwater-producing interval in Attachment XI-1. The proposed injection zone (Lower Wolfcamp, Cisco, and Canyon Formations) is separated from the USDWs by 6957 feet (6957 feet = 7450 feet - 493 feet, where 7450 feet is the depth of the top of the injection zone) of carbonates, siltstones, and shales in WDW-1. In WDW-2, the USDWs are separated from the injection zone by 6797 feet (= 7270

feet - 473 feet). In proposed WDW-3, the USDWs are separated from the injection zone by 6883 feet (= 7303 feet - 420 feet).

VIII.E Compatibility Issues

The integrity of the carbonates of the injection zone and the confining zone is not threatened by the injected waste. The monitoring system and physical limitations on injection established by state and federal regulations are adequate checks to identify and address any problems that may arise. Operating limits on maximum injection pressure and monitoring requirements for well annular pressure versus injection pressure and annular fluid volume force the operator to be as protective of his wellbore and the injection zone as is possible. Furthermore, events such as tubing failures and packer failures that are caused by the injection of corrosive materials would require that the well be shut down and that a workover be performed. The proposed monitoring methods are capable of detecting wellbore integrity and injection problems before they could threaten human health and the environment.

The proposed waste stream will have a pH range of 6.0 to 9.0, that is, near neutral to slightly alkaline. The reactions of alkaline solutions with carbonates are slow or non-existent, so no significant loss of formation is expected from injection of this waste stream. Therefore, no chemical incompatibility between the proposed waste stream and the formation is expected to occur that could allow wastes to migrate out of the injection zone.

ATTACHMENT VIII-2B

RESISTIVITY LOG OF PROPOSED WDW-3



ATTACHMENT VIII-2C
POROSITY LOG OF PROPOSED WDW-3



X. LOGGING AND TESTING

WDW-1: Two (2) formation fluid samples were retrieved from the Cisco injection interval when WDW-1 was completed in July 1998. The sampling procedure was detailed in the "Reentry and Completion Report, Waste Disposal Well No. 1" (the completion report was submitted to the OCD in September 1998). The results of the analysis of the fluid samples are also discussed in Section VI.E and included as Attachment VII-4 of this application.

No cores were taken from WDW-1.

The WDW-1 logging program is described fully in the completion report, and the logs are included in the completion report. The logs run in WDW-1 are listed below:

<u>TYPE OF LOG</u>	<u>TYPE OF HOLE LOGGED</u>	<u>INTERVAL (ft)</u>
	<u>Intermediate Casing</u>	
Cement Bond Log Variable Density Log Gamma Ray	Cased Hole	0 to 2548
	<u>Long-String Casing</u>	
Dual Laterolog Gamma Ray Micro-Spherically Focused Electric Log	Open Hole	2546 to 10,182
Spectral Density Dual Spaced Neutron Log Gamma Ray	Open Hole	350 to 10,139
Compensated Sonic Log Gamma Ray	Open Hole	350 to 10,181
Formation Microscanner Imaging Results	Open Hole	4000 to 9143
Caliper Log Gamma Ray	Open Hole	2553 to 9143
Cement Bond Log Variable Density Log Gamma Ray	Cased Hole	0 to 8990
Casing Evaluation Log w/Multi-Finger Caliper Tool w/Electromagnetic Casing Caliper Thickness Tool	Cased Hole	0 to 8997
Temperature Log	Cased Hole	0 to 8997
Temperature Log	Cased Hole	0 to 8997

The mechanical integrity of WDW-1 was demonstrated by the use of: a casing inspection log, a casing pressure test, and a cement bond log of the 7-inch casing; a cement bond log of the 9-5/8 inch casing; and a radioactive tracer survey, an annulus pressure test, and a differential temperature survey. These tests are detailed in the completion report for WDW-1.

WDW-2: Details of the logging and testing conducted during the reentry and recompletion of WDW-2 in May and June 1999 were provided in the document "Reentry and Completion Report, Waste Disposal Well No. 2," prepared by Subsurface and submitted to the OCD by Navajo in July 1999.

Proposed WDW-3: A formation fluid sample will be retrieved from the injection zone in proposed WDW-3. Navajo will conduct injectivity testing in permeable intervals of proposed WDW-3.

The proposed logging program is described below:

HOLE/CASING	OPEN-HOLE LOGS	CASED-HOLE LOGS
Proposed WDW-3		
17-1/2-inch Surface Borehole (13-3/8 inch Casing) 400 feet		Log run on 1/29/91: Gamma Ray
12-1/4-inch Intermediate Borehole (9-5/8-inch Casing) 2604 feet		Log run on 1/29/91: Gamma Ray
8-3/4-inch Long-String Borehole (7-inch Casing) 9450 feet	Logs Run on 1/29/91: Gamma Ray Caliper Dual Laterolog Micro SFL Spectral Density Dual Spaced Neutron	Logs Proposed on Reentry: Cement Bond/Variable Density Casing Inspection Log Differential Temperature Log Radioactive Tracer Survey
6-inch Liner Borehole (4-1/2-inch Liner) 9051 feet to 1019 feet	Logs Run on 1/29/91: Gamma Ray Caliper Dual Laterolog Micro SFL Spectral Density Dual Spaced Neutron	

ATTACHMENT A

REVISIONS TO THE DISCHARGE PLAN APPLICATION

ADMINISTRATIVE APPLICATION CHECKLIST

Updated.

DISCHARGE PLAN APPLICATION FORM

Updated.

APPLICATION FORMS

Replaced OCD Forms C-101 and C-102 for proposed WDW-3 to show new location.

Updated forms for WDW-2, which was completed in May and June 1999. Updated Form

C-108.

TABLE OF CONTENTS

Updated.

SECTION I: PURPOSE

Updated to include that WDW-2 was completed and that the location of proposed WDW-3 has been changed.

SECTION III: WELL DATA

Updated to include information about WDW-2 and new information about proposed WDW-3.

SECTION IV: EXISTING PROJECT

Updated.

ATTACHMENT A (Continued)

SECTION V: AREA OF REVIEW

Updated Attachment V-1 to show the locations of non-freshwater wells in the vicinity of Navajo's WDW-1, WDW-2, and proposed WDW-3.

SECTION VI: WELLS IN THE AREA OF REVIEW

Updated information about wells in the 1-mile-radius area of review of WDW-1, WDW-2, and proposed WDW-3. The predicted pressure buildup caused by the proposed injection operations and the size of the cone of influence was modified to include the revised location of proposed WDW-3.

SECTION VII: PROPOSED OPERATIONS

~~Revised to update the maximum surface injection pressure in proposed WDW-3.~~ Updated to include the analysis of formation fluid samples retrieved from WDW-2 in June 1999.

SECTION VIII: GEOLOGY

Revised to add information about the injection zone that was obtained by testing WDW-2. Injection zone data from WDW-2 support the reservoir model in Section VI.E. Revised to add site-specific geological information for proposed WDW-3.

SECTION X: LOGGING AND TESTING

Revised to specify the logging program planned for proposed WDW-3.

ATTACHMENT B

INSTRUCTIONS FOR UPDATING THE DOCUMENT “DISCHARGE PLAN AND APPLICATION FOR AUTHORIZATION TO INJECT,” SUBMITTED BY NAVAJO ON MAY 1, 1998, AND REVISED IN APRIL 1999 AND SEPTEMBER 1999

VOLUME I

Remove and discard the title page, and replace with enclosed.

Remove and discard the Table of Contents, and replace with enclosed.

Add enclosed Administrative Application Checklist.

Add enclosed Discharge Plan Application.

Add the enclosed OCD Form C-105 and schematics for WDW-2 behind the divider that reads "WDW-2: OCD and BLM Forms."

Behind the divider that reads "WDW-3: Forms C-101 and C-102," remove and discard the existing forms, and replace with enclosed.

Add enclosed Form C-108.

SECTION I: Remove and discard the text of Section I, and replace with enclosed.

SECTION III: Remove and discard cover sheet and well data sheet for WDW-2 and replace with enclosed (keep schematics). Remove Drilling Program. Remove and discard Attachment III-3, and replace with enclosed.

SECTION IV: Remove and discard the text of Section IV, and replace with enclosed.

SECTION V: Remove and discard Attachment V-1, and replace with enclosed.

SECTION VI: Remove and discard the text of Section VI, and replace with enclosed.

Remove and discard Attachment VI-1, and replace with enclosed.

Remove and discard Attachment VI-1A, and replace with enclosed.

For Map ID No. 157, remove the existing well schematic, and add the well records for Map ID No. 157 (proposed WDW-3) behind the divider in Attachment VI-2.

Add the well records for Map ID No. 353, with tabbed divider, to Attachment VI-2.

Behind the divider for Map ID No. 861, add new cover sheet.

Add the well records for Map ID No. 911, with tabbed divider.

Add new Attachments VI-2D and VI-2E.

Remove and discard Attachments VI-3 through VI-5, and replace with enclosed. Note that Attachment VI-4 is not used.

SECTION VII: Remove and discard the text of Section VII, and replace with enclosed.

Add chemical analyses of Lovington refinery waste at the end of Attachment VII-1.

VOLUME II

Remove and discard title page and Table of Contents, and replace with enclosed.

SECTION VIII: Remove and discard the text of Section VIII, and replace with enclosed.

Add new Attachments VIII-2B and VIII-2C.

SECTION X: Remove and discard the text of Section X, and replace with enclosed.

ATTACHMENT C

LEASEHOLD OPERATORS WITHIN 1 MILE OF NAVAJO REFINING COMPANY'S PROPOSED WDW-3

Map ID Nos. 354, 356, and 358

Aspen Oil, Inc.
PO Box 2674
Hobbs, NM 88241-2674

Map ID Nos. 27, 93, 94, 95, 96, 97, 102, 118, 121, 122, 125, 129, 130, 135, 136, 138, 139, 140, 141, 143, 146, 147, 148, 149, 150, 151, 152, 154, 155, 156, 160, 355, 752, 753, 756, 765, 779, 785, 786, 789, 791, 796, 797, 799, 800, 801, 802, 805, 806, 813, 814, 836, 837, 838, 839, 840, and 841

BP America Production Company
PO Box 3092
Houston, TX 77253

Map ID Nos. 162, 165, 166, 859, 860, 862, 864, 866, 869, 870, and 943

The Eastland Oil Company
PO Drawer 3488
Midland, Texas 79702

Map ID No. 772

H & S Oil, L.L.C.
PO Box 186
Artesia, NM 88211-0168

Map ID No. 100

Hanson Energy
R 342 South Haldeman Rd.
Artesia, NM 88210

ATTACHMENT C (Continued)

Map ID Nos. 928, 929, 930, 931, 940, and 941

Marbob Energy Company
PO Box 227
Artesia, NM 88211-0227

Map ID Nos. 748, 758, and 766

McQuadrangle, L.C.
7008 Salem
Lubbock, TX 79424

Map ID No. 124, 134, 144, 161, and 353

Mewbourne Oil Company
PO Box 7698
Tyler, Texas 75711

Map ID NO. 167

MOREXCO, Inc.
PO Box 1591
Roswell, NM 88202-1591

Map ID No. 123

Penroc Oil Corporation
PO Box 2769
Hobbs, NM 88241-2769

Map ID No. 354

Pronghorn Management Corporation
PO Box 1772
Hobbs, NM 88241

Map ID Nos. 131, 142, 145, 153, 158, 159, 359, 749, 750, 751, 755, 757, 773, 774, 781, 856, 857, 858, 863, 865, 868, 871, 872, 901, 910

P&A'd Wells

ATTACHMENT C (Continued)

Map ID Nos. 119, 132, 137, 754, 792, 795, and 933

Mis-spotted and duplicate well locations

Map ID Nos. 120, 932, 934, 944

Abandoned Locations

Map ID No. 778

Inactive Well (no information in OCD files)

All Wells on Federal Land

Bureau of Land Management
New Mexico State Office
Post Office and Federal Building
Post Office Box 1449
Santa Fe, New Mexico 87504-1449

Bureau of Land Management
Roswell Field Office
2909 West Second Street
Roswell, New Mexico 88201
Attn: Mr. David Glass

Bureau of Land Management
Carlsbad Field Office
Post Office Box 1778
Carlsbad, New Mexico 88221-1778
Attn: Mr. Joe Lara



**DISCHARGE PLAN APPLICATION AND
APPLICATION FOR AUTHORIZATION TO INJECT,
PER OIL CONSERVATION DIVISION FORM C-108,
INTO CLASS I WELLS WDW-1, WDW-2
AND PROPOSED WDW-3**

**VOLUME I
SECTIONS I THROUGH VII**

**NAVAJO REFINING COMPANY
Artesia, New Mexico**

Subsurface Project No. 60D5497

September 2003

Prepared By:

**SUBSURFACE TECHNOLOGY, INC.
Houston, Texas**

TABLE OF CONTENTS

VOLUME I

DISCHARGE PLAN UTC-CLI-008-1 APPROVAL LETTERS

ADMINISTRATIVE APPLICATION CHECKLIST

DISCHARGE PLAN APPLICATION

FORM C-101: APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUG
BACK, OR ADD A ZONE

FORM C-102: WELL LOCATION AND ACREAGE DEDICATION PLAT

FORM C-108: APPLICATION FOR AUTHORIZATION TO INJECT

ADDENDUM NO. 1: RESPONSE TO REQUEST FOR ADDITIONAL
INFORMATION RECEIVED ON JUNE 10, 1998

ADDENDUM NO. 2 RESPONSE TO COMMENTS RECEIVED
ON AUGUST 6 and August 10, 1999

I.	PURPOSE.....	I-1
II.	OPERATOR.....	II-1
III.	WELL DATA.....	III-1

ATTACHMENTS

ATTACHMENT III-1: WDW-1 Injection Well Data Sheet and Well Schematic

ATTACHMENT III-2: WDW-2 Injection Well Data Sheet and Well Schematic

ATTACHMENT III-3: Proposed WDW-3 Injection Well Data Sheet, Well
Schematic, and Drilling and Completion Procedure

ATTACHMENT III-4: Closure Plan for WDW-1 and Proposed WDW-2 and
WDW-3

IV.	EXISTING PROJECT.....	IV-1
-----	-----------------------	------



TABLE OF CONTENTS (Continued)

V.	AREA OF REVIEW	V-1
----	----------------------	-----

ATTACHMENTS

ATTACHMENT V-1: Non-Freshwater Wells in the Area of Review

ATTACHMENT V-2: Water Wells in the Vicinity of the Proposed Injection Wells

VI.	INJECTION ZONE WELLS	VI-1
-----	----------------------------	------

VI.A Protocol for Identifying Wells VI-1

VI.B Well Data Tabulations and Well Records VI-2

VI.C Well Schematics..... VI-5

VI.D Condition of Artificial Penetrations..... VI-5

VI.E Cone of Influence and AOR Determination..... VI-8

ATTACHMENTS

ATTACHMENT VI-1: Tabulation of Wells Within 1 Mile of the Injection Wells

ATTACHMENT VI-1A: Construction Data for Wells that Penetrate the Injection Zone within 1 Mile of the Injection Wells

ATTACHMENT VI-2: Well Records for Wells That Penetrate the Injection Zone and Schematics for Plugged and Abandoned Wells

ATTACHMENT VI-2A: Scout Tickets for Wells in the AOR Without Available Records at the OCD



TABLE OF CONTENTS (Continued)

ATTACHMENT VI-2B:	Map ID No. 754 (Mis-Plotted Location for Map ID No. 756): Note from Midland Map Company, Records for Map ID No. 756
ATTACHMENT VI-2C:	Map ID No. 795 (Mis-Plotted Location for Map ID No. 765): Note from Midland Map Company, Records for Map ID No. 765
ATTACHMENT VI-2D:	Map ID No. 942 (same as Map ID No. 89): Records for Map ID No. 89
ATTACHMENT VI-2E:	Map ID No. 778: Note from Midland Map Co.; 1959 Map of Wells in 2-18S-27E
ATTACHMENT VI-3:	Top of Cement in Injection Zone Wells in the Area of Review
ATTACHMENT VI-4:	<i>Intentionally Left Blank</i>
ATTACHMENT VI-5:	Predicted Pressure Increase and Cone of Influence
ATTACHMENT VI-6:	PREDICTW - Reservoir Pressure Increase Program
ATTACHMENT VI-7:	Water Viscosity at Various Salinities and Temperatures
ATTACHMENT VI-8:	Compressibility of Pore Volume and Distilled Water
VII. PROPOSED OPERATIONS	VII-1

ATTACHMENTS

ATTACHMENT VII-1:	Chemical Analyses of Injected Waste Water
ATTACHMENT VII-2:	Average Concentration Levels for Major Wastestream Constituents
ATTACHMENT VII-3:	Salinity of Formation Brines from Hydrocarbon-Producing Intervals in the Wolfcamp, Cisco, Canyon, and Strawn Formations



TABLE OF CONTENTS (Continued)

ATTACHMENT VII-4: Analysis of Formation Fluid from the Cisco in WDW-1

VOLUME II

VIII. GEOLOGY	VIII-1
VIII.A Injection Zone Lithology, Depth, Thickness, Porosity, and Permeability	VIII-1
VIII.B Confining Zone	VIII-4
VIII.C Structure	VIII-6
VIII.D Underground Sources of Drinking Water.....	VIII-7
VIII.E Compatibility Issues.....	VIII-8

ATTACHMENTS

ATTACHMENT VIII-1: Resistivity Log of WDW-1
ATTACHMENT VIII-1A: Porosity Log of WDW-1
ATTACHMENT VIII-2: Resistivity Log of Proposed WDW-2
ATTACHMENT VIII-2A: Porosity Log of Proposed WDW-2
ATTACHMENT VIII-2B: Resistivity Log of Proposed WDW-3
ATTACHMENT VIII-2C: Porosity Log of Proposed WDW-3
ATTACHMENT VIII-3: Dip Structure Cross Section A-A'
ATTACHMENT VIII-4: Strike Structural Cross Section B-B'
ATTACHMENT VIII-5: Thickness of the Wolfcamp Porous Interval



TABLE OF CONTENTS (Continued)

ATTACHMENT VIII-6:	Thickness of the Cisco Porous Interval	
ATTACHMENT VIII-7:	Permeability, Porosity, and Thickness of Hydrocarbon-Producing Intervals in the Wolfcamp, Cisco, and Canyon Formations in Eddy and Lea Counties	
ATTACHMENT VIII-8:	Drilling Report from Proposed WDW-1	
ATTACHMENT VIII-9:	Drillstem Test Data from Proposed WDW-1	
ATTACHMENT VIII-9A:	Calculation of Permeability from DST No. 5 in WDW-1	
ATTACHMENT VIII-9B:	WDW-1 Pressure Falloff Test Analysis, July 30-31, 1998	
ATTACHMENT VIII-10:	Structure Map of the Top of the Rio Bonito Member of the San Andres Formation	
ATTACHMENT VIII-11:	Structure Map of the Strawn Formation	
ATTACHMENT VIII-12:	Local Structure Map of the Wolfcamp Formation	
ATTACHMENT VIII-13:	Local Structure Map of the Cisco Formation	
ATTACHMENT VIII-14:	Local Structure Map of the Canyon Formation	
ATTACHMENT VIII-15:	Local Structure Map of the Strawn Formation	
ATTACHMENT VIII-16:	Map Showing the Altitude of the 10-g/l Isosaline Surface	
IX.	PROPOSED STIMULATION PROGRAM.....	IX-1
X.	LOGGING AND TESTING	X-1
XI.	FRESHWATER CHEMISTRY	XI-1

ATTACHMENTS

ATTACHMENT XI-1:	Freshwater Wells in the Vicinity of the Proposed Injection Wells (Table)	
------------------	--	--



TABLE OF CONTENTS (Continued)

ATTACHMENT XI-2: Chemical Analysis of Samples from Water Well ID No. 18.28.7.430 in Section 7, T18S, R28E

ATTACHMENT XI-3: Water Wells in the Vicinity of the Proposed Wells (Data from the State Engineer Office Water Well Database from March 1999)

ATTACHMENT XI-4: Records on File with the State Engineer Office for Water Wells in the Vicinity of the Proposed Wells

XII. FAULTING AND OTHER HYDRAULIC CONNECTIONS
BETWEEN THE INJECTION ZONE AND THE USDWs.....XII-1

REFERENCES



DATE IN	SUSPENSE	ENGINEER	LOGGED IN	TYPE	APP NO.
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ABOVE THIS LINE FOR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION

- Engineering Bureau -

1220 South St. Francis Drive, Santa Fe, NM 87505



ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

Application Acronyms:

[NSL-Non-Standard Location] [NSP-Non-Standard Proration Unit] [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 - Simultaneous Dedication
☐ NSL ☐ NSP ☐ 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

[D] Other: Specify Class I Injection

[2] 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] SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED ABOVE.

[4] **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

Darrell Moore

Print or Type Name

Darrell Moore

Signature

Env. Mgr. for Water & Waste 9/12/03

Title

Date

darrell@navajo-retining.com

e-mail Address

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Revised June 10, 2003

Submit Original
Plus 1 Copy
to Santa Fe
1 Copy to Appropriate
District Office

**DISCHARGE PLAN APPLICATION FOR SERVICE COMPANIES, GAS PLANTS,
REFINERIES, COMPRESSOR, GEOTHERMAL FACILITIES
AND CRUDE OIL PUMP STATIONS**

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

☐ New ☐ Renewal ☒ Modification

1. Type: Class I Injection Well Nos. WDW-1, WDW-2, and Proposed WDW-3

2. Operator: Navajo Refining Company

Address: Post Office Box 159, Highway 82 East, Artesia, New Mexico 88211

Contact Person: Darrell Moore Phone: 505-748-3311

3. Location: SE /4 SW /4 Section 1 Township 18S Range 27E
Submit large scale topographic map showing exact location.

4. Attach the name, telephone number and address of the landowner of the facility site.

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

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

7. Attach a description of present sources of effluent and waste solids. Average quality and daily volume of waste water must be included.

8. Attach a description of current liquid and solid waste collection/treatment/disposal procedures.

9. Attach a description of proposed modifications to existing collection/treatment/disposal systems.

10. Attach a routine inspection and maintenance plan to ensure permit compliance.

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

12. Attach geological/hydrological information for the facility. Depth to and quality of ground water must be included.

13. Attach a facility closure plan, and other information as is necessary to demonstrate compliance with any other OCD rules, regulations and/or orders.

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

Name: Darrell Moore

Title: Env. Mgr. for Waters & Waste

Signature: Darrell Moore

Date: 9/17/03

E-mail Address: darrell@navajo-refining.com

**DISCHARGE PLAN APPLICATION
FOR SERVICE COMPANIES, GAS PLANTS, REFINERIES,
COMPRESSOR, AND CRUDE OIL PUMP STATIONS**

1. Type

Class I Wells WDW-1, WDW-2, and proposed WDW-3

2. Operator

Navajo Refining Company
Post Office Box 159
Highway 82 East
Artesia, New Mexico 88211

Contact

Darrell Moore
Environmental Manager of Water and Waste
Navajo Refining Company
Post Office Box 159
Artesia, New Mexico 88211
505-748-3311

3. Location

The locations of WDW-1 and proposed WDW-2 and WDW-3 are detailed on accompanying Forms C-102. The well locations are shown on Attachment V-2 of the Application for Authorization to Inject, Per OCD Form C-108, Into Proposed WDW-1, WDW-2, and WDW-3 (the "Application to Inject").

4. Facility Ownership

Navajo Refining Company owns the site of WDW-1. The sites of WDW-2 and proposed WDW-3 are owned by the United States government. Navajo is applying to the Bureau of Land Management for a right-of-way permit to use the site of proposed WDW-3.

5. Facilities

The facilities currently planned for each wellsite include the wellhead, the well annulus monitoring system, and monitoring and recording instrumentation. The waste water to be injected will be delivered to each well from Navajo's refineries in Artesia and Lovington by pipeline systems. Tankage to store up to 10,000 barrels may be constructed at the site of WDW-1.

6. Materials Storage

No materials storage is planned.

7. Waste Stream

The waste stream to be injected is described in Section VII of the "Application to Inject."

8. Current Treatment and Disposal

The waste stream to be injected is currently managed in evaporation ponds at Navajo's refineries. A portion of the stream is sent to publicly owned treatment works.

9. Modifications

Not applicable; this application is for planned facilities.

10. Inspection and Maintenance Plan

Navajo will operate instrumentation that will monitor and record continuously the injection pressure, flow rate, flow volume, and casing-tubing annulus pressure.

The injection well system will be equipped with a pressure-limiting device that will prevent the wellhead pressure from exceeding the permitted maximum surface injection pressure.

A well annulus monitoring system will be installed and maintained at each wellsite to monitor for tubing and casing leaks.

Mechanical integrity testing will be conducted annually and any time the tubing is pulled or the packer is resealed, in accordance with OCD testing procedures.

11. Contingency Plan

Navajo will notify the OCD District Office in Artesia within 24 hours of failures of the tubing, casing, or packer and will correct failures in a timely manner.

12. Geological and Hydrological Information

Geological and hydrogeological information is included in Sections VIII and XI of the "Application to Inject."

13. Closure Plan

The proposed closure plan for the wells is included as Attachment III-4 of the "Application to Inject."

Submit To Appropriate District Office
State Lease - 6 copies
Fee Lease - 5 copies
District I
1625 N. French Dr., Hobbs, NM 87240
District II
811 South First, Artesia, NM 87210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources
OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

SF Form C-105
Revised March 25, 1999

WELL API NO.
30-015-20894
5. Indicate Type of Lease
STATE ☐ FEE ☒ Federal
State Oil & Gas Lease No. NM 6852

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

1a. Type of Well:
OIL WELL ☐ GAS WELL ☐ DRY ☐ OTHER ☐ Glass I Waste Disposal Well
b. Type of Completion:
NEW WELL ☐ WORK OVER ☐ DEEPEN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ OTHER ☐ Recentry ☐
2. Name of Operator
Navajo Refining Company
3. Address of Operator
Post Office Box 159, Artesia, New Mexico 88211
4. Well Location
Unit Letter E 1980 Feet From The North Line and 660 Feet From The West Line
Section 12 Township 18 South Range 27 East NMPM Eddy County
10. Date Spudded
July 18, 1973
11. Date T.D. Reached
August 27, 1973
12. Date Compl. (Ready to Prod.)
June 8, 1999
13. Elevations (DF& R(B. RT, GR, etc.)
3607 feet GL, 3623 feet RKB
14. Elev. Casinghead
3609 feet GL
15. Total Depth
10,372 feet
16. Plug Back T.D.
8770 feet
17. If Multiple Compl. How Many Zones?
1
18. Intervals Drilled By
Rotary Tools
All
Cable Tools
N/A
19. Producing Interval(s), of this completion - Top, Bottom, Name
L. Wolfcamp-Cisco-Canyon
20. Was Directional Survey Made
Yes
21. Type Electric and Other Logs Run
Fracture Finder and Caliper Logs, Dual Induction Laterolog, Compensated Neutron Formation Density
22. Was Well Cored
No

23. **CASING RECORD (Report all strings set in well)**

CASING SIZE	WEIGHT LB./FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8"	N/A	40'	N/A	N/A	None
8-5/8"	32	1995'	11"	800 sacks circulated	None
5-1/2"	17	8869'	7-7/8"	1570 sacks circulated	None

24. **LINER RECORD**

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN

25. **TUBING RECORD**

SIZE	DEPTH SET	PACKER SET
3-1/2"	7528'	7528'

26. Perforation record (interval, size, and number)

7570' to 7620', 7676' to 7736', 7826' to 7834', 7858' to 7880', 7886' to 7904', 7916' to 7936', 7944' to 7964', 7990' to 8042', 8096' to 8116', 8191' to 8201', 8304' to 8319', 8395' to 8399' (2 jspf for total of 598 holes).

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
7570' to 8399'	10,000 gallons of 15% HCl, plus 4600 pounds of rock salt as diverter

28. **PRODUCTION**

Date First Production
N/A
Production Method (Flowing, gas lift, pumping - Size and type pump)
N/A
Well Status (Prod. or Shut-in)
N/A
Date of Test
N/A
Hours Tested
N/A
Choke Size
N/A
Prod'n For Test Period
Oil - Bbl
Gas - MCF
Water - Bbl.
Gas - Oil Ratio
Flow Tubing Press.
Casing Pressure
Calculated 24-Hour Rate
Oil - Bbl.
Gas - MCF
Water - Bbl.
Oil Gravity - API - (Corr.)
29. Disposition of Gas (Sold, used for fuel, vented, etc.)
N/A
Test Witnessed By

30. List Attachments

Deviation Report

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

Signature Darrell Moore Printed Name Darrell Moore Title Eau. Mgr. Date 7/19/99

INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Division not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depth also be reported. For multiple completions, items 25 through 29 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico

T. Anhy	
T. Salt	
B. Salt	
T. Yates	
T. 7 Rivers	
T. Queen	
T. Grayburg	
T. San Andres	2005
T. Glorieta	
T. Paddock	
T. Blinebry	
T. Tubb	
T. Drinkard	
T. Abo	5506
T. Wolfcamp	6728
T. Penn	
T. Cisco (Bough C)	7645

T. Canyon	8390
T. Strawn	8894
T. Atoka	
T. Miss	
T. Devonian	
T. Silurian	
T. Montoya	
T. Simpson	
T. McKee	
T. Ellenburger	
T. Gr. Wash	
T. Delaware Sand	
T. Bone Springs	
T.	
T.	
T.	
T.	

Northwestern New Mexico

T. Ojo Alamo
T. Kirtland-Fruitland
T. Pictured Cliffs
T. Cliff House
T. Menefee
T. Point Lookout
T. Mancos
T. Gallup
Base Greenhorn
T. Dakota
T. Morrison
T. Todilto
T. Entrada
T. Wingate
T. Chinle
T. Permian
T. Penn "A"

T. Penn. "B" _____
T. Penn. "C" _____
T. Penn. "D" _____
T. Leadville _____
T. Madison _____
T. Elbert _____
T. McCracken _____
T. Ignacio Otzte _____
T. Granite _____
T. _____
T. _____
T. _____
T. _____
T. _____
T. _____
T. _____
T. _____

OIL OR GAS SANDS OR ZONES

No. 1, from.....to.....
No. 2, from.....to.....

No. 3, from.....to.....
No. 4, from.....to.....

IMPORTANT WATER SANDS

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

No. 1, from.....to.....feet.....
 No. 2, from.....to.....feet.....
 No. 3, from.....to.....feet.....

LITHOLOGY RECORD (Attach additional sheet if necessary)

From	To	Thickness In Feet	Lithology

From	To	Thickness In Feet	Lithology

TELEPHONE
(505) 748-3311

EASYLINK
62905278



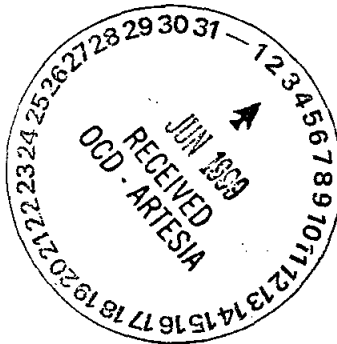
N.M. Oil Cons. Div. Jon
811 S. 1st Street
ARIZONA 88210-2824
REFINING COMPANY

501 EAST MAIN STREET • P. O. BOX 159
ARTESIA, NEW MEXICO 88211-0159

ST
FAX:
(505) 746-6410 ACCTG
(505) 746-6155 EXEC
(505) 748-9077 ENGR
(505) 746-4438 P/L

May 10, 1999

Mr. Tim Gumm
State of New Mexico
Energy, Minerals and Natural
Resources Department
Oil Conservation Division
811 South First Street
Artesia, New Mexico 88210



RE: Re-Entry for Navajo Refining Company's Waste Disposal Well No. 2

Dear Mr. Gumm:

Navajo Refining Company (Navajo) has contracted Subsurface Technology, Inc. to re-enter, test and complete Waste Disposal Well No. 2 (WDW-2), formerly the Chukka Federal No. 2 operated by The Eastland Oil Company. The United States Department of the Interior, Bureau of Land Management approved the Application for Permit to Drill or Deepen on April 27, 1999. Subsequent approval from the State of New Mexico Oil Conservation Commission (OCD) was granted on Tuesday, May 4, 1999.

Navajo initiated field operations on Wednesday, May 5, 1999. The existing pumping equipment, rods, and tubing were removed from the wellbore. The perforations from 1446 feet to 1462 feet were squeezed using 100 sacks of Class 'H' cement (approximately 50 sacks of cement were displaced into the perforated interval). The cement was allowed to cure and drilled out to a total depth of 1922 feet (KB)(1911 feet below ground level).

On Sunday, May 9, 1999, the 8-5/8 inch surface casing, set from 1955 feet (KB) to surface, was pressure tested for internal mechanical integrity between 1922 feet (KB) and 30 feet (KB) using a packer set at 30 feet. The 8-5/8 inch surface casing was pressure tested to 660 pounds per square inch and monitored at the surface for one hour (Attachment A). The fluid used for testing was a clean fresh water fluid. A pressure loss of 1 psi (0.15%) was observed during the first 30 minutes of the test. A pressure loss of 2 psi (0.30%) was observed during the last 30 minutes of the test. The results from the pressure test confirmed internal mechanical integrity of the 8-5/8 inch surface casing from 1922 feet (KB) to 30 feet (KB).

The 8-5/8 inch surface casing was originally set in an 11 inch open-hole to a depth of 1955 feet (KB) and cemented to surface using 700 sacks of Class 'H' cement with 2% gel and 100 sacks of Class 'H' neat. A total of 200 sacks of cement was recorded circulated to surface. The calculated volume between an 11 inch hole and 8-5/8 inch casing is (0.2407 cubic feet per foot X 1955 feet) 471 cubic feet. The volume of cement pumped is (1.18 cubic feet per sack X 800 sacks) 944 cubic feet for an excess of 473 cubic feet or 400 sacks circulated to surface. The calculated volume of cement and apparent volume of actual cement pumped indicated excess cement was circulated to surface.

On Sunday, May 9, 1999, Halliburton Logging Services completed a cement bond and microseismogram (same as a variable density log) logging survey within the 8-5/8 inch casing from a wireline total depth of 1919 feet (KB) to the surface (Attachment B). The results from the survey indicate a continuous column of cement from 1922 feet to surface with good bonding characteristics. The cement behind the 8-5/8 inch casing will provide an effective hydraulic seal to prevent the movement of groundwater fluids into the underground source of drinking water with a base at 473 feet.

Please review and approve the pressure testing and cement bond log results at your earliest convenience. Navajo will proceed with the mobilization of the drilling rig Wednesday, May 12, 1999 and begin re-entry of the WDW-2 wellbore according to the approved drilling program. Navajo will periodically contact the OCD, Artesia office with a status update of the re-entry operations. The Bureau of Land Management will be notified in sufficient time for a representative to witness the cementing of the 5-1/2 inch protection casing.

Should you have any questions or concerns, please call me at (505) 748-3311.

Sincerely yours,



Darrell Moore
Environmental Manager for Water and Waste

c: Mr. David Glass
Bureau of Land Management
Roswell Field Office
2909 West Second Street
Roswell, New Mexico 88201

Mr. Brian Rogers
Subsurface Technology, Inc.
7020 Portwest, Suite 100
Houston, Texas 77024

File: Injection Wells

APPROVED

JUN 02 1999
(ORIG. SGD.) DAVID R. GLASS

AUTHORIZED OFFICER, MINERALS
BUREAU OF LAND MANAGEMENT

**SUBJECT TO
LIKE APPROVAL
BY STATE**

District I

1625 N. French Dr., Hobbs, NM 88240

District II

811 South First, Artesia, NM 88210

District III

1000 Rio Brazos Rd., Aztec, NM 87410

District IV

2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural ResourcesOIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

Form C-101

Revised March 12, 1999

Submit to Appropriate District Office

State Lease - 6 Copies

Fee Lease - 5 Copies

☐ AMENDED REPORT

APPLICATION FOR PERMIT TO DRILL, RE-ENTER DEEPEN, PLUG BACK, OR ADD A ZONE

Operator Name and Address: Navajo Refining Company Post Office Box 159 Artesia, New Mexico 88211		OGRID Number 15694
Property Code 23592		API Number 30-015-20894
Property Name WDW		Well No. 2

Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
E	12	18S	27E		1980	North	660	West	Eddy

Proposed Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
---------------	---------	----------	-------	---------	---------------	------------------	---------------	----------------	--------

Proposed Pool 1

Proposed Pool 2

Lower Wolfcamp-Cisco-Canyon Injection Zone	Navajo Injection, Perma-Penn.
--	-------------------------------

Work Type Code E-Reentry	Well Type Code Class I Injection	Cable/Rotary R	Lease Type Code Federal	Ground Level Elevation 3607' GR, 3623' KB
Multiple No	Proposed Depth 9200'	Formation Strawn	Contractor	Spud Date 5/15/99

Proposed Casing and Cement Program

Hole Size	Casing Size	Casing weight/foot	Setting Depth	Sacks of Cement	Estimated TOC
11"	8-5/8"	32 lb/ft	1995 feet	800	Surface
7-7/8"	5-1/2"	17 lb/ft	9200 feet	Caliper vol. +20%	Surface

²² Describe the proposed program. If this application is to DEEPEN or PLUG BACK give the data on the present productive zone and proposed new productive zone. Describe the blowout prevention program, if any. Use additional sheets if necessary.

Proposed Reentry of The Eastland Oil Company (originally Fred Pool Drilling, Inc.) Chukka Federal No. 2 (PBDT 1912 feet, September 10, 1985) formerly Amoco Production Company Diamond Federal Gas Com. No. 1 (OTD 10,372 feet, P&A August 31, 1973). The well currently produces oil and gas from perforations from 1446 feet to 1462 feet (Penrose.)

Navajo will squeeze the perforations from 1446 feet to 1462 feet, drill out cement plugs, and clean out the well to 9200 feet, set 5-1/2 inch casing at 9200 feet and cement to the surface, perforate porous intervals in the Lower Wolfcamp, Cisco, and Canyon Formations between 7270 feet and 9200 feet, and conducted injectivity tests.

Attached are the Well Location Plat and Drilling Program.

²³ I hereby certify that the information given above is true and complete to the best of my knowledge and belief.

Signature:

Printed name:

Title:

Date:

Phone:

OIL CONSERVATION DIVISION

Approved by:

Title:

Approval Date:

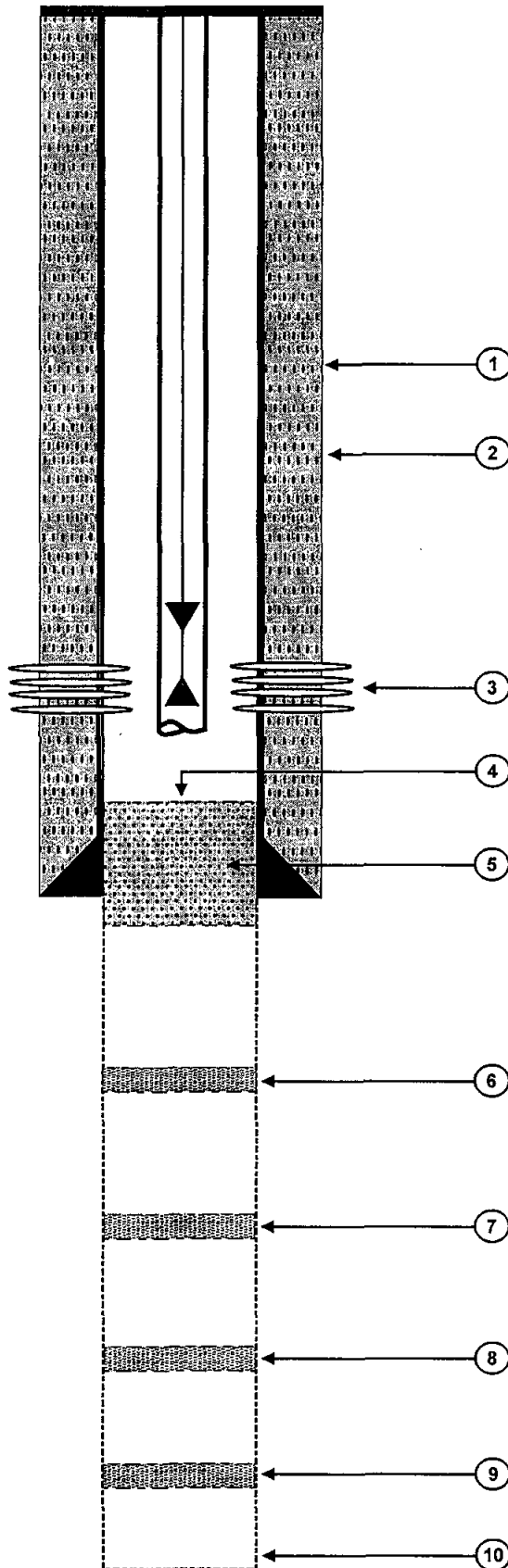
Expiration Date:

Conditions of Approval:

Attached ☐

BELOW GROUND DETAIL

All depths are referenced to the kelly bushing elevation of 13 feet. The surface elevation is 3610 feet.



Total Depth: 10,372'

1. Base of the USDW at 473'.

2. Casing: 8-5/8", 32 lb/ft, set at 1995' in an 11" hole. Cemented to surface with 800 sacks of cement.

3. Perforations: 1446' - 1462'.

4. PBTB: 1912'.

5. Cement Plug: 40 sacks from 1912' to 2045'.

6. Cement Plug: 50 sacks from 3620' to 3720'.

7. Cement Plug: 40 sacks from 5456' to 5556'.

8. Cement Plug: 50 sacks from 7435' to 7535'.

9. Cement Plug: 45 sacks from 9675' to 9775'.

10. Hole Size: 7-7/8".

SUBSURFACE

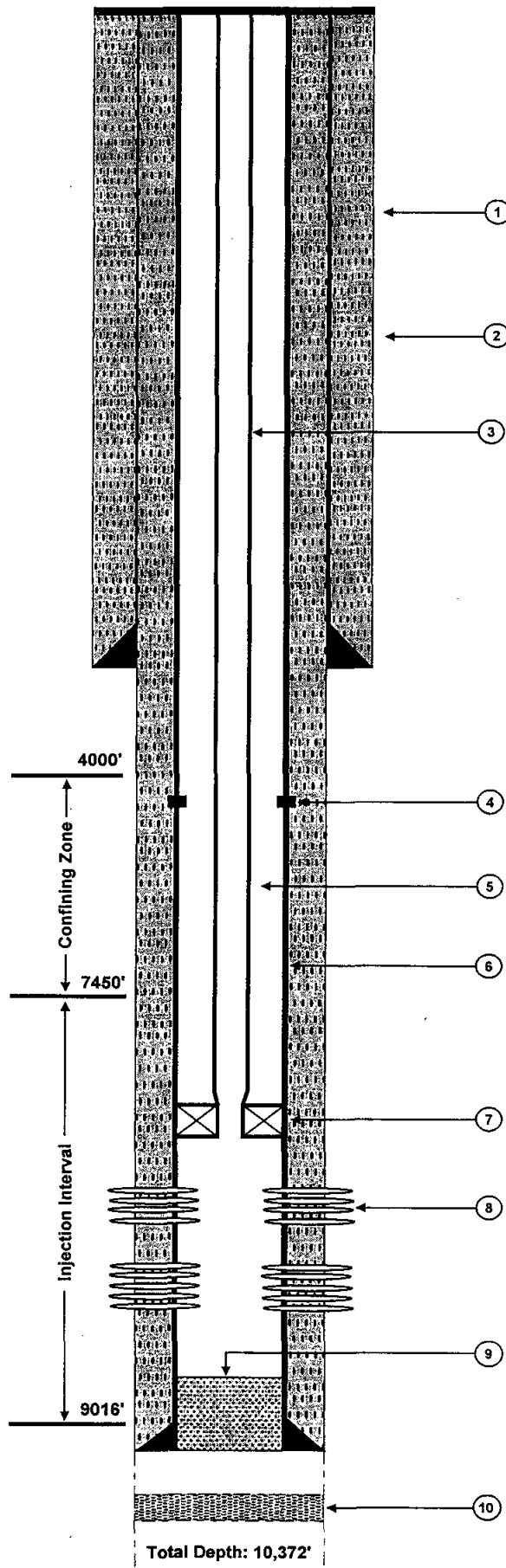
HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

FIGURE 2.0-1
THE EASTLAND OIL COMPANY
PLUGGED-BACK WELLBORE CONFIGURATION
CHUKKA FEDERAL No. 2

Date: 07/02/99	Checked By: B.R.	Job No.: 70A4955
Drawn By: LKM	Approved By: B.R.	File: WDW2B.DS4

BELOW GROUND DETAIL

All depths are referenced to the kelly bushing elevation of 13 feet. Surface elevation is 3610 feet.



1. Base of the USDW at 473'.

2. Casing: 8-5/8", 32 lb/ft, set at 1995' in an 11" hole. Cemented to surface with 800 sacks of cement.

3. Injection Tubing: 3-1/2", 9.2 lb/ft, J-55, smls, NUE 10 rd. set at 7528'.

4. DV Tool: at 5785'.

5. Annulus Fluid: 8.7 ppg brinewater mixed with Unichem Techni-Hib 370 corrosion inhibitor.

6. Protection Casing: 5-1/2", 17 lb/ft, L-80, LT&C; 8869' to the surface and set in a 7-7/8" hole. Casing cemented in two stages as follows:

First Stage: 575 sacks of modified Class "H" with 0.4% CFR-3, 5 lb/sk Gilsonite, 0.5% Halad-344, and 3 lb/sk salt. Mixed at 13.0 ppg. Opened DV tool at 5785' and circulated 20 sacks to surface.

Second Stage: Lead slurry: 300 sacks of Interfill "C" (35:65:6) mixed at 11.7 ppg. Tail slurry: 695 sacks modified Class "H" with 0.4% CFR-3, 5 lb/sk Gilsonite, 0.5% Halad-344, and 3 lb/sk salt mixed at 13.0 ppg. Circulated 150 sacks to surface. Top out with 10 yards of ready mix.

7. Packer: 5-1/2" x 2-7/8" Weatherford Completion Tools (Arrow) Model X-1 retrievable packer set at 7528'. Minimum ID is 2.4375". Wireline re-entry guide is on bottom. To release: turn 1/4 turn to the right and pick up.

8. Perforations (2 spf):

Zone 1: 7570' - 7620'; 7676' - 7736'.

Zone 2: 7826' - 7834'; 7858' - 7880'; 7886' - 7904'; 7916' - 7936'; 7944' - 7964'; 7990' - 8042'; 8096' - 8116'; 8191' - 8201'; 8304' - 8319'; 8395' - 8399'.

9. PBTD: 8770'

10. Cement Plug: 45 sacks from 9675' to 9775'.

SUBSURFACE

HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

FIGURE 2.0-2
NAVAJO REFINING COMPANY
WDW-2
ARTESIA, NEW MEXICO

Date: 07/02/99	Checked By: B.R.	Job No.: 70A4955
Drawn By: LKM	Approved By: B.R.	File: WDW2C.DS4

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB No. 1004-0135
Expires: January 31, 2004

SUNDRY NOTICES AND REPORTS ON WELLS
Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on reverse side

1. Type of Well

☐ Oil Well ☐ Gas Well ☐ Other TEMPORARILY ABANDONED

2. Name of Operator

NAVAJO REFINING COMPANY

3a. Address

PO BOX 159, ARTESIA, NM 88211

3b. Phone No. (include area code)

505-748-3311

4. Location of Well (Footage, Sec., T, R., M., or Survey Description)

790' FSL, 2250' FWL, 1-18S-27E

5. Lease Serial No.

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

8. Well Name and No.

WDW-3

9. API Well No.

30-015-26575

10. Field and Pool, or Exploratory Area

NAVAJO INJECTION; PERMO-PENN

11. County or Parish, State

EDDY

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
<input checked="" type="checkbox"/> Notice of Intent	<input type="checkbox"/> Acidize	<input type="checkbox"/> Deepen	<input type="checkbox"/> Production (Start/Resume)	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Alter Casing	<input type="checkbox"/> Fracture Treat	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Well Integrity
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> New Construction	<input type="checkbox"/> Recomplete	<input type="checkbox"/> Other RECOMPLETE AS
	<input type="checkbox"/> Change Plans	<input type="checkbox"/> Plug and Abandon	<input type="checkbox"/> Temporarily Abandon	CLASS I INJECTION
	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Plug Back	<input checked="" type="checkbox"/> Water Disposal	WELL

3. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 shall be filed once completion has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

Original well name was CHALK BLUFF FEDERAL COM. NO. 1

DRILL OUT BRIDGE PLUG AT 7010' AND CLEAN OUT TO 7208'.
INJECTION-TEST PERFORATIONS AT 7050' - 7102', 7262' - 7278' TO PLAN SQUEEZE-CEMENT JOB.
DRILL OUT BRIDGE PLUGS AT 7208' AND 7294'. CLEAN OUT HOLE THROUGH PERFS AT 7304'-7314'.
SQUEEZE-CEMENT PERFORATIONS AT 7050' - 7102', 7262' - 7278', AND 7304' - 7314'.
DRILL OUT BRIDGE PLUG AT 7600' AND CLEAN OUT TO TOP OF LINER AT 9051'.
RUN CBL/VDL AND CALIPER FROM 9051' TO SURFACE.
PERFORATE 8540' - 8620' AND 7660' - 8450'.
RUN INJECTIVITY TEST, AND ACIDIZE IF NECESSARY.
RUN INJECTION/FALLOFF TEST.
RUN DIFFERENTIAL TEMPERATURE SURVEY.
RUN RADIOACTIVE TRACER SURVEY.
INSTALL INJECTION TUBING AND PACKER TO APPROX. 7600'.
INSTALL WELL ANNULUS MONITORING EQUIPMENT, AND PREPARE WELL FOR INJECTION.

14. I hereby certify that the foregoing is true and correct

Name (Printed/Typed)

Title

Signature

Date

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by (Signature)

Name
(Printed/Typed)

Title

Comments of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office

Date

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on next page)

GENERAL INSTRUCTIONS

This form is designed for submitting proposals to perform certain well operations, and reports of such operations when completed, as indicated on Federal and Indian lands pursuant to applicable Federal law and regulations. Any necessary special instructions concerning the use of this

form and the number of copies to be submitted, particularly with regard to local area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from the local Federal office.

SPECIFIC INSTRUCTIONS

Item 4 - Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult the local Federal office for specific instructions.

Item 13 - Proposals to abandon a well and subsequent reports of abandonment should include such special information as is required by the local Federal office. In addition, such proposals and reports should include reasons for the abandonment; data on any former or present

productive zones, or other zones with present significant fluid contents not sealed off by cement or otherwise; depths (top and bottom) and method of placement of cement plugs; mud or other material placed below, between and above plugs; amount, size, method of parting of any casing, liner or tubing pulled and the depth to top of any left in the hole; method of closing top of well and date well site conditioned for final inspection looking to approval of the abandonment.

NOTICE

The Privacy Act of 1974 and the regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.

AUTHORITY: 30 U.S.C. 181 et seq., 351 et seq., 25 U.S.C. 396; 43 CFR 3160.

PRINCIPAL PURPOSE: The information is used to: (1) Evaluate, when appropriate, approve applications, and report completion of subsequent well operations, on a Federal or Indian lease; and (2) document for administrative use, information for the management, disposal and use of National Resource lands and resources, such as: (a) evaluating the equipment and procedures to be used during a proposed subsequent well operation and reviewing the completed well operations for compliance with the approved plan; (b) requesting and granting approval to perform those actions covered by 43 CFR 3162.3-2, 3162.3-3 and 3162.3-4; (c) reporting the beginning or resumption of production, as required by 43 CFR 3162.4-1(c); and (d) analyzing future applications to drill or modify operations in light of data obtained and methods used.

ROUTINE USES: Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecutions in connection with congressional inquiries or to consumer reporting agencies to facilitate collection of debts owed the Government.

EFFECT OF NOT PROVIDING THE INFORMATION: Filing of this notice and report and disclosure of the information is mandatory for those subsequent well operations specified in 43 CFR 3162.3-2, 3162.3-3, 3162.3-4.

The Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.) requires us to inform you that:

This information is being collected to evaluate proposed and/or completed subsequent well operations on Federal or Indian oil and gas leases.

Response to this request is mandatory.

BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT

Public reporting burden for this form is estimated to average 25 minutes per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0135), Bureau Clearance Officer, (WO-630), Mail Stop 401 LS, 1849 C St., N.W., Washington, D.C. 20240.

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised June 10, 2003
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies
☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30 - 015 -26575	² Pool Code	³ Pool Name Navajo Injection; Permo-Penn
⁴ Property Code	⁵ Property Name WDW	⁶ Well Number 3
⁷ OGRID No.	⁸ Operator Name Navajo Refining Company	⁹ Elevation 3609' GL; 3625' KB

¹⁰ Surface Location

UL or lot no. N	Section 1	Township 18S	Range 27E	Lot Idn	Feet from the 790	North/South line South	Feet from the 2250	East/West line West	County Eddy
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¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
¹² Dedicated Acres		¹³ Joint or Infill		¹⁴ Consolidation Code		¹⁵ Order No.			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

	¹⁷ OPERATOR CERTIFICATION <i>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief.</i>			
	Signature			
	Printed Name			
	Title and E-mail Address			
Date				
	¹⁸ SURVEYOR CERTIFICATION <i>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.</i>			
	Date of Survey			
	Signature and Seal of Professional Surveyor:			
	Certificate Number			

REENTRY PROCEDURE

NAVAJO REFINING COMPANY'S WDW-3 (PROPOSED)

790' FSL and 2250' FWL, Section 1, T18S, R27E
Eddy County, New Mexico
Chalk Bluff Federal Com. No. 1, API No. 30-015-26575

All depths are in feet below well's original kelly bushing height (RKB) of 16 feet above ground level. The original KB elevation is 3625 feet above mean sea level. The ground level elevation is 3609 feet above mean sea level.

Tops of Geologic Formations (from RKB)

The base of the lowermost USDW is at 420 feet.

San Andres	1976 feet	Lower Wolfcamp	7303 feet
Yeso	4030 feet	Cisco	7650 feet
Abo	5380 feet	Canyon	8390 feet
Wolfcamp	6745 feet	Strawn	8894 feet

Depth of Plugs

7010 feet in 7-inch casing above perforations 7050 feet to 7102 feet
7208 feet in 7-inch casing above perforations 7262 feet to 7278 feet
7294 feet in 7-inch casing above perforations 7304 feet to 7314 feet
7600 feet in 7-inch casing above perforations 7676 feet to 7678 and
7826 feet to 7830 feet
9800 feet in 4-1/2-inch liner above perforations 9861 feet to 9967 feet

Anticipated Formation Pressure

The expected bottom-hole pressure is 3448 pounds per square inch absolute (psia) at 9000 feet, for a gradient of 0.383 pounds per square inch (psi) per foot, or an equivalent

mud weight of 7.36 pounds per gallon (ppg). The bottom-hole pressure was determined from the pressure measured in Navajo's WDW-2, or 2813 psia, at 7570 feet. Navajo's WDW-2 is completed in the same interval proposed for WDW-3 and is located in 12-T18S-R27E, 3200 feet southwest of proposed WDW-3. The average specific gravity of the fluid in the Cisco and Canyon Formations is expected to be 1.025, which is the specific gravity of the fluid swabbed from WDW-2 in June 1999 from the interval between 7826 feet and 8399 feet. The expected bottom-hole pressure at 9000 feet in proposed WDW-3 is calculated below:

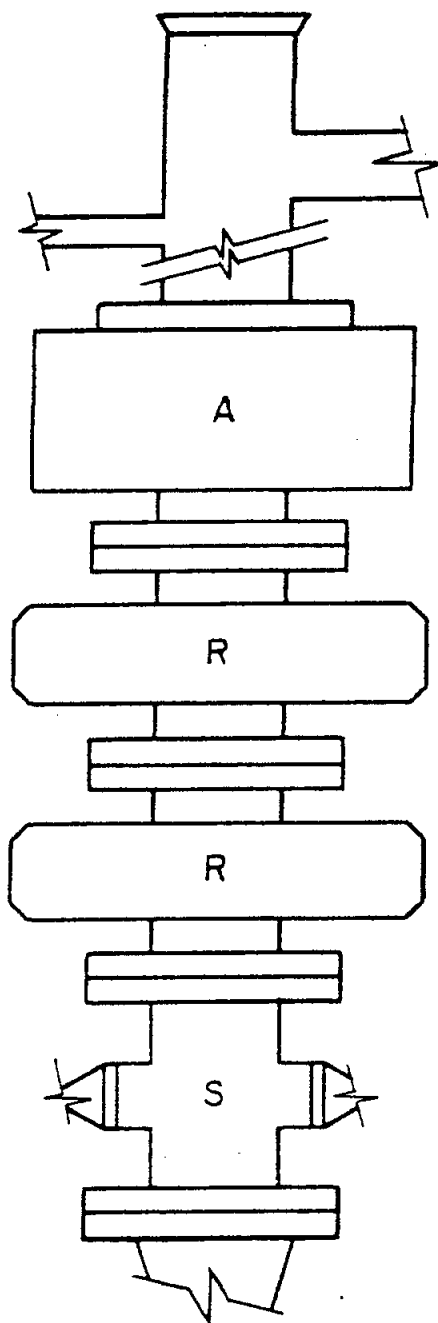
$$\begin{aligned}\text{BHP (9000 feet)} &= 2813 \text{ psia} + (9000 \text{ feet} - 7570 \text{ feet}) \times 0.433 \text{ psi/ft} \times 1.025 \\ &= 3448 \text{ psia}\end{aligned}$$

Reentry Procedure

1. Level location to accommodate a workover rig, pump, tanks, and ancillary equipment. Build a small working pit approximately 30 feet square and 3 feet deep with a plastic lining. Move in the rig, tank, shale shaker, and work string.
2. Install a 7-1/16-inch, 3000-psi double hydraulic blowout preventer (BOP) and a 7-1/16-inch, 3000-psi annular BOP (see Exhibit A for schematic). Pressure test the BOP stack and casing to 1500 psi for 30 minutes. Pick up a 6-1/8-inch bit, and sufficient 4-3/4-inch drill collars to drill out the cement plugs, on a 2-7/8-inch work string. Mix a tank of 8.5-ppg sodium chloride brine water for circulating fluid.
3. Run the bit to 7000 feet and circulate the wellbore fluid out of the casing into a frac tank for disposal. Drill out the cast iron bridge plug (CIBP), cement at 7010 feet, and clean out to the CIBP at 7208 feet. Circulate the hole clean and pump into the perforations from 7050 feet to 7102 feet to establish a rate and pressure for a pending squeeze cement job.
4. Drill out the CIBP at 7208 feet and clean out past the perforations from 7262 feet to 7278 feet and drill out the third CIBP at 7294 feet. Clean out below the perforations from 7304 feet to 7314 feet. Run a second injection test for injection rate and pressure comparison.

5. Pull the bit and run a retrievable squeeze packer on the work string. Set the packer at 7150 feet and test for communication between the perforations. Squeeze the perforations from 7262 feet to 7278 feet and 7304 feet to 7314 feet with approximately 100 sacks of neat cement (actual squeeze cement volume to be determined by the injection rate established previously), attempting to reach 1500 psi to 2000 psi squeeze pressure. Release the packer and reverse out any excess cement, then re-test the perforations to the squeeze pressure.
6. Re-set the packer at 6900 feet and squeeze the perforations from 7050 feet to 7102 feet as before.
7. Lay down the squeeze packer and drill out the cement to the CIBP at 7600 feet. Conduct a pressure test to 500 psi for 12 hours to confirm the squeeze cement will contain the annular fluid pressure required during injection operations.
8. Drill out the CIBP at 7600 feet and circulate to the top of the liner at 9051 feet. Circulate the casing clean with 8.5-ppg brine water. Pull the bit and lay down the drill collars.
9. Run a cement bond log with variable density (CBL/VDL) from the liner top to the surface, followed by a baseline multi-finger caliper log from the liner top to the surface.
10. Perforate the intervals 8540 feet to 8620 feet and 7660 feet to 8450 feet with 2 JSPF, using hollow steel carrier perforating guns.
11. Run the work string and retrievable packer to 7600 feet. Swab, or backflow, the perforated interval to recover a representative sample of the formation water for laboratory analysis. Monitor the recovered fluid for hydrogen sulfide.
12. Conduct a short injectivity test with 8.5-ppg brine water to determine the need for stimulation. If required, stimulate the perforations with acid (type and amount to be determined from injectivity results), followed by 500 barrels of 8.5-ppg brine water.

13. Pull the work string and lay it down. Run a surface readout pressure gauge, with memory backup, to 7600 feet. Conduct an injection test down the casing at 420 gallons per minute for 12 hours (7200 barrels). Shut the well in and record the pressure falloff for a minimum of 12 hours.
14. Pull the gauges and run a differential temperature survey from surface to 9100 feet. Run a radioactive tracer survey to demonstrate mechanical integrity.
15. Run a tubing conveyed injection packer on 4-1/2-inch, 11.60 lb/ft, K-55, LT&C, 8rd injection tubing. Set the packer at approximately 7600 feet. Fill the annular space with 8.5-ppg brine water containing oxygen scavenger and corrosion inhibitor. Land the injection tubing in the wellhead and install the upper section.
16. Pressure test the annulus as required by New Mexico regulations.
17. Install well annulus monitoring equipment and prepare the well for injection.



A = ANNULAR BLOWOUT PREVENTER
7-1/16", 3000 psi working pressure

R = RAM TYPE BLOWOUT PREVENTER
7-1/16", 3000 psi working pressure

S = DRILLING SPOOL WITH SIDE OUTLETS
7-1/16", 3000 psi working pressure

Manual Choke Manifold 2", 3000 psi working pressure

Source: API RP 53, Recommended Practices
for Blowout Prevention Equipment Systems

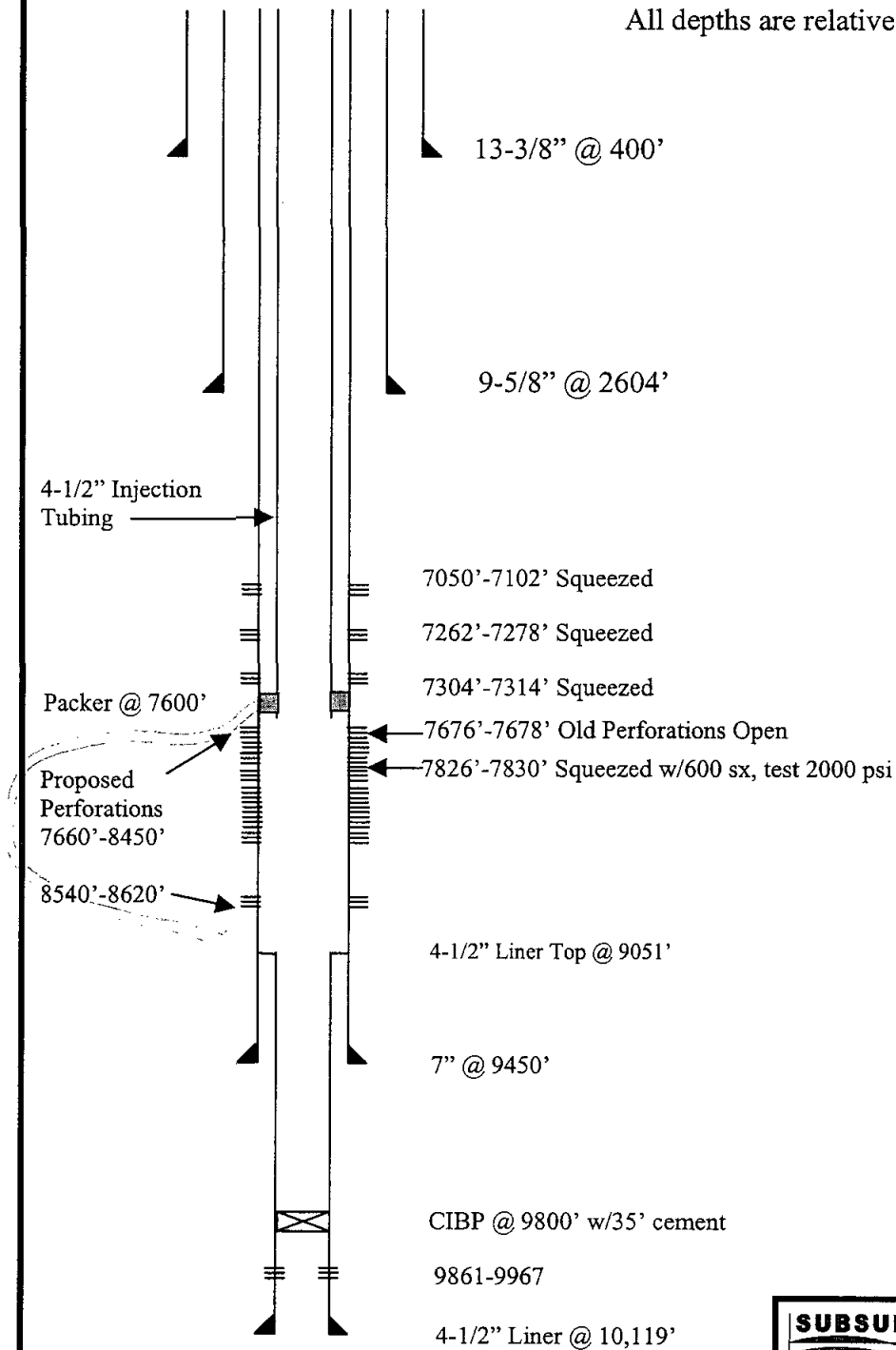
SUBSURFACE

HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

Exhibit A
Blowout Preventer Minimum
Requirements

DATED: 07/24/03	APPROVED BY:	JOB NO. 60d5497
DRAWN BY: JDB	CHECKED BY:	SCALE: N/A

All depths are relative to kelly bushing



Not to Scale



HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

Navajo Refining Company
Proposed WDW-3
orig. Chalk Bluff Federal Com 1

DATED: 07/24/03	APPROVED BY:	JOB NO. 60d5497
DRAWN BY: JDB	CHECKED BY:	SCALE: N/A

SURFACE USE PLAN

NAVAJO REFINING COMPANY PROPOSED WDW-3 790' FSL, 2250' FWL, 1-T 18S-R27E EDDY COUNTY, NEW MEXICO

1. Existing Roads: Existing roads that lead to the proposed drillsite are shown on Exhibit A.
2. Access Roads To Be Constructed: No new access road is proposed.
3. Location of Existing Wells: Existing wells within one mile of proposed WDW-3 are shown on Exhibit B.
4. Location of Proposed Facilities If Well Is Completed: The well will be shut in after completion and testing.
5. Location and Type of Water Supply: Water for reentry, testing, and completion operations will be purchased from a commercial water hauler.
6. Source of Construction Materials: No construction materials will be required.
7. Methods of Handling Waste Disposal:
 - A. Drill cuttings will be disposed of in the drilling pits.
 - B. Drilling fluids will be allowed to evaporate in the drilling pits until the pits are dry.
 - C. Water produced during tests will be disposed of in the drilling pits.
 - D. Trash, waste paper, garbage, and junk will be buried in a trash pit and covered with a minimum of 24 inches of dirt. All waste material will be contained to prevent scattering by the wind.
 - E. All trash and debris will be buried or removed from the wellsite after finishing drilling and/or completion operations.

8. Ancillary Facilities: None anticipated.

9. Wellsite Layout:

- A. The existing well pad will be leveled to accommodate a workover rig, pump, tanks, and ancillary equipment.
- B. Existing topsoil to a depth of 6 inches will be lifted and stockpiled at the uphill end of the well pad. The stockpiled topsoil will be located uphill to avoid mixing with subsurface materials.
- C. The well pad will be surfaced with material found in place.
- D. A small working pit will be constructed to hold drilling fluids and cuttings. The approximate dimensions of the pit will be 30 feet x 30 feet x 3 feet.
- E. The working pit for drilling fluids and cuttings will be lined with 6-mil plastic.

10. Plans for Restoration of Surface:

- A. After completion of drilling and/or completion operations, all equipment and other material not needed for operations will be removed. Pits will be filled and the location cleaned of all trash and junk.
- B. Any unguarded pits containing fluids will be fenced until they are filled.
- C. After abandonment, all equipment, trash, and junk will be removed and the location cleaned.
- D. The stockpiled topsoil will be spread over the surface of the location.

11. Surface Ownership: U.S. Department of Interior, Bureau of Land Management.

12. Archaeological Survey: Navajo Refining Company is conducting an archeological survey. The report of the survey will be submitted by Navajo under separate cover.

13. Operator's Representatives: Representatives responsible for assuring compliance with the approved Surface Use Plan:

Mr. Darrell Moore
Navajo Refining Company
Post Office Box 159
Artesia, New Mexico 88211
505/748-3311

Mr. Jim Bundy
Subsurface Technology, Inc.
7020 Portwest Drive, Suite 100
Houston, Texas 77024
713/880-4640

Exhibits

- A. Topographic Map
- B. Oil and Gas Map

14. Certification:

I hereby certify that I, or persons under my direct supervision, have inspected the proposed drillsite and access route; that I am familiar with the conditions that exist; that the statements made in this plan are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed by Navajo Refining Company and its contractors and subcontractors in conformity with this plan and the terms and conditions under which it is approved.

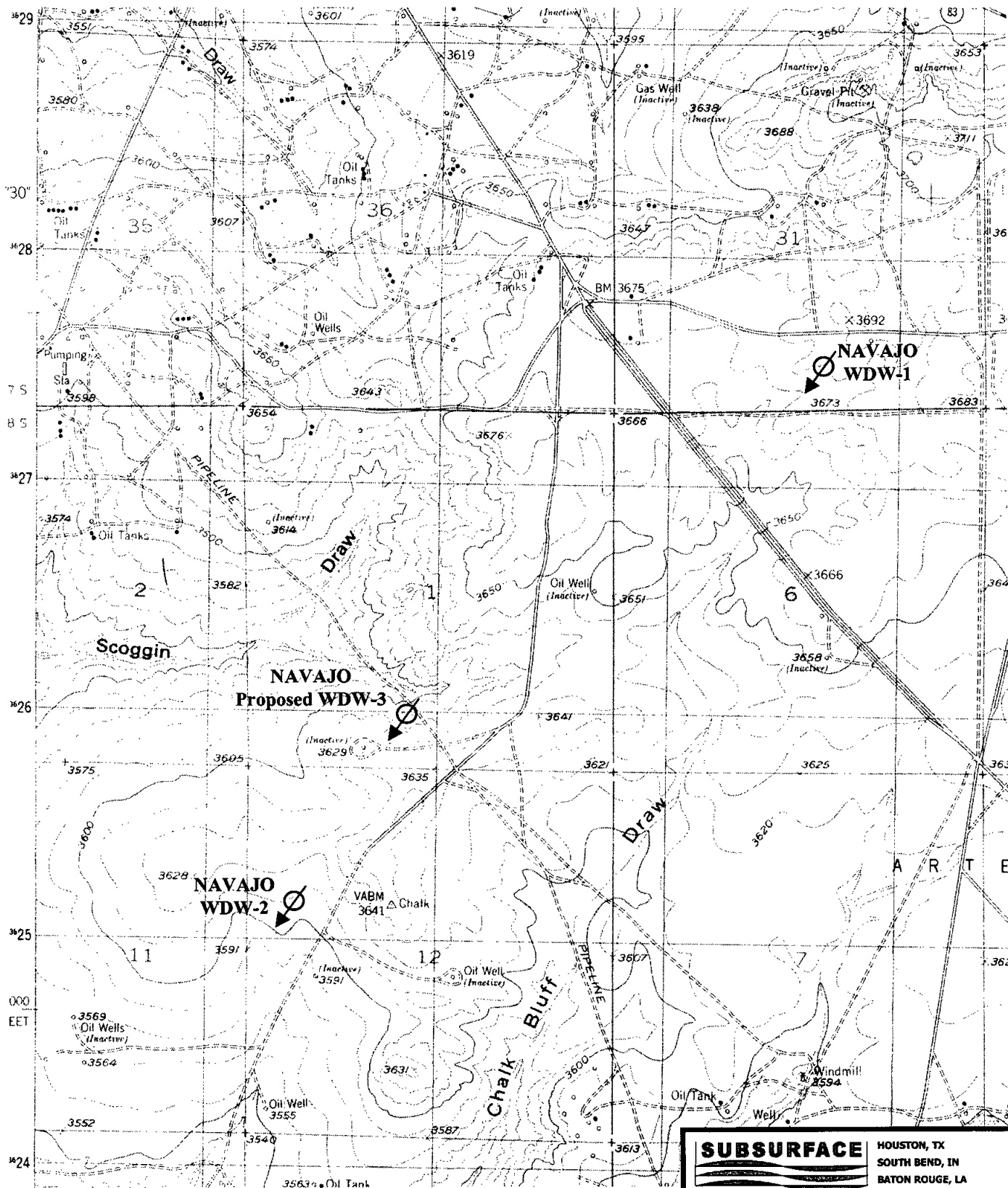
Date

Signature

Name

Title

Navajo Refining Company
Company



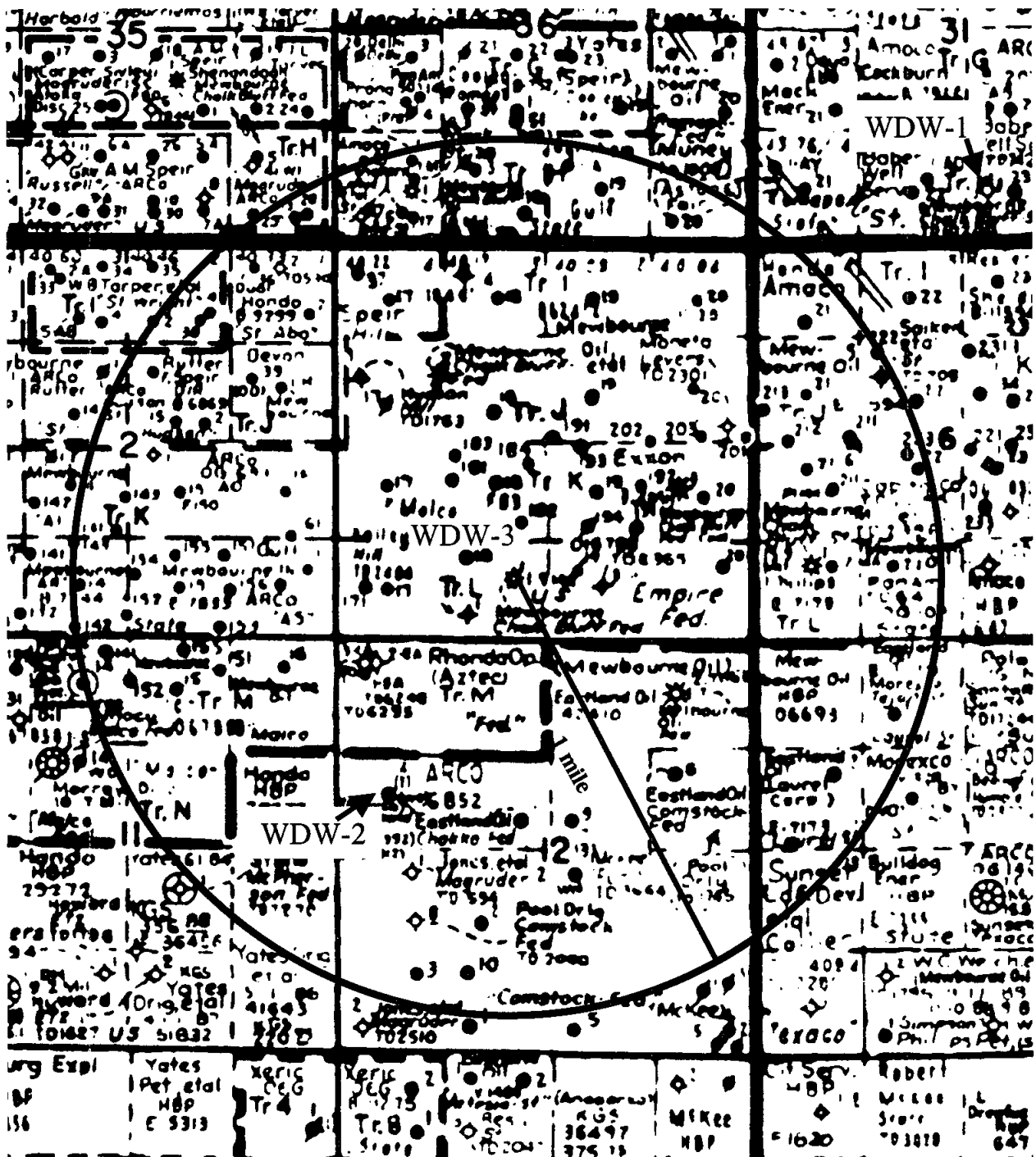
USGS Topographic Map
Red Lake Quadrangle, Eddy County, NM

Section corners marked with +

SUBSURFACE		HOUSTON, TX SOUTH BEND, IN BATON ROUGE, LA
EXHIBIT A		
NAVAJO REFINING COMPANY		
PROPOSED WDW-3		
790' FSL, 2250' FWL 1-18S-27E		
DATE: 7/28/03	APPROVED BY: NLN	JOB NO: 60DS497
DRAWN BY:	CHECKED BY:	SCALE: 1"=2000'

T17S - R27E

T17S - R28E



T18S - R27E
EDDY COUNTY, NM

SUBSURFACE

HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

EXHIBIT B
WELLS WITHIN 1 MILE OF
NAVAJO REFINING COMPANY
PROPOSED WDW-3

DATED: 7/28/03	APPROVED BY: NLN	JOB NO. 60D5497
DRAWN BY:	CHECKED BY:	SCALE: N/A

Map courtesy of Midland Map Company

APPLICATION FOR AUTHORIZATION TO INJECT

PURPOSE: _____ Secondary Recovery _____ Pressure Maintenance X Disposal _____ Storage _____
Application qualifies for administrative approval? _____ Yes X No

II. OPERATOR: Navajo Refining Company

ADDRESS: P.O. Box 159, Highway 82 East, Artesia, NM 88211

CONTACT PARTY: Darrell Moore, Environmental Manager-Water and Waste PHONE: 505-748-3311

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? X Yes _____ No **Revise WDW-3 location.**
If yes, give the Division order number authorizing the project: Discharge Plan Permit UIC-CL1-008-1

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 geologic data on the injection zone including appropriate lithologic detail, geologic 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 sources 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 sources 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: Darrell Moore TITLE: Env. Mgr. for Water & Waste

SIGNATURE: Darrell Moore DATE: 9/17/03

E-MAIL ADDRESS: darrell@navajo-refining.com

* If the information required under Sections VI, VII, X, and XI above has been previously submitted, it need not be resubmitted.
Please show the date and circumstances 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 the 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, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505, 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.

I. PURPOSE

Navajo Refining Company (Navajo) submits this application to construct and operate three nonhazardous Class I effluent disposal wells. The waste stream proposed for injection is exempt and nonexempt nonhazardous oilfield wastes that are generated exclusively by Navajo at its refinery in Artesia, New Mexico. The waste water will be transported to the injection wellsites by pipeline.

In February 1998, Navajo submitted an application to the New Mexico Oil Conservation Division (OCD) for permission to reenter, test, and complete the Mewbourne Oil Company's Chalk Bluff 31 State No. 1 well, which is located in Section 31, T17S, R28E, Unit Letter O, in Eddy County, New Mexico. Approval for the reentry and testing was granted by the OCD by letter dated May 21, 1998. The reentry and testing was completed on August 4, 1998. The reentry and completion report for Navajo's WDW-1 was prepared by Subsurface Technology, Inc. (Subsurface), formerly Envirocorp Services & Technology, Inc., and submitted to the OCD in September 1998.

On May 1, 1998, Navajo submitted the original version of this discharge plan application and application for authorization to inject. On July 14, 1998, OCD wrote "Approval of Discharge Plan UIC-CLI-008-1" for Navajo's proposed wells. The approval was revised by OCD on August 4, 1998.

In April 1999, Navajo requested a modification of the discharge plan to revise the location of proposed WDW-2. The location of proposed WDW-2 that was approved on July 14, 1998, was 2310 feet FNL and 1500 feet FWL of Section 6, T18S, and R28E. Instead, Navajo proposed to convert an existing well to proposed WDW-2, Eastland Oil Company's Chukka Federal No. 2 well (formerly Fred Pool Drilling, Inc., originally the Amoco Production Diamond Federal Gas Com. No. 1). The well is located 1980 feet FNL and 660 feet FWL of Section 12, T18S, R27E.

The permit modification to change the location of WDW-2 was approved by the OCD on May 3, 1999. In May and June 1999, Navajo recompleted WDW-2. The reentry and completion report for Navajo's WDW-2 was prepared by Subsurface and submitted to the OCD in July 1999.

Navajo now requests a modification of the discharge plan to revise the location of proposed WDW-3. The original permitted location of proposed WDW-3 is 778 feet FNL and 995 feet FWL of Section 6, T18S, R28E. Instead, Navajo proposes to convert an existing well to proposed WDW-3. The well is the Navajo Chalk Bluff Federal Com. No. 1 well (originally operated by Mewbourne Oil Company). The well is located 790 feet FSL and 2250 feet FWL of Section 1, T18S, R27E. The total depth of the well is 10,120 feet.

The injection zone consists of porous intervals in the lower Wolfcamp Formation and the Cisco and Canyon Formations between 7450 feet and 9016 feet below the kelly bushing (KB) elevation in WDW-1, between 7270 feet and 8894 feet below the KB elevation in WDW-2, and between 7303 feet and 8894 feet below KB in proposed WDW-3.

*DOES NOT MATCH
BLM SUNDAY NOTICE?*

ATTACHMENT III-2

**WDW-2 INJECTION WELL DATA SHEET
AND WELL SCHEMATIC**



ATTACHMENT III-2

INJECTION WELL DATA SHEET

OPERATOR: Navajo Refining Company

LEASE: WDW-2

1980' FNL, 650' FWL	12	T18S	R27E
Footage	Section	Township	Range

WELL CONSTRUCTION DATA

Surface Casing

Size	<u>8-5/8"</u>	Cemented with	<u>800 sx</u>
TOC	<u>Surface</u>	feet determined by	<u>Circulated 200 sacks to surface</u>
Hole Size	<u>11"</u>	Set at	<u>1995 feet</u>

Long String

Size	<u>5-1/2"</u>	Cemented with	<u>1570 sx</u>
TOC	<u>Surface</u>	feet determined by	<u>Cement bond log (5/28/99)</u>
Hole Size	<u>7-7/8"</u>	Set at	<u>8869 feet</u>
Total Depth	<u>10,372', Plugged back to 8770'</u>		

Injection Interval

7270 feet to 8894 feet, perforated
 (perforated or open-hole; indicate which)

Perforations

Zone 1: 7570'-7620'; 7676'-7736'

Zone 2: 7826'-7834'; 7858'-7880'; 7886'-7904'; 7916'-7936'; 7944'-7964'; 7990'-8042'; 8096'-8116'; 8191'-8201'; 8304'-8319'; 8395'-8399'

Tubing size 3-1/2" lined with not lined set in a retrievable packer at 7528 feet. Other type of tubing/casing seal if applicable not applicable.



ATTACHMENT III-2 (Continued)

OTHER DATA

1. Is this a new well drilled for injection? ___ Yes X No

If no, for what purpose was the well originally drilled? The well was drilled in 1973 as an exploratory well.

2. Name of the injection formation: Lower Wolfcamp, Cisco, and Canyon Formations

3. Name of Field or Pool (if applicable): Navajo Injection; Permo-Penn

4. Has the well ever been perforated in any other zones(s)? List all such perforated intervals and give plugging detail, i.e., sacks of cement or plug(s) used. Yes. 1446 feet to 1456 feet, 1459 feet to 1462 feet. Perforations were squeezed on May 5-8, 1999, when Navajo recompleted the well.

5. Give the names and depths of any over or underlying oil or gas zones (pools) in the area:

Within one mile: Queen and Grayburg (1450 feet to 2000 feet), San Andres (200 feet to 3600 feet),

Abo (5400 feet to 6300 feet), and Morrow (9900 feet)

ATTACHMENT III-3

INJECTION WELL DATA SHEET

OPERATOR: Navajo Refining Company

LEASE: WDW-3 (Proposed)

790' FSL, 2250' FWL 1-T18S-R27E
Footage Location Section Township Range

WELL CONSTRUCTION DATA

Surface Casing

Size 13-3/8" Cemented with 425 sacks + 200 sacks by 1" line
TOC Surface feet determined by Cementing through 1" line
Hole Size 17-1/2" Set at 400 feet

Intermediate Casing

Size 9-5/8" Cemented with 1025 sacks
TOC Surface feet determined by Circulating to surface
Hole Size 12-1/4" Set at 2604 feet

Long String

Size 7" Cemented with 1350 sacks
TOC 1547 feet determined by Calculation
Hole Size 8-1/2" Set at 9450 feet

Liner

Size 4-1/2" Cemented with 175 sacks
TOC 9051 feet determined by Calculation
Hole Size 6" Set at 9051 to 10119 feet
Total Depth 10120 feet

Injection Interval

7270 feet KB to 8890 feet KB, perforated
(perforated or open-hole; indicate which)

Tubing size 4-1/2 lined with not lined set in a retrievable packer at approximately 6600 feet. Other type of tubing/casing seal if applicable latch-in seal assembly



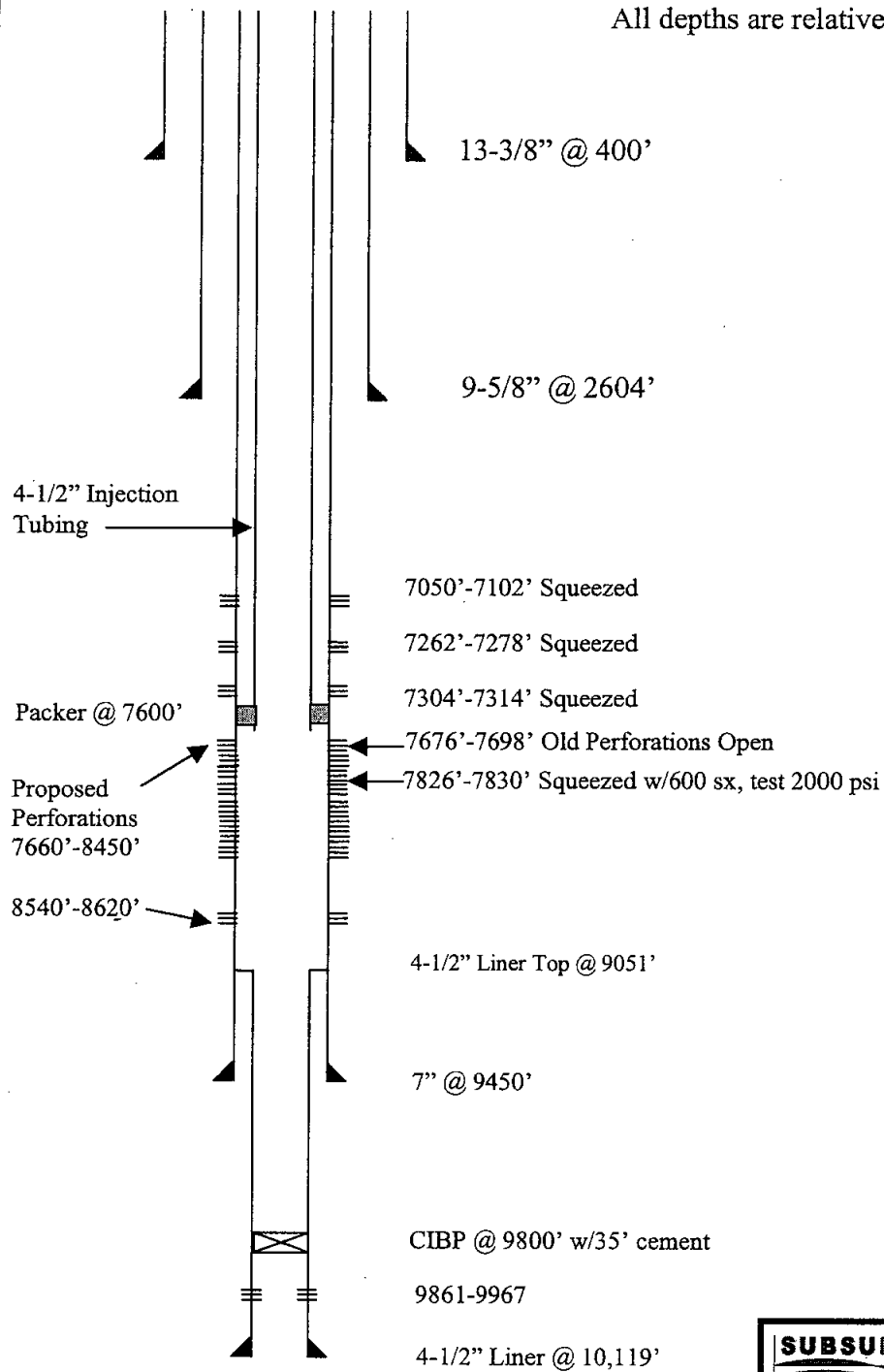
ATTACHMENT III-3 (Continued)

INJECTION WELL DATA SHEET

OTHER DATA

1. Is this a new well drilled for injection? ____ Yes X No
2. Name of the injection formation: Lower Wolfcamp, Cisco, and Canyon Formations
3. Name of Field or Pool (if applicable): Navajo Injection; Permo-Penn
4. Has the well ever been perforated in any other zones(s)? List all such perforated intervals and give plugging detail, i.e., sacks of cement or plug(s) used. 9861' - 9882', CIBP at 9800' with 35' of cement; 7826' - 7830', squeezed with 600 sacks; 7676' - 7678', CIBP at 7600' with 35' of cement; 7304' - 7314', CIBP at 7294'; 7262' - 7278', CIBP at 7208'; 7050' - 7102', CIBP at 7010'
5. Give the names and depths of any over or underlying oil or gas zones (pools) in the area:
Within one mile: Yates (500 feet), Seven Rivers (600 feet), Grayburg (1600 feet to 1900 feet), San Andres (2000 feet), Abo (5400 feet to 6200 feet), and Morrow (9900 feet)

All depths are relative to kelly bushing



Not to Scale

SUBSURFACE

HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

Navajo Refining Company
Proposed WDW-3
orig. Chalk Bluff Federal Com 1

DATED: 07/24/03	APPROVED BY:	JOB NO. 60d5497
DRAWN BY: JDB	CHECKED BY:	SCALE: N/A

IV. EXISTING PROJECT

Navajo recompleted and tested WDW-1 in July and August 1998 in the Cisco portion of the injection zone. Navajo began injecting into WDW-1 on September 23, 1999.

Navajo recompleted and tested WDW-2 in May and June 1999, in the Lower Wolfcamp and Cisco portions of the injection zone. Injection into WDW-2 began on September 23, 1999.

Navajo intends to reenter, test, and recomplete a currently temporarily abandoned well, the Navajo Chalk Bluff Federal Com. No. 1 (formerly operated by Mewbourne Oil Company). Pending successful tests, Navajo proposes to convert the well to its effluent disposal well WDW-3.

VI. INJECTION ZONE WELLS

VI.A Protocol for Identifying Wells

Search Protocol for Non-Freshwater Artificial Penetrations

As Navajo's agent, Subsurface employed the services of Federal Abstract Company in the research and acquisition of data concerning non-freshwater wells. Federal Abstract understands the necessity for complete records and makes every diligent effort to complete this task. Subsurface and Federal Abstract examined public and private sources of data to identify producing and abandoned oil and gas wells and disposal wells in the AOR.

The Oil Conservation Division (OCD) is the primary agency in which files are researched for oil and gas well records. The OCD is the state repository for oil and gas well and Class II well records, as the state regulatory authority for the oil and gas industry. In order to retrieve well records, the following general procedure is used for researching each well within a given area.

Map Review

Before the retrieval process can begin, it is necessary to know the operator, lease name, county in which the well is located, and the township, range, and section in which the well is found. This information is normally found on commercially prepared oil and gas base maps. Maps are produced by commercial firms, who obtained the data to build the oil and gas bases from "scout" tickets (completion information received from individual oil companies) in the early years and then, in later years, from the OCD itself. The commercial firms continually update the maps by plotting information filed by oil and gas operators with the OCD. Changes in the status of existing wells are noted, as well as information on new wells. Attachment V-1 is a modified version of the oil and gas base map provided by Midland Map Company, a recognized commercial supplier of oil and gas base maps for southeastern New Mexico.

Well Records Review

The OCD filing system is the best source of oil and gas well data in New Mexico. Microfiche and microfilm files of historical well records are searched as well as the hard copy files of well records not yet placed on microfilm. These files are organized by quarter-quarter section, township, and range.

Scout Tickets

Scout tickets were available for the wells in the AOR from IHS Energy Group (formerly Petroleum Information Dwigths LLC). Information about nearly every well in the AOR was available, including some wells for which records were not available from the OCD. Scout tickets were also available from The Subsurface Library, Midland, Texas.

OCD Online

Well information is also available for downloading from the website maintained by the OCD. The spreadsheet of information for wells in the Artesia district, which includes the Navajo vicinity, was used as the source for well API numbers and as a guide to current well status and operator. The specific file used was "artesia030521.xls." The file was downloaded from the OCD's FTP site on July 8, 2003.

VI.B Well Data Tabulations and Well Records

Two hundred ninety-five (295) well locations have been identified within or slightly beyond one mile of WDW-1, WDW-2, and proposed WDW-3. The well locations are shown in Attachment V-1. A tabulation of total depth, status, and drill date for all of the wells in the one-mile AOR is provided in Attachment VI-1. Wells in Attachment VI-1 are identified with Map ID numbers that are keyed to the map in Attachment V-1. Scout tickets for the wells in the AOR for which no records were available from the OCD are presented as Attachment VI-2A.

Well construction data for wells within the one-mile AOR that penetrate the Injection Zone are tabulated in Attachment VI-1A.

Wells That Do Not Penetrate the Injection Zone (264 Wells)

Two hundred sixty-four (264) of the wells are documented to have been drilled to depths of less than 7270 feet, which coincides with the top of the injection zone in WDW-2. The top of the injection zone in WDW-1 and proposed WDW-3 is 7450 feet and 7303 feet, respectively. The wells did not penetrate the proposed injection zone. These wells are:

Map ID Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 82, 84, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 121, 122, 123, 125, 126, 127, 128, 129, 130, 131, 133, 135, 136, 138, 139, 140, 141, 142, 143, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 158, 159, 160, 162, 165, 166, 354, 355, 356, 358, 359, 595, 748, 749, 750, 751, 752, 753, 755, 756, 757, 758, 765, 766, 772, 773, 774, 779, 781, 785, 786, 789, 791, 793, 796, 797, 799, 800, 801, 802, 805, 806, 807, 808, 812, 813, 814, 836, 837, 838, 839, 840, 841, 842, 843, 844, 846, 849, 850, 852, 853, 854, 856, 857, 858, 859, 860, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 888, 895, 896, 897, 901, 910, 912, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 936, 938, 939, 940, and 943.

Mis-Plotted or Duplicate Locations (9 Well Spots)

Nine (9) well locations appear on Attachment V-1 for which well records could not be found in the files of the OCD and for which scout tickets were not available. All of these well locations are mis-plotted or duplicate locations.

Five (5) of these locations (Map ID Nos. 30, 108, 119, 132, and 137) appear only on a commercial base map prepared by the Midland Map Company (Attachment V-1). These locations do not appear on a commercial base map prepared by the Geomap Company or on the lease map prepared by Midland Map Company. A representative of Midland Map Company confirmed that four of the five well locations on the oil and gas base map, Map ID Nos. 108, 119, 132, and 137, are duplicate locations for existing wells. The Midland Map representative stated that the locations will be removed from the map. Map ID No. 30 is the incorrect, duplicate location plotted on the Midland Map base map for Map ID No. 14, the Arco Empire Abo Unit G No. 20 (formerly the Kersey Ramapo No. 5). The correct location of Map ID No. 14 is shown on the Midland Map lease map.

Four (4) well locations (Map ID Nos. 754, 792, 795, and 942) are mis-plotted on Attachment V-1. These mis-plotted locations are incorrect duplicate locations for other wells, as discussed below.

Map ID No. 754 is the incorrect location for Map ID No. 756, the ARCO Permian Empire Abo Unit K No. 17. The well spot on the Midland Map map for Map ID No. 754 is labeled "17." The form "Sundry Notices and Reports on Wells" that was filed on May 18, 1959, for Map ID No. 756 states that the form was "Filed to show change in well location..." A copy of the original "Notice of Intention to Drill" with the originally permitted location was not available from the files of the OCD in Santa Fe. The Midland Map Company's lease and oil and gas base maps show the incorrect location of the well as Map ID No. 754. Subsurface plotted the correct location for this well as Map ID No. 756 on Attachment V-1. A representative of Midland Map Company confirmed that Map ID No. 756 is the correct location for the well. The representative stated that the well will be correctly spotted on the company's new maps and that the well spot for Map ID No. 754 will be removed. Information to support the conclusion that Map ID No. 754 is mis-plotted is included in Attachment VI-2B.

Map ID No. 792 is an incorrect location on the Midland Map oil and gas base map for Map No. 814, the ARCO Permian Empire Abo Unit K No. 141. Midland Map Company's lease map shows Map ID No. 814 but not Map ID No. 792. A

representative of Midland Map Company confirmed that the correct location for the well is the location of Map ID No. 814. The representative said that the well spot for Map ID No. 792 will be removed from the oil and gas base map and that the location for Map ID No. 814 will be added to the oil and gas base map.

Map ID No. 795 is an incorrect location for Map ID No. 765. Midland Map shows the location of Map ID No. 795 on both their lease map and their oil and gas base map. Map ID No. 795 is labeled on Midland Map Company's lease map as Well No. 1. A representative of Midland Map Company concluded after examining their series of historical maps that Map ID No. 795 was permitted sometime between 1959 and 1960. Map ID No. 765 was permitted in 1959 as the William Hudson Hudson-State Abo No. 1. A discrepancy in the location of Map ID No. 765 is evident upon examination of the "Notice of Intention to Drill." The location for Map ID No. 765 was typed in on the "Notice of Intention to Drill" as 990 feet from the South line and 330 feet from the East line of the section, which is the location of Map ID No. 795. On this form, the word South was crossed out, and North was written in by hand. On the plat of the section in the upper left portion of the same form, the well is spotted at the location of Map ID No. 765. Map ID No. 795 was spotted by Midland Map Company on their maps at the typed-in location on the "Notice of Intention to Drill." The same well was also spotted at the correct location, that of Map ID No. 765. Information to support the conclusion that Map ID No. 795 is mis-plotted is included in Attachment VI-2C.

Map ID No. 942 is an incorrect location for Map ID No. 89. Map ID No. 942 is API No. 30-015-06250, included in the well data spreadsheet available on the OCD website on July 8, 2003, "artesia030521.xls." In the spreadsheet, this well is the Arco Oil and Gas Company Empire Abo UT I. No records are found in the OCD's files for this well in this location. The well records on file for Map ID No. 89 (API No. 30-015-02625) are included in Attachment VI-2D. The records include three sundry notices filed for API No. "30-015-0625." Map ID No. 89 was operated by ARCO Permian (and its predecessors and successors) as the Empire Abo Unit "I" No. 23 beginning in 1973. Because of the similarity in the API number, well name, and locations of the two wells, the API number and

location of Map ID No. 942 are considered to be incorrect. Map ID No. 942 is considered to be the same well as Map ID No. 89.

The mis-plotted well locations are:

Map ID Nos. 30, 108, 119, 132, 137, 754, 792, 795, and 942.

Expired Permits and Revised Locations (4 Wells)

Three wells, Map ID Nos. 934, 935, and 944, were permitted and never drilled. The permits were allowed to expire.

Map ID No. 120 is the original proposed location for Navajo's WDW-3. No well has been drilled at this location.

Proposed Locations (2 Wells)

Map ID Nos. 937 and 941 are permitted locations that have not yet been drilled.

Well with No Records (1 Well)

Map ID No. 778 was drilled to the Abo or shallower, and did not penetrate the injection zone. The well is shown as an oil well on the Midland Map. No records for the well are available from the OCD's files. Available information for the well is included in Attachment VI-2E. A representative of Midland Map Company stated that the well was drilled before 1957 by the Rutter & Wilbanks Bros. as the Hudson No. 2. However, the well does not appear on a 1959 location plat submitted for Map ID No. 785 (included in Attachment VI-2E). Rutter & Wilbanks Bros. drilled three wells in the vicinity of Map ID No. 778. Map ID No. 773, the Turner No. 1, was drilled in 1948 to 1742 feet in the Red Lake Queen-Grayburg-San Andres pool. Map ID No. 774, the Hudson No. 1, was drilled in 1948 to 1707 feet in the same pool. Map ID No. 779 was drilled in 1959 to 5884 feet in the Empire Abo pool. Because the well, if it exists, is shown as an oil well drilled by Rutter & Wilbanks Bros. (who drilled Abo and shallower wells nearby) that is surrounded by oil production from the Abo and shallower intervals, the well is not considered to have penetrated the Navajo injection zone.

Injection Zone Penetrations (15 Wells)

Fifteen (15) wells reached total depths of 7270 feet or greater and penetrated the proposed injection zone. Each of these wells is discussed in detail in Sections VI.C through VI.E. The wells that penetrated the injection zone are:

Map ID Nos. 59, 81, 83, 124, 134, 144, 157, 161, 167, 353, 848, 851, 855, 861, and 917.

Attachment VI-1A includes construction details, total depth, status, and drill date for the injection zone penetrations in the AOR. Well records available from the OCD for these wells are provided in Attachment VI-2.

VI.C Well Schematics

Schematics of all wells within one mile of WDW-1, WDW-2, and proposed WDW-3 that penetrate the injection zone are included with the well records in Attachment VI-2.

VI.D Condition of Artificial Penetrations

Each of the wells that penetrates the injection zone was evaluated to determine if it will allow movement of fluids into or between USDWs. For the purpose of this demonstration, the artificial penetrations may be categorized as follows:

Class I Waste Disposal Well (3 wells):

Map ID Nos. 59 and 861 are Navajo's Class I injection wells, WDW-1 and WDW-2. Map ID No. 157 is Navajo's proposed WDW-3.

Class II Saltwater Disposal Wells (1 well):

Map ID No. 83, the I&W Inc., Walter Solt SWD-1, is a Class II saltwater disposal well that is currently active. The well injects into the Wolfcamp in four sets of perforations: 7518 to 7534 feet, 7742 to 7756 feet, 7778 to 7787 feet, and 7810 to

7812 feet. The injection zone coincides with the shallowest formation proposed for injection by the proposed Navajo injection wells. The well has surface and intermediate or production casing set to prevent contamination of the USDW. The casing/formation annulus is cemented across the injection zone, as presented in Attachment VI-3. At the end of the well's useful life, the operator will plug and abandon the well according to OCD regulations with cement plugs set to protect the USDW and with heavy mud left in the wellbore. The Class II well in the AOR is listed below:

Map ID No. 83.

No corrective action is required for this well. ✓

Active Producing Wells (9 wells):

Active producing wells include producing and temporarily abandoned oil and gas wells. These wells have surface and intermediate or production casing set to prevent contamination of the USDW. In all wells, the casing/formation annulus is cemented across the injection zone. Reported top of cement, where available, or calculated top of cement for each casing string in each well is presented in Attachment VI-3. At the end of the wells' useful lives, the operators will plug and abandon the wells according to OCD regulations with cement plugs set to protect the USDW and with heavy mud left in the wellbore. The active producing wells within the AOR are listed below:

Map ID Nos. 81, 124, 134, 144, 161, 167, 355, 855, and 911. No

No corrective action is required for these wells. ✓

Plugged and Abandoned Producing Wells (1 well):

Plugged and abandoned producing wells are former producing wells with surface and intermediate or production casing set that have been plugged with cement plugs and heavy mud. The cement plugs were placed between the injection zone and the

ATTACHMENT VI-1 TABULATION OF WELLS WITHIN 1 MILE OF THE INJECTION WELLS

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
1	30-015-00693	ASPEN OIL INC DELHI #001	36 17S 27E A 330N 330E	528	T/A O	8/30/41
2	30-015-00694	DELHI OIL CORP. STATE #013	36 17S 27E A 990N 990E	1993	P&A O	6/24/48
3	30-015-00646	ASPEN OIL INC DELHI #007	36 17S 27E A 990N 330E	540	T/A O	4/21/50
4	30-015-00668	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #010	36 17S 27E G 1650N 2310E	1736	SHUT IN O	12/6/47
5	30-015-00690	ASPEN OIL INC CONKLIN #002	36 17S 27E G 1830N 2205E	532	ACTIVE O	3/6/49
6	30-015-00667	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #011	36 17S 27E G 2310N 2310E	1733	ACTIVE I	3/23/49
7	30-015-00666	ASPEN OIL INC CONKLIN #001	36 17S 27E G 2310N 2310E	533	ACTIVE O	1/10/42
8	30-015-00689	C E LARUE & B M MUNCY JR GATES STATE #001	36 17S 27E H 1650N 330E	557	ACTIVE O	8/4/50
9	30-015-00647	C E LARUE & B M MUNCY JR GATES STATE #002	36 17S 27E H 1650N 990E	551	SHUT IN O	10/10/52
10	30-015-00669	ASPEN OIL INC HOMAN #001	36 17S 27E H 2310N 330E	1804	SHUT IN O	6/20/49
11	30-015-00688	KERSEY & CO RAMAPO #001	36 17S 27E I 2310S 330E	590	P&A O	10/28/41
12	30-015-00670	KERSEY & CO RAMAPO #003	36 17S 27E I 2970N 330E	1857	P&A O	1/3/50
13	30-015-00687	KERSEY & CO RAMAPO #002	36 17S 27E I 2310S 990E	1900	P&A G	5/7/48

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
14	30-015-00685	ARCO OIL & GAS EMPIRE ABO UNIT G #020	36 17S 27E I 1650S 330E	5980	P&A O	7/10/89
15	30-015-00671	ROJO GRANDE COMPANY LLC RAMAPO #003	36 17S 27E J 2310S 2310E	591	ZONE ABAN O	2/13/42 1/24/00
16	30-015-01221	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #023	36 17S 27E J 2300S 2300E	1790	ZONE ABAN O	2/27/48 8/13/02
17		MARTIN YATES III DOOLEY STATE #3	36 17S 27E J	5865		4/22/61
18	30-015-05934	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #019A	36 17S 27E J 1650S 1650E	5970	ACTIVE O	2/26/61
19	30-015-01220	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #022	36 17S 27E K 2310S 2330W	1747	ZONE ABAN O	2/3/49 7/17/02
20	30-015-00674	ROJO GRANDE COMPANY LLC RAMAPO #002	36 17S 27E K 2310S 2310W	514	ACTIVE O	5/15/47
21	30-015-01219	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #021	36 17S 27E K 2310S 1650W	1710	ACTIVE I	1/20/48
22	30-015-23913	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #043	36 17S 27E K 1650S 1650W	1785	ACTIVE O	12/11/81
23		MARTIN YATES III DOOLEY STATE ABO #3	36 17S 27E K	5865	ACTIVE O	4/19/61
24	30-015-00673	ROJO GRANDE COMPANY LLC RAMAPO #001	36 17S 27E K 1650S 2310W	510	ZONE ABAN O	10/16/41 1/24/00
25	30-015-00682	ROJO GRANDE COMPANY LLC RAMAPO #004	36 17S 27E N 990S 1650W	541	ZONE ABAN O	9/29/42 1/24/00
26	30-015-00683	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #028	36 17S 27E N 965S 1650W	1812	ACTIVE I	4/16/48
27	30-015-01218	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #018	36 17S 27E N 330S 2310W	5925	T/A O	2/2/60

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
28	30-015-00684	BURNHAM OIL COMPANY STATE B-6961 NO. 1-A	36 17S 27E O 990S 2310E	1500	P&A O	5/13/47
29	30-015-01251	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #019	36 17S 27E O 660S 1980E	6200	T/A O	9/8/59
30			36 17S 27E I		MISPLOT OF 14	
31	30-015-00677	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #020	36 17S 27E P 330S 990E	6013	T/A O	5/16/60
32	30-015-01616	C F M OIL CO BLAKE STATE #001	30 17S 28E P 330S 990E	615	ACTIVE O	3/7/53
33	30-015-01638	BEDINGFIELD, MALCO, RESLER STATE NO. 1	31 17S 28E A 330N 990E	2004	P&A O	7/15/52
34	30-015-21594	RODNEY B WEBB DBA WEBB OIL CO POWCO STATE #001	31 17S 28E B 330N 1650E	652	ACTIVE O	11/15/75
35	30-015-01636	BEDINGFIELD, J E DELHI-STATE NO. 1	31 17S 28E C 330N 2310E	637	P&A O	12/23/52
36	30-015-25621	RODNEY B WEBB DBA WEBB OIL CO POWCO STATE #002	31 17S 28E B 980N 1620E	747	ACTIVE O	7/15/86
37	30-015-01633	ASPEN OIL INC ASTON & FAIR A #001	31 17S 28E D 330N 330W	531	SHUT IN O	6/23/42
38	30-015-01634	ASTON & FAIR STATE 31 NO. 1X	31 17S 28E D 350N 345W	525	NO COMPL O	1/5/46
39	30-015-01645	MCLAUGHLIN, C T BEDINGFIELD STATE 1 NO. 1	31 17S 28E F 990N 990W	2307	P&A O	2/16/50
40	30-015-02666	HANSON ENERGY HUDSON SAIKIN STATE #001	31 17S 28E E 2310N 330W	1816	ACTIVE O	5/29/48
41	30-015-24887	HANSON ENERGY HUDSON SAIKIN STATE #002	31 17S 28E E 2310N 990W	1950	ACTIVE O	7/7/84

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
42	30-015-01643	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #022	31 17S 28E F 2310N 2260W	5971	T/A O	6/7/60
43	30-015-01635	ASPEN OIL INC ASTON & FAIR #001Y	31 17S 28E F 2310N 2310W	1926	SHUT IN O	5/8/48
44	30-015-01637	ASPEN OIL INC MALCO STATE #001	31 17S 28E G 2310N 2310E	1852	ACTIVE O	10/12/53
45	30-015-01652	KERSEY & CO BOLING #001	31 17S 28E G 2288N 1625E	6025	ACTIVE O	8/10/60
46	30-015-10537	SDX RESOURCES INC NORTHWEST ARTESIA UNIT #004	31 17S 28E H 2277N 330E	6180	ACTIVE O	9/23/65
47	30-015-10833	SDX RESOURCES INC NORTHWEST ARTESIA UNIT #010	31 17S 28E I 1980S 660E	1945	ACTIVE O	6/17/66
48	30-015-01644	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #024A	31 17S 28E I 1650S 330E	6106	T/A O	4/29/60
49	30-015-01642	HANSON ENERGY STATE FW #001	31 17S 28E J 1650S 2310E	1937	ACTIVE O	12/23/62
50	30-015-01650	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #023A	31 17S 28E J 1650S 1958E	6094	SHUT IN O	3/13/60
51	30-015-01651	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #022B	31 17S 28E K 1650S 2387W	6046	ACTIVE O	4/10/60
52	30-015-01640	HANSON ENERGY RAMPO #002	31 17S 28E L 2310S 330W	1996	ACTIVE O	7/16/55
53	30-015-01648	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #021A	31 17S 28E L 1651S 1089E	5971	ZONE ABAN O	4/29/60 8/24/02
54	30-015-01639	HANSON ENERGY RAMPO #001	31 17S 28E M 990S 330W	1975	ACTIVE O	5/1/48
55	30-015-01647	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #021	31 17S 28E M 660S 660W	6006	T/A O	1/31/60

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
56	30-015-01646	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #022A	31 17S 28E N 660S 2082W	6050	ACTIVE O	1/22/60
57	30-015-10118	HANSON ENERGY STATE FV #001	31 17S 28E N 766S 2188W	1938	ACTIVE O	3/1/63
58	30-015-01653	OTIS A ROBERTS PARKER-STATE NO. 1	31 17S 28E O 990S 1650E	742	P&A O	1/18/42
59	30-015-27592	NAVAJO REFINING CO. PIPELINE DIVISION WDW #001	31 17S 28E 660S 2310E	10200	ACTIVE I	8/4/98
60	30-015-01649	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #023	31 17S 28E O 660S 1939E	6094	ACTIVE O	2/24/60
61	30-015-20042	SDX RESOURCES INC NORTHWEST ARTESIA UNIT #011	31 17S 28E P 990S 660E	2012	ACTIVE O	5/8/67
62	30-015-01641	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #024	31 17S 28E P 660S 660E	6122	ACTIVE O	3/12/60
63	30-015-01654	BEDINGFIELD, J E ASTON-STATE NO. 1	32 17S 28E D 330N 330W	651	P&A O	5/12/53
64	30-015-01671	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #025B	32 17S 28E E 2280N 978W	6013	T/A O	9/13/60
65	30-015-01657	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #026	32 17S 28E F 2280N 1980W	6171	T/A O	8/24/60
66	30-015-10818	SDX RESOURCES INC NORTHWEST ARTESIA UNIT #008	32 17S 28E K 2310S 2105W	2003	ACTIVE O	6/8/66
67	30-015-01661	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #026B	32 17S 28E K 1650S 2310W	6083	ACTIVE O	3/27/60
68	30-015-10795	SDX RESOURCES INC NORTHWEST ARTESIA UNIT #009	32 17S 28E L 2310S 660W	1930	T/A O	5/15/66
69	30-015-01662	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #025A	32 17S 28E L 1650S 990W	6075	ACTIVE O	4/13/60

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL		DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
70	30-015-20043	SDX RESOURCES INC NORTHWEST ARTESIA UNIT #012	32 17S 28E M	990S 760W	1998	T/A O	5/9/67
71	30-015-01660	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #025	32 17S 28E M	660S 660W	6132	SHUT IN O	3/5/60
72	30-015-10834	SDX RESOURCES INC NORTHWEST ARTESIA UNIT #013	32 17S 28E N	990S 2030W	1954	ACTIVE O	6/17/66
73	30-015-01659	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #026A	32 17S 28E N	660S 1980W	6172	ACTIVE O	2/14/60
74	30-015-21539	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #261	32 17S 28E N	150S 1400W	6220	ACTIVE O	7/25/75
75	30-015-22009	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #272	32 17S 28E O	330S 2481E	6370	ACTIVE O	7/18/77
76	30-015-02606	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #026E	5 18S 28E C	330N 1941W	6254	T/A O	7/18/60
77	30-015-22697	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #261A	5 18S 28E C	1080N 1914W	6350	ACTIVE O	1/4/79
78	30-015-02607	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #025C	5 18S 28E D	660N 660W	6273	ACTIVE O	3/27/60
79	30-015-22750	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #251	5 18S 28E D	660N 150W	6250	SHUT IN O	1/12/79
80	30-015-02608	CONOCOPHILLIPS COMPANY STATE E AI #001	5 18S 28E E	1660N 330W	6265	ACTIVE O	5/10/60
81	30-015-24485	CONOCOPHILLIPS COMPANY ILLINOIS CAMP A COM #001	5 18S 28E E	1980N 990W	10450	ACTIVE G	8/10/83
82	30-015-02602	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #026D	5 18S 28E F	1650N 1650W	6265	ACTIVE O	12/30/59
83	30-015-25522	I & W INC WALTER SOLT STATE #001	5 18S 28E L	2240S 400W	8500	ACTIVE S	8/12/83

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
84	30-015-10244	MACK ENERGY CORP STATE AG #001	5 18S 28E L 2310S 330W	6365	ZONE ABAN O	8/25/63 3/27/01
87	30-015-20019	SDX RESOURCES INC NORTHWEST ARTESIA UNIT #016	6 18S 28E A 330N 330E	3280	ACTIVE O	3/14/67
88	30-015-02615	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #024B	6 18S 28E A 660N 660E	6241	ACTIVE O	2/29/60
89	30-015-02625	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #023C	6 18S 28E B 470N 2170E	6194	T/A O	12/21/59
90	30-015-21542	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #231	6 18S 28E B 1260N 1580E	6250	ACTIVE O	11/1/75
91	30-015-02621	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #022E	6 18S 28E C 660N 1980W	6033	ACTIVE O	12/29/59
92	30-015-21626	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #231A	6 18S 28E G 1361N 2531E	6380	SHUT IN O	10/22/75
93	30-015-02613	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #021B	6 18S 28E D 990N 660W	6119	ACTIVE O	12/30/59
94	30-015-23116	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #213	6 18S 28E E 2050N 100W	6225	ACTIVE O	6/2/80
95	30-015-02619	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #021C	6 18S 28E E 1990N 660W	6202	ACTIVE O	10/30/59
96	30-015-22637	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #212	6 18S 28E E 2450N 400W	6267	ACTIVE O	12/28/78
97	30-015-21395	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #211	6 18S 28E E 2630N 1300W	6200	ACTIVE O	2/1/75
98	30-015-22012	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #222	6 18S 28E F 1350N 1572W	6303	ACTIVE O	3/13/77
99	30-015-02626	SARKIN, DAVID C & OLIVER, HENRY F STATE NO. 1	6 18S 28E F 1650N 1650W	705	P&A O	2/21/42

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
100	30-015-10107	HANSON ENERGY STATE FX #001	6 18S 28E F 1874N 1874W	1985	ACTIVE O	8/8/63
101	30-015-02620	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #022D	6 18S 28E F 1990N 2082W	6206	ACTIVE O	11/26/59
102	30-015-22527	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #223	6 18S 28E F 2630N 1930W	6250	ACTIVE O	5/19/78
103	30-015-21746	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #221	6 18S 28E F 2610N 2713W	6305	ACTIVE O	4/23/76
104	30-015-22913	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #235	6 18S 28E G 1750N 1600E	6300	ACTIVE O	7/8/79
105	30-015-22593	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #234	6 18S 28E G 1900N 2441E	6260	SHUT IN O	8/27/78
106	30-015-02614	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #023B	6 18S 28E G 1980N 1980E	6242	ACTIVE O	1/26/60
107	30-015-21737	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #232	6 18S 28E G 2253N 1576E	6345	SHUT IN O	4/13/76
108			6 18S 28E H	MISLOT OF 107		
109	30-015-22490	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #233	6 18S 28E G 2550N 2050E	6300	T/A O	6/5/78
110	30-015-02616	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #024C	6 18S 28E H 1650N 990E	6253	ACTIVE O	3/24/60
111	30-015-23547	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #241	6 18S 28E H 1950N 660E	6386	ACTIVE O	4/12/81
112	30-015-02617	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #024K	6 18S 28E I 2310S 990E	6350	ZONE ABAN O	8/24/60 12/12/02
113	30-015-22528	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #232A	6 18S 28E J 2300S 1570E	6350	T/A O	2/5/79

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
114	30-015-02611	BARNEY COCKBURN STATE NO. 1	6 18S 28E J 2310S 2310E	2095	P&A O	8/15/49
115	30-015-02628	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #023D	6 18S 28E J 2260S 2270E	6310	ACTIVE O	5/23/79
116	30-015-22491	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #231B	6 18S 28E J 1700S 2350E	6350	T/A O	8/13/78
117	30-015-02618	MILLER BROS OIL CO CAPITOL STATE NO. 1	6 18S 28E J 1647S 2076E	2396	P&A G	3/21/55
118	30-015-02623	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #022F	6 18S 28E K 2248S 2075W	6210	ACTIVE O	2/22/60
119			6 18S 28E K		MISPLOT	
120		NAVAJO REFINING COMPANY WDW-2 (ORIGINAL LOCATION)	6 18S 28E L			
121	30-015-02622	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #021D	6 18S 28E L 2219S 660W	6194	ACTIVE O	1/23/60
122	30-015-23548	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #211A	6 18S 28E L 1950S 1000W	6312	ACTIVE O	7/17/80
123	30-015-02627	PENROC OIL CORP STATE M-AI #002	6 18S 28E M 949S 990W	6225	ACTIVE O	10/21/60
124	30-015-26943	MEWBOURNE OIL CO CHALK BLUFF 6 STATE #001	6 18S 28E M 990S 730W	10200	ACTIVE G	4/16/92
125	30-015-02610	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #022C	6 18S 28E N 955S 1750W	6243	ACTIVE O	8/5/60
126	30-015-02624	PAN AMERICAN PETROLEUM CO STATE CD NO. 1	6 18S 28E O 968S 2270E	6412	P&A O	5/1/61
127	30-015-25503	DICKSON PETROLEUM CO KIMBERLY STATE NO. 1	6 18S 28E P 660S 330E	1750	P&A O	12/30/85

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
128	30-015-02612	D & H OIL CO STATE NO. 1	6 18S 28E P 330S 330E	2246	P&A O	5/13/52
129	30-015-01215	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #020D	1 18S 27E A 667N 666E	6118	ACTIVE O	11/5/59
130	30-015-00708	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #019B	1 18S 27E B 660N 1980E	6078	ACTIVE O	7/7/59
131		MALCO REFINERIES HILL #4	1 18S 27E C	1840	P&A	5/10/48
132			1 18S 27E C		MISPLOT	
133	30-015-00710	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #018C	1 18S 27E C 660N 1980W	6173	ACTIVE O	9/16/59
134	30-015-26741	MEWBOURNE OIL CO CHALK BLUFF FEDERAL COM #002	1 18S 27E F 1650N 1350W	10140	ACTIVE G	8/24/91
135	30-015-00706	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #018A	1 18S 27E F 2310N 1980W	6087	ACTIVE O	5/31/59
136	30-015-00709	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #019C	1 18S 27E G 1980N 1980E	6205	ACTIVE O	8/2/59
137			1 18S 27E G		MISPLOT	
138	30-015-21552	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #191	1 18S 27E G 2500N 2500E	6259	ACTIVE O	9/7/75
139	30-015-00711	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #020C	1 18S 27E H 1980N 660E	6218	ACTIVE O	10/13/59
140	30-015-21783	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #202	1 18S 27E H 2490N 1299E	6296	ACTIVE O	5/13/76
141	30-015-22656	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #203	1 18S 27E H 2400N 700E	6225	ACTIVE O	10/10/78

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
142		MANHATTAN OIL CRONIN #1	1 18S 27E H	2900	P&A	4/1/25 7/1/27
143	30-015-21553	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #201	1 18S 27E H 2501N 20E	6225	ACTIVE O	7/19/75
144	30-015-27163	MEWBOURNE OIL CO CHALK BLUFF FEDERAL COM #003	1 18S 27E I 1980S 990E	10150	ACTIVE G	1/16/93
145	30-015-00697	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #020K	1 18S 27E I 1980S 660E	6185	ZONE ABAN O	9/29/59 1/5/03
146	30-015-22657	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #193	1 18S 27E J 2490S 2200E	6225	ACTIVE O	10/26/78
147	30-015-00696	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #019Q	1 18S 27E J 1980S 1980E	6180	ACTIVE O	8/20/59
148	30-015-22560	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #192	1 18S 27E J 220S 1390E	6250	ACTIVE O	6/25/78
149	30-015-21873	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #191A	1 18S 27E J 1526S 1470E	6350	ACTIVE O	9/23/76
150	30-015-22658	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #194	1 18S 27E J 1500S 2130E	6325	ACTIVE O	11/14/78
151	30-015-22559	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #184	1 18S 27E K 2290S 2445W	6200	SHUT IN O	7/25/78
152	30-015-22096	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #183	1 18S 27E K 2370S 1510W	6210	ACTIVE O	7/24/77
153	30-015-21554	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #181	1 18S 27E K 1367S 1440W	6203	ZONE ABAN O	10/30/75 4/17/03
154	30-015-00707	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #018B	1 18S 27E K 1980S 1980W	6163	ACTIVE O	5/22/59
155	30-015-21792	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #182	1 18S 27E K 1533S 2370W	6369	ACTIVE O	6/1/76

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
156	30-015-00713	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #018D	1 18S 27E N 995S 1644W	6174	T/A O	12/5/59
157	30-015-26575	NAVAJO REFINING COMPANY WDW-3 (PROPOSED)	1 18S 27E N 790S 2250W	10120	T/A G	3/7/91
158	30-015-20394	HUMBLE OIL & REFINING CO EMPIRE ABO FEDERAL NO. 5	1 18S 27E O 953S 2197E	6300	P&A O	4/9/71
159	30-015-00698	ARCO PERMIAN EMPIRE ABO UNIT #191	1 18S 27E O 660S 1980E	6365	P&A S	11/8/59
160	30-015-00699	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #020B	1 18S 27E P 940S 330E	6250	ACTIVE O	12/2/61
161	30-015-26404	MEWBOURNE OIL CO FEDERAL T #001	12 18S 27E A 660N 990E	10141	T/A G	9/13/90
162	30-015-25099	EASTLAND OIL CO COMSTOCK FEDERAL #006	12 18S 27E H 1809N 990E	1652	ACTIVE O	9/11/85
165	30-015-25997	EASTLAND OIL CO LAUREL STATE #001	7 18S 28E C 940N 1757W	1690	ACTIVE O	2/23/87
166	30-015-25675	EASTLAND OIL CO LAUREL STATE #002	7 18S 28E E 940N 1757W	1690	ACTIVE O	11/10/88
167	30-015-25236	MOREXCO INC STATE BY #001	7 18S 28E F 1980N 1980W	10400	ACTIVE O	6/10/85
353	30-015-27286	MEWBOURNE OIL CO CHALK BLUFF 36 STATE #001	36 17S 27E M 660S 990W	10060	ACTIVE O	3/30/93
354	30-015-24612	PRONGHORN MANAGEMENT CORP STATE M #001	36 17S 27E M 790S 990W	1451	ACTIVE O	10/11/83
355	30-015-00676	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #017	36 17S 27E M 330N 990W	5797	ACTIVE O	
356	30-015-10184	ASPEN OIL INC STATE #006	36 17S 27E M 330S 920W	1343	ACTIVE O	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
358	30-015-21623	ASPEN OIL INC STATE #007	36 17S 27E M 360S 455W	1366	ACTIVE O	
359	30-015-00662	ACREY, B L & F D STATE NO. 2	36 17S 27E M 330S 330W	592	P&A O	10/15/42
595	30-015-02605	BP AMERICA PRODUCTION UNIT EMPIRE ABO UNIT NO. 27 E	5 18S 28E B 930N 2271E	6261	ACTIVE O	3/30/60
748	30-015-00715	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #037	1 18S 27E D 330N 330W	1835	ACTIVE I	
748	30-015-00701	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT 37 WIW	1 18S 27E D 330N 330W	1835	ACTIVE O	
749	30-015-00712	ARCO OIL & GAS EMPIRE ABO UNIT I NO. 17	1 18S 27E D 647N 667W	5900	P&A O	1/24/87
750		JONES BRAINARD	1 18S 27E E 1650N 330W	481	P&A O	5/10/39
751	30-015-00704	ARCO OIL & GAS EMPIRE ABO UNIT J NO. 17	1 18S 27E E 1980N 660W	5960	P&A O	3/26/59
752	30-015-00703	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #017A	1 18S 27E L 1980S 660W	6091	ACTIVE O	5/22/95
753	30-015-22815	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #171	1 18S 27E M 670S 330W	6300	ACTIVE O	5/22/79
754			1 18S 27E M	MISPLLOT OF 756		
755	30-015-00714	VALLEY REFINING CO HILL #1	1 18S 27E N	2404	P&A	12/20/43
756	30-015-00705	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #017B	1 18S 27E M 990S 660W	6150	ACTIVE O	6/25/59
757		BRAINARD & GUY STATE 2	2 18S 27E A 330N 610E	530	NO COMPL	1/31/42

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
758	30-015-00721	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #036	2 18S 27E A 330N 990E	1705	SHUT IN O	11/6/47
765	30-015-00724	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #016B	2 18S 27E A 990N 330E	5920	ACTIVE O	
766	30-015-00737	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #038	2 18S 27E B 905N 1601E	1722	ACTIVE O	5/23/48
772	30-015-00745	H & S OIL LLC STATE H #001	2 18S 27E H 1980N 660E	6140	ACTIVE O	3/9/59
773	30-015-00742	S&J OPERATING COMPANY SOUTH RED LAKE GRAYBURG UNIT 39 WIW	2 18S 27E H 1650N 990E	1742	P&A O	4/1/48 2/8/91
774	30-015-00740	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #040	2 18S 27E G 1650N 2197E	1707	P&A I	5/13/48 7/10/02
778		RUTTER & WILBANKS HUDSON #2	2 18S 27E G 2310N 1650E		O	1/1/57
779	30-015-00741	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #015B	2 18S 27E G 2310N 1980E	5880	ACTIVE O	6/6/59
781		MALCO REFINING CO STATE B-2	2 18S 27E J 2310S 2310E	4164	P&A O	1/1/47
785	30-015-00717	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #016	2 18S 27E I 1980S 660E	6114	ACTIVE O	2/6/95
786	30-015-00716	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #015	2 18S 27E J 1980S 1830E	6100	ACTIVE O	3/23/59
789	30-015-22896	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #143A	2 18S 27E K 1820S 2550W	6108	ACTIVE O	5/13/79
791	30-015-22914	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #161	2 18S 27E I 1310S 590E	6225	ACTIVE O	9/13/79
792			2 18S 27E O		MISLOT OF 814	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
793	30-015-22609	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #143	2 18S 27E N 1200S 1900W	6093	ACTIVE O	12/20/78
795			2 18S 27E P		MISPLUG OF 765	
796	30-015-21544	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #151	2 18S 27E O 1110S 1322E	6285	T/A O	11/4/75
797	30-015-22885	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #155	2 18S 27E O 1040S 2025E	6202	T/A O	5/1/79
799	30-015-00722	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #016A	2 18S 27E P 660S 660E	6115	T/A O	1/20/59
800	30-015-22808	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #156	2 18S 27E O 600S 1330E	6225	ACTIVE O	4/12/79
801	30-015-00731	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #015A	2 18S 27E O 660S 1980E	6220	ACTIVE O	11/19/58
802	30-015-22669	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #154	2 18S 27E O 800S 2500E	6200	T/A O	12/4/78
805	30-015-22013	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #153	2 18S 27E O 90S 1456E	6303	T/A O	4/20/77
806	30-015-21825	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #152	2 18S 27E O 320S 2602E	6335	T/A O	6/17/76
807	30-015-22608	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #142	2 18S 27E N 100S 1950W	6200	ACTIVE O	1/12/79
808	30-015-21807	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #132	2 18S 27E M 275S 1243W	6200	ACTIVE O	7/1/76
812	30-015-00730	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #014	2 18S 27E N 660S 1980W	6112	ACTIVE O	10/21/58
813	30-015-00720	BP AMERICA PRODUCTION COMPANY RIVERWOLF UNIT #004	2 18S 27E A 990N 1650E	5881	ACTIVE O	10/21/59

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
814	30-015-22051	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #141A	2 18S 27E K 1370S 2445W	6203	ACTIVE O	5/17/77
836	30-015-00869	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #016C	11 18S 27E A 330N 653E	6211	ACTIVE O	7/1/59
837	30-015-22568	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #151B	11 18S 27E B 400N 1450E	6310	T/A O	8/1/78
838	30-015-22838	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #153B	11 18S 27E B 200N 1925E	6252	T/A O	5/6/79
839	30-015-00868	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #015C	11 18S 27E B 660N 1980E	6260	T/A O	4/6/58
840	30-015-22569	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #152B	11 18S 27E B 560N 2588E	6300	T/A O	8/23/78
841	30-015-22834	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #141B	11 18S 27E C 225N 2280W	6225	SHUT IN O	5/21/79
842	30-015-00864	ARCO OIL & GAS EMPIRE ABO UNIT M NO. 14	11 18S 27E C 660N 1980W	6315	P&A O	9/5/57
843	30-015-22833	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #133B	11 18S 27E D 450N 1175W	6225	T/A O	5/23/79
844	30-015-00867	ARCO OIL & GAS EMPIRE ABO UNIT M NO. 13	11 18S 27E D 660N 660W	6114	P&A O	4/26/58
846	30-015-22556	ARCO OIL & GAS EMPIRE ABO UNIT M NO. 131	11 18S 27E D 1100N 1200W	6325	P&A O	7/10/78
848	30-015-20510	AMOCO PRODUCTION CO MALCO S NO. 1	11 18S 27E F 1650N 1653W	10168	P&A O	10/16/71
849	30-015-00865	ARCO OIL & GAS EMPIRE ABO UNIT N NO. 14	11 18S 27E F 1650N 1980W	6208	P&A O	2/3/61
850	30-015-00866	ARCO OIL & GAS EMPIRE ABO UNIT N NO. 131	11 18S 27E E 1980N 660W	6120	P&A O	3/27/58

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
851	30-015-00870	AMOCO PRODUCTION CO SMITH-MCPHERSON NO. 1	11 18S 27E J 1980S 1980E	7270	P&A O	9/1/56
852	30-015-01201	OSCAR HOWARD AN ETZ #3	11 18S 27E N	1828	P&A	4/15/27
853	30-015-01202	OSCAR HOWARD AN ETZ #2	11 18S 27E O	1827	P&A	2/4/27
854	30-015-00863	B.R. POLK, JR. VICKERS #1	11 18S 27E N	1794	P&A	10/14/49
855	30-015-24857	RICKS EXPLORATION, INC. FEDERAL DH GAS COM #001	11 18S 27E M 700S 990W	11915	ACTIVE G	5/18/84
856	30-015-20535	ROBERT G COX FEDERAL EA 2	12 18S 27E D 330N 455W	6248	P&A O	11/27/71 8/7/73
857	30-015-00871	RHONDA OPERATING CO FEDERAL EA #001	12 18S 27E D 330N 330W	6253	P&A O	7/8/75 4/12/94
858	30-015-23115	RHONDA OPERATING CO FEDERAL EA NO. 3	12 18S 27E D 330N 380W	6295	D&A O	3/16/80
859	30-015-25738	EASTLAND OIL CO COMSTOCK FEDERAL #009	12 18S 27E G 2310N 2310E	1586	ACTIVE O	4/25/87
860	30-015-25270	EASTLAND OIL CO CHUKKA FEDERAL #001	12 18S 27E F 2310N 2310W	1600	ACTIVE O	4/23/85
861	30-015-20894	NAVAJO REFINING COMPANY WDW #002	12 18S 27E E 1980N 660W	10372	ACTIVE I	7/18/73
862	30-015-00874	EASTLAND OIL CO COMSTOCK FEDERAL #007	12 18S 27E J 2310S 2355E	3664	ACTIVE O	6/29/48
863	30-015-00872	MCKEE-JONES MAGRUDER NO. 1	12 18S 27E L 310S 990W	594	D&A O	2/18/43
864	30-015-25201	EASTLAND OIL CO COMSTOCK FEDERAL #002	12 18S 27E K 1650S 1770W	1600	ACTIVE O	3/16/85

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
865	30-015-25649	FRED POOL DRILLING CO COMSTOCK FEDERAL NO. 8	12 18S 27E L 1650S 990W	2000	D&A O	10/10/86
866	30-015-25545	EASTLAND OIL CO COMSTOCK FEDERAL #003	12 18S 27E M 990S 990W	1530	ACTIVE O	5/19/86
867	30-015-00873	R.E. MCKEE ET AL MAGRUDER #2	12 18S 27E M	2510	P&A	2/27/45
868	30-015-26017	EASTLAND OIL CO COMSTOCK FEDERAL #010	12 18S 27E N 990S 1650W	2040	ZONE ABAN O	12/16/89 1/23/03
869	30-015-25100	EASTLAND OIL CO COMSTOCK FEDERAL #001	12 18S 27E N 330S 1650W	2400	ACTIVE O	12/10/84
870	30-015-25202	EASTLAND OIL CO COMSTOCK FEDERAL #005	12 18S 27E O 330S 2310E	1625	ACTIVE O	4/19/85
871	30-015-06171	PILCHER OIL & GAS MICHAEL CRONIN NO. 3	12 18S 27E I 1069S 251E	2200	P&A O	5/20/26
872		PILCHER OIL & GAS MICHAEL CRONIN #1	12 18S 27E P	2002	P&A	2/15/32
873	30-015-00875	CITIES SERVICE OIL CO MAGRUDER NO. B-4	12 18S 27E P 330S 330E	2000	P&A O	7/30/52
874	30-015-00876	ROBERT E MCKEE MAGRUDER NO. 5	12 18S 27E P 100S 500E	1994	P&A O	2/8/54
875	30-015-06170	PILCHER OIL & GAS MICHAEL CRONIN NO. 2	12 18S 27E P 200S 200E	2004	P&A O	2/22/26
876	30-015-01200	HASSENFUSH-DONNELLY STATE NO. 1	13 18S 27E A O O	2030	P&A O	1/1/26
877	30-015-06137	EASTLAND OIL CO STATE NO. 2	13 18S 27E A 250N 990E	2696	D&A O	1/1/26
878	30-015-25394	EASTLAND OIL CO ARTESIA STATE #002	13 18S 27E C 330N 2310W	1613	ACTIVE O	9/28/85

IB NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RSE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
879	30-015-25241	EASTLAND OIL CO ARTESIA STATE #001	13 18S 27E C 330N 1650W	1575	ACTIVE O	4/13/85
880	30-015-00884	DALE RESLER STATE NO. 3	13 18S 27E C 990N 1650W	2047	P&A O	1/29/45
881	30-015-25370	CBS OPERATING CORP ARTESIA STATE UNIT #002A	13 18S 27E D 480N 940W	1608	ACTIVE O	8/27/85
882	30-015-00883	CBS OPERATING CORP ARTESIA STATE UNIT #001	13 18S 27E D 990N 990W	1950	ACTIVE O	12/11/44
883	30-015-00880	DALE RESLER - JONES STATE NO. 1	13 18S 27E E 1650N 990W	2353	P&A O	1/26/45
884	30-015-24881	DAVID G HAMMOND ANADARKO 13 FEDERAL #001	13 18S 27E F 1880N 1830W	3020	ACTIVE O	6/18/84
885	30-015-00888	RALPH NIX & JERRY CURTIS PAGE NO. 1	13 18S 27E F 1980N 1650W	2000	P&A O	11/28/54
886	30-015-00879	DALE RESLER JONES-GOVT NO. 1	13 18S 27E F 2310N 1650W	2000	D&A O	3/14/45
888	30-015-25078	DICKSON PETROLEUM, INC ANADARKO 13 FEDERAL NO. 1	13 18S 27E G 1724N 2279E	2150	D&A O	12/30/84
895	30-015-00891	ANADARKO PETROLEUM CORP ARTESIA STATE UNIT TRACT 4 NO. 1	14 18S 27E A 990N 330E	2060	P&A O	6/30/44
896	30-015-00893	RESLER STATE NO. 1	14 18S 27E G 1650N 1650E	2375	D&A O	1/1/00
897	30-015-00895	CBS OPERATING CORP ARTESIA STATE UNIT #001B	14 18S 27E H 1650N 330E	1888	ACTIVE O	2/8/45
901	30-015-00695	WILLIAM & EDWARD HUDSON HILL NO. 1	1 18S 27E L 1650S 330W	1763	D&A O	6/18/48
910	30-015-00744	COMPTON-SMITH STATE 1	2 18S 27E J 2310S 1640E	1080	P&A O	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
911	30-015-31123	SOUTHWESTERN ENERGY PRODUCTION C NO BLUFF 36 STATE COM #002	36 17S 27E H 1980N 760E	10050	ACTIVE G	
912	30-015-31036	C E LARUE & B M MUNCY JR GATES STATE #003	36 17S 27E H 2310N 990E	614	ACTIVE O	
916	30-015-31592	ROJO GRANDE COMPANY LLC RAMAPO #007	36 17S 27E N 330S 2310E	612	P&A O	7/6/01 12/21/01
917	30-015-30784	SDX RESOURCES INC NW STATE #012	31 17S 28E A 330N 480E	3300	ACTIVE O	
918	30-015-30893	SDX RESOURCES INC NW STATE #028	31 17S 28E A 973N 959E	2808	ACTIVE O	
919	30-015-32162	SDX RESOURCES INC ENRON STATE #004	31 17S 28E D 460N 990W	3460	NO COMPL O	4/3/03
920	30-015-30783	SDX RESOURCES INC NW STATE #011	31 17S 28E H 1650N 330E	3205	ACTIVE O	
921	30-015-30849	SDX RESOURCES INC NW STATE #009	31 17S 28E I 2310S 270E	3195	ACTIVE O	
922	30-015-30760	SDX RESOURCES INC NW STATE #010	31 17S 28E P 735S 330E	3210	ACTIVE O	
923	30-015-31920	SDX RESOURCES INC ENRON STATE #002	32 17S 28E D 990N 990W	4030	ACTIVE O	
924	30-015-30781	SDX RESOURCES INC NW STATE #005	32 17S 28E K 1900S 2146W	3190	ACTIVE O	
925	30-015-30777	SDX RESOURCES INC NW STATE #006	32 17S 28E L 2310S 990W	3204	ACTIVE O	
926	30-015-30685	SDX RESOURCES INC NW STATE #007	32 17S 28E M 990S 990W	3220	ACTIVE O	
927	30-015-30815	SDX RESOURCES INC NW STATE #008	32 17S 28E N 1090S 2126W	3310	ACTIVE O	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC. TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
928	30-015-32310	MARBOB ENERGY CORP AAO FEDERAL #004	1 18S 27E A 990N 990E	4000	PROPOSED O	
929	30-015-32309	MARBOB ENERGY CORP AAO FEDERAL #003	1 18S 27E B 330N 1690E	4125	NO COMPL O	4/10/03
930	30-015-32308	MARBOB ENERGY CORP AAO FEDERAL #002	1 18S 27E C 430N 2310W	4150	ACTIVE O	9/19/02
931	30-015-32307	MARBOB ENERGY CORP AAO FEDERAL #001	1 18S 27E D 330N 990W	3851	ACTIVE O	12/10/02
932	30-015-22816	ARCO OIL & GAS EMPIRE ABO UNIT L #192	1 18S 27E O 1120S 1440E	6350	ABAN LOCATION O	6/28/80 6/23/80
933	30-015-20388	ARCO OIL & GAS EMPIRE ABO #5	1 18S 27E N 990S 2297E	6300	SAME AS 158 O	12/31/99
934	30-015-27719	MEWBOURNE OIL CO CHALK BLUFF 12 FED #001	12 18S 27E 1650S 990E		ABAN LOCATION G	
935	30-015-27437	YATES PETROLEUM CORPORATION BEAUREGARD ANP STATE COM #001	14 18S 27E B 660N 1980E	0	ABAN LOCATION G	
936	30-015-31086	MARBOB ENERGY CORP LP STATE #001	5 18S 28E E 1650N 990W	4503	ACTIVE O	
937	30-015-31109	MARBOB ENERGY CORP LP STATE #002	5 18S 28E E 2301N 230W	0	PROPOSED O	
938	30-015-30785	SDX RESOURCES INC NW STATE #015	6 18S 28E A 430N 330E	3225	ACTIVE O	
939	30-015-00264	BARNEY COCKBURN CAPITAL STATE NO. 1	6 18S 28E J 2310S 2310E	2095	SAME AS 114 O	5/23/79
940	30-015-31087	MARBOB ENERGY CORP LP STATE #003	6 18S 28E M 990S 330W	4466	ACTIVE O	7/15/00
941	30-015-31088	MARBOB ENERGY CORP LP STATE #004	6 18S 28E M 330S 990W	0	PROPOSED O	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
942	30-015-06250	SAME AS 89	6 18S 28E O 470S 2170E	0	SAME AS 89 O	
943	30-015-31319	EASTLAND OIL CO LAUREL STATE #003	7 18S 28E E 2310N 330W	1630	ACTIVE O	1/31/01
944		NAVAJO REFINING COMPANY WDW-3 (ORIGINAL LOC.)	6 18S 28E D 778N 995W		ABAN LOCATION I	

ATTACHMENT VI-1A

CONSTRUCTION DATA FOR WELLS THAT PENETRATE THE INJECTION ZONE WITHIN 1 MILE OF THE INJECTION WELLS

ID NO	OPERATOR/LEASE	TYPE	TOTAL DEPTH (ft)	CASING			DATE COMPLETED OR PLUGGED	PLUGGING		MUD DATA		REMARKS
				DIAMETER (in)	DEPTH (ft)	SX OF CEMENT		DEPTH (ft)	SX OF CEMENT	FILLED (Y/N)	MUD WEIGHT (lb/gal)	
59	Navajo Refining Company WDW-1 31-17S-28E Unit O	Active Class I	10200 PB 9004	13-3/8 9-5/8 7	390 2555 9094	525 1000 1370	9/9/93 Recompleted 8/4/98	9734	45	NA	NA	
81	Phillips Oil Company Illinois Camp A Com No. 1 Empire Penn Gas Field 5-18S-28E Unit E	Active Gas	10450	13-3/8 8-5/8 5-1/2 2-7/8	663 4000 10450 9922	650 1400 2007	8/10/83	NA	NA	NA	NA	Perfs: 10172 - 10184 feet 10070 - 10075 feet
83	Meek Pipe & Supply (original) I&W, Inc. Walter Solt State No. 1 5-18S-28E Unit L	Active SWD	8500	13-3/8 8-5/8 5-1/2 2-7/8	354 1745 8466 7500	350 650 520	8/12/83	NA	NA	NA	NA	Perfs: 7518 - 7534 feet 7632 - 7642 feet (cemented) 7742 - 7756 feet 7778 - 7787 feet 7810 - 7812 feet
124	Mewbourne Oil Company Chalk Bluff 6 State No. 1 North Illinois Camp Morrow 6-18S-28E Unit M	Active Gas	10200	13-3/8 9-5/8 7 4-1/2 2-3/8	400 2600 9445 9077 - 10198 9990	500 1100 1895 175	4/16/92	NA	NA	NA	NA	Perfs: 10084 - 10092 feet
134	Mewbourne Oil Company Chalk Bluff Federal Com No. 2 North Illinois Camp Morrow 1-18S-27E Unit F	Active Gas	10140	13-3/8 9-5/8 5-1/2 2-7/8	416 2610 10148 9939	450 1025 1020	8/24/91	NA	NA	NA	NA	Perfs: 9999 - 10024 feet
144	Mewbourne Oil Company Chalk Bluff Federal Com No. 3 North Illinois Camp Morrow 1-18S-27E Unit I	Active Gas	10150	13-3/8 9-5/8 7 4-1/2 2-3/8	400 2600 8968 8600 - 10150 9972	100 250 1200 200	1/16/93	NA	NA	NA	NA	Perfs: 9950 - 9954 feet 9957 - 9972 feet

ATTACHMENT VI-1A (Continued)

CONSTRUCTION DATA FOR WELLS THAT PENETRATE THE INJECTION ZONE WITHIN 1 MILE OF THE INJECTION WELLS

ID NO	OPERATOR/LEASE	TYPE	TOTAL DEPTH (ft)	CASING			DATE COMPLETED OR PLUGGED	PLUGGING		MUD DATA		REMARKS
				DIAMETER (in)	DEPTH (ft)	SX OF CEMENT		DEPTH (ft)	SX OF CEMENT	FILLED (Y/N)	MUD WEIGHT (lb/gal)	
152	Navajo Refining Company WDW-3 Mewbourne Oil Company (original) Chalk Bluff Fed. Com No. 1 North Illinois Camp Morrow 1-18S-27E Unit N	Proposed Class I	10120	13-3/8 9-5/8 7 4-1/2	400 2604 9450 9051 - 10119	425 1025 1350 175	3/7/91	NA	NA	NA	NA	
161	Mewbourne Oil Company Federal T No. 1 North Illinois Camp Morrow 12-18S-27E Unit A	Active Shut In	10141	13-3/8 8-5/8 5-1/2 4	472 2589 9473 10140 (liner)	450 900 430 80	9/13/90					
167	ARCO Oil & Gas Company Morexco, Inc. State BY No. 1 Artesia Q-GB-SA 7-18S-28E Unit F	Active Oil	10400	13-3/8 8-5/8 5-1/2 2-7/8	418 2600 10400 1706	500 1150 1000	6/10/85 12/20/95 Recompleted to Grayburg	10050 7050 5950 2600	35', CIBP 100' 100' 100'	Y	Unknown	Perfs: 10116 - 10124 feet (cemented) 1627 - 46 feet
153	Mewbourne Oil Company Chalk Bluff 36 State No. 1 36-17S-27E Unit N	Active Gas	10060	13-3/8 9-5/8 7 4-1/2	399 2603 9253 8439- 10057	530 1150 1620 225	3/30/93	8300	NA	NA	NA	Perfs: 7164-7277 feet 8528-8572 feet 9466-9484 feet 9842-9856 feet 9864-9886 feet
848	Amoco Production Company Malco S No. 1 11-18S-27E Unit F	P&A	10168	11-3/4 8-5/8 5-1/2	1000 6348 6277-10138	970 300 855	10/16/71 12/03/85	9495 7863-7613 6995 5350-5250 1050-950 Surface	NA 25 15 40 350 10	Y		Cement plug is present at the top of the liner, which is set above the top of the injection zone.
851	Amoco Production Company Smith-McPherson No. 1 (was Stanolind Oil and Gas Co. Ruth C. McPherson No. 1) 11-18S-27E Unit J	P&A	7270	13-3/8 9-5/8 4-1/2	572 960-1790 2990-4500	700 250 NA	09/01/56 06/06/73	4119-3735 3040-2900 2040-1922 1010-910 602-502 Surface	30 30 40 50 60 10	Y		Injection zone is not cased and is mud-filled.

ATTACHMENT VI-1A (Continued)

CONSTRUCTION DATA FOR WELLS THAT PENETRATE THE INJECTION ZONE WITHIN 1 MILE OF THE INJECTION WELLS

ID NO	OPERATOR/LEASE	TYPE	TOTAL DEPTH (ft)	CASING			DATE COMPLETED OR PLUGGED	PLUGGING		MUD DATA		REMARKS
				DIAMETER (in)	DEPTH (ft)	SX OF CEMENT		DEPTH (ft)	SX OF CEMENT	FILLED (Y/N)	MUD WEIGHT (lb/gal)	
855	Amoco Production Company Federal DH Gas Com. No. 1 11-18S-27E Unit M	Oil	11915	13-3/8 9-5/8 5-1/2	502 2200 11915	700 1400 2720	05/18/84	11610 10700	55 55			Long-string casing is cemented from total depth to above the top of the confining zone. Perfs (Strawn, Morrow): 9295-9308 feet 9789-9846 feet
861	Navajo Refining Company, WDW-2 12-18S-27E Unit E	Active Class I	10372 PB 8770	13-3/8 8-5/8 5-1/2	40 1995 8869	Surface 800 1570	07/18/73 Recompleted 6/8/99	NA	NA	NA	NA	
911	Southwest Energy Production Co. No. Bluff 36 State Comm. No. 2 36-17S-27E Unit H	Active Gas	10050	13-3/8 8-5/8 5-1/2	425 2002 10050	465 650 553	4/28/01	NA	NA	NA	NA	Perfs: 9927-9964 feet

NA - Not applicable

MAP ID NO. 157

**NAVAJO REFINING COMPANY
NO. 1 CHALK BLUFF FEDERAL COM.**

PROPOSED WDW-3



SUBSURFACE

Artificial Penetration Review
Number 157

OPERATOR Navajo Refining Company

LEASE Chalk Bluff Federal Com.

WELL NUMBER 1

DATE DRILLED 3/7/91

DATE PLUGGED

STATUS Active - T/A

DISTANCE FROM INJECTOR (FT)

LOCATION 1-18S-27E Unit N

MUD FILLED BOREHOLE

REPORTED MUD WEIGHT

API NUMBER 30-015-26575

790' FSL, 2250' FWL

Proposed WDW-3

13 3/8" surface casing @ 400' w/ 425 sx.

9 5/8" casing @ 2604' w/ 1025 sx.

CIBP @ 7010'

CIBP @ 7208'

CIBP @ 7294'

CIBP @ 7600' w/ 35' cement

Perfs: 7050'-7102'
7262'-7278'
7304'-7314'
7676'-7678'
7826'-7830'
9861'-9967'

7" casing @ 9450' cemented w/ 1350 sx in 2 stages
circulated to surface

4 1/2" liner 9051'-10119'
w/ 175 sx

TD 10120'

Revised July 2003

3160-5
(September 1994)UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on reverse side

1. Type of Well

☐ Oil Well ☐ Gas Well ☐ Other

2. Name of Operator

Navajo Refining Co.

3a. Address

P.O. Drawer 159, Artesia, NM 88211

3b. Phone No. (include area code)

505-748-3311

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

N-1-18s-27e

790' FSL & 2250' FWL

FORM APPROVED
OMB No. 1004-0135
Expires July 31, 1996

5. Lease Serial No.

NM 0557371

6. If Indian, Allottee or Tribe Name

7. If Unit or CA Agreement, Name and/or No.

8. Well Name and No.

Chalk Bluff Fed. Com. #1

9. API Well No.

30-015-26575

10. Field and Pool, or Exploratory Area

11. County or Parish, State

Eddy

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION

TYPE OF ACTION

☐ Notice of Intent☐ Subsequent Report☐ Final Abandonment Notice☐ Acidize☐ Alter Casing☐ Casing Repair☐ Change Plans☐ Convert to Injection☐ Deepen☐ Fracture Treat☐ New Construction☐ Plug and Abandon☐ Plug Back☐ Production (Start/Resume)☐ Reclamation☐ Recomplete☒ Temporarily Abandon☐ Water Disposal☐ Water Shut-Off☐ Well Integrity☐ Other

Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

This well is temporarily abandoned. We are holding it for future use as a waste water injection well. We ran an MIT on it on March 31, 2003 (chart enclosed) and it passed. This test was witnessed by the New Mexico OCD.

TH Approved For 12 Month Period
Ending 3/31/04

14. I hereby certify that the foregoing is true and correct
Name (Printed/Typed)

Darrell Moore

Signature

Darrell Moore

Title

Env. Mgr. for Water & Waste

Date

5/13/03

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

JIM R. LARA

Title

Secretary

Date

6/11/03

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office

CFO

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on reverse)

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 South First, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Form C-104A
August 11, 2000

Oil Conservation Division
2040 South Pacheco
Santa Fe, NM 87505

Submit 1 copy of the final affected wells
list along with 2 copies of this form per
number of wells on that list to
appropriate District Office

Change of Operator

Previous Operator Information:

OGRID: 14744
Name: Mewbourne Oil Company
Address: P. O. Box 7698
Address: _____
City, State, Zip: Tyler, TX 75711

New Operator Information:

Effective Date: 5 October, 2000
New Ogrid: 15694
New Name: Navajo Refining Company
Address: ~~100 Crescent Court, Ste 1600~~
Address: P.O. Box 159
City, State, Zip: ~~Dallas, TX 75201~~
Artesia, NM 88211

I hereby certify that the rules of the Oil Conservation Division have been complied with and that the information on this form and the attached list of wells is true and complete to the best of my knowledge and belief.

New Operator

Signature: Darrell Moore

Printed name: Darrell Moore

Title: Env. Mgr. for Water and Waste

Date: 12/5/00 Phone: 505-748-3311

Previous operator complete below:

Previous
Operator: Mewbourne Oil Company
Previous
OGRID: 14744
Signature: Monty Whetstone
Printed Name: Monty Whetstone

NMOCD Approval

Signature: Jim W. Beem

Printed

Name: District Supervisor

District: _____

NOV 27 2000

Date: _____

27021 - property code - Chalk Bluff Federal Leas #1
30-015-26575 - API Number 1-185-27E

SUBSURFACE

Artificial Penetration Review
Number 353

OPERATOR Mewbourne Oil Company

LEASE Chalk Bluff 36 State

WELL NUMBER 1

DATE DRILLED 3/30/93

DATE PLUGGED

STATUS ACTIVE

DISTANCE FROM INJECTOR (FT)

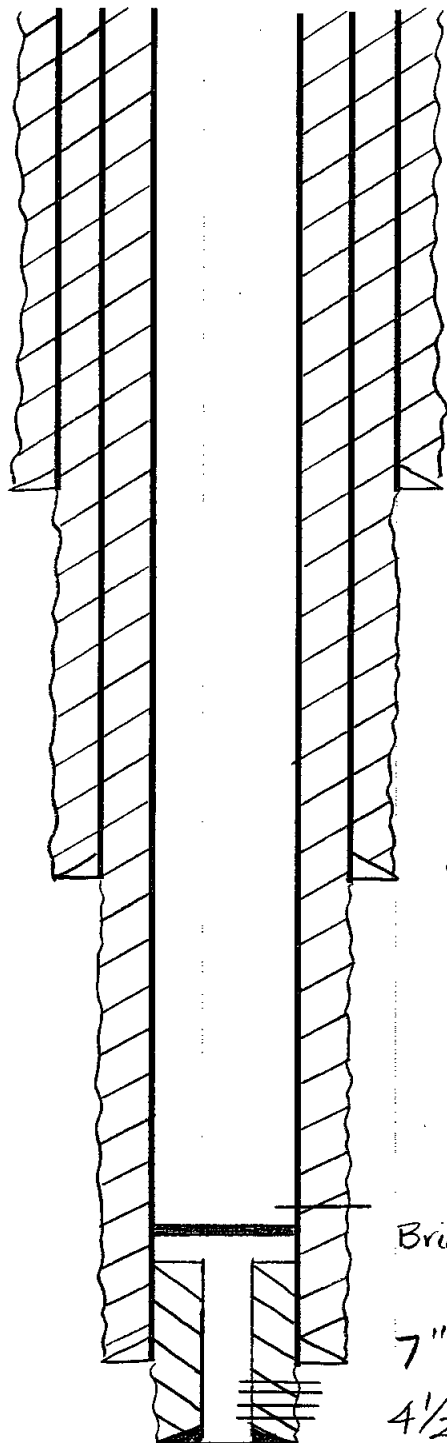
LOCATION 36-17S-27E, N

MUD FILLED BOREHOLE

REPORTED MUD WEIGHT

API NUMBER 30-015-27286

660' FSL, 990' FWL



13 3/8" casing at 399', cement to surface,
530 SX

9 5/8" casing at 2603', cement to surface,
1150 SX

Perfs:

7164'-7277'
8528'-8572'
9466'-9484'
9842'-9856'
9864'-9886'

Bridge Plug @ 8300'

7" casing at 9253', cement to surface, 1620 SX
4 1/2" liner 8439'-10057'

TD 10060'

District I
PO Box 1980, Hobbs, NM 88241-1980
District II
811 South First, Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

353 Form C-104
Revised October 18, 1994
Instructions on back
Submit to Appropriate District Office
5 Copies
☐ AMENDED REPORT

I. REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT

¹ Operator name and Address Mewbourne Oil Company PO Box 5270 Hobbs, New Mexico 88241		² OGRID Number 14744
		³ Reason for Filing Code Plug Back/Recompletion
⁴ API Number 30 - 0 15-27286	⁵ Pool Name Logan Draw Wolfcamp.	⁶ Pool Code 96960
⁷ Property Code 7871	⁸ Property Name Chalk Bluff 36 State	⁹ Well Number 1

II. ¹⁰ Surface Location

Ul or lot no.	Section 36	Township 17S	Range 27E	Lot Idn	Feet from the 660	North/South Line South	Feet from the 990	East/West line West	County Eddy
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¹¹ Bottom Hole Location

Ul or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South Line	Feet from the	East/West line	County
¹² Lse Code	¹³ Producing Method Code Pumping		¹⁴ Gas Connection Date 07/17/01		¹⁵ C-129 Permit Number		¹⁶ C-129 Effective Date		¹⁷ C-129 Expiration Date

III. Oil and Gas Transporters

¹⁸ Transporter OGRID	¹⁹ Transporter Name and Address	²⁰ POD	²¹ OIG	²² POD ULSTR Location and Description
138648	Amoco Pipeline Company Tulsa, Ok.	1923810	O	
990	Elkhorn Operating Company Artesia, NM	2829736	G	

IV. Produced Water

²³ POD 1923850	²⁴ POD ULSTR Location and Description
------------------------------	--

V. Well Completion Data

²⁵ Spud Date 02/03/93	²⁶ Ready Date 07/17/01	²⁷ TD 10060	²⁸ PBTD 8300	²⁹ Perforations 7164-7277	³⁰ DHC, DC, MC
³¹ Hole Size 17 1/2"	³² Casing & Tubing Size 13 3/8"	³³ Depth Set 399'	³⁴ Sacks Cement 530		
12 1/4"	9 5/8"	2603'	1150		
8 3/4"	7"	9253'	1620		
6 1/8"	4 1/2"	10057'	225		

VI. Well Test Data

³⁵ Date New Oil 07/17/01	³⁶ Gas Delivery Date 07/17/01	³⁷ Test Date 07/22/01	³⁸ Test Length 24	³⁹ Tbg. Pressure N/A	⁴⁰ Csg. Pressure 35
⁴¹ Choke Size N/A	⁴² Oil 88	⁴³ Water 78	⁴⁴ Gas 88	⁴⁵ AOF	⁴⁶ Test Method Pumping

⁴⁷ I hereby certify that the rules of the Oil Conservation Division have been complied with and that the information given above is true and complete to the best of my knowledge and belief.		OIL CONSERVATION DIVISION	
Signature: <i>N.M. Young</i>	Printed name: N.M. Young	Approved by: <i>Jim W. Green</i>	Title: District Supervisor
Title: District Manager	Date: 08/24/01	Approval Date: SEP 6 2001	Phone: 505-393-5905
⁴⁸ If this is a change of operator fill in the OGRID number and name of the previous operator			
Previous Operator Signature		Printed Name	Title Date

Submit to Appropriate
District Office,
State Lease - 6 copies
Fee Lease - 5 copies
DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-105
Revised 1-1-89

51
354

OIL CONSERVATION DIVISION

2040 Pacheco St.
Santa Fe, NM 87505

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd, Aztec, NM 87410

WELL API NO. 30-015-27286
5. Indicate Type of Lease STATE <input checked="" type="checkbox"/> FEE <input type="checkbox"/>
6. State Oil & Gas Lease No. E-379-4
7. Lease Name or Unit Agreement Name Chalk Bluff 36 State
8. Well No. 1
9. Pool name or Wildcat Logan Draw Wolfcamp

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

1a. Type of Well: OIL WELL <input checked="" type="checkbox"/> GAS WELL <input type="checkbox"/> DRY <input type="checkbox"/> OTHER <input type="checkbox"/>						7. Lease Name or Unit Agreement Name Chalk Bluff 36 State	
b. Type of Completion: NEW WELL <input type="checkbox"/> WORK OVER <input type="checkbox"/> DEEPEN <input type="checkbox"/> PLUG BACK <input checked="" type="checkbox"/> DIFF RESVR <input type="checkbox"/> OTHER <input type="checkbox"/>						8. Well No. 1	
2. Name of Operator Mewbourne Oil Company						9. Pool name or Wildcat Logan Draw Wolfcamp	
3. Address of Operator PO Box 5270, Hobbs, New Mexico 88241							
4. Well Location Unit Letter <u>M</u> : <u>660</u> Feet From The <u>South</u> Line and <u>990</u> Feet From The <u>West</u> Line Section <u>36</u> Township <u>17S</u> Range <u>28E</u> NMPM Eddy County							
10. Date Spudded 02/03/93	11. Date T.D. Reached 03/19/93	12. Date Compl. (Ready to Prod.) 07/17/01	13. Elevations (DF & RKB, RT, GR, etc.) 3635' GL	14. Elev. Casinghead 3635'			
15. Total Depth 10060	16. Plug Back T.D. 8300	17. If Multiple Compl. How Many Zones?	18. Intervals Drilled By all	Rotary Tools	Cable Tools		
19. Producing Interval(s), of this completion - Top, Bottom, Name 7164-7277						20. Was Directional Survey Made No	
21. Type Electric and Other Logs Run CBL, DN & DLL						22. Was Well Cored No	

CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB/FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13 3/8"	48#	399'	17 1/2"	530 sks	N/A
9 5/8"	36#	2603'	12 1/4"	1150 sks	N/A
7"	26#	9253	8 3/4"	1620 sks	N/A

24. LINER RECORD					25. TUBING RECORD		
SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN	SIZE	DEPTH SET	PACKER SET
4 1/2"	8439'	10057'	225		2 7/8"	7352	TAC @ 7190'

26. Perforation record (interval, size, and number) 7164-7277". 58 .38" diameter holes				27. ACID, SHOT, FRACTURE, CEMENT, SQUEEZE, ETC.		
				DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED	
				7164-7277	5000 gals 20% Ne-Fe & ball sealers	

28. PRODUCTION							
Date First Production 07/17/01		Production Method (Flowing, gas lift, pumping - Size and type pump) Pumping. 2" x 1 1/2" x 24'				Well Status (Prod. or Shut-in) Producing	
Date of Test 07/22/01	Hours Tested 24	Choke Size N/A	Prod'n For Test Period	Oil - BbL. 88	Gas - MCF 88	Water - BbL. 78	Gas - Oil Ratio 1000
Flow Tubing Press. N/A	Casing Pressure 35	Calculated 24-Hour Rate	Oil - BbL. 88	Gas - MCF 88	Water - BbL. 78	Oil Gravity - API - (Corr.) 38	

29. Disposition of Gas (Sold, used for fuel, vented, etc.) Sold	Test Witnessed By J. Capps
--	-------------------------------

30. List Attachments C-103 & C104.

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

Signature A. M. Young Printed Name N.M. Young Title District Manager Date 08/24/01

This form is to be filed with the appropriate District Office of the Division not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all specific tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, items 25 through 29 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

Northwestern New Mexico

T. Anhy _____	T. Canyon _____	8327.0	T. Ojo Alamo _____	T. Penn. "B" _____
T. Salt _____	T. Strawn _____	8820.0	T. Kirtland-Fruitland _____	T. Penn. "C" _____
B. Salt _____	T. Atoka _____	9380.0	T. Pictured Cliffs _____	T. Penn. "D" _____
T. Yates _____	T. Miss _____	10040.0	T. Cliff House _____	T. Leadville _____
T. 7 Rivers _____	T. Devonian _____		T. Menefee _____	T. Madison _____
T. Queen _____	T. Silurian _____		T. Point Lookout _____	T. Elbert _____
T. Grayburg _____	T. Montoya _____		T. Mancos _____	T. McCracken _____
T. San Andres _____	T. Simpson _____		T. Gallup _____	T. Ignacio Otzte _____
T. Glorieta _____	T. McKee _____		Base Greenhorn _____	T. Granite _____
T. Paddock _____	T. Ellenburger _____		T. Dakota _____	T. _____
T. Blinebry _____	T. Gr. Wash _____		T. Morrison _____	T. _____
T. Tubb _____	T. Delaware Sand _____		T. Todilto _____	T. _____
T. Drinkard _____	T. Bone Springs _____		T. Entrada _____	T. _____
T. Abo _____	T. Morrow _____	9494.0	T. Wingate _____	T. _____
T. Wolfcamp _____	T. _____		T. Chinle _____	T. _____
T. Penn _____	T. _____		T. Permian _____	T. _____
T. Cisco (Bough C) _____	T. _____		T. Penn. "A" _____	T. _____

No. 1, from _____ to _____ No. 3, from _____ to _____
No. 2, from _____ to _____ No. 4, from _____ to _____

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

No. 1, from to feet

No. 2, from to feet

No. 3, from to feet

From	To	Thickness in Feet	Lithology

From	To	Thickness in Feet	Lithology

OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

☐ AMENDED REPORT

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

Operator Name and Address Mewbourne Oil Company PO Box 5270 Hobbs, N.M. 88241 505-393-5905		OGRID Number 14744
Property Name Chalk Bluff 36 State 1		API Number 30 - 015-27286
Property Code 7871	Well No. 1	

Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West Line	County
M	36	17S	28E		660	S	990	W	Eddy

Proposed Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West Line	County
Proposed Pool 1					Proposed Pool 2				

Work Type Code P	Well Type Code G	Cable/Rotary R	Lease Type Code S	Ground Level Elevation 3625
Multiple	Proposed Depth 9400	Formation Canyon/Wolfcamp	Contractor TBA	Spud Date

Proposed Casing and Cement Program

Hole Size	Casing Size	Casing weight/foot	Setting Depth	Sacks of Cement	Estimated TOC

Describe the proposed program. If this application is to DEEPEN or PLUG BACK give the data on the present productive zone and proposed new productive zone. Describe the blowout prevention program, if any. Use additional sheets if necessary.

This well has been producing from the Morrow & Atoka formations. Mewbourne Oil Company would like to set a CIBP 100' above top perforations. Cap CIBP w/ 35' cement. Attempt a completion in the Canyon @ +/- 8550'. If results warrant, Mewbourne Oil Company would like to test the Wolfcamp @ +/- 7200'.

During operations of plugback & testing, a 7 1/16 x 3000 psi BOP w/ 2 3/8" rams & blinds will be used.

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

Signature:

Printed name: N.M. Young

Title: District Manager

OIL CONSERVATION DIVISION

Approved By:

Title:

Approval Date:

Expiration Date:

AUG 29 2001

AUG 29 2002

OIL CONSERVATION DIVISION

P.O. Box 2088

Santa Fe, New Mexico 87504-2088

DISTRICT I

P.O. Box 1980, Hobbs, NM 88240

DISTRICT II

P.O. Drawer DD, Artesia, NM 88210

DISTRICT III

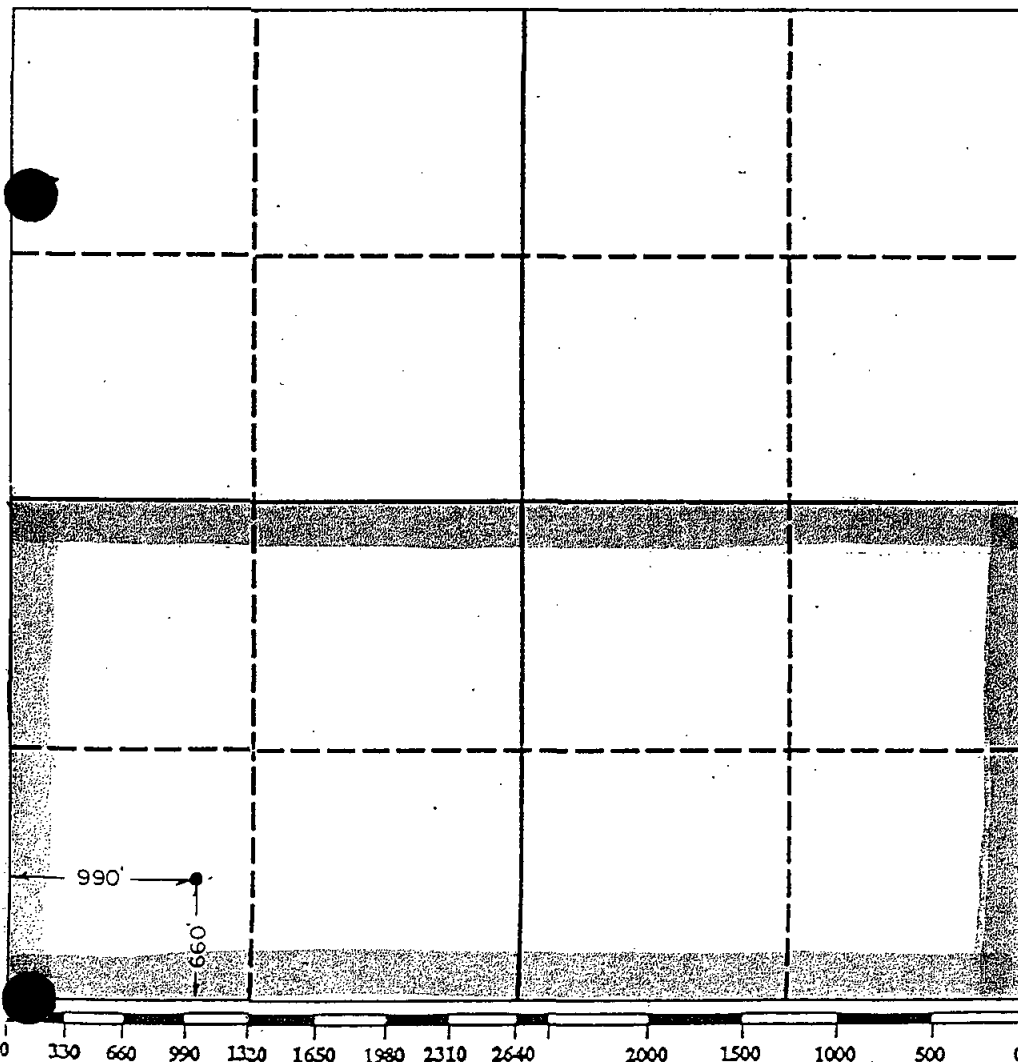
1000 Rio Brazos Rd., Aztec, NM 87410

WELL LOCATION AND ACREAGE DEDICATION PLAT

All Distances must be from the outer boundaries of the section

Operator MEWBOURNE OIL COMPANY			Lease CHALK BLUFF 36 STATE		Well No. 1
Unit Letter M	Section 36	Township 17 SOUTH	Range 27 EAST	NMPM	County EDDY
Actual Footage Location of Well: 990 feet from the WEST line and 660 feet from the SOUTH line					
Ground level Elev. 3635	Producing Formation		Pool Illinois Camp Morrow North		Dedicated Acreage: 320 Acres

- Outline the acreage dedicated to the subject well by colored pencil or hatchure marks on the plat below.
- If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).
- If more than one lease of different ownership is dedicated to the well, have the interest of all owners been consolidated by communitization, unitization, force-pooling, etc.?
☒ Yes ☐ No If answer is "yes" type of consolidation Communitization
If answer is "no" list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary.)
No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interest, has been approved by the Division.



OPERATOR CERTIFICATION

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

Signature

Bill Pierce

Printed Name

Bill Pierce

Position

Drilling Superintendent

Company

Mewbourne Oil Company

Date

October 27, 1992

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed

10/19/92

Signature & Seal of
Professional Surveyor

Harold R. [Signature]

Certificate No.

3640

DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

OIL CONSERVATION DIVISION

2040 Pacheco St.
Santa Fe, NM 87505

WELL API NO. 30-015-27286
Indicate Type of Lease STATE <input checked="" type="checkbox"/> FEE <input type="checkbox"/>
State Oil & Gas Lease No. E-379-4
Lease Name or Unit Agreement Name Chalk Bluff 36 State
Well No. 1
Pool name or Wildcat Logan Draw Atoka

<p>SUNDRY NOTICES AND REPORTS ON WELLS (DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)</p>	
<p>Type of Well: OIL WELL <input type="checkbox"/> GAS WELL <input checked="" type="checkbox"/> OTHER</p>	
Name of Operator Mewbourne Oil Company	
Address of Operator PO Box 5270, Hobbs, New Mexico 88241	
<p>Well Location Unit Letter <u>M</u> : <u>660</u> Feet From The <u>South</u> Line and <u>990</u> Feet From The <u>West</u> Line Section <u>36</u> Township <u>17S</u> Range <u>R28E</u> NMPM <u>Eddy</u> County</p>	
<p>Elevation (Show whether DF, RKB, RT, GR, etc.) 3635' GL</p>	

11

Check Appropriate Box to Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK <input type="checkbox"/>	PLUG AND ABANDON <input type="checkbox"/>
TEMPORARILY ABANDON <input type="checkbox"/>	CHANGE PLANS <input type="checkbox"/>
PULL OR ALTER CASING <input type="checkbox"/>	
OTHER: <input type="checkbox"/>	

SUBSEQUENT REPORT OF:

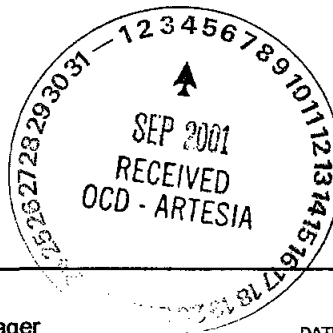
REMEDIAL WORK <input type="checkbox"/>	ALTERING CASING <input type="checkbox"/>
COMMENCE DRILLING OPNS. <input type="checkbox"/>	PLUG AND ANBANDONMENT <input type="checkbox"/>
CASING TEST AND CEMENT JOB <input type="checkbox"/>	
OTHER: PB Atoka. Test & plug off Canyon. Test & Produce Wolfcamp <input checked="" type="checkbox"/>	

Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 1103.

6/28/01... POOH w/ tbg. RIH w/ 4 1/2" CIBP & set @ 9400'. Dump 35' cement on plug. New PBTD @ 9365'. Test to 1000 psi. OK. Perforate Canyon @ 8528-72' (12'. 2 spf. 24 holes). Acidize w/ 2100 gals 20% Ne-Fe & ball sealers. Swab test.

7/05/01...POOH. RIH & set 7" RBP @ 8300'. Load & test to 1000 psi. OK. New PBTD @ 8300'. Perforate Wolfcamp @ 7164-7277' (29'. 2 spf. 58 holes). GIH w/ tbg. Acidize perms w/ 5000 gals 20% Ne-Fe & ball sealers. Swab test.

7/16/01...POOH w/ test equipment. Run tbg & rods & put well on production.



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

SIGNATURE N.M. Young TITLE District Manager DATE 08-24-01

TYPE OR PRINT NAME N.M. Young TELEPHONE NO. 505-393-5905

(This space for State Use)

APPROVED BY Jim W. Young TITLE District Supervisor DATE SEP 6 2001

CONDITIONS OF APPROVAL, IF ANY:



NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
DISTRICT II ARTESIA
811 S. FIRST ST. ARTESIA, NM 88210
(505) 748-1283
FAX (505) 748-9720

Jennifer A. Salisbury
CABINET SECRETARY

January 28, 2000

Mewbourne Oil Company
P.O. Box 5270
Hobbs, NM 88241

Re: **Well Placed In Pool**

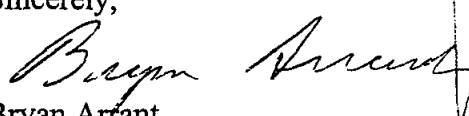
Gentlemen/Madams:

As the result of Division Order 11300, the following described gas well has been placed in the pool shown below. This change in nomenclature has been made in our files. Please change your records to reflect the proper pool name. All subsequent reports must show this nomenclature until further notice.

Logan Draw; Atoka, Southeast Gas Pool
Chalk Bluff '36' State #1
Unit M, Section 36, Township 17 South, Range 27 East, NMPM
Poolcode: 96979

Transporters are advised by copy of this letter, to change their records to reflect the pool name as established by this order, effective October 1, 1999.

Sincerely,


Bryan Arrant
District Geologist

Cc: Amoco Pipeline Company
Transwestern Pipeline Company
Santa Fe
Mae
Well File

Submit in duplicate to
appropriate district office
See Rule 401 & Rule 1122

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-122
Revised 4-1-91

OIL CONSERVATION DIVISION

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

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Operator <input checked="" type="checkbox"/> Mewbourne Oil Company				Lease or Unit Name Chalk Bluff 36 State			
Type Test <input checked="" type="checkbox"/> Initial <input type="checkbox"/> Annual <input type="checkbox"/> Special				Test Date 10/27/99		Well No. 1	
Completion Date 10/16/99		Total Depth 10060		Plug Back TD 9780		Elevation 3563' GL	
Csg. Size 4 1/2		Wt. 11.35		d 4.000		Set At 8439 - 10060	
Tbg. Size 2 3/8		Wt. 4.6		d 1.995		Set At 9385	
Type Well - Single - Bradenhead - G.G. or G.O. Multiple Single				Packer Set At 9385		Formation Atoka	
Producing Thru Tbg		Reservoir Temp. °F 60		Mean Annual Temp. °F 60		Baro. Press - P 13.2	
L 9385		H 9385		Gg 0.696		% CO ₂ 4.586	
				% N ₂ 0.788		% H ₂ S	
				Prover		Meter Run 3.068	
						Taps FLG	

FLOW DATA						TUBING DATA		CASING DATA		Duration of Flow
NO.	Prover Line Size	Orifice X Size	Press. p.s.i.g.	Diff. h _w	Temp. °F	Press. p.s.i.g.	Temp. °F	Press. p.s.i.g.	Temp. °F	
SI						1385		PACKER		24 hrs
1.	3.068	x 0.875	28	10.00	60	1319		"		1 hr
2.	3.068	x 0.875	27	32.00	70	1249		"		1 hr
3.	3.068	x 0.875	27	60.00	77	1165		"		1 hr
4.	3.068	x 0.875	29	95.00	68	1055		"		1 hr
5.										

RATE OF FLOW CALCULATIONS							
NO.	COEFFICIENT (24 HOUR)	$\sqrt{h_w P_m}$	Pressure P _m	Flow Temp. Factor Ft.	Gravity Factor Fg.	Super Compress. Factor, F _{pv}	Rate of Flow Q, Mcfd
1.	3.650	20.30	41.2	1.000	1.199	1.004	89
2.	3.650	35.87	40.2	.9905	1.199	1.004	156
3.	3.650	49.11	40.2	.9840	1.199	1.004	212
4.	3.650	63.32	42.2	.9924	1.199	1.004	276
5.							

NO.	P _r	Temp. °R	T _r	Z	Gas Liquid Hydrocarbon Ratio	Dry Gas	Mcf/bbl.
1.	.06	520	1.36	.993	A.P. I. Gravity of Liquid Hydrocarbons	Dry	Deg.
2.	.06	530	1.39	.993	Specific Gravity Separator Gas	.696	XXXXXXXXXX
3.	.06	537	1.40	.993	Specific Gravity Flowing Fluid	XXXXXX	
4.	.06	528	1.38	.993	Critical Pressure * 652	P.S.I.A.	P.S.I.A.
5.					Critical Temperature * 381	R	R

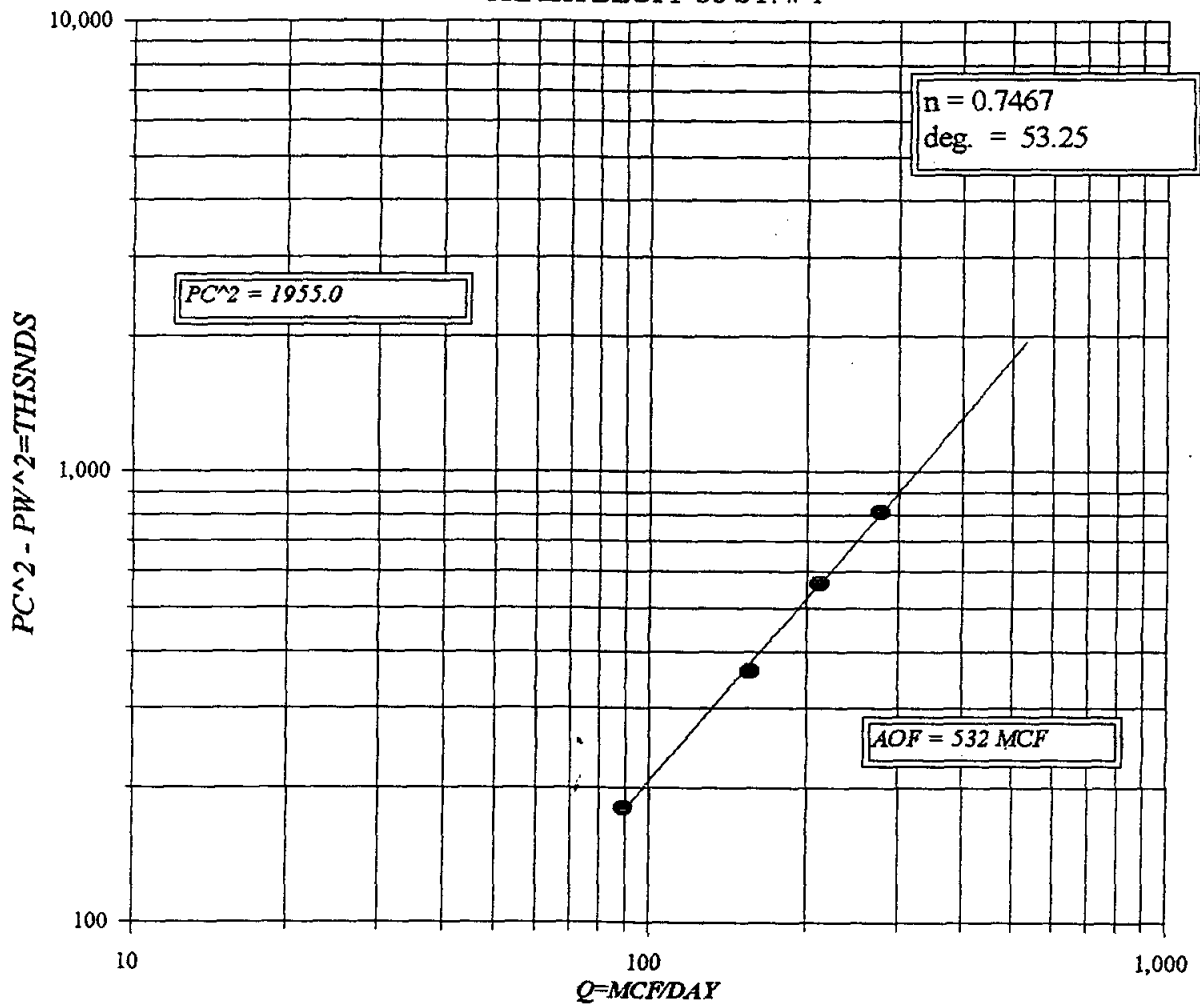
P _c 1398.2	P _c 1955.00						
NO.	P _i ²	P _w	P _w ²	P _c ² - P _w ²	1) $\frac{P_c^2}{P_c^2 - P_w^2} = 2.409$	(2) $\left[\frac{P_c^2}{P_c^2 - P_w^2} \right]^n = 1.928$	
1.	1332.3	1775.0	180.0				
2.	1262.5	1593.9	361.1				
3.	1178.8	1389.5	565.5				
4.	1069.3	1143.4	811.6				
5.							

Absolute Open Flow 532	Mcf @ 15.025	Angle of Slope θ 53.25	Slope, n .7467
------------------------	--------------	------------------------	----------------

Remarks: Well produced no fluid
* Corrected to 4.586% CO₂

Approved By Division	Conducted By: Jarrel Services, Inc.	Calculated By: Bob Murray	Checked By: Bob Murray
----------------------	-------------------------------------	---------------------------	------------------------

MEWBOURNE OIL COMPANY
CHALK BLUFF 36 ST. # 1



Pc = 1398.2	Pc2 = 1955.0 *
	*
Pt2 = 1774.8	Pw = 1332.3 *
1593.1	1262.5 *
1388.2	1178.8 *
1141.1	1069.3 *

Pc2-Pw2=	180.0	Pw2 =	1775.0 *
	361.1		1593.9 *
	565.5		1389.5 *
	811.6		1143.4 *

	Pc2/(Pc2-Pw2) =	10.862	*
		5.414	*
		3.457	*
		2.409	*

$Pc2/(Pc2-Pw2) =$	10.862	*
	5.414	*
	3.457	*
	2.409 ✓	*
		*
		*
$[Pc2/Pc2-Pw2]n =$	5.936	*
	3.529	*
	2.525	*
	1.928 ✓	*
		*
		*
AOF= Q	0.528	*
	0.551	*
	0.535	*
	0.532 ✓	*

AOF= Q 0.528
 0.551
 0.535
 0.532

FORM C122-D

DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

OIL CONSERVATION DIVISION

2040 Pacheco St.
Santa Fe, NM 87505

WELL API NO.
30-015-27286

Indicate Type of Lease

STATE ☒

FEE ☐

State Oil & Gas Lease No.
E-379-4

Lease Name or Unit Agreement Name
Chalk Bluff 36 State

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A
DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT"
(FORM C-101) FOR SUCH PROPOSALS.)

Type of Well:

OIL
WELL ☐

GAS
WELL ☒

OTHER

Name of Operator
Mewbourne Oil Company ✓

Well No.
1

Address of Operator
PO Box 5270, Hobbs, New Mexico 88240

Pool name or Wildcat
Wildcat Atoka

Well Location

Unit Letter M 660 Feet From The South Line and 990 Feet From The West Line

Section 36 Township 17s Range 27e NMPM Eddy County

Elevation (Show whether DF, RKB, RT, GR, etc.)
3625 GL

11

Check Appropriate Box to Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK ☐

PLUG AND ABANDON ☐

TEMPORARILY ABANDON ☐

CHANGE PLANS ☐

PULL OR ALTER CASING ☐

OTHER: ☐

SUBSEQUENT REPORT OF:

REMEDIAL WORK ☐

ALTERING CASING ☐

COMMENCE DRILLING OPNS. ☐

PLUG AND ANBANDONMENT ☐

CASING TEST AND CEMENT JOB ☐

OTHER: Test Atoka ☒

Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 1103.

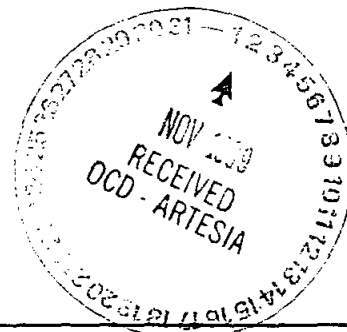
9-21-99...POOH w/ Tbg.

9-22-99...Set RBP over Morrow perms. Perforate Atoka perms @ 9466-84. GIH w/ Pkr & tbg.

9-24-99...Acidize new Atoka perms w/ 3000 gals 7 1/2% HCL adding N2 w/ Ball Sealers. Swab & Flow test.

10-16-99...Frac Atoka perms w/ 30,000 gals 70 Quality Foam using 10,000 lbs 20/40 Interprop. Flow back & clean-up

10-19-99...Turn to sales.



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

SIGNATURE

[Signature]

TITLE

Consultant

DATE 11-01-99

505

TYPE OR PRINT NAME

NM YOUNG

TELEPHONE NO. 393-5405

(This space for State Use)

APPROVED BY

Jim W. Gunn *B6C*

TITLE

District Supervisor

DATE

11-5-99

CONDITIONS OF APPROVAL, IF ANY:

District I
PO Box 1980, Hobbs, NM 88241-1980

District II
811 South First, Artesia, NM 88210

District III
1000 Rio Brazos Rd., Aztec, NM 87410

District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

354

SP

Form C-10

Revised October 18, 199

Instructions on bac

Submit to Appropriate District Office

5 Copie

☒ AMENDED REPORT

I. REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT

¹ Operator name and Address Mewbourne Oil Company ✓ P. O. Box 5270 Hobbs, NM 88241		² OGRID Number 14744
		³ Reason for Filing Code Plug Back
⁴ API Number 30 - 0 15-27286	⁵ Pool Name Wildcat Atoka Gas Pool Logan Draw; Atoka, SE	⁶ Pool Code 96979
⁷ Property Code 7871	⁸ Property Name Chalk Bluff "36" State	⁹ Well Number 1

II. ¹⁰ Surface Location

Ul or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South Line	Feet from the	East/West line	County
M	36	17S	27E		660	South	990	West	Eddy

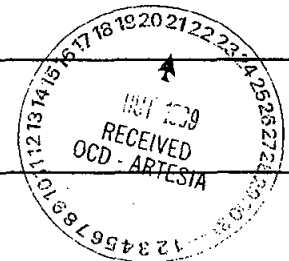
¹¹ Bottom Hole Location

Ul or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South Line	Feet from the	East/West line	County

¹² Lse Code	¹³ Producing Method Code Flowing	¹⁴ Gas Connection Date 10/24/94	¹⁵ C-129 Permit Number	¹⁶ C-129 Effective Date	¹⁷ C-129 Expiration Date
------------------------	--	---	-----------------------------------	------------------------------------	-------------------------------------

III. Oil and Gas Transporters

¹⁸ Transporter OGRID	¹⁹ Transporter Name and Address	²⁰ POD	²¹ O/G	²² POD ULSTR Location and Description
138648	Amoco Pipeline Company Tulsa, OK	1923810	O	
000990	Transwestern Pipeline Company Houston, TX	2819523	G	



IV. Produced Water

²³ POD 1923850	²⁴ POD ULSTR Location and Description
------------------------------	--

V. Well Completion Data

²⁵ Spud Date 02/03/93	²⁶ Ready Date 09/24/99	²⁷ TD 10060	²⁸ PBD 9780	²⁹ Perforations 9466-9484'	³⁰ DHC, DC, MC
-------------------------------------	--------------------------------------	---------------------------	---------------------------	--	---------------------------

³¹ Hole Size	³² Casing & Tubing Size	³³ Depth Set	³⁴ Sacks Cement
17-1/2"	13-3/8"	399'	530
12-1/4"	9-5/8"	2603'	1150
8-3/4"	7"	9253'	1620
6-1/8"	4-1/2"	10057'	225

VI. Well Test Data

³⁵ Date New Oil 09/24/99	³⁶ Gas Delivery Date 09/24/99	³⁷ Test Date 10/18/99	³⁸ Test Length 24 hours	³⁹ Tbg. Pressure 45	⁴⁰ Csg. Pressure Packer
⁴¹ Choke Size 24/64"	⁴² Oil 2	⁴³ Water 2	⁴⁴ Gas 317	⁴⁵ AOF	⁴⁶ Test Method Sold

⁴⁷ I hereby certify that the rules of the Oil Conservation Division have been complied with and that the information given above is true and complete to the best of my knowledge and belief.

Signature: *Jeffrey Elgin*
Printed name: Jeff Elgin

Title: District Manager

Date: 10/20/99

Phone: 505-393-5805

OIL CONSERVATION DIVISION

Approved by: *Jim W. Green*
Title: District Supervisor

Approval Date: 10-27-99

⁴⁸ If this is a change of operator fill in the OGRID number and name of the previous operator

Previous Operator Signature	Printed Name	Title	Date

Submit to Appropriate
District Office
State Lease - 6 copies
Fee Lease - 5 copies
DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-105
Revised 1-1-89

SF

OIL CONSERVATION DIVISION

2040 Pacheco St
Santa Fe, NM 87505

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd, Aztec, NM 87410

WELL API NO.
30-015-27286

5. Indicate Type of Lease
STATE ☒ FEE ☐

6. State Oil & Gas Lease No.
E-379-4

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

1a. Type of Well:
OIL WELL ☐ GAS WELL ☒ DRY ☐ OTHER ☐
b. Type of Completion:
NEW WELL ☐ WORK OVER ☐ DEEPEN ☐ PLUG BACK ☒ DIFF RESVR ☐ OTHER ☐

2. Name of Operator
Mewbourne Oil Company

3. Address of Operator
P. O. Box 5270, Hobbs, NM 88241

7. Lease Name or Unit Agreement Name
Chalk Bluff "36" State

8. Well No.
1

9. Pool name or Wildcat *SE Logan Draw*
~~Wildcat Atoka Gas Pool~~ *Atoka*

4. Well Location
Unit Letter M 660 Feet From The South Line and 990 Feet From The West Line
Section 36 Township 17S Range 27E NMPM Eddy County

10. Date Spudded 02/03/93 11. Date T.D. Reached 03/19/93 12. Date Compl. (Ready to Prod.) 09/24/99 13. Elevations (DF & RKB, RT, GR, etc.) 3635' GR 14. Elev. Casinghead 3635'

15. Total Depth 10060' 16. Plug Back T.D. 9780' 17. If Multiple Compl. How Many Zones? NA 18. Intervals Drilled By Rotary Tools ☒ Cable Tools

19. Producing Interval(s), of this completion - Top, Bottom, Name 9466-9470' & 9476-9484', Atoka 20. Was Directional Survey Made No

21. Type Electric and Other Logs Run DIL 22. Was Well Cored No

CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB/FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8"	48#	399'	17-1/2"	530 sks Class C	None
9-5/8"	36#	2603'	12-1/4"	1150 sks Class C	None
7"	26#	9253'	8-3/4"	1620 sks Class H	None

LINER RECORD				TUBING RECORD		
SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN	SIZE	DEPTH SET
4-1/2"	8439'	10057'	225		2-3/8"	9407'

26. Perforation record (interval, size, and number)

9466-9484', 0.44" entry hole diameter, 56 holes total

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

DEPTH INTERVAL 9466-9484' AMOUNT AND KIND MATERIAL USED Fracture stimulated with 10000# IP 20/40

28. PRODUCTION

Date First Production 09/24/99 Production Method (Flowing, gas lift, pumping - Size and type pump) Flowing Well Status (Prod. or Shut-in) Producing

Date of Test 10/18/99 Hours Tested 24 Choke Size 24/64" Prod'n For Test Period Oil - BbL 2 Gas - MCF 317 Water - BbL 2 Gas - Oil Ratio 158500

Flow Tubing Press. 45 Casing Pressure Packer Calculated 24-Hour Rate Oil - BbL 2 Gas - MCF 317 Water - BbL 2 Oil Gravity - API - (Corr.) 63.8

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

Test Witnessed By Mr. Miller

30. List Attachments

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

Signature

Jerry Elgin

Printed Name Jerry Elgin

Title District Manager

Date 10/19/99

District I
PO Box 1980, Hobbs, NM 88241-1980

District II
811 South First, Artesia, NM 88210

District III
1000 Rio Brazos Rd., Aztec, NM 87410

District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department

Form C-101
Revised October 18, 1994
Instructions on back
Submit to Appropriate District Office
State Lease - 6 Copies
Fee Lease - 5 Copies

OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

☒ AMENDED REPORT

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

Operator Name and Address Mewbourne Oil Company P. O. Box 5270 Hobbs, NM 88241		OGRID Number 14744
		API Number 30 - 015-27286
Property Code 7871	Property Name Chalk Bluff "36" State	Well No. 1

Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West Line	County
M	36	17S	27E		660	South	990	West	Eddy

Proposed Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West Line	County
Proposed Pool 1 Atoka Gas Pool					Proposed Pool 2				

Work Type Code P	Well Type Code G	Cable/Rotary R	Lease Type Code S	Ground Level Elevation 3635
Multiple No	Proposed Depth 10060	Formation Atoka	Contractor Key Energy Services	Spud Date 09-15-99

Proposed Casing and Cement Program

Hole Size	Casing Size	Casing weight/foot	Setting Depth	Sacks of Cement	Estimated TOC
17-1/2"	13-3/8"	48#	399	530	Surface
12-1/4"	9-5/8"	36#	2603	1150	Surface
8-3/4"	7"	26#	9253	1620	Surface
6"	4-1/2" Liner	11.6#	10057	225	TOL @ 8439'

Describe the proposed program. If this application is to DEEPEN or PLUG BACK give the data on the present productive zone and proposed new productive zone. Describe the blowout prevention program, if any. Use additional sheets if necessary.

- Temporarily abandon Morrow perforations 9842-9856' and 9864-9886' by setting a cast iron bridge plug at 9800' and dumping 20' cement plug on top.
- Test the Atoka Formation through perforations 9442-9446' and 9452-9464'.
- File for commingling permit if well conditions warrant.

6" 5000 psi WP dual hydraulic BOP's will be utilized on this project. Any produced fluids will be diverted through a 5000 psi WP adjustable choke to a steel tank via 2" steel lines

I hereby certify that the information given above is true and complete to the best of my knowledge and belief. Signature: <i>Jerry Elgin</i> Printed name: Jerry Elgin Title: District Manager	OIL CONSERVATION DIVISION	
	Approved By: <i>Jim W. Gumb B6.0</i> Title: District Supervisor Approval Date: 8-17-99	Expiration Date: 8-17-00

District I
PO Box 1980, Hobbs, NM 88241-1980

District II
811 South First, Artesia, NM 88210

District III
1000 Rio Brazos Rd., Aztec, NM 87410

District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

Form C-102
Revised October 18, 1994
Instructions on back
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

☒ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number 30-015-27286	2 Pool Code	3 Pool Name North Illinois Camp Atoka Gas Pool
4 Property Code	5 Property Name Chalk Bluff "36" State	6 Well Number 1
7 OGRID No. 14744	8 Operator Name Mewbourne Oil Company	9 Elevation 3635

10 Surface Location

UL or lot no. M	Section 36	Township 17S	Range 27E	Lot Idn	Feet from the 660	North/South line South	Feet from the 990	East/West Line West	County Eddy
--------------------	---------------	-----------------	--------------	---------	----------------------	---------------------------	----------------------	------------------------	----------------

11 Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West Line	County
12 Dedicated Acres 320.00	13 Joint or Infill	14 Consolidation Code C	15 Order No.						

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

16					17 OPERATOR CERTIFICATION I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief Signature Jerry Elgin Printed Name District Manager Title 08-13-99 Date
				18 SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. 10-19-92 Date of Survey Signature and Seal of Professional Surveyer: Original signed by Herschel Jones Certificate Number	

Submit 3 Copies
Appropriate District Office
DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

Oil Conservation Division

State of New Mexico
Energy, Minerals and Natural Resources Department

Oil Conservation Division

P.O. Box 2088

Santa Fe, New Mexico 87504-2088

Form C-104
Revised 1-1-89
See Instructions
at Bottom of Page

REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT OIL AND NATURAL GAS

Operator Mewbourne Oil Company	Well API No. 30-015-27286
Address P.O. Box 5270 Hobbs, New Mexico 88241	
Reason(s) for Filing (Check proper box) <input type="checkbox"/> Other (Please explain)	
New Well <input checked="" type="checkbox"/>	Change in Transporter of:
Recompletion <input type="checkbox"/>	Oil <input type="checkbox"/> Dry Gas <input type="checkbox"/>
Change in Operator <input type="checkbox"/>	Casinghead Gas <input type="checkbox"/> Condensate <input type="checkbox"/>

If change of operator give name
and address of previous operator

II. DESCRIPTION OF WELL AND LEASE

Lease Name Chalk Bluff "36" State	Well No. 1	Pool Name, Including Formation N. Illinois Camp Morrow	Kind of Lease State, XXXXXX XXXX XXXX XXXX	Lease No. E-379-4
Location Unit Letter M : 990 Feet From The West Line and 660 Feet From The South Line Section 36 Township 17S Range 27E, NMPM, Eddy County				

III. DESIGNATION OF TRANSPORTER OF OIL AND NATURAL GAS

Name of Authorized Transporter of Oil <input type="checkbox"/> or Condensate <input checked="" type="checkbox"/>	Address (Give address to which approved copy of this form is to be sent)
Amoco Pipeline ICT	Oil Tender Dept. Box 702068 Tulsa, Ok 74170-2068
Name of Authorized Transporter of Casinghead Gas <input type="checkbox"/> or Dry Gas <input checked="" type="checkbox"/>	Address (Give address to which approved copy of this form is to be sent)
Transwestern Pipeline Company	P.O. Box 1188 Houston, Texas 77251
If well produces oil or liquids, give location of tanks.	Unit M Sec. 36 Twp. 17S Rge. 27E Is gas actually connected? Yes When? 03/30/93

If this production is commingled with that from any other lease or pool, give commingling order number:

IV. COMPLETION DATA

Designate Type of Completion - (X)	Oil Well	Gas Well	New Well	Workover	Deepen	Plug Back	Same Res'v	Diff Res'v
		X	X					
Date Spudded 02/02/93	Date Compl. Ready to Prod. 03/30/93	Total Depth 10,060'	P.B.T.D. 10,012'					
Elevations (DF, RKB, RT, GR, etc.) 3650' KB 3635' GR	Name of Producing Formation Morrow	Top Oil/Gas Pay 9,842'	Tubing Depth 9,803'					
Performances 9842'-9856', 9864'-9886'			Depth Casing Shoe					
TUBING, CASING AND CEMENTING RECORD								
HOLE SIZE	CASING & TUBING SIZE	DEPTH SET	SACKS CEMENT					
17-1/2"	13-3/8"	399'	530 sx. Class "C"					
12-1/4"	9-5/8"	2603'	1150 sx. Class "C"					
8-3/4"	7"	9253'	1620 sx. Class "C"					
6"	4-1/2" Liner	10057'	225 sx. Class "H"					

V. TEST DATA AND REQUEST FOR ALLOWABLE

OIL WELL (Test must be after recovery of total volume of load oil and must be equal to or exceed top allowable for this depth or be for full 24 hours.)

Date First New Oil Run To Tank	Date of Test	Producing Method (Flow, pump, gas lift, etc.)	
Length of Test	Tubing Pressure	Casing Pressure	Choke Size
Actual Prod. During Test	Oil - Bbls.	Water - Bbls.	Gas - MCF

GAS WELL

Actual Prod. Test - MCF/D 1500	Length of Test 24 Hours	Bbls. Condensate/MMCF 6.6	Gravity of Condensate 55
Testing Method (pilot, back pr.) Back Pressure	Tubing Pressure (Shut-in) 2700#	Casing Pressure (Shut-in) Packer	Choke Size 1/4"

VI. OPERATOR CERTIFICATE OF COMPLIANCE

I hereby certify that the rules and regulations of the Oil Conservation
Division have been complied with and that the information given above
is true and complete to the best of my knowledge and belief.

Signature Erick W. Nelson
Printed Name Erick W. Nelson Engineer
Date 04/02/93 (505) 393-5905
April 5, 1993 Telephone No.

OIL CONSERVATION DIVISION

APR 26 1993

Date Approved

By ORIGINAL SIGNED BY
MIKE WILLIAMS
Title SUPERVISOR, DISTRICT II

INSTRUCTIONS: This form is to be filed in compliance with Rule 1104

- 1) Request for allowable for newly drilled or deepened well must be accompanied by tabulation of deviation tests taken in accordance with Rule 111.
- 2) All sections of this form must be filled out for allowable on new and recompleted wells.
- 3) Fill out only Sections I, II, III, and VI for changes of operator, well name or number, transporter, or other such changes.
- 4) Separate Form C-104 must be filed for each pool in multiply completed wells.

Submit to Appropriate
District Office
State Lease - 6 copies
Fee Lease - 5 copies
DISTRICT I

P.O. Box 1980, Hobbs, NM, 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III

1000 Rio Brazos Rd., Aztec, NM 87410

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-105
Revised 1-1-89

OIL CONSERVATION DIVISION

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

APR 15 1993

WELL API NO.

30-015-27286

5. Indicate Type of Lease

STATE ☒

FEE ☐

6. State Oil & Gas Lease No.

E-379-4

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

1a. Type of Well:

OIL WELL ☐

GAS WELL ☒

DRY ☐

OTHER ☐

b. Type of Completion:

NEW WELL ☒

WORK OVER ☐

DEEPEN ☐

PLUG BACK ☐

DIFF RESVR ☐

OTHER ☐

7. Lease Name or Unit Agreement Name

Chalk Bluff "36" State

2. Name of Operator

Mewbourne Oil Company

3. Address of Operator

P.O. Box 5270 Hobbs, New Mexico 88241

4. Well Location

Unit Letter M: 990 Feet From The West Line and 660 Feet From The South Line

Section 36

Township 17S

Range 27E

NMPM

Eddy

County

10. Date Spudded

02/02/93

11. Date T.D. Reached

03/17/93

12. Date Compl. (Ready to Prod.)

03/30/93

13. Elevations (DF& RKB, RT, GR, etc.)

3650' KB 3635' GR

14. Elev. Casinghead

3635' GR

15. Total Depth

10,060'

16. Plug Back T.D.

10,012'

17. If Multiple Compl. How

Many Zones? 2

18. Intervals

Rotary Tools

X

Cable Tools

19. Producing interval(s), of this completion - Top, Bottom, Name

9842'-9886'; Lower Morrow

20. Was Directional Survey Made

Yes

21. Type Electric and Other Logs Run

SDI-DSN, DII-MSFL-GR, Sonic, CBL

22. Was Well Cored

No

CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB/FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8"	48#/ft.	399'	17-1/2"	530 sx. Class "C"	Circulated
9-5/8"	36#/ft.	2603'	12-1/4"	1150 sx. Class "C"	Circulated
7"	26#/ft.	9253'	8-3/4"	1620 sx. Class "H"	Circulated

24. LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN	SIZE	DEPTH SET	PACKER SET
4-1/2"	8439'	10,057'	225 sx.		2-7/8-2-3/8"	9803'	9702'

25. TUBING RECORD

26. Perforation record (interval, size, and number)

9842'-9856' 14' 4 spf 49 holes

9864'-9886' 22' 4 spf 80 holes

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

DEPTH INTERVAL

AMOUNT AND KIND MATERIAL USED

28. PRODUCTION

Date First Production 03/30/93		Production Method (Flowing, gas lift, pumping - Size and type pump) Flowing				Well Status (Prod. or Shut-in) Producing	
Date of Test 03/31/93	Hours Tested 24 Hours	Choke Size 1/4"	Prod'n For Test Period	Oil - Bbl. 10	Gas - MCF 1500	Water - Bbl. 0	Gas - Oil Ratio 150 MCF/BBL
Flow Tubing Press. 1500#	Casing Pressure Packer	Calculated 24- Hour Rate	Oil - Bbl. 10	Gas - MCF 1500	Water - Bbl. 0	Oil Gravity - API - (Corr.) 55.0	

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

Sold

Test Witnessed By

Erick W. Nelson

30. List Attachments

Logs

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

Signature

Erick W. Nelson

Printed Name

Erick W. Nelson

Title

Engineer

Date

04/05/93

Submit to Appropriate
District Office
State Lease - 6 copies
Fee Lease - 5 copies

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-101
Revised 1-1-89

DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

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

API NO. (assigned by OCD on New Wells)

5. Indicate Type of Lease

STATE ☒

FEE ☐

6. State Oil & Gas Lease No.

E-379-4

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. Type of Work:

DRILL ☒

RE-ENTER ☐

DEEPEN ☐

PLUG BACK ☐

b. Type of Well:

OIL
WELL ☐

GAS
WELL ☒

OTHER ☐

SINGLE
ZONE ☒

MULTIPLE
ZONE ☐

7. Lease Name or Unit Agreement Name

Chalk Bluff "36" State

8. Well No.

1

9. Pool name or Wildcat

Illinois Camp Morrow North

4. Well Location

Unit Letter M : 990 Feet From The West Line and 660 Feet From The South Line

Section 36

Township 17S

Range 27E

NMPM

Eddy

County

10. Proposed Depth

10,300'

11. Formation

Morrow

12. Rotary or C.T.

Rotary

13. Elevations (Show whether DF, RT, GR, etc.)

3635' G.R.

14. Kind & Status Plug. Bond

Blanket on file

15. Drilling Contractor

WEK Drilling

16. Approx. Date Work will start

Jan. 31, 1993

17. PROPOSED CASING AND CEMENT PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS OF CEMENT	EST. TOP
17-1/2"	13-3/8"	48#	400'	400 sks.	Circ.
12-1/4"	9-5/8"	36#	2,600'	700 sks.	Tie back into s
8-3/4"	5-1/2"	17#	10,300'	600 sks.	Bring above top of Abo

Mud Program:

0' - 400' Spud mud w/fresh water gel, LCM as needed.
400' - 2,600' Fresh water gel & lime. LCM as needed.
2,600' - 9,200' Cut brine with lime for pH control. WL-NC.
9,200' - 10,300' Cut brine w/Drispac, salt gel, lime, soda ash and starch. Wt. 9.2-9.6 ppg, WL 10 cc or less, Vis. 32-36. Raise wt. accordingly if abnormal pressures are encountered.

BOP Program:

1500 Series Double Ram Hydraulic BOP w/900 Series Hydril from Intermediate csg. to T.D. 900 Series Hydril on Surface csg. to Intermediate csg. point. PVT system, mud-gas separator, rotating head from Wolfcamp to T.D.

Gas is not dedicated.

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: IF PROPOSAL IS TO DEEPEN OR PLUG BACK, GIVE DATA ON PRESENT PRODUCTIVE ZONE AND PROPOSED NEW PRODUCTIVE ZONE. GIVE BLOWOUT PREVENTER PROGRAM, IF ANY.

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

SIGNATURE

Bill Pierce

TITLE

Drilling Superintendent

DATE

01/18/93

(505)

TYPE OR PRINT NAME

Bill Pierce

TELEPHONE NO. 393-5905

(This space for State Use)

APPROVED BY

Mark R. H. /

TITLE

Geologist

DATE

1-19-93

CONDITIONS OF APPROVAL, IF ANY:

NOTIFY N.M.O.C.D. IN SUFFICIENT
TIME TO WITHHEAR CELEBRATING THE

APPROVAL VALID FOR 12 DAYS
PERMIT EXPIRES 1-19-93
RETURN TO STATE OFFICE

Submit to Appropriate
District Office
State Lease - 4 copies
Fee Lease - 3 copies

State of New Mexico
Energy, Minerals and Natural Resources Department

Form O-11
Revised 1-1-84

OIL CONSERVATION DIVISION

P.O. Box 2088

Santa Fe, New Mexico 87504-2088

DISTRICT I

P.O. Box 1980, Hobbs, NM 88240

DISTRICT II

P.O. Drawer DD, Artesia, NM 88210

DISTRICT III

1000 Rio Brazos Rd., Aztec, NM 87410

WELL LOCATION AND ACREAGE DEDICATION PLAT

All Distances must be from the outer boundaries of the section

Operator MEWBOURNE OIL COMPANY			Lease CHALK BLUFF 36 STATE		Well No. 1
Unit Letter M	Section 36	Township 17 SOUTH	Range 27 EAST	County NMPM EDDY	
Actual Footage Location of Well: 990 feet from the WEST line and 660 feet from the SOUTH line					
Ground level Elev. 3635	Producing Formation Morrow		Pool Illinois Camp Morrow North	Dedicated Acreage: 320 Acres	

1. Outline the acreage dedicated to the subject well by colored pencil or hatchure marks on the plat below.

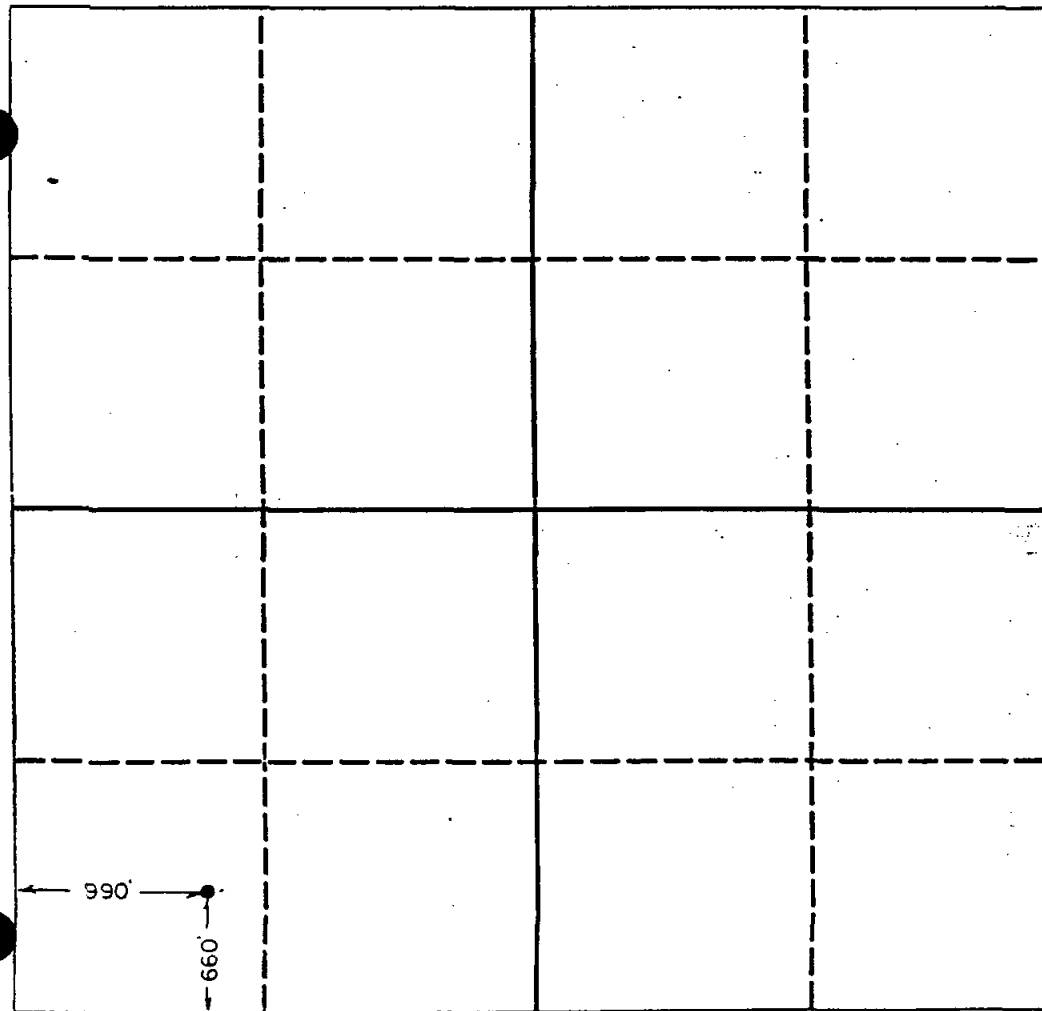
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

3. If more than one lease of different ownership is dedicated to the well, have the interest of all owners been consolidated by communitization, unitization, force-pooling, etc.?

☒ Yes ☐ No If answer is "yes" type of consolidation **Communitization**

If answer is "no" list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary.)

No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interest, has been approved by the Division.



OPERATOR CERTIFICATION

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

Signature

Bill Pierce

Printed Name

Bill Pierce

Position

Drilling Superintendent

Company

Mewbourne Oil Company

Date

October 27, 1992

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed

10/19/92

Signature & Seal of
Professional Surveyor

[Signature]

Certificate No.

3640

MAP ID NO. 861

NAVAJO REFINING COMPANY, WDW-2

**SEE DIVIDER LABELED
"WDW-2: OCD AND BLM FORMS"**



SUBSURFACE

Artificial Penetration Review
Number 911

OPERATOR Southwest Energy Production Co.

STATUS Active

LEASE No. Bluff 36 State Corn

DISTANCE FROM INJECTOR (FT)

WELL NUMBER 2

LOCATION 36-17S-27E, H

DATE DRILLED 4/28/01

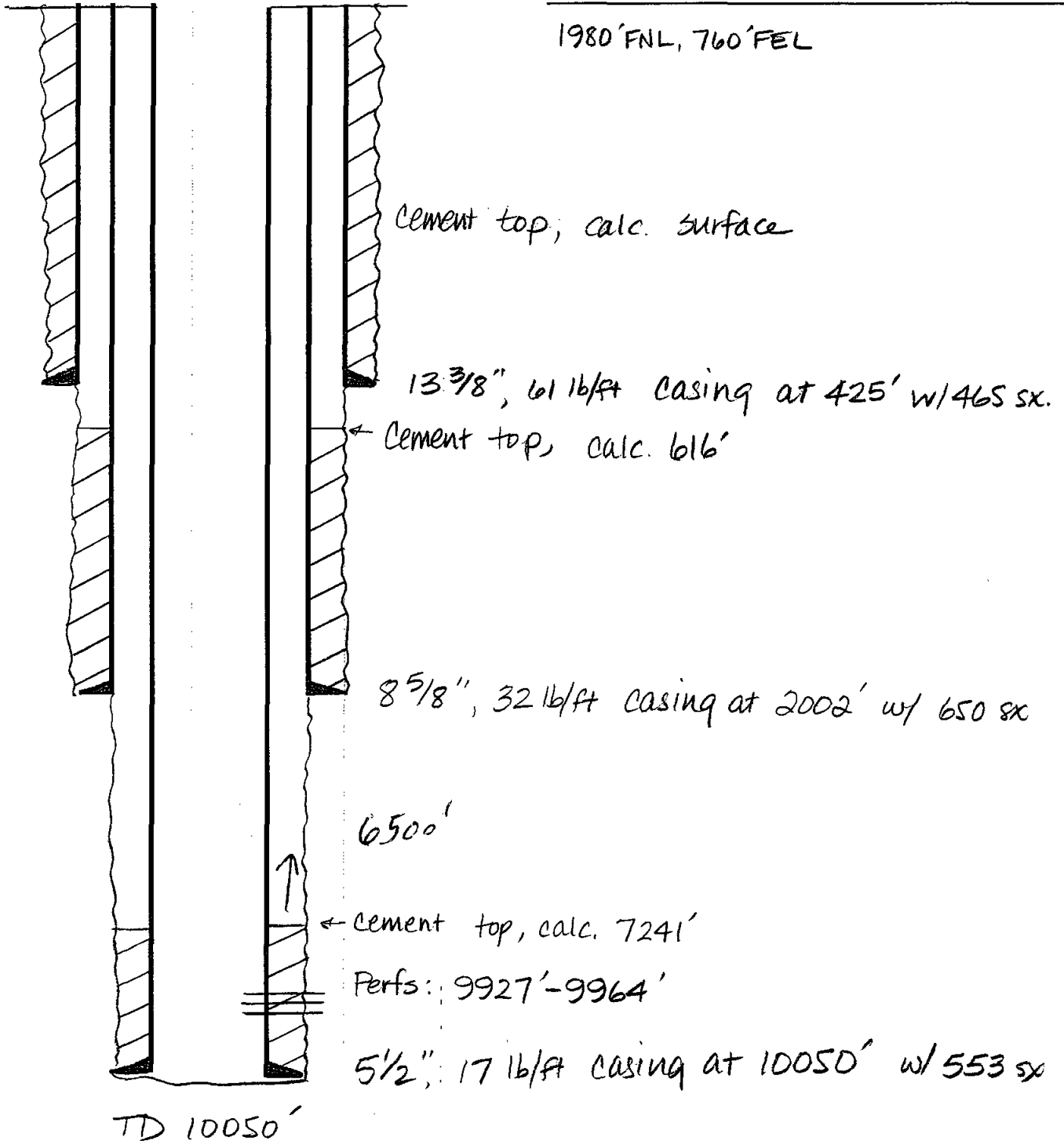
MUD FILLED BOREHOLE

DATE PLUGGED

REPORTED MUD WEIGHT

API NUMBER 30-015-31123

1980' FNL, 760' FEL



District I

1625 N. French Dr., Hobbs, NM 88240

District II

811 South First, Artesia, NM 88210

District III

1000 Rio Brazos Road, Aztec, NM 87410

District IV

2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division

2040 South Pacheco

Santa Fe, NM 87505

Form C-101

Revised March 17, 1999

Submit to appropriate District Office

State Lease - 6 Copies

Fee Lease - 5 Copies

☒ AMENDED REPORT

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

¹ Operator Name and Address Southwestern Energy Production Company 2350 North Sam Houston Parkway East, Suite 300 Houston, TX 77032		² OGRID Number 148111
		³ API Number 30 - 015 - 31123
³ Property Code 25858	⁵ Property Name No. Bluff "36" State Com.	⁶ Well No. 2

⁷ Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
4	36	17S	27E		1980	North	760	East	Eddy

⁸ Proposed Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
⁹ Proposed Pool 1 Wildcat (Mississippian)					¹⁰ Proposed Pool 2				

¹¹ Work Type Code N	¹² Well Type Code G	¹³ Cable/Rotary R	¹⁴ Lease Type Code S	¹⁵ Ground Level Elevation 3634
¹⁶ Multiple N	¹⁷ Proposed Depth 10,050'	¹⁸ Formation Mississippian	¹⁹ Contractor UTI	²⁰ Spud Date 04/01/01 (est.)

²¹ Proposed Casing and Cement Program

Hole Size	Casing Size	Casing weight/foot	Setting Depth	Sacks of Cement	Estimated TOC
26"	20"		40'	Ready Mix	Surface
17 - 1/2"	13 - 3/8"	61#	425'	1500	Surface
12 - 1/4"	8 5/8"	32#	2,000'	1,495	Surface
7 7/8"	5 1/2"	17#	10,100'	860	8,000'

²² Describe the proposed program. If this application is to DEEPEN or PLUG BACK, give the data on the present productive zone and proposed new productive zone. Describe the blowout prevention program, if any. Use additional sheets if necessary.

SEE ATTACHMENT

NOTE: SL changed from 1980' FNL, 660' FEL to 1980' FNL, 760' FEL

²³ I hereby certify that the information given above is true and complete to the best of my knowledge and belief.		OIL CONSERVATION DIVISION	
Signature: <i>Cathy Rowan</i>		1300	
Printed name: Cathy Rowan		Approved by: ORIGINAL SIGNED BY TIM W. GUM DISTRICT II SUPERVISOR	
Title: Sr. Engineering Technician		Approval Date: MAR - 8 2001 Expiration Date: MAR - 8 2002	
Date: March 1, 2001	Phone: 281-618-4733	Conditions of Approval:	
		Attached <input type="checkbox"/>	

GENERAL DRILLING PROGRAM- Attachment to Form C-101

Southwestern Energy Production Company- No Bluff "36" State Com. #2
1980' FNL 760' FEL Section 36-T17S-R27E
Eddy County, New Mexico

Elevation: 3630' GR

Proposed Total Depth: 10,100'

Estimated Formation Tops

Yates	320'
7 Rivers	460'
Queen	1000'
Grayburg	1300'
San Andres 'D'	1784'
Glorieta	3160'
Wolfcamp	6470'
Strawn	8870'
Atoka	9430'
Morrow Lime	9544'
Morrow Clastics	9724'
Missippian	10,040'

Casing/Cement Program

<u>Hole Size</u>	<u>Casing Size/Weight/Grade</u>	<u>Setting Depth</u>	<u>Cement</u>	<u>Est. TOC</u>
	20" Conductor pipe	40'	ready mix	surface
17-1/2"	13-3/8" 61# J-55 ST&C	425'	550 sx 15:85 Poz: Class C + 0.25 pps D29+2% S1+2% D20	surface
12-1/4"	8-5/8" 32# J-55 ST&C	1900'	Lead:700 sx 35:65 Poz: Class C + 6% D20+ 0.25 pps D29 Tail: 235 sx Class C+ 2% S1 +0.25 pps D29	surface
7-7/8"	5-1/2" 17# N-80 LT&C	10,050'	860 sx 50:50 Poz: Class H + 6% D44 +2% D20+0.4% D59	8000'

Drilling Fluids Program

<u>Depth</u>	<u>Mud Weight</u>	<u>Viscosity</u>	<u>Fluid Loss</u>	<u>Comments</u>
0-425'	8.4-8.6	32-34	NC	spud mud
425'-1900'	9.0-9.2	28-29	NC	cut brine water,paper,caustic
1900'-9300'	8.4-9.3	28-29	NC	cut brine,caustic,paper
9300'-10,050'	9.3-9.6	34-38	<15 cc	xantham gum, starch

Blowout Prevention Program- Attachment to Form C-101

District I
1625 N. French Dr., Hobbs, NM 88240

District II
811 South First, Artesia, NM 88210

District III
1000 Rio Brazos Rd., Aztec, NM 87410

District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources

OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

Form C-104
Revised March 25, 1999

Submit to Appropriate District Office
5 Copies

☐ AMENDED REPORT

I. REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT

¹ Operator name and Address Southwestern Energy Production Company 2350 N. Sam Houston Parkway East, Suite 300 - Houston, TX 77032		² OGRID Number 14811
		³ Reason for Filing Code NW
⁴ API Number 30 - 015-31123	⁵ Pool Name Illinois Camp	⁶ Pool Code 78890
⁷ Property Code 25858	⁸ Property Name No Bluff State Com.	⁹ Well Number 2

II. ¹⁰ Surface Location

UI or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South Line	Feet from the	East/West line	County
H	36	17S	27E		1980	North	760	East	Eddy

¹¹ Bottom Hole Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
¹² Loe Code S	¹³ Producing Method Code Flowing		¹⁴ Gas Connection Date 5/17/01		¹⁵ C-129 Permit Number		¹⁶ C-129 Effective Date		¹⁷ C-129 Expiration Date

III. Oil and Gas Transporters

¹⁸ Transporter OGRID	¹⁹ Transporter Name and Address	²⁰ POD	²¹ O/G	²² POD ULSTR Location and Description
36785	Duke Energy Field Services	2829076	G	

IV. Produced Water

²³ POD	²⁴ POD ULSTR Location and Description

V. Well Completion Data

²⁵ Spud Date 3/19/01	²⁶ Ready Date 4/28/01	²⁷ TD 10,050'	²⁸ PBD 10,015'	²⁹ Perforations 9,927' - 9,964'	³⁰ DHC, MC
³¹ Hole Size		³² Casing & Tubing Size		³³ Depth Set	³⁴ Sacks Cement
17 1/2"		13 3/8", 61#		425'	465
12 1/2"		8 5/8", 32#		2,002'	650
7 7/8"		5 1/4", 17#		10,050'	553
		2 7/8" TBG		9,925'	

VI. Well Test Data

³⁵ Date New Oil n/a	³⁶ Gas Delivery Date 5/19/01	³⁷ Test Date 5/19/01	³⁸ Test Length 24 HRS	³⁹ Tbg. Pressure 4	⁴⁰ Csg. Pressure 0
⁴¹ Choke Size open	⁴² Oil 0	⁴³ Water 0	⁴⁴ Gas 250 MCF	⁴⁵ AOF	⁴⁶ Test Method F

⁴⁷ I hereby certify that the rules of the Oil Conservation Division have been complied with and that the information given above is true and complete to the best of my knowledge and belief. Signature: <i>Cathy Rowan</i> Printed name: Cathy Rowan Title: Sr. Engineering Technician Date: 05/21/01 Phone: (281) 618-4733		OIL CONSERVATION DIVISION ORIGINAL SIGNED BY TIM W. GUM DISTRICT II SUPERVISOR Approved by: <i>AW</i> Title: Approval Date: JUL 05 2001
--	--	--

⁴⁸ If this is a change of operator fill in the OGRID number and name of the previous operator

Previous Operator Signature	Printed Name	Title	Date

Arrant, Bryan

From: Arrant, Bryan
Sent: Monday, July 15, 2002 1:37 PM
To: Jones, William V
Cc: Gum, Tim
Subject: RE: No Bluff "36" State Com Well No. 2 API: 30-015-31123

Will,

I briefly looked into the area surrounding the Bluff 36 State Com. #2 well and I see that there is Abo production immediately to the south of this well.

The operator should have brought cement to cover the Abo. As you indicated with operators permitting Glorieta-Yeso wells in this area, possibly cement up through these formations also. Once you issue an order, we will take steps and have SW Energy perf and squeeze their production casing to meet OCD requirements. If you have other plans or concerns, please advise.

Bryan

-----Original Message-----

From: Jones, William V
Sent: Thursday, July 11, 2002 8:50 AM
To: Gum, Tim
Cc: Arrant, Bryan; Catanach, David
Subject: No Bluff "36" State Com Well No. 2 API: 30-015-31123

Hello Tim:

I thought I would send an email with all the facts as I have found them:

This well was drilled and 5.5 inch set to 10050' (to the Mississippian) on 4/16/01. They only used 553 sx of cement and calc cement top at 7,350'. Many operators in this area to this depth have used 2 stage tools and cemented 2000 sacks total in 3 stages. I see OCD instructions in the file 5/3/2000 for the operator (Southwestern Energy Production Company) to "cover all oil, gas, and water bearing zones".

I think there are other productive zones. For instance, the Jeffers 36 St #003 (api: 30-015-31541) and other wells have been permitted to 4000' in this area with the Glorieta or SA as the objective. There is also some 500' shallow Yates production that is played out already.

The reason I found this:

I am looking at an SWD application from Mack Energy. They have drilled a new well and want to complete the Beech Federal #003 for SWD in the Abo at 5000'. The No Bluff 36 State Com #2 is in the Area of Review with cement top below the Abo.

Please let me know what action you will take on this - so I can determine how to proceed with Mack's application.

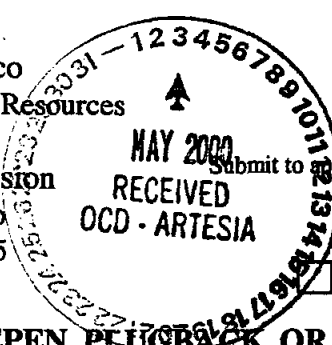
Regards,

Will Jones

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 South First, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
2040 South Pacheco
Santa Fe, NM 87505



Form C-101
Revised March 17, 1999

Submit to appropriate District Office
State Lease - 6 Copies
Fee Lease - 5 Copies

AMENDED REPORT

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUG BACK, OR ADD A ZONE

¹ Operator Name and Address Southwestern Energy Production Company 2350 North Sam Houston Parkway East, Suite 300 Houston, TX 77032		² OGRID Number 148111
		³ API Number 30-015-31123
³ Property Code 25858	⁵ Property Name No Bluff "36" State Com.	⁶ Well No. 2

⁷ Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
G	36	17S	27E		1980	North	1980	East	Eddy

⁸ Proposed Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County

⁹ Proposed Pool 1

Wildcat (Mississippian)

¹⁰ Proposed Pool 2

¹¹ Work Type Code N	¹² Well Type Code G	¹³ Cable/Rotary R	¹⁴ Lease Type Code S	¹⁵ Ground Level Elevation 3639
¹⁶ Multiple N	¹⁷ Proposed Depth 10,100'	¹⁸ Formation Mississippian	¹⁹ Contractor Patterson	²⁰ Spud Date 5/25/00 (est.)

²¹ Proposed Casing and Cement Program

Hole Size	Casing Size	Casing weight/foot	Setting Depth	Sacks of Cement	Estimated TOC
26"	20"	Minimum WOC	time 4 hrs.	Ready Mix	Surface
17 - 1/2"	13 - 3/8"	61#	425'	1500	Surface
12 - 1/4"	8 5/8"	32#	2,000'	1,495	Surface
7 7/8"	5 1/2"	17#	10,100'	860	2,000' *
* Oper. To cover all oil, gas, water bearing zones					

22 Describe the proposed program. If this application is to DEEPEN or PLUG BACK, give the data on the present productive zone and proposed new productive zone. Describe the blowout prevention program, if any. Use additional sheets if necessary.

SEE ATTACHMENT

Notify OCD at SPUD & TIME
to witness cementing the
13318" casing.

²³ I hereby certify that the information given above is true and complete to the best of my knowledge and belief.

Signature: *Cathy Rowan*

Printed name: Cathy Rowan

Title: Drilling Technician

Date: May 2, 2000

Phone: 281-618-4733

OIL CONSERVATION DIVISION

Approved by: *Jim W. Green* BSA

Approval Date: MAY 03 2000 Expiration Date: MAY 03 2001

Conditions of Approval:

Attached ☐

GENERAL DRILLING PROGRAM- Attachment to Form C-101

Southwestern Energy Production Company- No Bluff "36" State Com. #2
1980' FNL 1980' FEL Section 36-T17S-R27E
Eddy County, New Mexico

Elevation: 3639' GR

Proposed Total Depth: 10,100'

Estimated Formation Tops

San Andres	1851'
Glorietta	3355'
Wolfcamp	6670'
Strawn	9030'
Morrow Clastics	9770'
Missippian	10,000'

Casing/Cement Program

<u>Hole Size</u>	<u>Casing Size/Weight/Grade</u>	<u>Setting Depth</u>	<u>Cement</u>	<u>Est. TOC</u>
	20" Conductor pipe	40'	ready mix	surface
17-1/2"	13-3/8" 61# J-55 ST&C	425'	1500 sx 15:85 Poz: Class C + 0.25 pps D29+2% S1+2% D20	surface
12-1/4"	8-5/8" 32# J-55 ST&C	2000'	Lead: 1260 sx 35:65 Poz: Class C + 6% D20+ 0.25 pps D29 Tail: 235 sx Class C+ 2% S1 +0.25 pps D29	surface
7-7/8"	5-1/2" 17# N-80 LT&C	10,100'	860 sx 50:50 Poz: Class H + 6% D44 +2% D20+0.4% D59	8000'

Drilling Fluids Program

<u>Depth</u>	<u>Mud Weight</u>	<u>Viscosity</u>	<u>Fluid Loss</u>	<u>Comments</u>
0-425'	8.4-8.6	32-34	NC	spud mud
425'-2000'	9.0-9.2	28-29	NC	cut brine water,paper,caustic
2000'-9300'	8.4-9.3	28-29	NC	cut brine,caustic,paper
9300'-10,100'	9.3-9.6	34-38	<15 cc	xantham gum, starch

Blowout Prevention Program- Attachment to Form C-101

0'-425'	None
425'-2000'	20" 2000# annular preventer system.

2000'-10,100' 13-5/8" 5000# double ram type preventers, 5000# annular preventer and rotating head body. Test all rams choke manifold, kill line upper and lower kelly valves to 3000 psi. A choke manifold and 120 gallon accumulator with floor and remote operating stations and auxiliary power system.

Any equipment failing to test satisfactorily, will be repaired or replaced. Results of the BOP test will be recorded in the Driller's Log.

The BOP's will be maintained ready for use until drilling operations are completed. BOP drills will be conducted as necessary to assure that equipment is operational and each crew is properly trained to carry out emergency duties.

Accumulator shall maintain a pressure capacity reserve at all times to provide for the close-open-close sequence of the blind and pipe rams of the hydraulic preventers.

DISTRICT I
P.O. Box 1880, Hobbs, NM 88241-1880

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

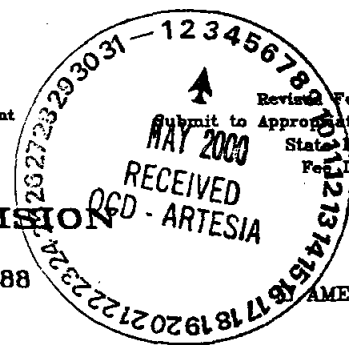
DISTRICT III
10 Elmo Brazos Rd., Aztec, NM 87410

DISTRICT IV
P.O. BOX 2088, SANTA FE, N.M. 87504-2088

State of New Mexico
Energy, Minerals and Natural Resources Department

OIL CONSERVATION DIVISION

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



Form C-102
Revised February 10, 1994
Submit to Appropriate District Office
State Release - 4 Copies
Fee Release - 3 Copies

AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
Property Code	Property Name NO BLUFF "36" STATE COM.	Well Number 2
OGRID No.	Operator Name SOUTHWESTERN ENERGY PRODUCTION CO.	Elevation 3639

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
G	36	17 S	27 E		1980	NORTH	1980	EAST	EDDY

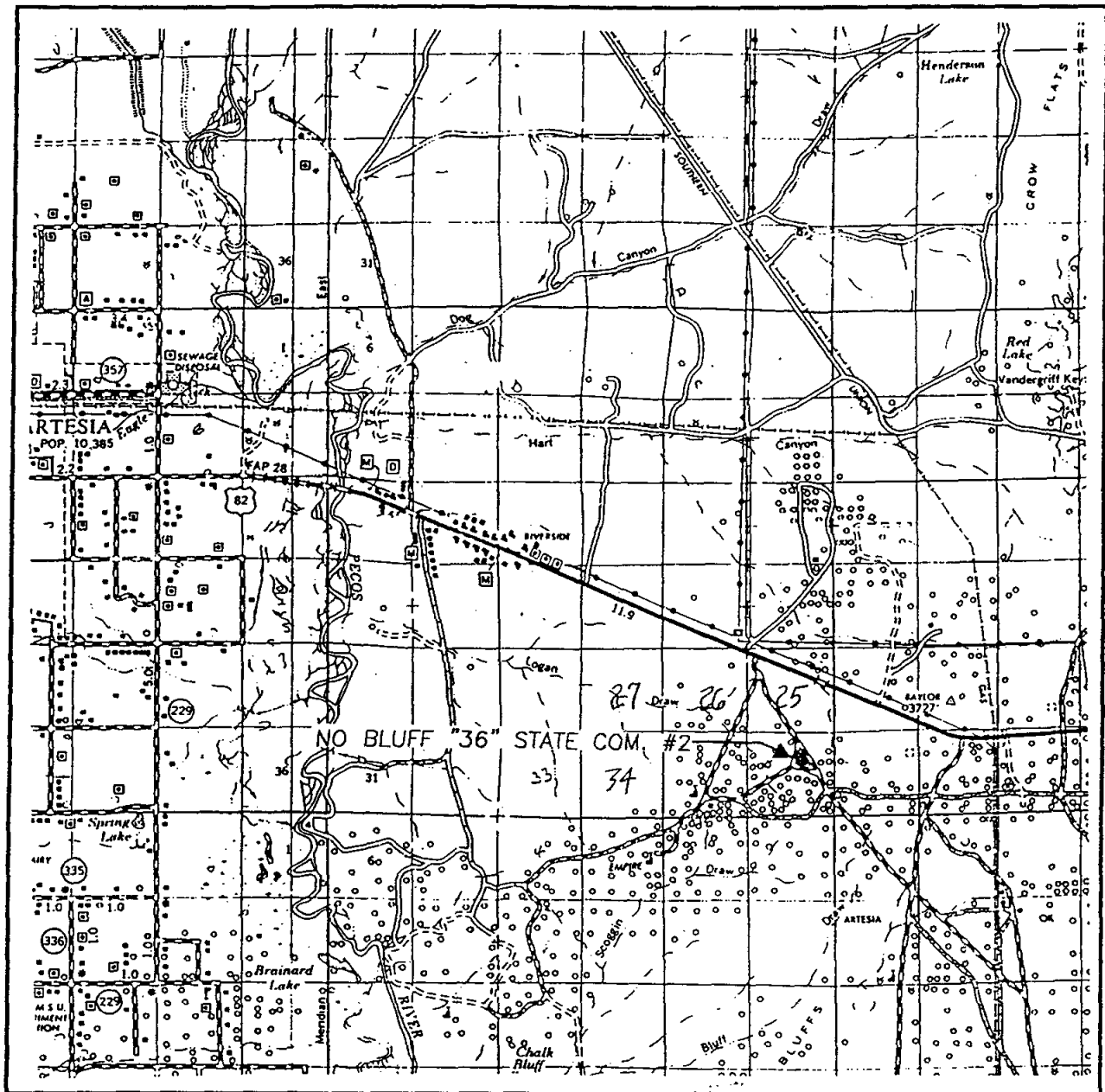
Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
Dedicated Acres	Joint or Infill	Consolidation Code	Order No.						
320									

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

	OPERATOR CERTIFICATION I hereby certify the the information contained herein is true and complete to the best of my knowledge and belief. Signature Cathy Rowan Printed Name Drilling Technician Title May 2, 2000 Date
	SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision and that the same is true and correct to the best of my belief. APRIL 19, 2000 Date Surveyed Signature & Seal of Professional Surveyor 00-11-05092 Certificate No. RONALD L. EDSON 3239 GARY EDSON 12641 MACON McDONALD 12185

VICINITY MAP



SCALE: 1" = 2 MILES

SEC. 36 TWP. 17-S RGE. 27-E

SURVEY N.M.P.M.

COUNTY EDDY

DESCRIPTION 1980' FNL & 1980' FEL

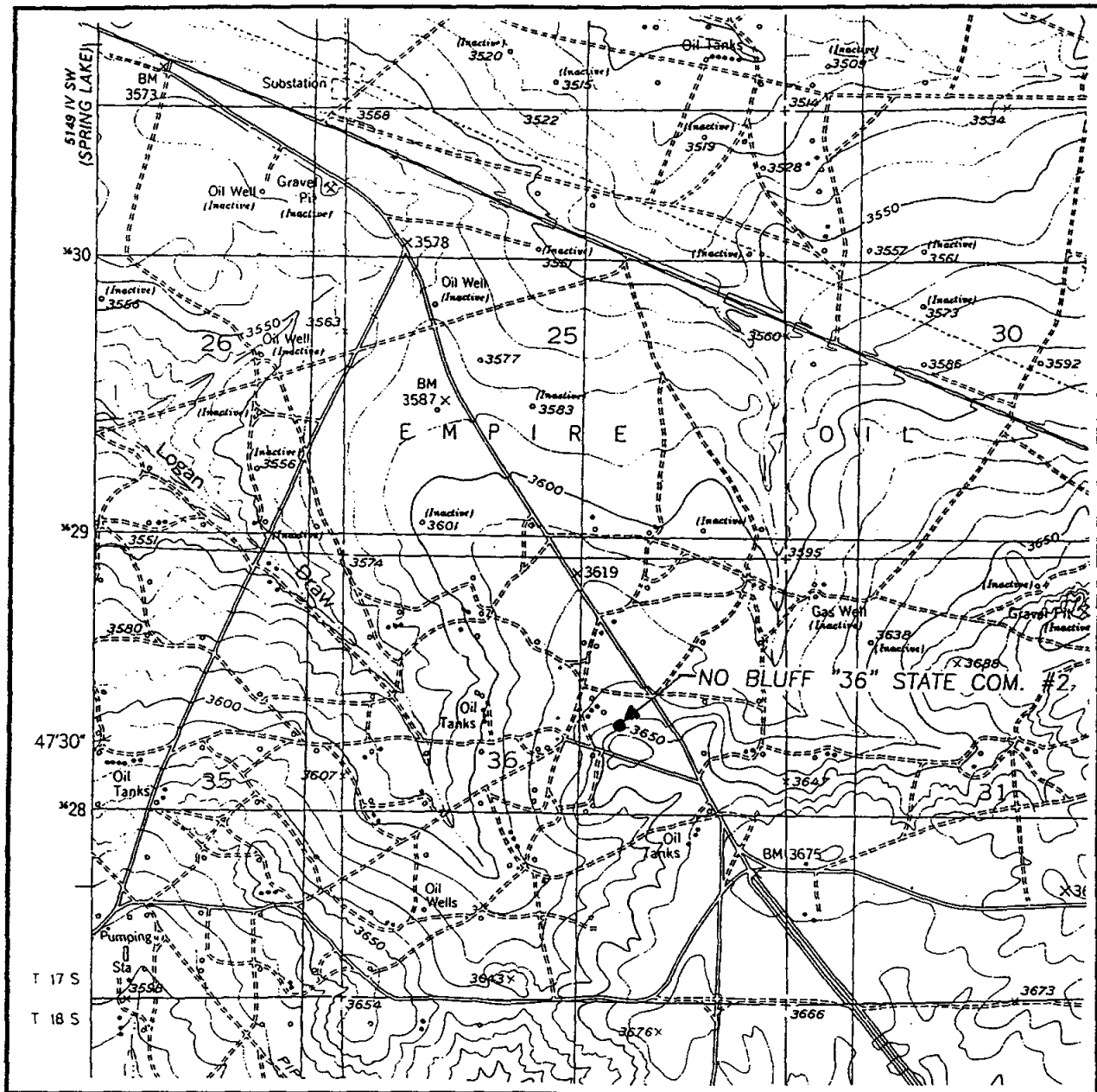
ELEVATION 3639

OPERATOR SOUTHWESTERN ENERGY PRODUCTION CO.

LEASE NO BLUFF "36" STATE COM.

JOHN WEST SURVEYING
HOBBS, NEW MEXICO
(505) 393-3117

LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL:
RED LAKE, N.M. - 10'

SEC. 36 TWP. 17-S RGE. 27-E

SURVEY N.M.P.M.

COUNTY EDDY

DESCRIPTION 1980' FNL & 1980' FEL

ELEVATION 3639

OPERATOR SOUTHWESTERN ENERGY
PRODUCTION CO.

LEASE NO BLUFF "36" STATE COM.

U.S.G.S. TOPOGRAPHIC MAP
RED LAKE, N.M.

JOHN WEST SURVEYING
HOBBS, NEW MEXICO
(505) 393-3117

ATTACHMENT VI-2D

MAP ID NO. 942
(Same as Map ID No. 89)

RECORDS FOR MAP ID NO. 89



District I
PO Box 1988, Hobbs, NM 88240-1988

District II OIL CONSERVATION DIVISION
PO Drawer DD, Artesia, NM 88211-9719

District III

1808 Rio Grande Rd., Aztec, NM 87418

District IV
PO Box 2088, Santa Fe, NM 87504-2088

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION

PO Box 2088
Santa Fe, NM 87504-2088

89 Form C-104
Revised February 10, 1994

Instructions on back
Submit to Appropriate District Office
5 Copies

☐ AMENDED REPORT

I. REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT

Operator name and Address ARCO Permian A Unit of Atlantic Richfield Co. P.O. Box 1710 Hobbs, NM 88240		OGRID Number 000990
		Reason for Filing Code 6-1-94 CH
API Number 30 - 045-02625	Pool Name EMPIRE ABO	Pool Code 22040
Property Code 001472	Property Name Empire ABO Unit "I"	Well Number 23

II. Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South Line	Feet from the	East/West Line	County
B	06	18S	29E		470	N	2170	E	EDDY

Bottom Hole Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South Line	Feet from the	East/West Line	County
Lee Code S	Producing Method Code Injection	Gas Connection Date	C-129 Permit Number	C-129 Effective Date	C-129 Expiration Date				

III. Oil and Gas Transporters

Transporter OGRID	Transporter Name and Address	POD	O/G	POD ULSTR Location and Description
000734	AMOCO Pipeline 502.NW Avenue Levelland, TX 79336		O	
000756	Amoco Production Co. P.O. Box 68 Hobbs, NM 88240		G	
009171	GPM Gas Corporation 4001 Penbrook Odessa, TX 79760		G	

IV. Produced Water

POD	POD ULSTR Location and Description

V. Well Completion Data

Spud Date	Ready Date	TD	FBTD	Perforations
Hole Size	Casing & Tubing Size	Depth Set	Sacks Cement	

VI. Well Test Data

Date New Oil	Gas Delivery Date	Test Date	Test Length	Tbg. Pressure	Csg. Pressure
Choke Size	Oil	Water	Gas	AOP	Test Method

I hereby certify that the rules of the Oil Conservation Division have been complied with and that the information given above is true and complete to the best of my knowledge and belief.

Signature: *Kellie D. Murrish*

Printed name: Kellie D. Murrish

Title: Records Clerk II

Date: 6-1-94 Phone: 505-391-1649

OIL CONSERVATION DIVISION

Approved by: SUPERVISOR, DISTRICT II

Title:

Approval Date: JUL 27 1994

If this is a change of operator fill in the OGRID number and name of the previous operator

Previous Operator Signature	Printed Name	Title	Date

DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

OIL CONSERVATION DIVISION

P.O. Box 2088

Santa Fe, New Mexico 87504-2088

RECEIVED

94 APR 14 AM 8 50

WELL API NO.

30-015-0625

5. Indicate Type of Lease

STATE ☒

FEE ☐

6. State Oil & Gas Lease No.

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

1. Type of Well:

OIL WELL ☐

GAS WELL ☐

X OTHER Gas Injection

2. Name of Operator

ARCO OIL AND GAS COMPANY

3. Address of Operator

P.O. 1710 HOBBS N.M. 88240

7. Lease Name or Unit Agreement Name

Empire Abo Unit "I"

8. Well No.

23

9. Pool name or Wildcat

Empire Abo

4. Well Location

Unit Letter B : 470 Feet From The North Line and 2170 Feet From The East Line

Section 6 Township 18S Range 28E NMPM Eddy County

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

3669.6 GL

11. Check Appropriate Box to Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK ☐

PLUG AND ABANDON ☐

TEMPORARILY ABANDON ☐

CHANGE PLANS ☐

PULL OR ALTER CASING ☐

OTHER: ☐

SUBSEQUENT REPORT OF:

REMEDIAL WORK ☐

ALTERING CASING ☐

COMMENCE DRILLING OPNS. ☐

PLUG AND ABANDONMENT ☐

CASING TEST AND CEMENT JOB ☐

OTHER: Convert to gas injection ☒

12. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 1103.

TD 6194' PERFS 5985-6130'

PBD 6184

03/10/94: Add perfs 5985-6080, set pkr @ 5943.85'. Acidize 5985-6130' w/3000 gals 15% NEFE acid.

03/19/94: Load casing w/1 bbl 8.6# brine w/TH-377 chemical. Pressure test to 640#, held for 30 mins. Test chart attached.

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

SIGNATURE

Keillie D. Murrish

TITLE

Records Clerk II.

DATE

03/29/94

TYPE OR PRINT NAME

Keillie D. Murrish

TELEPHONE NO. 391-1649

(This space for State Use)

APPROVED BY

[Signature]

TITLE

SUPERVISOR, DISTRICT II

DATE

APR 8 1994

CONDITIONS OF APPROVAL, IF ANY:

Submit 3 Copies
to Appropriate
District Office

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-183
Revised 1-1-89

DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

OIL CONSERVATION DIVISION

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

SEP 20 1993

WELL API NO.
30-015-0625

5. Indicate Type of Lease
STATE ☒ FEE ☐

6. State Oil & Gas Lease No.

7. Lease Name or Unit Agreement Name

EMPIRE ABO UNIT "I"

8. Well No.

23

9. Pool name or Wildcat

EMPIRE ABO

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A
DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT"
(FORM C-101) FOR SUCH PROPOSALS.)

1. Type of Well:
OIL WELL ☐ GAS WELL ☐ OTHER GAS INJECTION

2. Name of Operator
ARCO OIL AND GAS COMPANY

3. Address of Operator
P.O. 1710 HOBBS N.M. 88240

4. Well Location
Unit Letter B : 470 Feet From The NORTH Line and 2170 Feet From The EAST Line
Section 6 Township 18S Range 28E NMMPM EDDY County

10. Elevation (Show whether DF, RKB, RT, GR, etc.)
3669.6 GL

11. Check Appropriate Box to Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK ☐ PLUG AND ABANDON ☐
TEMPORARILY ABANDON ☐ CHANGE PLANS ☐
PULL OR ALTER CASING ☐
OTHER: CONVERT TO GAS INJECTION ☒

SUBSEQUENT REPORT OF:

REMEDIAL WORK ☐ ALTERING CASING ☐
COMMENCE DRILLING OPNS. ☐ PLUG AND ABANDONMENT ☐
CASING TEST AND CEMENT JOB ☐
OTHER: ☐

12. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 1103.

TD 6194, PBD 6182, PERFS 6120-30, PKR 6025

NOTIFY NMCD PRIOR TO STARTING WORK.

LOAD CSG W/TREATED FLUID, TEST CSG TO 500# FOR 20 MIN, AND START GAS INJECTION.

IF GAS INJECTION LESS THAN 2 MMCFPD ADD PERFS WITHIN ABO INTERVAL 6070-6120

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

SIGNATURE [Signature] TITLE OPERATION COORDINATOR DATE 9-16-93
TYPE OR PRINT NAME JAMES COGBURN TELEPHONE NO. 391-1621

(This space for State Use)
ORIGINAL SIGNED BY
MIKE WILLIAMS
SUPERVISOR, DISTRICT II

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY: _____

OCT 19 1993

Submit 3 Copies
to Appropriate
District Office

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-103
Revised 1-1-89

DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

OIL CONSERVATION DIVISION

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

MAY 14 1992

O. C. D.

WELL API NO.

30-015-0625

5. Indicate Type of Lease

STATE ☒

FEE ☐

6. State Oil & Gas Lease No.

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A
DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT"
(FORM C-101) FOR SUCH PROPOSALS.)

1. Type of Well:

OIL
WELL ☒

GAS
WELL ☐

OTHER

2. Name of Operator

ARCO OIL AND GAS COMPANY ✓

3. Address of Operator

BOX 1710, HOBBS, NEW MEXICO 88240

4. Well Location

Unit Letter B : 470 Feet From The NORTH Line and 2170 Feet From The EAST Line

Section 6 Township 18S Range 28E NMPM EDDY County

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

3669.6' GL

7. Lease Name or Unit Agreement Name

EMPIRE ABO UNIT "I"

8. Well No.

23

9. Pool name or Wildcat
EMPIRE ABO

11.

Check Appropriate Box to Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:

SUBSEQUENT REPORT OF:

PERFORM REMEDIAL WORK ☐

PLUG AND ABANDON ☐

REMEDIAL WORK ☐

ALTERING CASING ☐

TEMPORARILY ABANDON ☐

CHANGE PLANS ☐

COMMENCE DRILLING OPNS. ☐

PLUG AND ABANDONMENT ☐

PULL OR ALTER CASING ☐

CASING TEST AND CEMENT JOB ☐

OTHER: ☐

OTHER: TEMPORARILY ABANDON - ☒

12. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 1103.

TA & HOLD WELL BORE FOR BHP MONITOR

TD 6194'; PBD 6182'; PERFS: 6120-6130'

4/29/92 SET PKR w/13000# COMPRESSION. LOAD & PRESSURE CSG TO 500# w/8.6# BRINE
& WT-675 CHEMICAL. HELD FOR 25 MIN. OK. PKR SET @ 6025.83'. WELL TA
4/29/92. CHART ATTACHED.

This Approval of Temporary
Abandonment Expires 5/97

This Approval of Temporary
Abandonment Expires _____

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

SIGNATURE

James D. Cogburn

TITLE Operations Coordinator

DATE 5/13/92

TYPE OR PRINT NAME

James D. Cogburn

TELEPHONE NO. 391-1600

(This space for State Use)

APPROVED BY

[Signature]

TITLE

Field Rep

DATE

5/20/92

CONDITIONS OF APPROVAL, IF ANY:

ANTARCTIC	
FILE	
S.G.S.	
AND OFFICE	
TRANSPORTER	OIL
	GAS
OPERATOR	
PRORAT ON OFFICE	

NEW MEXICO OIL CONSERVATION COMMISSION
REQUEST FOR ALLOWABLE
AND
AUTHORIZATION TO TRANSPORT OIL AND NATURAL GAS

Form C-104
Supersedes Old C-104 and
Effective 1-1-65

RECEIVED

SEP 26 1973

Operator
Atlantic Richfield Company ✓
Address
P. O. Box 1710, Hobbs, N.M. 88240

O. C. C.
ARTESIA, OFFICE

Reason(s) for filing (Check proper box)
New Well ☐ Change in Transporter of:
Recompletion ☐ Oil ☐ Dry Gas ☐
Change in Ownership ☒ Casinghead Gas ☐ Condensate ☐
Other (Please explain)
Included in Empire Abo Unit eff:10/01/
Change in lease name from State #1.

If change of ownership give name and address of previous owner
Resler and Sheldon, Box 2053, S. Padre Island, TX

II. DESCRIPTION OF WELL AND LEASE

Lease Name	Well No.	Pool Name, including Formation	Kind of Lease	Lease
Empire Abo Unit I	23	Empire Abo	State, Federal or Fee	State
Location				
Unit Letter	B	470 Feet From The North Line and	2170 Feet From The East	
Line of Section	6	Township	18S	Range 28E, NMPM, Eddy Cour

III. DESIGNATION OF TRANSPORTER OF OIL AND NATURAL GAS

Name of Authorized Transporter of Oil <input checked="" type="checkbox"/> or Condensate <input type="checkbox"/>	Address (Give address to which approved copy of this form is to be sent)
AMOCO Pipe Line Company	2300 Continental Bk. Bldg. Fort Worth, TX 76102
Name of Authorized Transporter of Casinghead Gas <input checked="" type="checkbox"/> or Dry Gas <input type="checkbox"/>	Address (Give address to which approved copy of this form is to be sent)
Phillips Petroleum Company	Phillips Bldg., 4th & Washington, Odessa, TX 79
If well produces oil or liquids, give location of tanks.	Is gas actually connected? When
Unit B, Sec. 6, Twp. 18S, Rge. 28E	Yes August 1960

If this production is commingled with that from any other lease or pool, give commingling order number:

IV. COMPLETION DATA

Designate Type of Completion - (X)	Oil Well	Gas Well	New Well	Workover	Deepen	Plug Back	Same Res't.	Diff. R
Date Spudded	Date Compl. Ready to Prod.	Total Depth	P.B.T.D.					
Elevations (DF, RKB, RT, GR, etc.)	Name of Producing Formation	Top Oil/Gas Pay	Tubing Depth					
Perforations	Depth Casing Shoe							
TUBING, CASING, AND CEMENTING RECORD								
HOLE SIZE	CASING & TUBING SIZE	DEPTH SET	SACKS CEMENT					

V. TEST DATA AND REQUEST FOR ALLOWABLE OIL WELL

(Test must be after recovery of total volume of load oil and must be equal to or exceed top able for this depth or be for full 24 hours)

Date First New Oil Run To Tanks	Date of Test	Producing Method (Flow, pump, gas lift, etc.)	
Length of Test	Tubing Pressure	Casing Pressure	Choke Size
Actual Prod. During Test	Oil-Bbls.	Water-Bbls.	Gas-MCF

GAS WELL

Actual Prod. Test-MCF/D	Length of Test	Bbls. Condensate/MMCF	Gravity of Condensate
Testing Method (pilot, back pr.)	Tubing Pressure (Shut-in)	Casing Pressure (Shut-in)	Choke Size

VI. CERTIFICATE OF COMPLIANCE

I hereby certify that the rules and regulations of the Oil Conservation Commission have been complied with and that the information given above is true and complete to the best of my knowledge and belief.

L. L. Shackelford
(Signature)
Senior Accounting Clerk

September 26, 1973

(Date)

OIL CONSERVATION COMMISSION

APPROVED SEP 28 1973, 19
BY *W. A. Grisset*
TITLE OIL AND GAS INSPECTOR

This form is to be filed in compliance with RULE 1104.
If this is a request for allowable for a newly drilled or dee well, this form must be accompanied by a tabulation of the dev tests taken on the well in accordance with RULE 111.
All sections of this form must be filled out completely for able on now and recompleted wells.
Fill out only Sections I, II, III, and VI for changes of well name or number, or transporter, or other such change of con
Separate Forms C-104 must be filed for each pool in m-

CORD OF DRILL-STEM AND SPECIAL TESTS

If drill-stem or other special tests or deviation surveys were made, submit report on separate sheet and attach hereto

TOOLS USED

Rotary tools were used from 2080 feet to 6194 feet, and from feet to feet.
Cable tools were used from 0 feet to 2080 feet, and from feet to feet.

PRODUCTION

Put to Producing December 26, 1959

OIL WELL: The production during the first 24 hours was 456 barrels of liquid of which 100 % was oil; % was emulsion; % water; and % was sediment. A.P.I.

Gravity 882

GAS WELL: The production during the first 24 hours was M.C.F. plus barrels of liquid Hydrocarbon. Shut in Pressure lbs.

Length of Time Shut in

PLEASE INDICATE BELOW FORMATION TOPS (IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE):

Southeastern New Mexico		Northwestern New Mexico	
T. Anhy		T. Devonian	
T. Salt		T. Silurian	
B. Salt		T. Montoya	
T. Yates	320	T. Simpson	
T. 7 Rivers		T. McKee	
T. Queen	1175	T. Ellenburger	
T. Grayburg		T. Gr. Wash.	
T. San Andres	1957	T. Granite	
T. Glorieta		T.	
T. Drinkard		T.	
T. Tubbs		T.	
T. Abo	5470	T.	
T. Penn		T.	
T. Miss		T.	
		T. Ojo Alamo	
		T. Kirtland-Fruitland	
		T. Farmington	
		T. Pictured Cliffs	
		T. Menefee	
		T. Point Lookout	
		T. Mancos	
		T. Dakota	
		T. Morrison	
		T. Penn	
		T.	
		T.	
		T.	

FORMATION RECORD

From	To	Thickness in Feet	Formation	From	To	Thickness in Feet	Formation
0	22		Limestone	1490	1570		Anhy
22	130		Red Sand	1570	1700		Anhy & Lime
130	305		Anhy	1700	1920		Lime
305	317		Sand	1920	1950		Sand
317	380		Red Shale	1950	2080		Dolomite
380	942		Anhy	2080	4000		Dolomite
942	950		Red Sand	4000	5470		Black Dolomite
950	1175		Anhy	5470	5608		Buff Dolomite
1175	1210		Red Sand	5608	6120		White Dolomite Reef
1210	1350		Anhy	6120	6194		Buff & Brown Dolomite
1350	1390		Red Sand				
1390	1430		Anhy				
1430	1490		Grey Sand				

OIL CONSERVATION COMMISSION

ARTESIA DISTRICT OFFICE

ATTACH SEPARATE SHEET IF ADDITIONAL SPACE IS NEEDED

I hereby swear or affirm that the information given herewith is a complete and correct record of the well and all work done on it so far as can be determined from available records.

December 28, 1959

Company or Operator Resler and Sheldon

Address 302 Carper Bldg., Artesia, New Mexico

Name [Signature]

Position or Title Partner

NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

RECEIVED
Form O-101
Revised (12/1/59)
OCT 8 1959

NOTICE OF INTENTION TO DRILL

Notice must be given to the District Office of the Oil Conservation Commission and approval obtained before drilling or recompletion begins. If changes in the proposed plan are considered advisable, a copy of this notice showing such changes will be returned to the sender. Submit this notice in **QUINTUPPLICATE**. One copy will be returned following approval. See additional instructions in Rules and Regulations of the Commission. If State Land submit 6 Copies Attach Form O-128 in triplicate to first 3 copies of form O-101

1959 OCT 5
Artesia, New Mexico
(Place)

October 5, 1959
(Date)

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Gentlemen:

You are hereby notified that it is our intention to commence the Drilling of a well to be known as
Resler and Sheldon

(Company or Operator)

State **_____** (Lease), Well No. **1**, in **B** (Unit). The well is located **470** feet from the **north** line and **2170** feet from the **east** line of Section **6**, T. **18S**, R. **28E**, NMPM.
(GIVE LOCATION FROM SECTION LINE) **Artesia** Pool, **Edy** County

If State Land the Oil and Gas Lease is No. **B-11594**

If patented land the owner is _____

Address _____

We propose to drill well with drilling equipment as follows: **Cable Tools**

The status of plugging bond is **Blanket**

Drilling Contractor **Carl Howell**

We intend to complete this well in the **Grayburg** formation at an approximate depth of **2000** feet.

CASING PROGRAM

We propose to use the following strings of Casing and to cement them as indicated:

Size of Hole	Size of Casing	Weight per Foot	New or Second Hand	Depth	Seals Cement
10	8 5/8	24	New	500	50
8 1/4	5 1/2	14	New	2000	100

If changes in the above plans become advisable we will notify you immediately.

ADDITIONAL INFORMATION (If recompletion give full details of proposed plan of work.)

Approved **OCT 7 1959**, 19_____
Except as follows:

Sincerely yours,

Resler and Sheldon
(Company or Operator)
By **Vilas P. Sheldon**

Position **Partner**

Send Communications regarding well to

Name **Vilas P. Sheldon**

Address **302 Carper Bldg., Artesia, New Mexico**

OIL CONSERVATION COMMISSION
By **M. L. Armstrong**
OIL AND GAS INSPECTOR

NEW MEXICO OIL CONSERVATION COMMISSION
WELL LOCATION AND ACREAGE DEDICATION PLAT

SEE INSTRUCTIONS FOR COMPLETING THIS FORM ON THE REVERSE SIDE

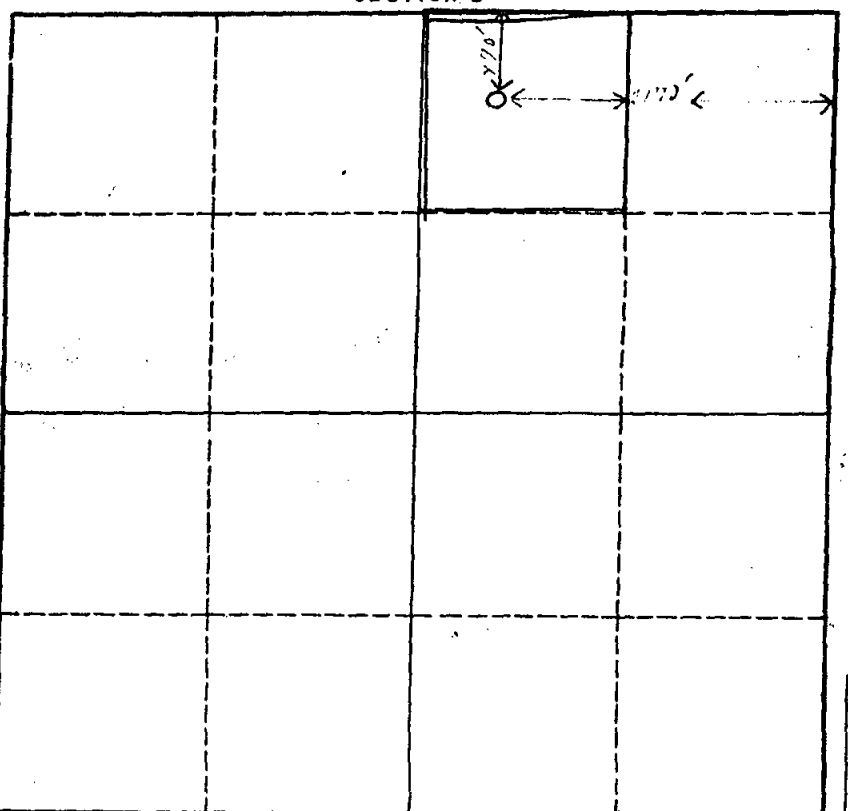
SECTION A

Operator Reaser and Sheldon			Lease State		Well No. 1
Unit Letter B	Section 6	Township 18N	Range 28E	County Eddy	
Actual Footage Location of Well: 470 feet from the north line and 2170 feet from the east line					
Ground Level Elev. 470	Producing Formation Grayburg		Pool Artesia	Dedicated Acreage: 40 Acres	

1. Is the Operator the only owner in the dedicated acreage outlined on the plat below? YES ☒ NO ☐ ("Owner" means the person who has the right to drill into and to produce from any pool and to appropriate the production either for himself or for himself and another. (65-3-29 (e) NMSA 1935 Comp.)
2. If the answer to question one is "no," have the interests of all the owners been consolidated by communization agreement or otherwise? YES ☐ NO ☐ If answer is "yes," Type of Consolidation _____
3. If the answer to question two is "no," list all the owners and their respective interests below:

Owner	Land Description

SECTION B



CERTIFICATION

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

Name **Reaser and Sheldon**
 Position **Partner**
 Company **Reaser and Sheldon**
 Date **October 5, 1959**

I hereby certify that the well location shown on the plat in SECTION B was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed **October 5, 1959**
 Registered Professional Engineer and Land Surveyor
 Certificate No. **263**

0 330 660 990 1320 1650 1980 2310 2640 2000 1500 1000 500 0

ATTACHMENT VI-2E

MAP ID NO. 778

**NOTE FROM MIDLAND MAP COMPANY
1959 MAP OF WELLS IN 2-18S-27E**



Midland Map Co.**Fax**

To: NANCY NIEMANN

From: DOREEN DEVORE

Fax: (713) 880-3248

Date: March 12, 1999

Phone:

Pages: 1

Re: EDDY COUNTY WELLS

CC:

☐ Urgent☒ For Review☐ Please Comment☐ Please Reply☐ Please Recycle

Comments: AFTER INVESTIGATING YOUR FAX, I AM ONLY ABLE TO GIVE YOU PART OF THE INFORMATION YOU REQUESTED. AS I TOLD YOU BEFORE, WE DON'T HAVE PERMIT AND COMPLETION INFORMATION FOR NEW MEXICO, SO I CAN ONLY GIVE YOU BASIC INFORMATION ABOUT THE WELLS YOU REQUESTED. I SUGGEST THAT YOU CONTACT EITHER THE SUBSURFACE LIBRARY HERE IN MIDLAND AT (915) 683-5588 (THIS IS WHERE I FOUND YOUR INFORMATION YESTERDAY) OR CALL HERROLD'S AT (915) 682-7773 AND ASK FOR "DOC". I AM NOT CERTAIN WHETHER THEY WILL OR WILL NOT CHARGE YOU FOR THE INFORMATION.

MAP ID NO.
778

1.) 2-18S-27E 2310FN, 1650FE

WELL#: 2, ORIG. OPERATOR: RUTTER & WILBANKS FEE: Hudson

THIS WELL WAS COMPLETED BEFORE 1957

795

2.) 2-18S-27E 990FS, 330FE

WELL#: 1 ORIG. OPERATOR: ATLANTIC RICHFIELD (ARCO) FEE: State "AS"

THIS WELL WAS PERMITTED SOMEWHERE BETWEEN 1959-1960

754

3.) 1-18S-27E 660FS, 660FW

WELL#: 17 ORIG. OPERATOR: HONDO OR PAM AM FEE: Malco

THIS WELL WAS COMPLETED SOMEWHERE AROUND 1975

I WISH YOU LUCK IN YOUR INVESTIGATION.

Well Location and Acreage Dedication Plat

APR 1 1959 735

Date March 25, 1959

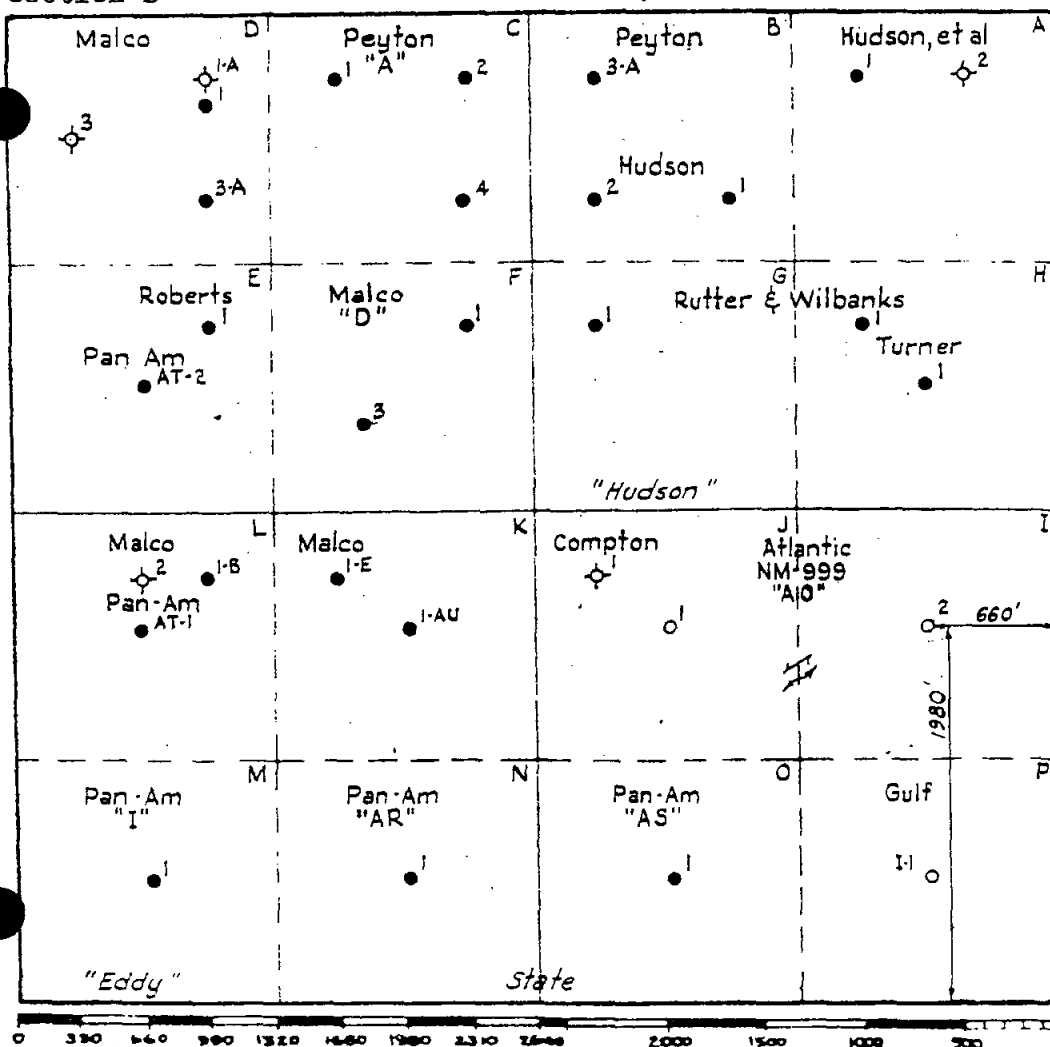
Operator The Atlantic Refining Company Lease State "A0"
 Well No. 2 Unit Letter 1 Section 2 Township 18 South Range 27 East N.M.
 Located 1980 Feet From the South Line, 660 Feet From the East Line
 County Eddy G. L. Elevation 5659' Dedicated Acreage 40.0 Acres
 Name of Producing Formation Abo Reef Pool Empire

1. Is the operator the only owner* in the dedicated acreage outlined on the plat below?
 Yes X No .
2. If the answer to question one is "no," have the interests of all the owners been consolidated by communitization agreement or otherwise? Yes No . If answer is "yes," Type of Consolidation
3. If the answer to question two is "no," list all the owners and their respective interest below:

Owner

Land Description

Section B



This is to certify that the information in Section A above is true and complete to the best of my knowledge and belief.

The Atlantic Refining Company
 (Operator)

W. J. Stewart
 (Representative)

P.O. Box 2819, Dallas, Tex.
 Address

This is to certify that the well location shown on the plat in Section B was plotted from field notes of actual surveys made by me or under my supervision and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed March 20, 1959

R. A. Waterhouse
 R. A. Waterhouse, Asst. Chief Surveyor
 The Atlantic Refining Company

PA10-698

ATTACHMENT VI-3

TOP OF CEMENT IN INJECTION ZONE WELLS IN THE AREA OF REVIEW

Map ID No.	Casing Diameter (inches)	Setting Depth (feet)	Cement Volume (sacks)	Hole Diameter (inches)	Cement Factor (cu ft/sacks)	Hole Rugosity	Cement Height (feet)	Top of Cement (feet below ground)
81	13.375 8.625 5.5	663 4000 10450	650 1400 2007	17.5 11 7.875	1.1 1.1 1.1	0.8 0.8 0.8	823 4846 10194	Surface Surface 256
83 ¹	13.375 8.625 5.5	354 1745 8466	350 650 520	17.5 .11 7.875	1.1 1.1 --	0.8 0.8 --	443 2250 --	Surface Surface 6250 ¹
124 ²	13.375 9.625 7 4.5	400 2600 9445 10198	500 1100 1895 175	17.5 12.25 7.875 6.125	1.1 1.1 1.1 1.1	0.8 0.8 0.8 0.8	633 3091 23491 1635	Surface Surface Surface Top of Liner
134	13.375 9.625 5.5	416 2610 10148	450 1025 1020	17.5 12.25 8.75	1.1 1.1 1.1	0.8 0.8 0.8	570 2880 3554	Surface Surface 6594
144	13.375 9.625 7 4.5	400 2600 8968 10150	100 250 1200 200	17.5 12.25 8.75 6.125	1.1 1.1 1.1 1.1	0.8 0.8 0.8 0.8	127 702 7025 1869	273 1898 1943 Top of Liner
157	13.375 9.625 7 4.5	400 2604 9450 10119	425 1025 1350 175	17.5 12.25 8.75 6.125	1.1 1.1 1.1 1.1	0.8 0.8 0.8 0.8	538 2880 7903 1635	Surface Surface 1547 Top of Liner
161	13.375 8.625 5.5 4.5	472 2589 9473 10140	450 900 430 80	17.5 12.25 7.875 5.5	1.1 1.1 -- 1.1	0.8 0.8 -- 0.8	570 1919 -- 1291	Surface 670 6000 ³ Top of Liner
167	13.375 8.625 5.5	418 2600 10400	500 1150 1000	17.5 11 7.875	1.1 1.1 1.1	0.8 0.8 0.8	633 3981 5079	Surface Surface 5321

ATTACHMENT VI-3 (Continued)

TOP OF CEMENT IN INJECTION ZONE WELLS IN THE AREA OF REVIEW

Map ID No.	Casing Diameter (inches)	Setting Depth (feet)	Cement Volume (sacks)	Hole Diameter (inches)	Cement Factor (cu ft/sacks)	Hole Rugosity	Cement Height (feet)	Top of Cement (feet below ground)
353	13.375 9.625 7 4.5	399 2603 9253 10057	530 1150 1620 225	17.5 12.25 8.75 6.125	1.1 1.1 1.1 1.1	0.8 0.8 0.8 0.8	671 3231 9483 2103	Surface Surface Surface Top of Liner
848	11.75 8.625 5.5	1000 6348 10138	970 300 855	17.5 12.25 7.875	1.1 -- --	0.8 -- --	931 -- --	69 5400 ⁴ 6850 ⁴
851	13.375 9.625 5.5	572 1790 4500	700 250 Unknown	17.5 12.25 6.125	1.1 1.1 --	0.8 0.8 --	887 702 --	Surface 1088 Unknown
855	13.375 9.625 5.5	502 2200 11,915	700 1400 2720	17.5 12.25 7.875	1.1 1.1 1.1	0.8 0.8 0.8	887 3934 13816	Surface Surface Surface
861 ⁵	8.625 5.5	1995 8869	800 1570	11.000 7.875	-- --	-- --	-- --	Surface ³ Surface ⁵
911	13.375 8.625 5.5	425 2002 10050	465 650 553	17.5 12.25 7.875	1.1 1.1 1.1	0.8 0.8 0.8	589 1386 2809	Surface 616 7241

Cement Height = Cement Volume * Cement Factor * Hole Rugosity * 1/(PI*(Hole Radius^2 - Casing Radius^2))

¹ For Map ID No. 83, cement volume for 5-1/2 inch casing includes squeezes. Top of cement per temperature survey conducted on May 9, 1991.

² For Map ID No. 124, hole diameter for 4-1/2 inch liner was not reported; 6.125 inches is estimated.

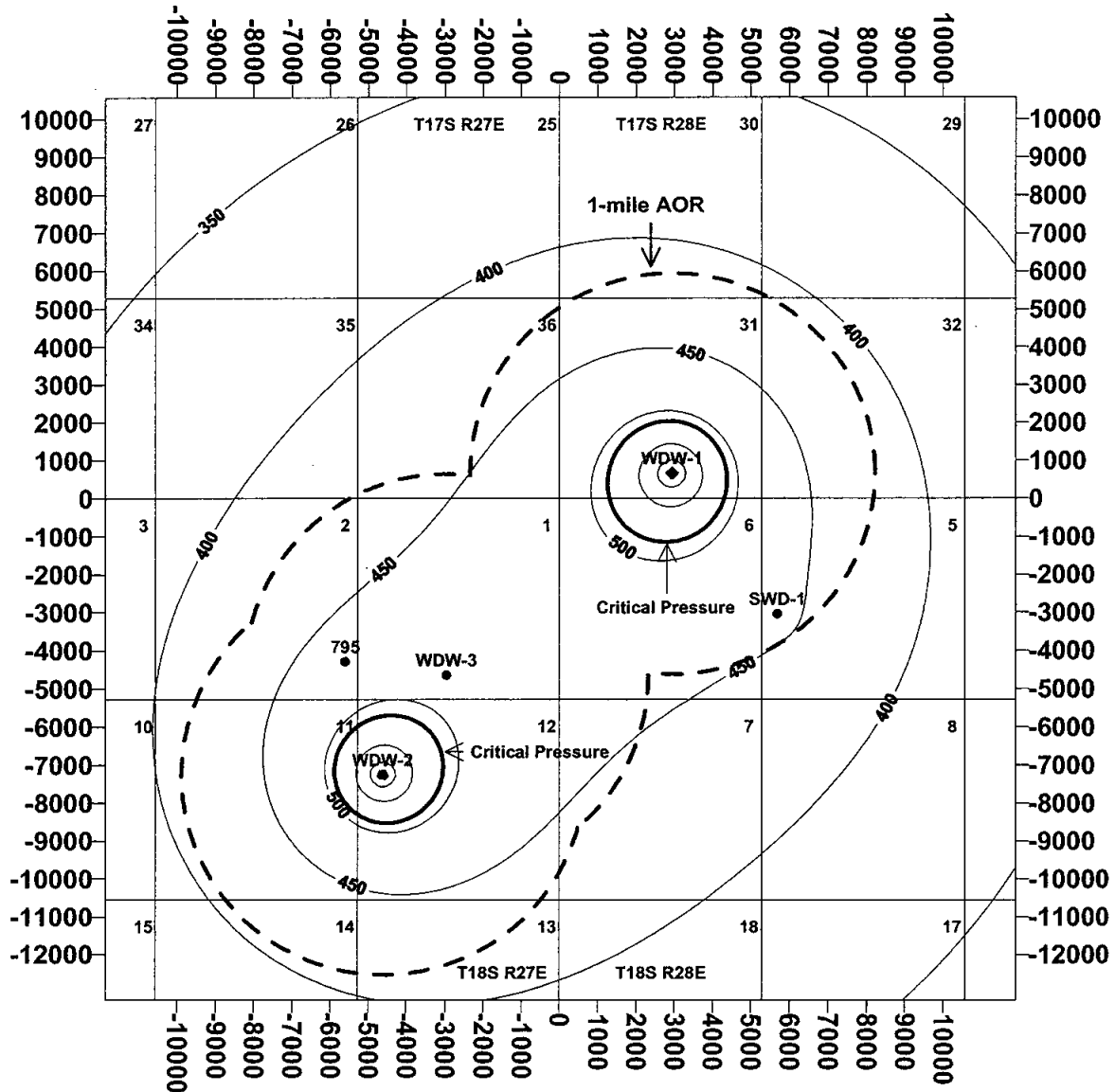
³ For Map ID No. 161, per cement bond log on July 20, 1993. Log is included in Attachment VI-2.

⁴ For Map ID No. 848, top of cement for 8-5/8 inch casing is 5100 feet per operator's well schematic. Top of cement for 5-1/2 inch liner is 6850 feet per operator's well schematic.

⁵ Map ID No. 861 is Navajo's WDW-2. Cement was circulated to the surface per operator.

NAVAJO REFINING COMPANY

PRESSURE INCREASE MODELING RESULTS



Critical Pressure Increase = 512 psi

$k = 250 \text{ md}$

$h = 85 \text{ feet}$

WDW-1 at Historical Rates 09/23/1999 to 06/30/2003

WDW-1 at 500 gpm 07/01/2003 to 09/22/2019

WDW-2 at Historical Rates 09/23/1999 to 06/30/2003

WDW-2 at 500 gpm 07/01/2003 to 09/22/2019

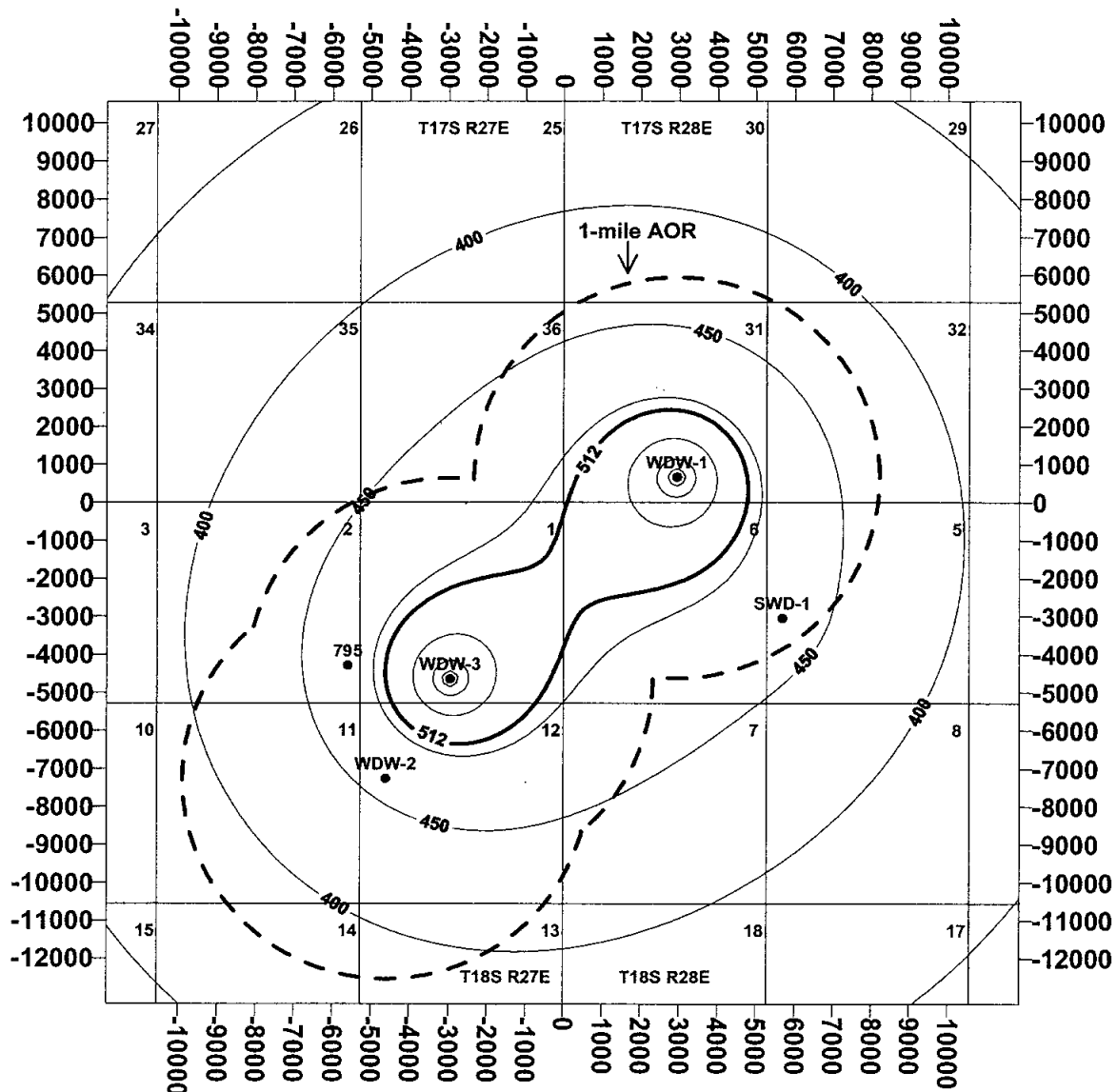
WDW-3 at 0 gpm 07/01/2003 to 09/22/2019

SWD-1 at 17.6 gpm 06/01/1998 to 09/22/1999

SWD-1 at 58.3 gpm 09/23/1999 to 09/22/2019

NAVAJO REFINING COMPANY

PRESSURE INCREASE MODELING RESULTS



Critical Pressure Increase = 512 psi

k = 250 md
h = 85 feet

WDW-1 at Historical Rates 09/23/1999 to 06/30/2003
WDW-1 at 500 gpm 07/01/2003 to 09/22/2019

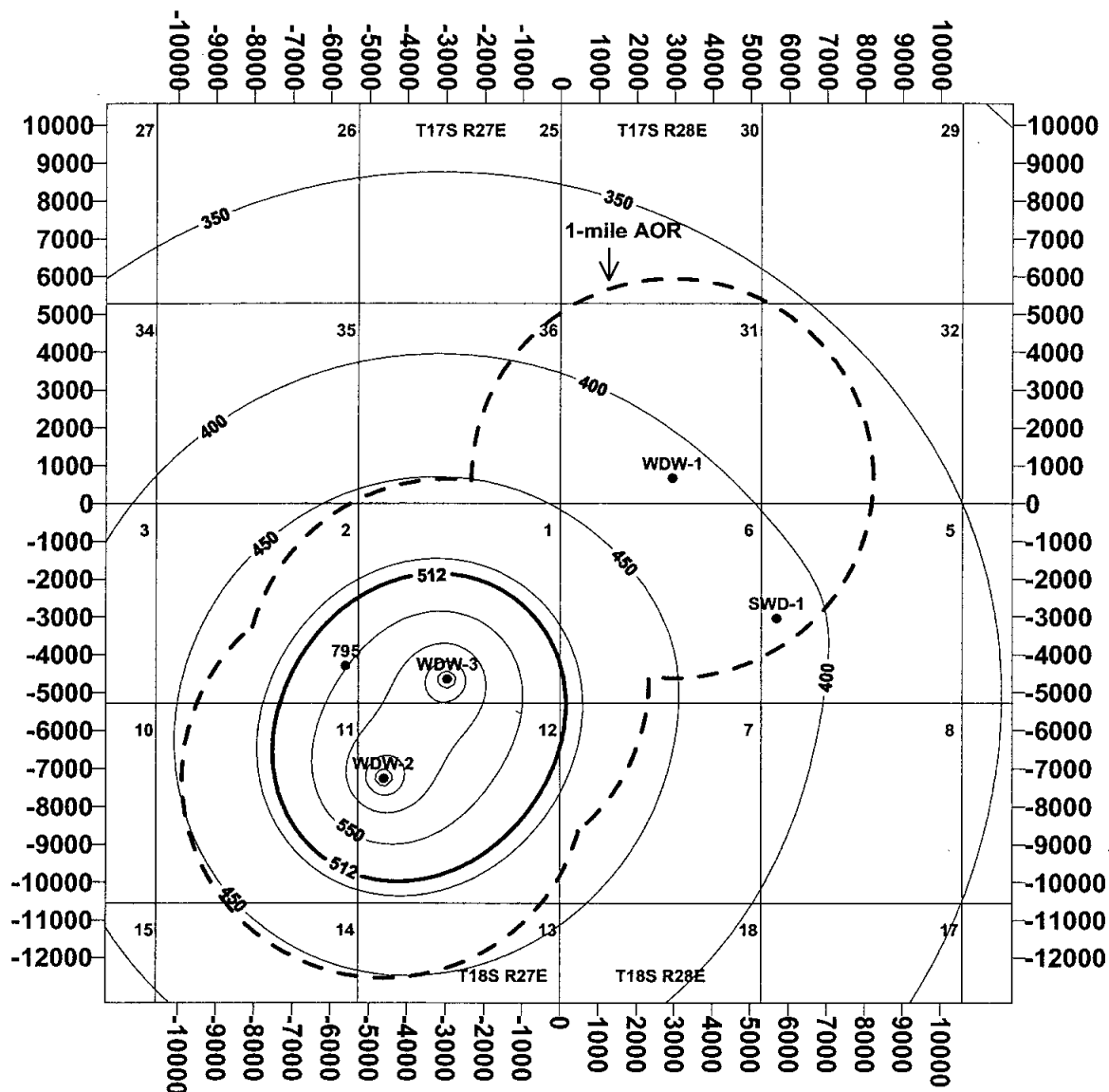
WDW-2 at Historical Rates 09/23/1999 to 06/30/2003
WDW-2 at 0 gpm 07/01/2003 to 09/22/2019

WDW-3 at 500 gpm 07/01/2003 to 09/22/2019

SWD-1 at 17.6 gpm 06/01/1998 to 09/22/1999
SWD-1 at 58.3 gpm 09/23/1999 to 09/22/2019

NAVAJO REFINING COMPANY

PRESSURE INCREASE MODELING RESULTS



Critical Pressure Increase = 512 psi

k = 250 md
h = 85 feet

WDW-1 at Historical Rates 09/23/1999 to 06/30/2003
WDW-1 at 0 gpm 07/01/2003 to 09/22/2019

WDW-2 at Historical Rates 09/23/1999 to 06/30/2003
WDW-2 at 500 gpm 07/01/2003 to 09/22/2019

WDW-3 at 500 gpm 07/01/2003 to 09/22/2019

SWD-1 at 17.6 gpm 06/01/1998 to 09/22/1999
SWD-1 at 58.3 gpm 09/23/1999 to 09/22/2019

VII. PROPOSED OPERATIONS

1. Proposed Injection Rate and Volume

The proposed maximum injection rate for WDW-1, WDW-2, and proposed WDW-3 combined is 1000 gpm or 34,286 bpd. The proposed maximum injection volume in any given month is that volume calculated by multiplying 1000 gpm by 60 minutes per hour by 24 hours per day by the number of days in the month.

The proposed maximum rate of injection into any one well is 500 gpm.

2. Whether the System Is Open or Closed

The operations for the proposed Class I wells will be restricted to injection from a closed system. Fluids to be injected will be generated on site at Navajo's refineries in Artesia and Lovington and will be transported to the injection wells by pipeline.

3. Proposed Injection Pressure

The maximum injection pressure at the wellhead will not exceed 0.2 psi per foot of depth to the top of the injection zone, as required by OCD Proposed Rule 21.B(7), dated October 6, 1997. The maximum injection pressure at the wellhead may vary, depending on the depth of the injection formation. For example, if WDW-1 is completed at the top of the injection zone at 7450 feet, then the requested maximum injection pressure is 1490 psi, as calculated below:

Maximum Injection Pressure at the Top of the Injection Zone

$$\begin{aligned} &= \text{Top of the Injection Zone} \times 0.2 \text{ psi/ft} \\ &= 7450 \text{ feet} \times 0.2 \text{ psi/ft} \\ &= 1490 \text{ psi} \end{aligned}$$

If the top of the injection formation coincides with the top of the Cisco or Canyon Formations, both of which are deeper than the Wolfcamp Formation, then the proposed injection pressure will be higher. The proposed injection pressure for each injection formation is summarized in the following table:

PROPOSED INJECTION PRESSURE			
Injection Formation	Top of Injection Formation	Maximum Injection Pressure Gradient	Proposed Injection Pressure
WDW-1			
Wolfcamp	7450 feet	0.2 psi/ft	1490 psi
Cisco	7816 feet	0.2 psi/ft	1563 psi
Canyon	8475 feet	0.2 psi/ft	1695 psi
WDW-2			
Wolfcamp	7270 feet	0.2 psi/ft	1454 psi
Cisco	7645 feet	0.2 psi/ft	1529 psi
Canyon	8390 feet	0.2 psi/ft	1678 psi
WDW-3			
Wolfcamp	7303 feet	0.2 psi/ft	1461 psi
Cisco	7650 feet	0.2 psi/ft	1530 psi
Canyon	8390 feet	0.2 psi/ft	1678 psi

4. Wastestream Information and Compatibility with the Injection Zone

Navajo proposes to inject exempt and nonexempt nonhazardous oilfield waste that is generated at its refineries in Artesia and Lovington. Waste waters from process units, cooling towers and boilers, streams from water purification units and desalting units, recovered and treated ground water, and general wash waters will be blended to make up the proposed waste stream.

Recent chemical analyses of the waste water are included as Attachment VII-1. Average concentration levels for major constituents are listed in Attachment VII-2, along with the expected pH range and specific gravity.

5. Injection Zone Fluid Analysis

The composition of the native formation fluid in the proposed Wolfcamp, Cisco, and Canyon injection zone is expected to be similar to that in these formations in other parts of southeastern New Mexico. The salinity of Wolfcamp, Cisco, and

Canyon formation brines from hydrocarbon producing areas in northern Lea County, to the east of Eddy County, was reported by Meyer (1966, Table 4). Attachment VII-3 summarizes the salinity data reported by Meyer (1966, Table 4) for Wolfcamp, Cisco, and Canyon formation brines from limestones that were deposited in a shelf environment similar to that of the proposed injection site. The salinity of the formation brines range from 67,098 to 119,909 parts per million (ppm). The formation brines were produced from intervals that occur between 9001 feet and 10742 feet below ground. Also listed in Attachment VII-7 are data from Strawn limestones that were deposited in a platform environment and that occur at 7700 feet below ground; the salinity of the Strawn formation brine is 39,374 ppm. DST data from WDW-1 indicate that the salinity of fluid recovered from the Cisco Formation in DST No. 5 is 25,000 ppm (Attachment VIII-9).

Formation fluid samples were obtained from the Cisco injection interval upon completion of Navajo's WDW-1 in July 1998. The sample from the lower Cisco perforations (8220 feet to 8476 feet) had a TDS concentration of 33,000 mg/l. The sample from the upper Cisco perforations (7924 feet to 8188 feet) had a TDS concentration of 18,000 mg/l. The report of the chemical analysis is included as Attachment VII-4.

Formation fluid samples were obtained from the Cisco injection interval upon completion of Navajo's WDW-2 in June 1999. The sample from the lower Cisco perforations (7820 feet to 8392 feet) had a specific gravity of 1.0249 and a TDS concentration of 20,000 mg/l. The sample from the Lower Wolfcamp and upper Cisco perforations (7570 feet to 7736 feet) had a specific gravity of 1.0082 and a TDS concentration of 13,000 mg/l.

Navajo will attempt to retrieve a sample of formation brine during the well testing operations of proposed WDW-3. Formation brine samples will be retrieved prior to any stimulation treatments or injection into the wells.

ATTACHMENT VII-1

CHEMICAL ANALYSES OF INJECTED WASTE WATER



**RECENT CHEMICAL ANALYSES OF WASTE WATER
FROM NAVAJO'S REFINERY IN LOVINGTON, NM**

Miller Petrolite

Submitter: Addington, Jeff

Navajo Lea

Analysts: Eric Vidacovich

WATER ANALYSIS

6/12/2003

Sample ID ASR#	71187 0305AD17				
Sample Point	Waste Water				
Sample Date Log In Log Out	28-May-03 3-Jun-03 12-Jun-03				
TESTS RUN					
Na, Total, mg/L	261				
K, Total, mg/L	11				
Mg, Total, mg/L	33				
Ca, Total, mg/L	240				
Mn, Total, mg/L	<0.01				
Fe, Total, mg/L	0.36				
Cu, Total, mg/L	<0.01				
Zn, Total, mg/L	0.09				
Al, Total, mg/L	<0.01				
Ca as CaCO3, Total, mg/L	600				
Mg as CaCO3, Total, mg/L	135.1				
Hardness as CaCO3, Total, mg/L	735.1				
Bicarbonate as HCO3, mg/L	133				
Carbonate as CO3, mg/L	0				
Hydioxide as OH, mg/L	0				
Cl, by FIA, mg/L	686				
NOx as NO3, by FIA, mg/L	<1				
SO4, by FIA, mg/L	210				
Ortho-PO4, by FIA, mg/L	4.4				
B as B(OH)4, by ICP, mg/L	4.5				
Mo as MoO4, by ICP, mg/L	<0.02				
Si as SiO2, Total by ICP, mg/L	45				
P as PO4, Total by ICP, mg/L	8.9				
S as SO4, Total by ICP, mg/L	255				
pH (as received, lab)	6.89				
P Alkalinity as CaCO3, mg/L	0				
T Alkalinity as CaCO3, mg/L	109				
Specific Conductivity, micromhos/cm	3140				
Neutralized Conductivity, micromhos/cm	NA				
TDS, mg/L, Calculated	1506				
TDS/Conductivity	0.48				
TDS/Neutralized Conductivity	0				
Total Cations, meq, Calculated	26.33				
Total Anions, meq, Calculated	26.1				

Report Date: June 27, 2003

Work Order: 3061622

Page Number: 1 of 4
Lovington, NM

Summary Report

Darrell Moore
Navajo Refining
501 E. Main
Artesia, NM 88210

Report Date: June 27, 2003

Work Order: 3061622

Project Location: Lovington, NM

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
10309	Lovington City WW	water	2003-06-13	13:00	2003-06-16

Sample: 10309 - Lovington City WW

Param	Flag	Result	Units	RL
Total Silver		<0.0125	mg/L	0.0125
Total Aluminum		<0.100	mg/L	0.100
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		108	mg/L as CaCo3	4.00
Total Alkalinity		108	mg/L as CaCo3	4.00
Total Arsenic		0.0500	mg/L	0.0100
Total Boron		0.455	mg/L	0.00500
Total Barium		0.204	mg/L	0.0100
Total Beryllium		<0.00250	mg/L	0.00250
Total Cadmium		<0.00500	mg/L	0.00500
Total Cobalt		<0.0200	mg/L	0.0200
Specific Conductance		2830	µMHOS/cm	0.00
Total Chromium		<0.0100	mg/L	0.0100
Total Copper		<0.0250	mg/L	0.0250
Total Iron		0.512	mg/L	0.0500
Total Mercury		<0.000200	mg/L	0.000200
Chloride		660	mg/L	0.500
Sulfate		206	mg/L	0.500
Total Manganese		0.0580	mg/L	0.0250
Total Molybdenum		<0.0500	mg/L	0.0500
Total Nickel		<0.0250	mg/L	0.0250
Total Lead		<0.0100	mg/L	0.0100
pH		7.00	s.u.	0.00
Reactivity	non-reactive			0.00
Hydrogen Sulfide		<10.0	mg/L	10.0
Hydrogen Cyanide		<2.50	mg/L	2.50
Corrosivity	non-corrosive		mm/yr	0.00
pH		7.20	s.u.	0.00
Ignitability	non-ignitable			0.00
Dissolved Calcium		213	mg/L	0.500
Dissolved Magnesium		26.9	mg/L	0.500
Dissolved Potassium		9.32	mg/L	0.500

continued ...

Report Date: June 27, 2003

Work Order: 3061622

Page Number: 2 of 4
Lovington, NM

sample 10309 continued ...

Param	Flag	Result	Units	RL
Dissolved Sodium		269	mg/L	0.500
Total Selenium		0.0700	mg/L	0.0100
Pyridine		<0.00500	mg/L	5.00
n-Nitrosodimethylamine		<0.00500	mg/L	5.00
2-Picoline		<0.00500	mg/L	5.00
Methyl methanesulfonate		<0.00500	mg/L	5.00
Ethyl methanesulfonate		<0.00500	mg/L	5.00
Phenol		<0.00500	mg/L	5.00
Aniline		<0.00500	mg/L	5.00
bis(2-chloroethyl)ether		<0.00500	mg/L	5.00
2-Chlorophenol		<0.00500	mg/L	5.00
1,3-Dichlorobenzene (meta)		<0.00500	mg/L	5.00
1,4-Dichlorobenzene (para)		<0.00500	mg/L	5.00
Benzyl alcohol		<0.00500	mg/L	5.00
1,2-Dichlorobenzene (ortho)		<0.00500	mg/L	5.00
2-Methylphenol		<0.00500	mg/L	5.00
bis(2-chloroisopropyl)ether		<0.00500	mg/L	5.00
4-Methylphenol / 3-Methylphenol		<0.00500	mg/L	5.00
n-Nitrosodi-n-propylamine		<0.00500	mg/L	5.00
Hexachloroethane		<0.00500	mg/L	5.00
Acetophenone		<0.00500	mg/L	5.00
Nitrobenzene		<0.00500	mg/L	5.00
n-Nitrosopiperidine		<0.00500	mg/L	5.00
Isophorone		<0.00500	mg/L	5.00
2-Nitrophenol		<0.00500	mg/L	5.00
2,4-Dimethylphenol		<0.00500	mg/L	5.00
bis(2-chloroethoxy)methane		<0.00500	mg/L	5.00
2,4-Dichlorophenol		<0.00500	mg/L	5.00
1,2,4-Trichlorobenzene		<0.00500	mg/L	5.00
Benzoic acid		<0.00500	mg/L	5.00
Naphthalene		<0.00500	mg/L	5.00
a,a-Dimethylphenethylamine		<0.00500	mg/L	5.00
4-Chloroaniline		<0.00500	mg/L	5.00
2,6-Dichlorophenol		<0.00500	mg/L	5.00
Hexachlorobutadiene		<0.00500	mg/L	5.00
n-Nitroso-di-n-butylamine		<0.00500	mg/L	5.00
4-Chloro-3-methylphenol		<0.00500	mg/L	5.00
2-Methylnaphthalene		<0.00500	mg/L	5.00
1-Methylnaphthalene		<0.00500	mg/L	5.00
1,2,4,5-Tetrachlorobenzene		<0.00500	mg/L	5.00
Hexachlorocyclopentadiene		<0.00500	mg/L	5.00
2,4,6-Trichlorophenol		<0.00500	mg/L	5.00
2,4,5-Trichlorophenol		<0.00500	mg/L	5.00
2-Chloronaphthalene		<0.00500	mg/L	5.00
1-Chloronaphthalene		<0.00500	mg/L	5.00
2-Nitroaniline		<0.00500	mg/L	5.00
Dimethylphthalate		<0.00500	mg/L	5.00
Acenaphthylene		<0.00500	mg/L	5.00
2,6-Dinitrotoluene		<0.00500	mg/L	5.00
3-Nitroaniline		<0.00500	mg/L	5.00
Acenaphthene		<0.00500	mg/L	5.00
2,4-Dinitrophenol		<0.00500	mg/L	5.00
Dibenzofuran		<0.00500	mg/L	5.00
Pentachlorobenzene		<0.00500	mg/L	5.00
4-Nitrophenol		<0.00500	mg/L	5.00
2,4-Dinitrotoluene		<0.00500	mg/L	5.00

continued ...

Report Date: June 27, 2003

Work Order: 3061622

Page Number: 3 of 4
Lovington, NM

sample 10309 continued ...

Param	Flag	Result	Units	RL
1-Naphthylamine		<0.00500	mg/L	5.00
2,3,4,6-Tetrachlorophenol		<0.00500	mg/L	5.00
2-Naphthylamine		<0.00500	mg/L	5.00
Fluorene		<0.00500	mg/L	5.00
4-Chlorophenyl-phenylether		<0.00500	mg/L	5.00
Diethylphthalate		<0.00500	mg/L	5.00
4-Nitroaniline		<0.00500	mg/L	5.00
Diphenylhydrazine		<0.00500	mg/L	5.00
4,6-Dinitro-2-methylphenol		<0.00500	mg/L	5.00
Diphenylamine		<0.00500	mg/L	5.00
4-Bromophenyl-phenylether		<0.00500	mg/L	5.00
Phenacetin		<0.00500	mg/L	5.00
Hexachlorobenzene		<0.00500	mg/L	5.00
4-Aminobiphenyl		<0.00500	mg/L	5.00
Pentachlorophenol		<0.00500	mg/L	5.00
Anthracene		<0.00500	mg/L	5.00
Pentachloronitrobenzene		<0.00500	mg/L	5.00
Pronamide		<0.00500	mg/L	5.00
Phenanthrene		<0.00500	mg/L	5.00
Di-n-butylphthalate		<0.00500	mg/L	5.00
Fluoranthene		<0.00500	mg/L	5.00
Benzidine		<0.00500	mg/L	5.00
Pyrene		<0.00500	mg/L	5.00
p-Dimethylaminoazobenzene		<0.00500	mg/L	5.00
Butylbenzylphthalate		<0.00500	mg/L	5.00
Benzo(a)anthracene		<0.00500	mg/L	5.00
3,3-Dichlorobenzidine		<0.00500	mg/L	5.00
Chrysene		<0.00500	mg/L	5.00
bis(2-ethylhexyl)phthalate		<0.00500	mg/L	5.00
Di-n-octylphthalate		<0.00500	mg/L	5.00
Benzo(b)fluoranthene		<0.00500	mg/L	5.00
Benzo(k)fluoranthene		<0.00500	mg/L	5.00
7,12-Dimethylbenz(a)anthracene		<0.00500	mg/L	5.00
Benzo(a)pyrene		<0.00500	mg/L	5.00
3-Methylcholanthrene		<0.00500	mg/L	5.00
Dibenzo(a,j)acridine		<0.00500	mg/L	5.00
Indeno(1,2,3-cd)pyrene		<0.00500	mg/L	5.00
Dibenzo(a,h)anthracene		<0.00500	mg/L	5.00
Benzo(g,h,i)perylene		<0.00500	mg/L	5.00
Total Dissolved Solids		1702	mg/L	10.00
Total Uranium		<0.0200	mg/L	0.0200
Total Vanadium		<0.0250	mg/L	0.0250
Bromochloromethane		<1.00	µg/L	1.00
Dichlorodifluoromethane		<1.00	µg/L	1.00
Chloromethane (methyl chloride)		<1.00	µg/L	1.00
Vinyl Chloride		<1.00	µg/L	1.00
Bromomethane (methyl bromide)		<5.00	µg/L	5.00
Chloroethane		<1.00	µg/L	1.00
Trichlorofluoromethane		<1.00	µg/L	1.00
Acetone		<10.0	µg/L	10.0
Iodomethane (methyl iodide)		<5.00	µg/L	5.00
Carbon Disulfide		1.08	µg/L	1.00
Acrylonitrile		<1.00	µg/L	1.00
2-Butanone (MEK)		<5.00	µg/L	5.00
4-Methyl-2-pentanone (MIBK)		<5.00	µg/L	5.00
2-Hexanone		<5.00	µg/L	5.00

continued ...

Report Date: June 27, 2003

Work Order: 3061622

Page Number: 4 of 4
Lovington, NM

sample 10309 continued ...

Param	Flag	Result	Units	RL
trans-1,4-Dichloro-2-butene		<10.0	µg/L	10.0
1,1-Dichloroethene		<1.00	µg/L	1.00
Methylene chloride		<5.00	µg/L	5.00
MTBE		<1.00	µg/L	1.00
trans-1,2-Dichloroethene		<1.00	µg/L	1.00
1,1-Dichloroethane		<1.00	µg/L	1.00
cis-1,2-Dichloroethene		<1.00	µg/L	1.00
2,2-Dichloropropane		<1.00	µg/L	1.00
1,2-Dichloroethane (EDC)		<1.00	µg/L	1.00
Chloroform		<1.00	µg/L	1.00
1,1,1-Trichloroethane		<1.00	µg/L	1.00
1,1-Dichloropropene		<1.00	µg/L	1.00
Benzene		<1.00	µg/L	1.00
Carbon Tetrachloride		<1.00	µg/L	1.00
1,2-Dichloropropane		<1.00	µg/L	1.00
Trichloroethene (TCE)		<1.00	µg/L	1.00
Dibromomethane (methylene bromide)		<1.00	µg/L	1.00
Bromodichloromethane		<1.00	µg/L	1.00
2-Chloroethyl vinyl ether		<5.00	µg/L	5.00
cis-1,3-Dichloropropene		<1.00	µg/L	1.00
trans-1,3-Dichloropropene		<1.00	µg/L	1.00
Toluene		<1.00	µg/L	1.00
1,1,2-Trichloroethane		<1.00	µg/L	1.00
1,3-Dichloropropane		<1.00	µg/L	1.00
Dibromochloromethane		<1.00	µg/L	1.00
1,2-Dibromoethane (EDB)		<1.00	µg/L	1.00
Tetrachloroethene (PCE)		<1.00	µg/L	1.00
Chlorobenzene		<1.00	µg/L	1.00
1,1,1,2-Tetrachloroethane		<1.00	µg/L	1.00
Ethylbenzene		1.36	µg/L	1.00
m,p-Xylene		<1.00	µg/L	1.00
Bromoform		<1.00	µg/L	1.00
Styrene		<1.00	µg/L	1.00
o-Xylene		<1.17	µg/L	1.00
1,1,2,2-Tetrachloroethane		<1.00	µg/L	1.00
2-Chlorotoluene		<1.00	µg/L	1.00
1,2,3-Trichloropropane		<1.00	µg/L	1.00
Isopropylbenzene		<1.00	µg/L	1.00
Bromobenzene		<1.00	µg/L	1.00
n-Propylbenzene		<1.00	µg/L	1.00
1,3,5-Trimethylbenzene		<1.00	µg/L	1.00
tert-Butylbenzene		<1.00	µg/L	1.00
1,2,4-Trimethylbenzene		<1.00	µg/L	1.00
1,4-Dichlorobenzene (para)		<1.00	µg/L	1.00
sec-Butylbenzene		<1.00	µg/L	1.00
1,3-Dichlorobenzene (meta)		<1.00	µg/L	1.00
p-Isopropyltoluene		<1.00	µg/L	1.00
4-Chlorotoluene		<1.00	µg/L	1.00
1,2-Dichlorobenzene (ortho)		<1.00	µg/L	1.00
n-Butylbenzene		<1.00	µg/L	1.00
1,2-Dibromo-3-chloropropane		<5.00	µg/L	5.00
1,2,3-Trichlorobenzene		<5.00	µg/L	5.00
1,2,4-Trichlorobenzene		<5.00	µg/L	5.00
Naphthalene		<5.00	µg/L	5.00
Hexachlorobutadiene		<5.00	µg/L	5.00
Total Zinc		0.173	mg/L	0.0250



**DISCHARGE PLAN APPLICATION AND
APPLICATION FOR AUTHORIZATION TO INJECT,
PER OIL CONSERVATION DIVISION FORM C-108,
INTO CLASS I WELLS WDW-1, WDW-2
AND PROPOSED WDW-3**

**VOLUME II
SECTIONS VIII THROUGH REFERENCES**

**NAVAJO REFINING COMPANY
Artesia, New Mexico**

Subsurface Project No. 60D5497

September 2003

Prepared By:

**SUBSURFACE TECHNOLOGY, INC.
Houston, Texas**

TABLE OF CONTENTS

VOLUME II

VIII. GEOLOGY	VIII-1
VIII.A Injection Zone Lithology, Depth, Thickness, Porosity, and Permeability	VIII-1
VIII.B Confining Zone	VIII-4
VIII.C Structure	VIII-6
VIII.D Underground Sources of Drinking Water.....	VIII-7
VIII.E Compatibility Issues.....	VIII-8

ATTACHMENTS

ATTACHMENT VIII-1: Resistivity Log of WDW-1	
ATTACHMENT VIII-1A: Porosity Log of WDW-1	
ATTACHMENT VIII-2: Resistivity Log of Proposed WDW-2	
ATTACHMENT VIII-2A: Porosity Log of Proposed WDW-2	
ATTACHMENT VIII-2B: Resistivity Log of Proposed WDW-3	
ATTACHMENT VIII-2C: Porosity Log of Proposed WDW-3	
ATTACHMENT VIII-3: Dip Structure Cross Section A-A'	
ATTACHMENT VIII-4: Strike Structural Cross Section B-B'	
ATTACHMENT VIII-5: Thickness of the Wolfcamp Porous Interval	
ATTACHMENT VIII-6: Thickness of the Cisco Porous Interval	

TABLE OF CONTENTS (Continued)

ATTACHMENT VIII-7:	Permeability, Porosity, and Thickness of Hydrocarbon-Producing Intervals in the Wolfcamp, Cisco, and Canyon Formations in Eddy and Lea Counties	
ATTACHMENT VIII-8:	Drilling Report from Proposed WDW-1	
ATTACHMENT VIII-9:	Drillstem Test Data from Proposed WDW-1	
ATTACHMENT VIII-9A:	Calculation of Permeability from DST No. 5 in WDW-1	
ATTACHMENT VIII-9B:	WDW-1 Pressure Falloff Test Analysis, July 30-31, 1998	
ATTACHMENT VIII-10:	Structure Map of the Top of the Rio Bonito Member of the San Andres Formation	
ATTACHMENT VIII-11:	Structure Map of the Strawn Formation	
ATTACHMENT VIII-12:	Local Structure Map of the Wolfcamp Formation	
ATTACHMENT VIII-13:	Local Structure Map of the Cisco Formation	
ATTACHMENT VIII-14:	Local Structure Map of the Canyon Formation	
ATTACHMENT VIII-15:	Local Structure Map of the Strawn Formation	
ATTACHMENT VIII-16:	Map Showing the Altitude of the 10-g/l Isosaline Surface	
IX.	PROPOSED STIMULATION PROGRAM.....	IX-1
X.	LOGGING AND TESTING	X-1
XI.	FRESHWATER CHEMISTRY.....	XI-1

ATTACHMENTS

ATTACHMENT XI-1:	Freshwater Wells in the Vicinity of the Proposed Injection Wells (Table)	
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TABLE OF CONTENTS (Continued)

ATTACHMENT XI-2:	Chemical Analysis of Samples from Water Well ID No. 18.28.7.430 in Section 7, T18S, R28E
ATTACHMENT XI-3:	Water Wells in the Vicinity of the Proposed Wells (Data from the State Engineer Office Water Well Database from March 1999)
ATTACHMENT XI-4:	Records on File with the State Engineer Office for Water Wells in the Vicinity of the Proposed Wells
XII.	FAULTING AND OTHER HYDRAULIC CONNECTIONS BETWEEN THE INJECTION ZONE AND THE USDWs.....XII-1
REFERENCES	

VIII. GEOLOGY

VIII.A Injection Zone Lithology, Depth, Thickness, Porosity, and Permeability

The proposed injection zones are porous carbonates of the lower portion of the Wolfcamp Formation and the Cisco and Canyon Formations. These formations occur in WDW-1, WDW-2, and proposed WDW-3 at the depths shown in the table below. The injection zone is shown on the logs of WDW-1, WDW-2, and proposed WDW-3 in Attachments VIII-1, VIII-1A, VIII-2, and VIII-2A, VIII-2B, and VIII-2C, and in cross sections in Attachments VIII-3 and VIII-4.

Injection Zone Formation	WDW-1 (KB height = 3693 feet)		WDW-2 (KB height = 3623 feet)		PROPOSED WDW-3 (KB height = 3625 feet)	
	Measured Depth below KB (feet)	Subsea Depth (feet)	Measured Depth below KB (feet)	Subsea Depth (feet)	Measured Depth below KB (feet)	Subsea Depth (feet)
Lower Wolfcamp	7450	-3757	7270	-3647	7303	-3678
Cisco	7816	-4123	7645	-4022	7650	-4025
Canyon	8475	-4782	8390	-4767	8390	-4765
Base of Injection Zone (base of Canyon)	9016	-5323	8894	-5271	8894	-5269

The lower portion of the Wolfcamp Formation (the Lower Wolfcamp) is the shallowest porous unit in the proposed injection interval. The Wolfcamp Formation (Permian - Wolfcampian age) consists of light brown to tan, fine- to medium-grained, fossiliferous limestones with variegated shale interbeds (Meyer, 1966, page 69). The top of the Wolfcamp Formation was correlated for this study to be below the base of the massive, dense dolomites of the overlying Abo Formation. The base of the Wolfcamp coincides with the top of the Cisco Formation. Attachment VIII-5 shows that the thickness of log porosity greater than 5% in the entire Wolfcamp Formation ranges from 0 feet to 295 feet in a band 3 miles wide that trends northeast-southwest across the study area. Attachment VIII-5 indicates that the

Wolfcamp will have porosity at proposed WDW-3 that is similar to that at Navajo's WDW-1 and WDW-2.

The upper portion of the Wolfcamp Formation from 6890 feet to 7450 feet in WDW-1, has low permeability, as indicated by DSTs run in WDW-1 in 1993 (see Section VIII.B). Logs of the upper portion of the Wolfcamp in proposed WDW-2 show that it includes bands of low porosity, such as the interval from 7120 feet to 7180 feet. The upper portion of the Wolfcamp Formation is not included in the proposed injection zone.

The Lower Wolfcamp is the same interval used for injection in the I&W, Inc., Walter Solt SWD-1 (Map ID No. 83), which is completed between 7518 feet and 7812 feet in that well. The caliper log run in WDW-1 in 1993 in the Lower Wolfcamp (Attachment VIII-1A) shows several intervals of hole enlargement in carbonates, for example from 7640 feet to 7670 feet. These intervals may have sufficient permeability and lateral extent to accept injected fluids. In WDW-2, the lower 80 feet of the Lower Wolfcamp, from 7565 feet to 7645 feet, is porous carbonate that is similar in log character to the underlying Cisco Formation. Navajo has demonstrated that the Cisco Formation has injection capacity in WDW-1.

The Cisco Formation (Pennsylvanian - Virgilian age) of the Northwest Shelf is described by Meyer (1966, page 59) as consisting of uniform, light-colored, chalky, fossiliferous limestones interbedded with variegated shales. Meyer (1966, page 59) also describes the Cisco at the edge of the Permian Basin as consisting of biohermal (mound) reefs composed of thick, porous, coarse-grained dolomites. Locally, the Cisco consists of porous dolomite that is 745 feet thick in WDW-2, 659 feet thick in WDW-1, and 720 feet in proposed WDW-3. The total thickness of intervals with log porosity greater than 5% is approximately 310 feet in WDW-1, 580 feet in WDW-2, and 572 feet in proposed WDW-3. The total thickness with log porosity greater than 10% is approximately 100 feet in WDW-1, 32 feet in WDW-2, and 65 feet in proposed WDW-3. Attachment VIII-6 shows that the thickness of the porous intervals in the Cisco ranges from 0 feet in the northwestern part of the study area to nearly 700 feet in a band 3 miles wide that trends northeast-southwest.

The Canyon Formation (Pennsylvanian - Missourian age) consists of white to tan to light brown fine-grained, chalky, fossiliferous limestone with gray and red shale interbeds (Meyer, 1966, page 53). Locally, the Canyon occurs between the base of the Cisco dolomites and the top of the Strawn Formation of Pennsylvanian (Desmoinesian) age. The total thickness of intervals with log porosity greater than 5% is 34 feet in WDW-1, 30 feet in WDW-2, and 10 feet in proposed WDW-3. No intervals appear to have log porosity greater than 10% in any of the three injection wells.

Permeability measurements that range from less than 100 md to 2733 md are available for the Lower Wolfcamp-Cisco-Canyon injection zone. Permeability measurements from hydrocarbon-producing intervals in the Wolfcamp, Cisco, and Canyon from Meyer (1966, Table 4) are summarized in Attachment VIII-7. Meyer reported permeabilities in the Cisco of up to 114 millidarcies (md), up to 38 md in the Canyon, and up to 200 md in the Wolfcamp.

Permeability was estimated to be 597 md from DST No. 5 conducted in WDW-1 on August 26, 1993. DST No. 5 was conducted near the top of the Cisco Formation from 7817 feet to 7851 feet. Test data for DST No. 5 and calculation of permeability are included in Attachments VIII-9 and VIII-9A, respectively.

A pressure buildup/pressure falloff test was conducted in WDW-1 on July 30 and 31, 1998, after WDW-1 was recompleted to the Cisco injection zone. The transmissibility (kh, or product of permeability and thickness) determined from the pressure falloff test data was 284,839 md-ft. The average permeability of the Cisco injection zone is determined by dividing kh by the thickness of the interval that was perforated, as shown below:

$$\begin{aligned} k &= \frac{k h}{h} \\ &= \frac{284,839 \text{ md-ft}}{253 \text{ feet}} \\ &= 1126 \text{ md} \end{aligned}$$

where,

k = permeability

kh = transmissibility from pressure falloff test

h = thickness of perforated interval

The WDW-1 pressure buildup/pressure falloff test data and analysis are included as Attachment VIII-9B.

A pressure buildup/pressure falloff test was conducted in WDW-2 on June 4 and 5, 1999, after WDW-2 was recompleted to the Lower Wolfcamp and Cisco injection zone. The transmissibility (kh, or product of permeability and thickness) determined from the pressure falloff test data was 817,018 md-ft. The average permeability of the injection zone was determined by dividing kh by the thickness of the interval that was perforated, 299 feet, to be 2733 md.

In summary, permeability values in the proposed injection zone from producing fields in the region range up to 200 md, as discussed above. Based on test data for WDW-1 and WDW-2, however, permeability values as high as 2733 md or higher occur in intervals in the injection zone. Permeabilities of 250 md and greater are also expected in the injection zone in proposed WDW-3.

VIII.B Confining Zone

The confining zone extends from 4000 feet to 7450 feet in WDW-1, from 4120 feet to 7270 feet in WDW-2, and from 4030 feet KB to 7303 feet KB in proposed WDW-3. The confining zone includes massive low-porosity carbonate beds and layers of shale in the Upper Wolfcamp, Abo, and Yeso Formations that will confine the injected fluids to the proposed injection zone (Lower Wolfcamp, Cisco, and Canyon Formations). The formations that comprise the confining zone are described below. The confining zone extends throughout the AOR, as shown in the cross sections in Attachments VIII-3 and VIII-4.

The proposed injection zone is directly overlain by the confining layers of the upper portion of the Wolfcamp Formation. Three (3) DSTs were conducted in the upper portion of the Wolfcamp in WDW-1, in the interval from 7016 feet to 7413 feet, that indicate that the interval has low permeability and can confine injected fluids to the injection zone. The DSTs, DST Nos. 2, 3, and 4, are summarized in the daily drilling reports in Attachment VIII-8. Reports of the data from DST Nos. 3 and 4 are presented in Attachment VIII-9. Although the data from DST No. 4 are not analyzable, an average permeability of 0.36 md was calculated from the data from DST No. 3, as shown below:

$$\begin{aligned}
 k &= 162.6 \frac{q B \mu}{mh} \\
 &= 162.6 \frac{(20 \text{ bbl}/89 \text{ min} \times 1440 \text{ min/day})(1)(0.53 \text{ cp})}{(570.883 \text{ psi/cycle})(7382 \text{ feet} - 7230 \text{ feet})} \\
 &= 162.6 \frac{(323.6 \text{ bpd})(1)(0.53 \text{ cp})}{(570.883 \text{ psi/cycle})(152 \text{ feet})} \\
 &= 0.36 \text{ md}
 \end{aligned}$$

A permeability on the order of 0.1 md is at the low end of the permeability range for carbonates, and is at the high end of the permeability range for shales, according to Freeze and Cherry (1979, p. 29). Therefore, the low-permeability carbonates of the upper Wolfcamp will provide the first level of confinement for the injection zone.

The Abo Formation overlies the Wolfcamp and extends from 5400 feet to 6890 feet in WDW-1, from 5506 feet to 6728 feet in WDW-2, and from 5380 feet KB to 6745 feet KB in proposed WDW-3. Although the Abo is well known as a major oil producer in the AOR, the producing intervals lie in the upper Abo, whose equivalents are above 6100 feet in WDW-1 and above 6200 feet in proposed WDW-2. The deepest Abo test well in the AOR, Map ID No. 126, located 6000 feet east (downdip) of proposed WDW-3, was drilled to 6412 feet. No Abo production in the AOR has been established below 6298 feet, the producing interval in Map ID No. 112, located 3800 feet southeast (downdip) of WDW-1. The base of

the producing interval within the Abo Formation in the AOR, therefore, is over 900 feet above the top of the proposed injection zone. The lower 600 feet of the Abo Formation (below the deepest producing interval in the AOR), consisting primarily of dolomite with average porosity less than 5% and interbedded shale, will serve as the secondary confining layer above the proposed injection zone.

The Yeso Formation, which will provide additional confining capabilities, directly overlies the Abo Formation. The top of the Yeso is not consistently identified in the AOR, according to well records submitted to the OCD and available scout tickets. However, the top of the confining zone can be considered to extend to the top of the low-porosity limestone interval below the higher-porosity dolomites below the Glorieta Member of the San Andres Formation (at 4000 feet in WDW-1, 4120 feet in WDW-2, and 4030 feet KB in proposed WDW-3). The Yeso consists of low-porosity carbonates and clastic beds. The Tubb shale, a shale interval that is up to 150 feet thick in some wells in the study area, also occurs in this interval. Although no faults are known to exist in the confining zone within the AOR, the Tubb shale will serve to prevent movement of fluids through a hypothetical unknown fault.

VIII.C Structure

The proposed injection well is located on the southern flank of the Artesia-Vacuum anticline (also called the Vacuum Arch), which trends east-west across the study area. The Vacuum Arch is shown clearly on Attachment VIII-10, a structure map drawn on the Rio Bonito member of the San Andres Formation. The top of the Rio Bonito member occurs at approximately 2260 feet in WDW-1 and at 2320 feet in WDW-2, or 300 feet to 320 feet below the top of the San Andres Formation, and over 4600 feet above the top of the proposed injection interval (Lower Wolfcamp, Cisco, and Canyon Formations). The general structure of the injection zone is shown on Attachment VIII-11, a regional structure map of the Strawn Formation, drawn on a horizon that is approximately 375 feet below the top of the Strawn (base of the proposed injection zone), as it is recognized in records and scout tickets for wells in the local study area. The top of the proposed injection zone is conformable with the structure of the Strawn Formation. Attachment VIII-11 shows the trend of the Vacuum arch, as well as the southeasterly dip of the beds at approximately 100 feet per mile in the vicinity of the proposed injection wells. No faults exist in the

study area, and faulting occurs no closer than 16 miles to the proposed injection wells. The nearest fault is the K-M fault, which is located 6 miles northwest of Artesia and trends northeast-southwest, as shown on Attachment VIII-10. Attachments VIII-12, VIII-13, VIII-14, and VIII-15 are local structure maps drawn on the Wolfcamp, Cisco, Canyon, and Strawn Formations.

VIII.D Underground Sources of Drinking Water (USDWs)

The base of the USDWs, in which the total dissolved solids (TDS) concentration of the formation water is less than 10,000 milligrams/liter (mg/l) or the equivalent, 10 g/l, occurs at approximately 3200 feet above sea level at WDW-1 and 3150 feet above sea level at WDW-2 and proposed WDW-3, as shown on Attachment VIII-16. In WDW-1, the base of the USDWs occurs at a measured depth of 493 feet below kelly bushing (KB; 493 feet KB = 3693 feet - 3200 feet, where 3693 feet is the elevation of the kelly bushing of WDW-1), or the base of the Tansill Formation (Permian - Guadalupian age). In WDW-2, the base of the USDWs occurs at a measured depth of 473 feet below KB (473 feet KB = 3623 feet - 3150 feet). In proposed WDW-3, the base of the Tansill Formation occurs at 420 feet KB. In the eastern part of the study area, at depth, the Tansill Formation is overlain by the Salado Formation (Permian - Ochoan age). The Salado consists of halite, polyhalite, anhydrite, and potassium salts, which are soluble. The Salado is overlain by the Rustler Formation (Permian - Ochoan age). In the AOR, which straddles the outcrop area of the Salado, and to the east, the Salado has been removed by solution by ground water flowing through the Rustler.

To the east, where the Rustler is present, the Rustler is the USDW. To the west, where the Rustler has been removed by erosion and the Salado has been removed by solution, the Tansill is the USDW. The Tansill Formation and the underlying Yates Formation comprise the Three Twins Member of the Chalk Bluff Formation known in outcrops in the region (Hendrickson and Jones, 1952, page 20), and listed as a freshwater-producing interval in Attachment XI-1. The proposed injection zone (Lower Wolfcamp, Cisco, and Canyon Formations) is separated from the USDWs by 6957 feet (6957 feet = 7450 feet - 493 feet, where 7450 feet is the depth of the top of the injection zone) of carbonates, siltstones, and shales in WDW-1. In WDW-2, the USDWs are separated from the injection zone by 6797 feet (= 7270

feet - 473 feet). In proposed WDW-3, the USDWs are separated from the injection zone by 6883 feet (= 7303 feet - 420 feet).

VIII.E Compatibility Issues

The integrity of the carbonates of the injection zone and the confining zone is not threatened by the injected waste. The monitoring system and physical limitations on injection established by state and federal regulations are adequate checks to identify and address any problems that may arise. Operating limits on maximum injection pressure and monitoring requirements for well annular pressure versus injection pressure and annular fluid volume force the operator to be as protective of his wellbore and the injection zone as is possible. Furthermore, events such as tubing failures and packer failures that are caused by the injection of corrosive materials would require that the well be shut down and that a workover be performed. The proposed monitoring methods are capable of detecting wellbore integrity and injection problems before they could threaten human health and the environment.

The proposed waste stream will have a pH range of 6.0 to 9.0, that is, near neutral to slightly alkaline. The reactions of alkaline solutions with carbonates are slow or non-existent, so no significant loss of formation is expected from injection of this waste stream. Therefore, no chemical incompatibility between the proposed waste stream and the formation is expected to occur that could allow wastes to migrate out of the injection zone.

ATTACHMENT VIII-2B
RESISTIVITY LOG OF PROPOSED WDW-3



ATTACHMENT VIII-2C
POROSITY LOG OF PROPOSED WDW-3



X. LOGGING AND TESTING

WDW-1: Two (2) formation fluid samples were retrieved from the Cisco injection interval when WDW-1 was completed in July 1998. The sampling procedure was detailed in the "Reentry and Completion Report, Waste Disposal Well No. 1" (the completion report was submitted to the OCD in September 1998). The results of the analysis of the fluid samples are also discussed in Section VI.E and included as Attachment VII-4 of this application.

No cores were taken from WDW-1.

The WDW-1 logging program is described fully in the completion report, and the logs are included in the completion report. The logs run in WDW-1 are listed below:

<u>TYPE OF LOG</u>	<u>TYPE OF HOLE LOGGED</u>	<u>INTERVAL (ft)</u>
	<u>Intermediate Casing</u>	
Cement Bond Log Variable Density Log Gamma Ray	Cased Hole	0 to 2548
	<u>Long-String Casing</u>	
Dual Laterolog Gamma Ray Micro-Spherically Focused Electric Log	Open Hole	2546 to 10,182
Spectral Density Dual Spaced Neutron Log Gamma Ray	Open Hole	350 to 10,139
Compensated Sonic Log Gamma Ray	Open Hole	350 to 10,181
Formation Microscanner Imaging Results	Open Hole	4000 to 9143
Caliper Log Gamma Ray	Open Hole	2553 to 9143
Cement Bond Log Variable Density Log Gamma Ray	Cased Hole	0 to 8990
Casing Evaluation Log w/Multi-Finger Caliper Tool w/Electromagnetic Casing Caliper Thickness Tool	Cased Hole	0 to 8997
Temperature Log	Cased Hole	0 to 8997
Temperature Log	Cased Hole	0 to 8997

The mechanical integrity of WDW-1 was demonstrated by the use of: a casing inspection log, a casing pressure test, and a cement bond log of the 7-inch casing; a cement bond log of the 9-5/8 inch casing; and a radioactive tracer survey, an annulus pressure test, and a differential temperature survey. These tests are detailed in the completion report for WDW-1.

WDW-2: Details of the logging and testing conducted during the reentry and recompletion of WDW-2 in May and June 1999 were provided in the document "Reentry and Completion Report, Waste Disposal Well No. 2," prepared by Subsurface and submitted to the OCD by Navajo in July 1999.

Proposed WDW-3: A formation fluid sample will be retrieved from the injection zone in proposed WDW-3. Navajo will conduct injectivity testing in permeable intervals of proposed WDW-3.

The proposed logging program is described below:

HOLE/CASING	OPEN-HOLE LOGS	CASED-HOLE LOGS
Proposed WDW-3		
17-1/2-inch Surface Borehole (13-3/8 inch Casing) 400 feet		Log run on 1/29/91: Gamma Ray
12-1/4-inch Intermediate Borehole (9-5/8-inch Casing) 2604 feet		Log run on 1/29/91: Gamma Ray
8-3/4-inch Long-String Borehole (7-inch Casing) 9450 feet	Logs Run on 1/29/91: Gamma Ray Caliper Dual Laterolog Micro SFL Spectral Density Dual Spaced Neutron	Logs Proposed on Reentry: Cement Bond/Variable Density Casing Inspection Log Differential Temperature Log Radioactive Tracer Survey
6-inch Liner Borehole (4-1/2- inch Liner) 9051 feet to 1019 feet	Logs Run on 1/29/91: Gamma Ray Caliper Dual Laterolog Micro SFL Spectral Density Dual Spaced Neutron	