UICI - 8 - 4

WDW-4 PERMITS, RENEWALS, & MODS

2014

Susana Martinez
Governor

Ken McQueen
Cabinet Secretary

Matthias Sayer
Deputy Cabinet Secretary

David R. Catanach, Division Director
Oil Conservation Division

MAY 9, 2017

CERTIFIED MAIL
RETURN RECEIPT NO: 7913 8114

Mr. Randy Dade
Environmental Specialist
HollyFrontier Navajo Refining LLC
501 East Main
Artesia, New Mexico 88210

Re: New Discharge Permit (UICI-008-4)
HollyFrontier Navajo Refining, LLC
UIC Class I (Non-hazardous) Disposal Well
Waste Disposal Well No. 4 (WDW-4)
UL: N, Section 23 Township 17 South, Range 27 East, NMPM, Eddy County, New Mexico
1,000 FSL 2,500 FEL

Mr. Dade,

The New Mexico Oil Conservation Division (OCD) or department is in receipt of HollyFrontier Navajo Refining LLC's discharge permit application for a new injection well with initial filing fee of $100 received on April 14, 2017.

The department has determined based on 20.6.2.3108 NMAC, the application for a new discharge permit request is **not administratively complete**. Therefore, the department hereby notifies the applicant of the deficiencies in writing.

The OCD has identified the following deficiencies:

1) Submit the locations of the sign(s) as required in 20.6.2.3108(B)(1) NMAC. The synopsis of the public notice at least 2 feet by 3 feet in size, in English and in Spanish, at a place conspicuous to the public, approved by the department at or near the facility for 30 days.
2) Provide OCD with draft public notice (20.6.2.3108(F) NMAC) in English for the WDW. Once approved by OCD, Navajo will need to publish in English and Spanish on signs and in the newspaper. OCD had requested a phone call to finalize the draft public notice in the application, but a phone call has not been received to date.
3) Provide accurate discharge locations per 20.6.2.3108(F)(2) NMAC, i.e., accurate latitude/longitude (NAD83) well location coordinates with more descriptive footage from major intersections or landmarks to locate the well. This shall also include a map of the pipeline transect to the WDW-4 for potential releases from the pipeline along the transect of the pipeline to WDW-4.
4) Provide an accurate brief description of the activities representative of the actual situation for WDW-4 per 20.6.2.3108(F)(3) NMAC.

5) Navajo will need to develop signs and locations (20.6.2.3108(B) NMAC) for a new DP application (please find attached public notice flow chart with relevant regulations).
6) The WQCC Public Notice (Appendix J) Max. Surface Injection Pressure is derived by multiplying the depth of open hole, i.e., 10,300 ft., by 0.2, and with a factor of safety is about 1,855 psig.

The OCD is currently conducting a technical review of the application. Therefore, the New Mexico Water Quality Control Commission regulations (WQCC) notice requirements of 20.6.2.3108 NMAC must be satisfied and demonstrated to the OCD. Upon receipt or communication on the information requested above, OCD may deem the application administratively complete and provide public notice pursuant to the WQCC notice requirements of 20.6.2.3108 NMAC to determine if there is any public interest.

Please contact me at (505) 476-3490 or carlj.chavez@state.nm.us if you have questions. Thank you for your cooperation throughout the review of the applications and discharge permit renewals review process.

Respectfully,

Carl J. Chávez
Environmental Engineer

xc: Jim Griswold, OCD- Environmental Bureau Chief
OCD District II Office, Artesia
Scott Denton, Navajo Refining LLC

HOLLYFRONTIER.

April 12, 2017

Submitted electronically via email to jim.griswold@state.nm.us and carlj.chavez@state.nm.us

Oil Conservation Division
New Mexico Energy, Minerals & Natural Resources Department
1220 South St. Francis Drive
Santa Fe, NM 87505

Certified Mail / Return Receipt
7014 3490 0000 6269 6236

RE: Discharge Permit Application for WDW-4, Class 1 Non-Hazardous Injection Well & Application Filing Fee
Hollyfrontier Navajo Refinery Co. LLC

Dear Sirs:

HollyFrontier Navajo Refining LLC has submitted the required discharge permit application for WDW-4. Enclosed is a check for $100.00 application fee.

If you have any questions regarding this application, please contact Randy Dade at (575) 746-5281 or Scott Denton at (575) 746-5487, or by email at Scott.Denton@HollyFrontier.com

Sincerely,

Scott M. Denton
Environmental Manager

Enclosures: Attachment 1: Check # 1000344821
Env. Files: Injection Wells, Permit Applications,WDW-4,Subm', 2017-04-12 Discharge Application Fee

cc. HFC: D. McWatters, R. O'Brien, M. Holder

HollyFrontier Navajo Refining LLC
501 East Main • Artesia, NM 88210
(575) 748-3311 • http://www.hollyfrontier.com

HollyFrontier Navajo Refining LLC
2828 N. Harwood St., Suite 1300
Dallas TX 75201-1507

WATER QUALITY MANAGEMENT FUND
OIL CONSERVATION DIV
1220 S SAINT FRANCIS DR
SANTA FE NM 87505-4225

Check Date		04/06/2017
Check Amount	$	100.00
Vendor No		5111809
Payment Document		2000042064
Company Code		1020

Invoice Date	Invoice Number	Description	Invoice Amount	Discount Amount	Net Amount
04/05/2017	040517	PERMIT APPLICATION FILING FEE	100.00	0.00	100.00

Payment document	Check number	Date	Currency	Payment amount
2000042064	1000344821	04/06/2017	USD	**********100.00*

⬇ PLEASE FOLD ON PERFORATION AND DETACH HERE ⬇

VERIFY THE AUTHENTICITY OF THIS MULTI-TONE SECURITY DOCUMENT. ■ CHECK BACKGROUND AREA CHANGES COLOR GRADUALLY FROM TOP TO BOTTOM.

HollyFrontier Navajo Refining LLC
2828 N. Harwood St., Suite 1300
Dallas TX 75201-1507

64-1278/611

1000344821
04/06/2017

PAY EXACTLY
**********100.00*USD
VOID AFTER 180 DAYS

PAY *** ONE HUNDRED and 00 /100 USD***

TO THE
ORDER OF WATER QUALITY MANAGEMENT FUND
OIL CONSERVATION DIV
1220 S SAINT FRANCIS DR
SANTA FE NM 87505-4225

AUTHORIZED SIGNATURE

Bank of America N.A.

[redacted]

HOLLYFRONTIER.

April 12, 2017

Submitted electronically via email to jim.griswold@state.nm.us and carlj.chavez@state.nm.us

Oil Conservation Division
New Mexico Energy, Minerals & Natural Resources Department
1220 South St. Francis Drive
Santa Fe, NM 87505

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If you have any questions regarding this application, please contact Randy Dade at (575) 746-5281 or Scott Denton at (575) 746-5487, or by email at Scott.Denton@HollyFrontier.com

Sincerely,

Scott M. Denton
Environmental Manager

Enclosures: Attachment 1: Check # 1000344821
Env. Files: Injection Wells, Permit Applications,WDW-4,Subm', 2017-04-12 Discharge Application Fee

cc. HFC: D. McWatters, R. O'Brien, M. Holder

HollyFrontier Navajo Refining LLC
2828 N. Harwood St., Suite 1300
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WATER QUALITY MANAGEMENT FUND
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HollyFrontier Navajo Refining LLC
2828 N. Harwood St., Suite 1300
Dallas TX 75201-1507

64-1278/611 1000344821
04/06/2017

PAY EXACTLY
**********100.00*USD
VOID AFTER 180 DAYS

PAY *** ONE HUNDRED and 00 /100 USD***

TO THE
ORDER OF WATER QUALITY MANAGEMENT FUND
OIL CONSERVATION DIV
1220 S SAINT FRANCIS DR
SANTA FE NM 87505-4225

AUTHORIZED SIGNATURE

Bank of America N.A.

Chavez, Carl J, EMNRD

From: Schultz, Michele <Michele.Schultz@HollyFrontier.com>
Sent: Thursday, May 21, 2015 4:00 PM
To: Chavez, Carl J, EMNRD; Goetze, Phillip, EMNRD
Subject: Navajo WDW-4 C-108 with Public Notices
Attachments: 2015-05-21 Subm' WDW-4 C-108.pdf

Carl and Phillip – The original and one copy of our new well WDW-4 C-108 application with confirmation of Public Notices have been put in the main to Carl today, and I will be dropping off a copy to the OCD office here in Artesia as well. The C-108 form requires only these copies to be sent to OCD. Mike Holder asked me to email a copy to Phillip also. Are there any other OCD people in need of an electronic copy of this application form? Please advise, and I will send electronic files to any others needing them.

We are waiting for the newspaper affidavits for the Class 1 Well Permit Public Notices, and will send them with the other Class 1 Well Public Notice confirmations when I can put the package together for you. I will mail the originals and also send electronic copies as I have done with this Class II Order.

Thanks!

Micki Schultz, P.E., CHMM
Environmental Specialist, Water and Waste Programs
Navajo Refining Company
575-746-5281 (office)
575-308-2141 (cell)
micki.schultz@hollyfrontier.com

CONFIDENTIALITY NOTICE: This e-mail, and any attachments, may contain information that is privileged and confidential.If you received this message in error, please advise the sender immediately by reply e-mail and do not retain any paper or electronic copies of this message or any attachments.Unless expressly stated, nothing contained in this message should be construed as a digital or electronic signature or a commitment to a binding agreement.

HOLLYFRONTIER.

May 21, 2015

Mr. Carl Chavez, CHMM
NM Energy, Minerals & Natural Resources Department
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Drive
Santa Fe, NM 87505-5472

Certified Mail/Return Receipt
7014 3490 0000 6858 7545

RE: Navajo Refining Company, L.L.C. Application for Authorization to Inject

Dear Mr. Chavez,

Enclosed, please find the Application For Authorization to Inject (Form C-108) treated wastewater effluent from Navajo Refining Company, L.L.C.'s refinery operations in Artesia, NM into a new well, WDW-4. As indicated on Form C-108, a detailed permit application for WDW-4 was submitted in November, 2014.

In accordance with the Public Notice requirements for OCD Class II Well Order, 19.15.26.8.B, NMAC, Injection of Fluids Into Reservoirs, a completed Form C-108 for well WDW-4 is attached, along with certified mail receipts, notices, and transmittal letters providing electronic copies of the permit application document to landowners within one half mile of WDW-4. In accordance with 19.15.26.8.C(1) NMAC, a copy of the legal notice published in the local newspaper is also attached.

If there are questions regarding this submittal, please contact Micki Schultz at 575-746-5281 or micki.schultz@hollyfrontier.com.

Respectfully,

Scott M Denton
Environmental Manager
Navajo Refining Company L.L.C.

Electronic cc (w/enc.): S. Denton, R Combs, M Schultz
Environmental File: Injection Wells/Permit Applications/WDW-4/Public Notice/Class II

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

FORM C-108
Revised June 10, 2003

APPLICATION FOR AUTHORIZATION TO INJECT

I. PURPOSE: _____Secondary Recovery _____Pressure Maintenance ___X___Disposal _____Storage
Application qualifies for administrative approval? _____Yes _____No

II. OPERATOR: Navajo Refining Company, L.L.C.

ADDRESS: 501 E. Main, Artesia, New Mexico 88210

CONTACT PARTY: Mike Holder PHONE: (214) 954-6536

III. WELL DATA: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project? _____Yes ___X___No
If yes, give the Division order number authorizing the project: _____

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

Please refer to Section 7(a) Area of Review of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

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.

Please refer to Section 7(a) Area of Review of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

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.).

Please refer to Section 7 of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

*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.

Please refer to Section 7(e) Geology of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

IX. Describe the proposed stimulation program, if any.

Please refer to Section 7(i) Stimulation Program of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

*X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted).

Please refer to Section 7(r) Logging and Testing of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

*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.

A diligent search of public records did not locate any groundwater quality data in the area of the location where WDW-4 will be installed.

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.

Subsurface Technology, a consultant working for Navajo Refining Company, L.L.C., has examined available geologic and engineering data and has found 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.

Please refer to Section 13 Draft Public Notice of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

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: ROBERT K-O'BRIEN TITLE: VICE PRESIDENT, REFINERY MGR.

SIGNATURE: R.K O'Brien DATE: 5/21/15

E-MAIL ADDRESS: ROBERT.O'BRIEN@hollyfrontier.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: PERMIT APPLICATION, WDW-4, NOVEMBER 2014

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.

Please refer to Sections 3.0 Location and 4.0 Landowner(s) of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(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.

Please refer to Section 7(l) Construction Procedures of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(3) A description of the tubing to be used including its size, lining material, and setting depth.

Please refer to Section 7(l) Construction Procedures of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Please refer to Section 7(l) Construction Procedures of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

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.

Please refer to Section 7(e) Geology of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(2) The injection interval and whether it is perforated or open-hole.

Please refer to Section 7(e) Geology of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(3) State if the well was drilled for injection or, if not, the original purpose of the well.

WDW-4 is being drilled specifically for injection of liquid wastes originating at the Navajo Artesia Refinery as described in Section 7(f) Proposed Operating Parameters of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe

(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.

Please refer to Section 7(l) Construction Procedures of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(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.

Oil and gas production in the area where WDW-4 will be installed occurs in the Queen, Grayburg, and San Andres Formation at depths of approximately 2,500 feet and the Morrow Formation at a depth of approximately 9,500 feet. The planned Devonian age Injection Interval in the Navajo WDW-4 injection wells is expected to be encountered below 10,000 feet, approximately 10,200 to 10,700 feet. There are no deeper oil or gas zones in the area.

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.

Please refer to Section 13 Draft Public Notice of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

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.

Side 1

INJECTION WELL DATA SHEET

OPERATOR: Navajo Refining Company, L.L.C.

WELL NAME & NUMBER: Waste Disposal Well No. 4 (WDW-4)

WELL LOCATION: 2,310' FNL and 1,100 FEL of Section 28, Township 17 South Range 27 East

FOOTAGE LOCATION | UNIT LETTER | SECTION | TOWNSHIP | RANGE

Refer to Figure 12 in the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

WELLBORE SCHEMATIC

WELL CONSTRUCTION DATA

Surface Casing

Hole Size: _____ Casing Size: _____

Cemented with: _____ sx. *or* _____ ft^3

Top of Cement: _____ Method Determined: _____

Intermediate Casing

Hole Size: _____ Casing Size: _____

Cemented with: _____ sx. *or* _____ ft^3

Top of Cement: _____ Method Determined: _____

Production Casing

Hole Size: _____ Casing Size: _____

Cemented with: _____ sx. *or* _____ ft^3

Top of Cement: _____ Method Determined: _____

Total Depth: _____

Injection Interval

_____feet to_____

(Perforated or Open Hole; indicate which)

Side 2

INJECTION WELL DATA SHEET

Refer to Figure 12 in the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

Tubing Size: _____ Lining Material: _____

Type of Packer: _____

Packer Setting Depth: _____

Other Type of Tubing/Casing Seal (if applicable): _____

Additional Data

1. Is this a new well drilled for injection? ___X___ Yes _____ No

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

   _____

2. Name of the Injection Formation: __Devonian (undifferentiated)_____

3. Name of Field or Pool (if applicable): __Not Applicable_____

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail, i.e. sacks of cement or plug(s) used. _No_____

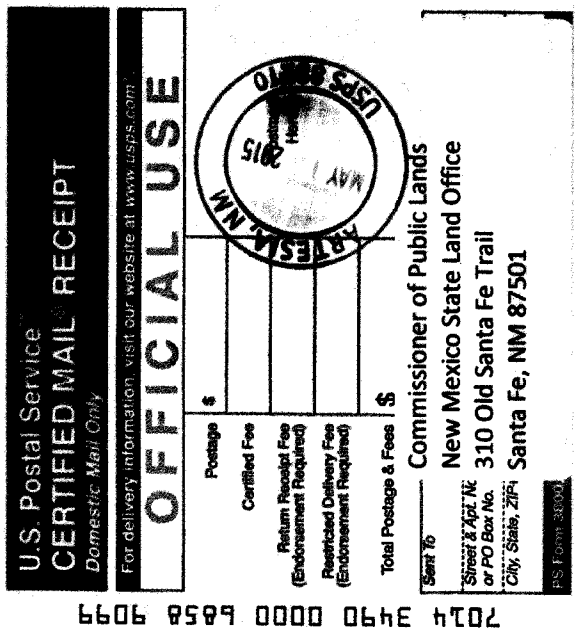
   _____

5. Give the name and depths of any oil or gas zones underlying or overlying the proposed injection zone in this area: __Queen, Grayburg, and San Andres (approximately 2,500 feet) and Morrow (approximately 9,500 feet)_____

Navajo WDW-4 C-108 Form Affirmation Statement

I, Jim Bundy, the undersigned, affirm: I am employed by Subsurface Technology, Inc., and I am authorized to affirm this document as stated in Section XII of the C-108 Form.

Printed Name: James Bundy Title: Principal Engineer
Signature James Bundy Date: 4/30/15



SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Commissioner of Public Lands
New Mexico State Land Office
310 Old Santa Fe Trail
Santa Fe, NM 87501

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by (Printed Name) | C. Date of Delivery: 5/15

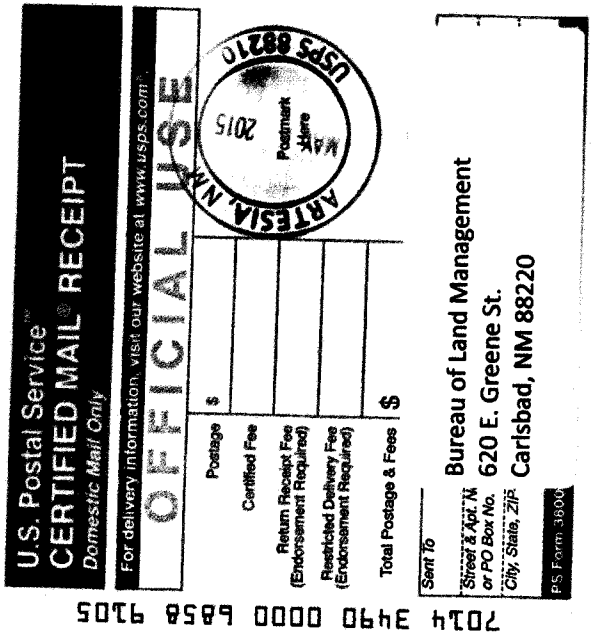
D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail® ☐ Priority Mail Express™
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ Collect on Delivery

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7014 3490 0000 6858 9099

PS Form 3811, July 2013 Domestic Return Receipt



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- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Bureau of Land Management
620 E. Greene St.
Carlsbad, NM 88220

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☒ Addressee

B. Received by (Printed Name) SSoules | C. Date of Delivery: 5/15/15

D. Is delivery address different from item 1? ☒ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail® ☐ Priority Mail Express™
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ Collect on Delivery

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7014 3490 0000 6858 9105

PS Form 3811, July 2013 Domestic Return Receipt

7014 3490 0000 6858 9112

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Postage	$
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Return Receipt Fee (Endorsement Required)	
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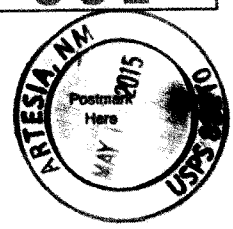
Total Postage & Fees	$



Sent To Shallow Valley Land Company, LLC
Wendall Iverson
Street & Apt. No. or PO Box No P.O. Box 205
City, State, ZIP+4 Midland, Tx79702

PS Form 3800

HOLLYFRONTIER.

May 13, 2015

Commissioner of Public Lands
New Mexico State Land Office
310 Old Santa Fe Trail
Santa Fe, NM 87501

Certified Mail/Return Receipt
7014 3490 0000 6858 9099

RE: Navajo Refining Company, L.L.C. Class II Well Order Public Notice for Waste Disposal Well #4 (WDW-4)

Dear Landowner:

As the land owner of record of the site of WDW-4, please be advised by the attached Class II Well Order Public Notice that the Navajo Refining Company, L.L.C. has applied to the New Mexico Oil Conservation Division for authorization to dispose of refinery fluids in a fourth well. WDW-4 is an Underground Injection Control (UIC) Class 1 non-hazardous waste injection well (API No. 30-015-42872) which will receive treated wastewater effluent from the refinery.

The enclosed CD contains an electronic copy of the WDW-4 Permit Application as required by state rule. A paper "hard copy" of the application can be made available upon request to Navajo Refining Company, L.L.C.

If you have questions or require additional information from Navajo Refining Company, L.L.C. regarding this authorization request, please contact Micki Schultz at 575-746-5281.

Cordially,

Micki Schultz

Micki Schultz, P.E., CHMM
Environmental Specialist, Water and Waste Programs
Navajo Refining Company
575-746-5281 (office)
575-308-2141 (cell)
micki.schultz@hollyfrontier.com

Enclosures

HOLLYFRONTIER.

May 13, 2015

Bureau of Land Management
620 E. Greene St.
Carlsbad, NM 88220

Certified Mail/Return Receipt
7014 3490 0000 6858 9105

RE: Navajo Refining Company, L.L.C. Class II Well Order Public Notice for Waste Disposal Well #4 (WDW-4)

Dear Nearby Landowner:

As a land owner of record within one half mile of the site of WDW-4, please be advised by the attached Class II Well Order Public Notice that the Navajo Refining Company, L.L.C. has applied to the New Mexico Oil Conservation Division for authorization to dispose of refinery fluids in a fourth well. WDW-4 is an Underground Injection Control (UIC) Class 1 non-hazardous waste injection well (API No. 30-015-42872) which will receive treated wastewater effluent from the refinery.

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Cordially,

Micki Schultz

Micki Schultz, P.E., CHMM
Environmental Specialist, Water and Waste Programs
Navajo Refining Company
575-746-5281 (office)
575-308-2141 (cell)
micki.schultz@hollyfrontier.com

Enclosures

HOLLYFRONTIER.

May 13, 2015

Shallow Valley Land Company, LLC
Wendall Iverson
P.O. Box 205
Midland, TX 79702

Certified Mail/Return Receipt
7014 3490 0000 6858 9112

RE: Navajo Refining Company, L.L.C. Class II Well Order Public Notice for Waste Disposal Well #4 (WDW-4)

Dear Nearby Landowner:

As a land owner of record within one half mile of the site of WDW-4, please be advised by the attached Class II Well Order Public Notice that the Navajo Refining Company, L.L.C. has applied to the New Mexico Oil Conservation Division for authorization to dispose of refinery fluids in a fourth well. WDW-4 is an Underground Injection Control (UIC) Class 1 non-hazardous waste injection well (API No. 30-015-42872) which will receive treated wastewater effluent from the refinery.

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Navajo Refining Company
575-746-5281 (office)
575-308-2141 (cell)
micki.schultz@hollyfrontier.com

Enclosures

May 13, 2015

NOTICE OF APPLICATION FOR INJECTION OR DISPOSAL WELL PERMIT

Navajo Refining Company, L.L.C. is in the process of applying to the New Mexico Oil Conservation Division for authorization to dispose of refinery fluids into a porous formation not productive of oil or gas.

The applicant proposes to dispose of refinery fluids into the Lower to Middle Devonian Age Dolomite Formation. The maximum allowable surface injection pressure will be 2,040 psig and the estimated maximum rate will be 17,143 bbls/day. The proposed injection or disposal well will be located in Eddy County, New Mexico in the SE/4, NE/4 of Section 18, Township 17 South, Range 27 East, approximately 7.5 miles SE of the intersection of I-285 and Hwy 82 or approximately 2.5 miles SE of the intersection of Hwy 82 and CR-201. The fluids will be disposed of at a subsurface depth of 10,200 ft. to 10,700 ft.

Any questions concerning this application should be directed to:

Micki Schultz, P.E., CHMM
Navajo Refining Company, L.L.C.
P.O. Box 159
Artesia, NM 88211-0159
(575) 746-5281

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.

Affidavit of Publication

No. 23492

State of New Mexico

County of Eddy:

Brienne Green Danny Scott

being duly sworn, sayes that he is the **Editor**

of the Artesia Daily Press, a daily newspaper of General circulation, published in English at Artesia, said county and state, and that the hereto attached

Legal Notice

was published in a regular and entire issue of the said Artesia Daily Press, a daily newspaper duly qualified for that purpose within the meaning of Chapter 167 of the 1937 Session Laws of the state of New Mexico for

1 Consecutive weeks/day on the same day as follows:

First Publication May 15, 2015

Second Publication

Third Publication

Fourth Publication

Fifth Publication

Sixth Publication

Subscribed ans sworn before me this

15th day of May 2015

OFFICIAL SEAL
Latisha Romine
NOTARY PUBLIC-STATE OF NEW MEXICO
My commission expires: 5/12/2019

Latisha Romine

Danny Scott

Notary Public, Eddy County, New Mexico

Copy of Publication:

LEGAL NOTICE

NOTICE OF APPLICATION FOR INJECTION OR DISPOSAL WELL PERMIT

Navajo Refining Company, L.L.C. is in the process of applying to the New Mexico Oil Conservation Division for authorization to dispose of refinery fluids into a porous formation not productive of oil or gas.

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P.O. Box 159
Artesia, NM 88211-0159
(575) 746-5281

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.

Published in the Artesia Daily Press, Artesia, N.M., May 15, 2015 Legal No. 23492.

Chavez, Carl J, EMNRD

From: Denton, Scott <Scott.Denton@HollyFrontier.com>
Sent: Thursday, June 25, 2015 3:50 PM
To: Chavez, Carl J, EMNRD; Griswold, Jim, EMNRD
Cc: Denton, Scott; Holder, Mike; Coons, Christina (Christie)
Subject: WDW-4 Application Withdraw
Attachments: 2015-06-25 Withdraw Application for WDW-4.pdf

Carl & Jim,

Please see the attached letter for the WDW-4 Application.

If you have any questions, please let me know.

Thanks,

SMD

Scott M. Denton
Environmental Manager

The HollyFrontier Companies
P.O. Box 159
Artesia, NM 88211-0159
575-746-5487 (o)
970-581-7268 (c)

Scott.Denton@HollyFrontier.com

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HOLLYFRONTIER.

June 25, 2015

Mr. Carl Chavez, CHMM
NM Energy, Minerals & Natural Resources Department
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Drive
Santa Fe, NM 87505-5472

Certified Mail/Return Receipt
7015 0640 0006 9944 5550

RE: Navajo Refining Company, L.L.C.
Withdrawal of WDW-4 Application

Dear Mr. Chavez,

On behalf of Navajo Refining Company, L.L.C. ("Navajo Refining"), I am writing to formally withdraw Navajo Refining's pending application for a Class I (non-hazardous) Injection Well Discharge Permit (UICI-008-4) for Waste Disposal Well No. 4 - WDW-4 (API# 30-015-42872), located in the SE/4, NE/4 of Section 18, Township 17 South, Range 27 East, NMPM, Eddy County, New Mexico. As proposed, Navajo Refining's permit application for WDW-4 would authorize injection of refinery waste water into the Devonian formation. Navajo Refining has decided to engage in further technical evaluation regarding well locations and injection zones to confirm sufficient injection capacity to meet Navajo Refining's projected needs prior to proceeding with an application. Thus, in order to avoid any unnecessary expenditure of New Mexico Oil Conservation Division ("NMOCD") resources, Navajo Refining is withdrawing its permit application for WDW-4 at this time.

The new UIC Class I disposal well is critical to the continued operation of the refinery. Therefore, Navajo Refining remains committed to seeking a permit for constructing and operating a new UIC Class I well, and will submit a new application to NMOCD as soon as possible. Further, Navajo Refining still intends to design and construct the new disposal well in accordance with the proposed permitting requirements for UIC Class I hazardous waste injection wells that are currently under consideration by the Water Quality Control Commission ("WQCC"). Thus, in the event the proposed regulations are approved, Navajo Refining intends to take the appropriate steps to permit its proposed well as a Class I hazardous waste injection well.

We thank you for your careful attention and thoughtful response to Navajo Refining's permit application for WDW-4 and look forward to working with you on a new permit application once we confirm the location for this well.

Sincerely,

Robert K. O'Brien
Vice President & Refinery Manager
Navajo Refining Company, L.L.C.

Electronic cc: OCD
S. Denton, M Holder
Environmental File: Injection Wells/Permit Applications/WDW-4/Withdrawal/2015-06-25 Withdraw Application for WDW-4

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

David Martin
Cabinet Secretary

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

David R. Catanach, Division Director
Oil Conservation Division

APRIL 23, 2015

CERTIFIED MAIL
RETURN RECEIPT NO: 3771 5879

Mr. Michael G. McKee
Vice President and Refinery Manager
Navajo Refining Company, L.L.C.
501 East Main
Artesia, New Mexico 88210

Re: Discharge Plan Permit (UICI-008-4)
Navajo Refining Company
Class I Non-Hazardous Oil Field Waste Disposal Well
WDW-4, API No. 30-015-42872
2310 FNL and 1100 FEL UL: H Section 28, T 17 S, R 27 E (Lat. 32.8062099 Long. 104.2777764)
Eddy County, New Mexico

Dear Mr. McKee:

The New Mexico Oil Conservation Division (OCD) has received Navajo Refining Company, LLC's application for the Waste Disposal Well No. 4 (WDW-4) to inject oil field exempt and non-exempt non-hazardous wastes into the Middle – Lower Devonian Formation (~ 500 ft. in thickness) from the perforated interval (10,200 ft. to 10,700 ft. below ground level) at a maximum surface injection pressure (MSIP) of 2,040 psig. The Class I non-hazardous waste disposal or injection well is located in the UL: H of Section 28, Township 17 South, Range 27 East, NMPM, Eddy County, New Mexico. The initial submittal provided the required information in order to deem the application "administratively" complete.

Therefore, the New Mexico Water Quality Control Commission regulations (WQCC) notice requirements of 20.6.2.3108 NMAC must be satisfied and demonstrated to the NMOCD. NMOCD will provide public notice pursuant to the WQCC notice requirements of 20.6.2.3108 NMAC to determine if there is any public interest.

Please contact me at (505) 476-3490 or carlj.chavez@state.nm.us if you have questions. Thank you for your cooperation throughout the discharge permit review process.

Sincerely,

Carl J. Chavez
Environmental Engineer

xc: OCD District II Office, Artesia

Chavez, Carl J, EMNRD

From: Holder, Mike <Michael.Holder@hollyfrontier.com>
Sent: Friday, November 21, 2014 2:55 PM
To: Chavez, Carl J, EMNRD; Shapard, Craig, EMNRD
Cc: Holder, Mike
Subject: RE: UIC Class I (NH) Disposal Wells & Well Stimulation w/ Hydraulic Fracturing (WQCC Well Regulatory Requirements)
Attachments: C-101 Navajo WDW-4.pdf; C-102 Navajo WDW-4.pdf; C-108 Navajo WDW-4.pdf; ATT00001.txt

Carl/TC – attached are the completed & signed C-1012, C-102, & C-108 forms for Navajo Refining's WDW-4 well application you received last week. Thanks for your patience & help as we work through everything – this is my first new well application in New Mexico. I looked at the on-line form process but couldn't quite figure out which account to use and how to change administrator, etc., - it looks like a number of registrations have been set up over the years. After trying to track down some of the information I finally came to the conclusion that submitting the hardcopies might be the easiest approach even though it takes longer. If I have missed anything or you need additional information, please let me know. Once the API # is issued I can also get the bond information updated.

Thanks again for your help & hope you have a great weekend.

Mike

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Wednesday, November 19, 2014 11:57 AM
To: Holder, Mike; Jerry Taylor (jtaylor@subsurfacegroup.com)
Subject: RE: UIC Class I (NH) Disposal Wells & Well Stimulation w/ Hydraulic Fracturing (WQCC Well Regulatory Requirements)

Mike and Jerry:

FYI: I spoke with TC Shapard from the Artesia DO Geologist at (575) 748-1283 x 103 for the C-101 and C-102 Forms. OCD needs these as part of the API# generation process. He recommended online application (must have OGRID) that would take less than a day to process. Hard copies take about a week.

Artesia DO Review includes issuing the following:

1) Pool
2) API#
3) Assign property code
4) Assign Pool Name, i.e., Devonian SWD Pool
5) Checks casing info.
6) Makes sure BH location is correct.
7) Once API# is issued for the well, he forwards it to the OCD Engineering Bureau (Phil Goetze at (505) 476-3466) who reviews the SWD Well Application (http://www.emnrd.state.nm.us/OCD/documents/admnapp.pdf) and C-108 Form (http://www.emnrd.state.nm.us/OCD/documents/C-10820030610.pdf) with complete information. He will also provide the API# to the operator for the well bond.

Number 7 above will then need to be submitted by the well operator to Phil for review and permit to inject. The review process takes about 60 days, but could take longer if there are protests, etc. You may call Phil for more details.

Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Department
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Drive, Santa Fe, New Mexico 87505
O: (505) 476-3490
E-mail: CarlJ.Chavez@State.NM.US
Web: http://www.emnrd.state.nm.us/ocd/
"Why Not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward With the Rest of the Nation?" To see how, please go to: "Pollution Prevention & Waste Minimization" at http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental

---

From: Holder, Mike [mailto:Michael.Holder@hollyfrontier.com]
Sent: Wednesday, November 19, 2014 9:57 AM
To: Chavez, Carl J, EMNRD; Jerry Taylor (jtaylor@subsurfacegroup.com)
Cc: Griswold, Jim, EMNRD; Holder, Mike
Subject: RE: UIC Class I (NH) Disposal Wells & Well Stimulation w/ Hydraulic Fracturing (WQCC Well Regulatory Requirements)

Thanks Carl! We are working on forms – did you ever hear back from Randy regarding new API #? Hope all is well on your end! Mike

---

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Wednesday, November 19, 2014 10:53 AM
To: Holder, Mike; Jerry Taylor (jtaylor@subsurfacegroup.com)
Cc: Griswold, Jim, EMNRD
Subject: UIC Class I (NH) Disposal Wells & Well Stimulation w/ Hydraulic Fracturing (WQCC Well Regulatory Requirements)

Mike and Jerry:

FYI: It appears fracking is allowed for well stimulation only. OCD requires a Step-Rate Test prior to well stimulation (fracking) to accurately determine fracture pressure prior to any well stimulation.

State Regulations:

EEE. "well stimulation" means a process used to clean the well, enlarge channels, and increase pore space in the interval to be injected, thus making it possible for fluids to move more readily into the injection zone; well stimulation includes, but is not limited to, (1) surging, (2) jetting, (3) blasting, (4) acidizing, (5) hydraulic fracturing.

20.6.2.5206 OPERATING REQUIREMENTS FOR CLASS I NON-HAZARDOUS WASTE INJECTION WELLS AND CLASS III WELLS:

A. General Operating Requirements Applicable to Class I non-hazardous waste injection wells and Class III wells.

(1) The maximum injection pressure at the wellhead shall not initiate new fractures or propagate existing fractures in the confining zone, or cause the movement of injection or formation fluids into ground water having 10,000 mg/l or less TDS except for fluid movement approved pursuant to Section 20.6.2.5103 NMAC.

(2) Injection between the outermost casing and the well bore is prohibited in a zone other than the authorized injection zone.

B. Additional Operating Requirements for Class I non-hazardous waste injection wells.

(1) Except during well stimulation, the maximum injection pressure shall not initiate new fractures or propagate existing fractures in the injection zone.

(2) Unless an alternative to a packer has been approved under Subparagraph (c) of Paragraph (3) of Subsection B of Section 20.6.2.5205 NMAC, the annulus between the tubing and the long string of casing shall be filled with a fluid approved by the secretary and a pressure, also approved by the secretary shall be maintained on the annulus.

C. Additional Operating Requirements for Class III wells: Initiation of new fractures or propagation of existing fractures in the injection zone will not be approved by the secretary as part of a discharge permit unless it is done during well stimulation and the discharger demonstrates:

(1) That such fracturing will not cause movement of fluids out of the injection zone into ground water having 10,000 mg/l or less TDS except for fluid movement approved pursuant to Section 20.6.2.5103 NMAC, and

(2) That the provisions of Subsection C of Section 20.6.2.3109 and Subsection C of Section 20.6.2.5101 NMAC for protection of ground water are met.

[9-20-82, 12-1-95; 20.6.2.5206 NMAC - Rn, 20 NMAC 6.2.V.5206, 1-15-01; A, 12-1-01]

Federal Regulations:

See Permitting Guide for Hydraulic Fracturing Activities Using Diesel Fuels: Underground Injection Control Program Guidance #84

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Department
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Drive, Santa Fe, New Mexico 87505
O: (505) 476-3490
E-mail: CarlJ.Chavez@State.NM.US
Web: http://www.emnrd.state.nm.us/ocd/

"Why Not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward With the Rest of the Nation?" To see how, please go to: "Pollution Prevention & Waste Minimization" at http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental

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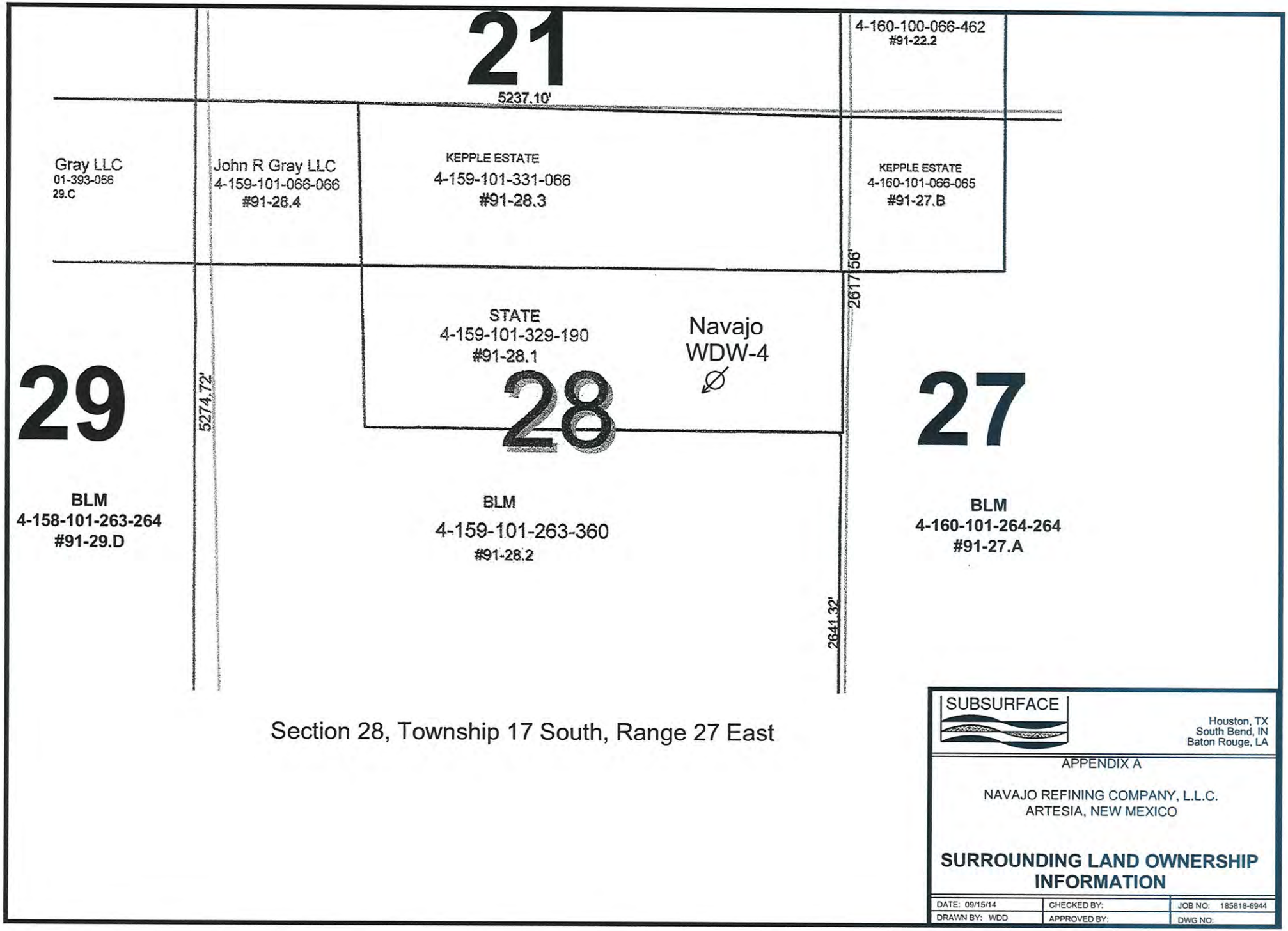
APPENDIX A

SURROUNDING LAND OWNERSHIP INFORMATION



Section 28, Township 17 South, Range 27 East

SUBSURFACE

Houston, TX
South Bend, IN
Baton Rouge, LA

APPENDIX A

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

SURROUNDING LAND OWNERSHIP INFORMATION

DATE: 09/15/14	CHECKED BY:	JOB NO: 185818-6944
DRAWN BY: WDD	APPROVED BY:	DWG NO:

APPENDIX B

USGS EARTHQUAKE DATA

NEIC: Earthquake Search Results

U. S. GEOLOGICAL SURVEY

EARTHQUAKE DATA BASE

FILE CREATED: Mon Jun 4 16:13:25 2012
Circle Search Earthquakes= 225
Circle Center Point Latitude: 32.772N Longitude: 104.233W
Radius: 321.860 km
Catalog Used: PDE
Data Selection: Historical & Preliminary Data

CAT	YEAR	MO	DA	ORIG TIME	LAT	LONG	DEP	MAGNITUDE	IEM NFO TF	DTSVNWG	DIST km
PDE	1973	09	22	233835.80	34.47	-106.95	5	3.1 MLGS	...	.....	314
PDE	1974	11	28	033520.50	32.31	-104.14	5	3.7 MLGS	...	.....	51
PDE	1975	08	01	072757.30	31.42	-104.01	5	3.0 LgTUL	.F.	.....	150
PDE	1976	01	19	040330.50	31.90	-103.08	1	3.5 MDGS	.F.	.....	145
PDE	1976	01	22	072157	31.90	-103.07	1	2.8 MDGS	...	.....	145
PDE	1976	01	25	044827.90	31.90	-103.08	2	3.9 MDGS	5F.	.....	145
PDE	1977	01	04	183137.60	32.36	-106.92	5	3.2 MLGS	5F.	.....	256
PDE	1977	04	26	090307.30	31.90	-103.08	4	3.3 MLGS	.F.	.....	144
PDE	1977	11	28	014050.50	32.95	-100.84	5	3.5 MLGS	...	.....	318
PDE	1978	03	02	100452.70	31.56	-102.51	11	3.5 MLGS	.F.	.....	210
PDE	1979	07	05	010501	32.95	-100.89	4	2.7 UKTUL	.H.	.....	312
PDE	1980	03	22	004912.50	34.60	-105.92	5	3.4 MLGS	4F.	.....	255
PDE	1981	05	09	123550.80	33.99	-107.03	5	3.1 MLGS	5F.	.....	293
PDE	1982	01	04	165608.05	31.18	-102.49	5	3.9 LgTUL	3F.	.....	240
PDE	1982	03	16	110302.67	35.36	-103.27	5	3.1 LgTUL	3F.	.....	300
PDE	1982	04	26	083147.79	33.02	-100.84	5	2.8 LgGS	...	.....	318
PDE	1982	05	18	060008.50	34.17	-106.95	9	2.8 MLGS	.F.	.....	296
PDE	1982	05	18	060838.40	34.20	-106.90	6	2.8 MLGS	.F.	.....	293
PDE	1982	05	24	063251.70	34.17	-106.95	6	2.9 MLGS	.F.	.....	295
PDE	1982	09	20	035517.20	33.95	-107.06	11	3.5 LgTUL	4F.	.....	293
PDE	1982	10	07	124125.99	34.31	-106.82	4	2.4 MLGS	.F.	.....	294
PDE	1982	11	28	023648.51	33.00	-100.84	5	3.3 LgTUL	4F.	.....	318
PDE	1983	03	02	232219.40	34.30	-106.89	8	4.3 LgTUL	6D.	.....	299
PDE	1983	04	30	073420.18	33.32	-106.44	7	3.5 MLGS	...	.....	214
PDE	1983	09	15	232536.05	35.14	-104.39	5	3.2 LgTUL	5F.	.....	263
PDE	1983	09	29	074408.43	35.24	-104.30	5	2.7 MDGS	...	.....	274
PDE	1984	05	21	133113.54	35.07	-102.23	5	3.1 LgTUL	...	.....	314
PDE	1984	08	26	021954	34.31	-106.80	5	2.9 MLGS	.F.	.....	292
PDE	1984	12	04	203636.02	32.26	-103.56	5	2.9 MLGS	...	.....	84
PDE	1985	06	05	103600.60	32.56	-106.92	6	2.9 MLGLD	4F.	.....	252
PDE	1985	06	27	182000.03	33.62	-106.47	0	3.4 LgGS	...	....E..	229
PDE	1985	08	16	145652.96	34.13	-106.83	7	4.1 MLGS	6D.	.....	284

PDE	1985	09 06	052246.20	32.54	-106.94	5	2.6	MDGLD	.F. 255
PDE	1985	12 15	071452.23	35.28	-104.64	5	3.6	LgTUL	.F. 280
PDE	1986	04 17	210430.30	32.59	-106.91	5	2.7	MDGLD	.F. 251
PDE	1986	04 28	130016	34.01	-106.82	5	2.6	MDGLD	.F. 276
PDE	1987	05 14	155958.46	33.54	-106.52	0	2.9	MLGS	.F. 276
PDE	1988	12 25	075233.93	35.12	-105.96	0	2.8	MDSNM	... .E.. 229
PDE	1989	01 29	050715.33	35.22	-104.09	7	3.4	MDSNM	.F. 304
PDE	1989	11 29	065438.50	34.46	-106.89	13	4.7	MDSNM	 271
PDE	1990	01 29	131610.68	34.46	-106.88	12	4.8	LgTUL	5F. 309
PDE	1990	01 31	010819.29	34.44	-106.86	10	4.0	LgTUL	6D. 308
PDE	1990	02 21	120219.34	34.01	-106.54	5	3.6	MLGS	5F. 306
PDE	1990	02 27	132322	33.95	-106.59	5	3.9	MDSNM	.F. 255
PDE	1990	05 05	162622.89	34.45	-106.88	6	3.6	MDSNM	4F. 255
PDE	1990	07 21	192822.79	34.46	-106.86	11	3.0	MDSNM	.F. 307
PDE	1990	07 21	203031.34	34.46	-106.86	7	3.1	MDSNM	 306
PDE	1990	07 21	234804.92	34.45	-106.85	7	3.2	MDSNM	 306
PDE	1990	07 22	212705.13	34.84	-106.01	10	3.7	MDSNM	 306
PDE	1990	07 31	073240.18	34.46	-106.86	7	3.3	MDSNM	 281
PDE	1990	11 08	104653.77	34.45	-106.86	6	4.3	MDSNM	.F. 307
PDE	1990	11 08	110346.51	34.45	-106.86	8	3.1	MDSNM	4F. 306
PDE	1990	11 10	121816.85	34.45	-106.85	7	3.1	MDSNM	.F. 306
PDE	1990	11 15	072524.38	34.46	-106.86	6	3.6	MDSNM	 305
PDE	1990	12 05	033644.30	34.45	-106.86	8	2.6	MDSNM	4F. 306
PDE	1991	03 05	201711.40	34.44	-106.87	9	2.9	MDSNM	 306
PDE	1991	03 06	143659.07	34.44	-106.88	7	2.5	MDSNM	3F. 306
PDE	1991	06 05	184414.90	34.45	-106.85	4	3.0	MDSNM	 307
PDE	1991	06 20	1605	33.62	-106.47	0	3.5	MLGS	.F. 305
PDE	1991	12 09	124716.50	34.85	-106.55	14	3.1	LgTUL	... .E.. 229
PDE	1992	01 02	114535.61	32.33	-103.10	5	5.0	LgTUL	3F. 314
PDE	1992	02 23	161752.51	30.65	-105.51	5	3.4	LgTUL	5F. 116
PDE	1992	08 24	012535.20	34.01	-106.86	5	2.6	MDSNM	 264
PDE	1992	08 26	032452.67	32.17	-102.71	5	3.0	LgGS	.F. 280
PDE	1993	03 24	023203.50	35.39	-104.19	5	3.0	LgGS	 157
PDE	1993	06 10	1510	33.62	-106.47	0	3.2	MLGS	2F. 290
PDE	1993	06 23	032312.28	31.35	-102.51	5	2.8	MDSNM	... .E.. 229
PDE	1993	12 22	192511.39	33.33	-105.68	10	3.2	MDSNM	 226
PDE	1994	01 01	025131.29	34.44	-106.98	10	2.5	MDSNM	 148
PDE	1995	03 19	183643.97	35.00	-104.21	5	3.3	LgGS	 314
PDE	1995	04 14	003256.17	30.28	-103.35	17	5.7	MwGS	 246
PDE	1995	04 14	011148.40	30.30	-103.35	10	2.7	LgGS	6CM 287
PDE	1995	04 14	021426	30.30	-103.35	10	2.8	LgGS	 286
PDE	1995	04 14	021938.50	30.30	-103.35	10	3.3	LgGS	 286
PDE	1995	04 14	034842	30.30	-103.35	10	2.6	LgGS	.F. 286
PDE	1995	04 14	041116	30.30	-103.35	10	2.4	LgGS	.F. 286
PDE	1995	04 14	055339	30.30	-103.35	10	2.7	LgGS	.F. 286
PDE	1995	04 14	073936.50	30.30	-103.35	10	2.4	LgGS	 286
PDE	1995	04 14	082712.50	30.30	-103.35	10	2.8	LgGS	.F. 286
PDE	1995	04 14	100258	30.30	-103.35	10	2.9	LgGS	.F. 286
PDE	1995	04 14	105720.40	30.30	-103.35	10	2.3	LgGS	.F. 286
PDE	1995	04 15	031805	30.30	-103.35	10	2.4	LgGS	.F. 286
PDE	1995	04 15	143329.51	30.27	-103.32	10	4.0	LgGS	6D. 290
PDE	1995	04 16	004043.30	30.30	-103.35	10	2.3	LgGS	 286
PDE	1995	04 16	102625.50	30.30	-103.35	10	2.5	LgGS	 286
PDE	1995	04 16	161609.60	30.30	-103.35	10	2.4	LgGS	 286
PDE	1995	04 17	085000.50	30.30	-103.35	10	2.5	LgGS	 286
PDE	1995	04 21	044144	30.30	-103.35	10	2.9	LgGS	3F. 286
PDE	1995	06 01	010615.70	30.30	-103.35	10	3.5	LgGS	4F. 286
PDE	1995	07 06	024151	30.30	-103.35	10	2.7	LgGS	.F. 286
PDE	1995	07 06	024704	30.30	-103.35	10	2.6	LgGS	.F. 286

PDE	1995	08	28	151339.05	34.21	-106.94	3	2.8	LgGS	5F.	297
PDE	1995	11	12	174559.40	30.30	-103.35	10	3.6	LgGS	.F.	286
PDE	1996	03	15	131757.22	33.59	-105.69	10	2.9	LgGS	.F.	163
PDE	1996	03	24	201612.70	34.26	-105.68	10	3.5	LgGS	.F.	212
PDE	1996	03	24	201923.10	34.27	-105.69	10	3.7	LgGS	.F.	214
PDE	1996	07	22	100614.98	34.20	-105.71	10	3.5	LgGS	.F.	209
PDE	1997	05	20	094105.82	34.19	-105.74	10	3.2	LgGS	.F.	210
PDE	1997	12	31	132830.05	34.53	-106.15	5	3.5	MLGS	.F.	264
PDE	1997	12	31	133206.60	34.55	-106.15	5	3.5	MLGS	... .	265
PDE	1997	12	31	133358.90	34.55	-106.15	5	3.4	MLGS	... .	265
PDE	1998	01	04	080531.87	34.55	-106.19	5	4.0	MLGS	.F.	268
PDE	1998	04	15	103342.42	30.19	-103.30	10	3.6	LgGS	.F.	299
PDE	1998	07	14	053848.75	35.34	-103.47	5	3.0	MDSNM	.F.	293
PDE	1999	03	01	080023.50	32.57	-104.66	1	2.9	LgGS	... .	45
PDE	1999	03	14	224317.97	32.59	-104.63	1	4.0	MDSNM	.F.	42
PDE	1999	03	17	122923.11	32.58	-104.67	1	3.5	MDSNM	... .	46
PDE	1999	05	30	190425.60	32.58	-104.66	10	3.9	MDSNM	... .	45
PDE	1999	08	09	065122.97	32.57	-104.59	5	2.9	MDSNM	... .	40
PDE	2000	02	02	071420.26	32.58	-104.63	5	2.7	LgGS	... .	42
PDE	2000	02	26	030100.83	30.24	-103.61	5	2.8	LgGS	.F.	286
PDE	2001	06	02	015553.72	32.33	-103.14	5	3.3	LgGS	... .	113
PDE	2001	11	22	000708.02	31.79	-102.63	5	3.1	LgGS	... .	186
PDE	2002	09	17	154514.47	32.58	-104.63	10	3.5	LgGS	... .	42
PDE	2002	09	17	233419.35	32.58	-104.63	10	3.3	LgGS	... .	43
PDE	2003	06	21	020309.56	32.67	-104.50	5	3.6	LgGS	... .	28
PDE	2004	05	23	092205.28	32.53	-104.57	5	4.0	mbGS	3F.	41
PDE	2004	05	24	213628.56	34.47	-106.90	5	3.5	MLGS	.F.	310
PDE	2004	06	22	085528.23	32.53	-104.58	5	3.7	LgGS	.F.	42
PDE	2004	08	26	184518.62	32.58	-104.50	5	3.4	MLGS	... .	33
PDE	2004	10	28	025904.82	32.60	-104.50	5	3.0	LgGS	... .	31
PDE	2004	11	14	212749.90	33.25	-106.20	5	3.5	LgGS	... .	191
PDE	2005	10	30	025734.81	34.07	-106.98	5	2.4	MLGS	.F.	292
PDE	2005	12	19	202740.37	32.53	-104.55	5	4.1	MwSLM	3FM	40
PDE	2005	12	22	143011.67	32.58	-104.57	5	3.6	LgGS	.F.	37
PDE	2006	01	27	100456.45	32.59	-104.55	5	2.7	LgGS	... .	35
PDE	2006	01	27	160745.84	32.55	-104.58	5	3.1	LgGS	... .	40
PDE	2006	02	04	195510.68	32.58	-104.62	5	2.7	MLGS	... .	42
PDE	2006	03	04	171458.25	30.29	-103.67	5	2.7	LgGS	... .	280
PDE	2006	03	20	175529.12	32.60	-104.56	5	3.0	MLGS	... .	36
PDE	2006	04	08	180835.23	31.95	-101.42	5	2.9	MLGS	... .	279
PDE	2006	08	12	104909.67	32.90	-100.89	5	2.8	LgGS	.F.	312
PDE	2007	05	23	051655.15	34.07	-106.94	5	3.4	MLGS	3F.	289
PDE	2008	01	29	102453.24	32.90	-100.84	5	3.3	LgGS	.F.	317
PDE	2008	02	18	1415	32.27	-101.42	0	2.1	LgGS	.C. ....E..	269
PDE	2008	04	16	090604.36	33.66	-106.06	5	2.7	MLGS	... .	196
PDE	2008	05	23	180305.86	32.50	-104.60	5	2.7	LgGS	... .	45
PDE	2008	07	18	173109.40	32.89	-100.84	5	2.7	LgGS	... .	317
PDE	2008	12	28	205659.99	30.44	-103.36	5	2.6	MLGS	... .	271
PDE	2009	01	30	014121.66	32.50	-104.61	5	2.7	LgGS	... .	46
PDE	2009	06	05	171732.94	31.35	-105.98	0	2.4	MLEPT	.F.	227
PDE	2009	06	05	181023.63	31.35	-105.98	0	2.6	MLEPT	.F.	227
PDE	2009	08	20	015723.10	34.03	-106.87	5	2.7	MLGS	3F.	282
PDE	2009	08	30	003100.29	34.22	-106.89	5	2.5	MLGS	.F.	293
PDE	2009	08	30	063947.47	34.16	-106.86	5	2.6	MLGS	.F.	289
PDE	2009	08	30	070943.72	34.19	-106.88	5	2.1	MLGS	.F.	291
PDE	2009	11	17	185306.84	32.43	-104.64	5	3.0	LgGS	... .	54
PDE	2010	01	27	045933.05	32.90	-100.83	5	3.1	LgGS	.F.	318
PDE	2010	02	21	095539.77	32.57	-104.61	5	2.8	LgGS	... .	41
PDE	2010	03	28	000355.08	32.44	-104.50	4	4.1	MwRMT	3FM	44
PDE	2010	04	11	195632.67	32.41	-101.06	5	2.9	LgGS	... .	300

PDE	2010	04	12	002005.97	32.94	-100.88	5	2.8	LgGS	... .	314
PDE	2010	05	09	071807.37	34.04	-106.83	5	2.1	MLGS	.F.	279
PDE	2010	05	27	204721.87	31.11	-105.58	5	3.7	MLGS	... .	223
PDE	2010	05	31	215819.17	32.52	-104.61	5	4.0	MLGS	... .	44
PDE	2010	08	08	011238.07	32.90	-100.85	5	3.4	MwRMT	2FM	316
PDE	2010	08	25	020514.32	32.95	-100.86	5	2.8	LgGS	... .	315
PDE	2010	08	29	124836.61	32.91	-100.92	5	2.6	LgGS	... .	310
PDE-W	2010	10	09	074227.63	32.93	-100.89	5	3.1	LgGS	... .	313
PDE-W	2010	10	26	065629.79	32.92	-100.85	5	3.1	LgGS	... .	316
PDE-W	2010	11	01	091058.42	33.00	-100.82	5	2.8	LgGS	... .	320
PDE-W	2011	01	11	043415.77	34.39	-106.99	5	2.7	MLGS	... .	312
PDE-W	2011	02	17	182534.41	30.11	-103.30	5	3.3	LgGS	... .	307
PDE-W	2011	03	01	033012.76	32.88	-100.84	5	3.1	LgGS	2F.	317
PDE-W	2011	03	01	063159.89	32.84	-100.80	5	2.5	LgGS	... .	321
PDE-W	2011	03	12	152200.86	32.88	-100.90	5	3.0	LgGS	... .	312
PDE-W	2011	03	14	001948.80	32.96	-100.81	5	3.0	LgGS	... .	320
PDE-W	2011	03	28	091211.95	32.91	-100.82	5	3.0	LgGS	... .	320
PDE-W	2011	04	06	233835.45	34.40	-107.02	5	3.2	MLGS	... .	315
PDE-W	2011	04	25	165631.88	32.82	-100.84	5	2.5	LgGS	... .	317
PDE-W	2011	04	28	010341.97	30.74	-105.71	6	4.4	mbGS	.F.	264
PDE-W	2011	04	28	035625.61	30.74	-105.78	10	4.0	mbGS	... .	268
PDE-W	2011	04	28	045834.59	30.68	-105.75	9	3.6	MwRMT	.FM	272
PDE-W	2011	04	28	074903.45	30.82	-105.80	5	3.1	LgGS	... .	262
PDE-W	2011	04	28	075418.94	30.58	-105.85	5	2.7	LgGS	... .	286
PDE-W	2011	04	30	010716.82	30.76	-105.75	10	4.6	MDUNM	... .	265
PDE-W	2011	05	02	114328.24	30.73	-105.72	10	4.2	MwRMT	2FM	266
PDE-W	2011	05	02	115836.35	30.74	-105.70	10	3.3	MLGS	... .	264
PDE-W	2011	05	02	134032.64	30.69	-105.75	10	3.3	MLGS	... .	271
PDE-W	2011	05	02	135536.79	30.73	-105.67	5	4.4	mbGS	2F.	264
PDE-W	2011	05	03	025830.18	30.67	-105.73	10	3.8	MwRMT	.FM	273
PDE-W	2011	05	03	114203.84	30.49	-105.68	10	2.8	MLGS	... .	287
PDE-W	2011	05	04	162627.03	30.71	-105.79	10	3.7	MwRMT	..M	271
PDE-W	2011	05	05	052010.02	30.79	-105.76	10	3.6	MLGS	... .	262
PDE-W	2011	05	06	002426.09	30.75	-105.73	10	2.8	MLGS	... .	264
PDE-W	2011	05	06	004559.26	30.81	-105.71	10	2.8	MLGS	... .	258
PDE-W	2011	05	07	045100.88	30.64	-105.73	10	4.1	MDUNM	2F.	275
PDE-W	2011	05	08	132449.65	30.75	-105.81	10	3.1	MLGS	... .	269
PDE-W	2011	05	08	134616.49	30.72	-105.76	10	3.2	MLGS	... .	269
PDE-W	2011	05	08	135758.52	30.71	-105.75	10	2.9	MLGS	... .	269
PDE-W	2011	05	08	190732.13	30.81	-105.31	10	3.0	MLGS	... .	239
PDE-W	2011	05	08	225459.93	30.74	-105.74	10	3.3	MLGS	... .	266
PDE-W	2011	05	09	064019.15	30.76	-105.69	10	3.9	MDUNM	.F.	261
PDE-W	2011	05	10	184118.44	30.72	-105.72	10	3.4	MLGS	... .	267
PDE-W	2011	05	13	124916.26	30.76	-105.45	10	2.6	MLGS	... .	250
PDE-W	2011	05	14	220751.11	30.82	-105.74	10	3.9	MDUNM	.F.	259
PDE-W	2011	05	17	200820	30.75	-105.74	10	4.2	MDUNM	... .	265
PDE-W	2011	05	19	103523.51	30.80	-105.69	10	3.4	MwRMT	..M	258
PDE-W	2011	05	19	115649.90	30.72	-105.59	10	2.9	MLGS	... .	260
PDE-W	2011	05	20	231419.06	30.20	-105.55	10	2.7	MLGS	... .	310
PDE-W	2011	05	25	100301.09	30.70	-105.63	10	2.8	MLGS	... .	264
PDE-W	2011	05	27	014128.20	30.80	-105.76	10	3.6	MLGS	... .	261
PDE-W	2011	05	27	014908.92	30.98	-105.78	10	3.0	MLGS	... .	246
PDE-W	2011	07	14	102913.60	32.93	-100.81	5	2.5	LgGS	... .	321
PDE-W	2011	09	11	183635.11	32.74	-100.84	5	2.5	LgGS	3F.	318
PDE-W	2011	09	11	203158.11	32.89	-100.85	5	2.8	LgGS	2F.	316
PDE-W	2011	09	12	003149.11	32.80	-100.88	5	2.7	LgGS	2F.	314
PDE-W	2011	09	12	022931.34	32.73	-100.85	5	2.5	LgGS	.H.	317
PDE-W	2011	09	12	091946.71	32.85	-100.85	5	2.6	LgGS	... .	316
PDE-W	2011	09	12	092612.90	32.76	-100.84	5	2.7	LgGS	2F.	317
PDE-W	2011	09	12	141834.05	32.82	-100.87	7	3.4	LgGS	3F.	314

PDE-W	2011	09	28	214637.55	32.52	-104.66	5	2.7	LgGS	... .	48
PDE-W	2011	11	24	064959.99	32.95	-100.81	5	2.8	LgGS	... .	320
PDE-W	2011	11	24	231549.01	32.94	-100.85	5	3.1	LgGS	... .	317
PDE-W	2011	12	09	184733.24	32.94	-100.86	5	3.5	LgGS	3F.	315
PDE-W	2011	12	17	144658.46	32.81	-100.85	5	3.2	LgGS	3F.	316
PDE-W	2011	12	29	061907.64	32.81	-100.91	5	2.5	LgGS	... .	311
PDE-W	2011	12	29	114808.28	32.88	-100.83	5	2.5	LgGS	.F.	318
PDE-W	2012	01	15	092901.68	31.23	-103.61	5	2.7	LgGS	2F.	181
PDE-W	2012	01	24	182102.61	30.32	-103.38	5	3.6	LgGS	4F.	283
PDE-W	2012	02	06	040024.75	32.09	-104.91	5	2.7	LgGS	... .	98
PDE-W	2012	03	06	031149.71	31.81	-106.31	5	2.5	MLGS	3F.	223
PDE-W	2012	03	18	105722.43	32.28	-103.89	5	3.1	LgGS	... .	63
PDE-Q	2012	04	05	091115.95	31.57	-106.09	5	2.9	MLGS	.F.	219

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APPENDIX C

INJECTION FLUID ANALYTICAL DATA

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

April 09, 2014

Mike Holder
Navajo Refining Company
P.O. Box 159
Artesia, NM 88211-0159
TEL: (575) 748-3311
FAX

RE: WDW-1, 2 & 3 Qtrly Inj Well OrderNo.: 1403871

Dear Mike Holder:

Hall Environmental Analysis Laboratory received 2 sample(s) on 3/20/2014 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report
Lab Order **1403871**
Date Reported: **4/9/2014**

CLIENT: Navajo Refining Company
Project: WDW-1, 2 & 3 Qtrly Inj Well
Lab ID: 1403871-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1, 2 & 3 Effluent
Collection Date: 3/20/2014 9:00:00 AM
Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **JRR**	
Fluoride	5.5	1.0	*	mg/L	10	3/21/2014 12:08:26 AM	R17472
Chloride	410	50		mg/L	100	3/21/2014 12:20:50 AM	R17472
Nitrogen, Nitrite (As N)	ND	1.0		mg/L	10	3/21/2014 12:08:26 AM	R17472
Bromide	1.6	1.0		mg/L	10	3/21/2014 12:08:26 AM	R17472
Nitrogen, Nitrate (As N)	ND	1.0		mg/L	10	3/21/2014 12:08:26 AM	R17472
Phosphorus, Orthophosphate (As P)	ND	5.0		mg/L	10	3/21/2014 12:08:26 AM	R17472
Sulfate	3900	50		mg/L	100	3/21/2014 12:20:50 AM	R17472
EPA METHOD 7470: MERCURY						Analyst: **JML**	
Mercury	ND	0.00020		mg/L	1	3/24/2014 5:57:04 PM	12328
MERCURY, TCLP						Analyst: **JML**	
Mercury	ND	0.020		mg/L	1	3/21/2014 4:08:02 PM	12307
EPA METHOD 6010B: TCLP METALS						Analyst: **ELS**	
Arsenic	ND	0.10		mg/L	1	3/21/2014 10:39:40 AM	12293
Barium	ND	0.10		mg/L	1	3/21/2014 10:39:40 AM	12293
Cadmium	ND	0.10		mg/L	1	3/21/2014 10:39:40 AM	12293
Chromium	ND	0.10		mg/L	1	3/21/2014 10:39:40 AM	12293
Lead	ND	0.10		mg/L	1	3/21/2014 10:39:40 AM	12293
Selenium	ND	0.10		mg/L	1	3/21/2014 10:39:40 AM	12293
Silver	ND	0.10		mg/L	1	3/21/2014 10:39:40 AM	12293
EPA 6010B: TOTAL METALS						Analyst: **ELS**	
Aluminum	2.3	0.10		mg/L	5	3/21/2014 10:29:25 AM	12293
Antimony	ND	0.050		mg/L	1	3/21/2014 10:25:56 AM	12293
Arsenic	ND	0.020		mg/L	1	3/21/2014 10:25:56 AM	12293
Barium	0.049	0.020		mg/L	1	3/21/2014 10:25:56 AM	12293
Beryllium	ND	0.0030		mg/L	1	3/21/2014 10:25:56 AM	12293
Cadmium	ND	0.0020		mg/L	1	3/21/2014 10:25:56 AM	12293
Calcium	93	1.0		mg/L	1	3/21/2014 10:25:56 AM	12293
Chromium	ND	0.0060		mg/L	1	3/21/2014 10:25:56 AM	12293
Cobalt	ND	0.0060		mg/L	1	3/21/2014 10:25:56 AM	12293
Copper	0.0092	0.0060		mg/L	1	3/21/2014 10:25:56 AM	12293
Iron	3.3	0.25		mg/L	5	3/21/2014 10:29:25 AM	12293
Lead	ND	0.0050		mg/L	1	3/21/2014 10:25:56 AM	12293
Magnesium	30	1.0		mg/L	1	3/21/2014 10:25:56 AM	12293
Manganese	0.12	0.0020		mg/L	1	3/21/2014 10:25:56 AM	12293
Nickel	0.016	0.010		mg/L	1	3/21/2014 10:25:56 AM	12293
Potassium	37	1.0		mg/L	1	3/21/2014 10:25:56 AM	12293
Selenium	0.13	0.050		mg/L	1	3/21/2014 10:25:56 AM	12293

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Qualifiers:

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E	Value above quantitation range
J	Analyte detected below quantitation limits
O	RSD is greater than RSDlimit
R	RPD outside accepted recovery limits
S	Spike Recovery outside accepted recovery limits
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2.
RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2 & 3 Qtrly Inj Well
Lab ID: 1403871-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1, 2 & 3 Effluent
Collection Date: 3/20/2014 9:00:00 AM
Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 6010B: TOTAL METALS						Analyst: **ELS**	
Silver	ND	0.0050		mg/L	1	3/21/2014 10:25:56 AM	12293
Sodium	1400	20		mg/L	20	3/21/2014 10:31:26 AM	12293
Thallium	ND	0.050		mg/L	1	3/21/2014 10:25:56 AM	12293
Vanadium	ND	0.050		mg/L	1	3/21/2014 10:25:56 AM	12293
Zinc	0.15	0.020		mg/L	1	3/21/2014 10:25:56 AM	12293
EPA METHOD 8260B: VOLATILES						Analyst: **SUB**	
Acetonitrile	ND	10		µg/L	1	3/26/2014	R17842
Allyl chloride	ND	0.50		µg/L	1	3/26/2014	R17842
Chloroprene	ND	0.50		µg/L	1	3/26/2014	R17842
Cyclohexane	1.6	0.50		µg/L	1	3/26/2014	R17842
Diethyl ether	ND	0.50		µg/L	1	3/26/2014	R17842
Diisopropyl ether	ND	0.50		µg/L	1	3/26/2014	R17842
Epichlorohydrin	ND	5.0		µg/L	1	3/26/2014	R17842
Ethyl acetate	ND	0.50		µg/L	1	3/26/2014	R17842
Ethyl methacrylate	ND	0.50		µg/L	1	3/26/2014	R17842
Ethyl tert-butyl ether	ND	0.50		µg/L	1	3/26/2014	R17842
Freon-113	ND	0.50		µg/L	1	3/26/2014	R17842
Isobutanol	ND	20		µg/L	1	3/26/2014	R17842
Isopropyl acetate	ND	0.50		µg/L	1	3/26/2014	R17842
Methacrylonitrile	ND	0.50		µg/L	1	3/26/2014	R17842
Methyl acetate	ND	0.50		µg/L	1	3/26/2014	R17842
Methyl ethyl ketone	5.6	2.5		µg/L	1	3/26/2014	R17842
Methyl isobutyl ketone	ND	2.5		µg/L	1	3/26/2014	R17842
Methyl methacrylate	ND	0.50		µg/L	1	3/26/2014	R17842
Methylcyclohexane	1.2	1.0		µg/L	1	3/26/2014	R17842
n-Amyl acetate	ND	0.50		µg/L	1	3/26/2014	R17842
n-Hexane	ND	0.50		µg/L	1	3/26/2014	R17842
Nitrobenzene	ND	5.0		µg/L	1	3/26/2014	R17842
Pentachloroethane	ND	5.0		µg/L	1	3/26/2014	R17842
p-isopropyltoluene	ND	0.50		µg/L	1	3/26/2014	R17842
Propionitrile	ND	0.50		µg/L	1	3/26/2014	R17842
Tetrahydrofuran	ND	0.50		µg/L	1	3/26/2014	R17842
Benzene	0.63	0.50		µg/L	1	3/26/2014	R17842
Toluene	ND	0.50		µg/L	1	3/26/2014	R17842
Ethylbenzene	ND	0.50		µg/L	1	3/26/2014	R17842
Methyl tert-butyl ether (MTBE)	ND	10		µg/L	1	3/26/2014	R17842
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/26/2014	R17842
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/26/2014	R17842
1,2-Dichloroethane (EDC)	ND	0.50		µg/L	1	3/26/2014	R17842

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Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2 & 3 Qtrly Inj Well
Lab ID: 1403871-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1, 2 & 3 Effluent
Collection Date: 3/20/2014 9:00:00 AM
Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **SUB**	
1,2-Dibromoethane (EDB)	ND	0.50		µg/L	1	3/26/2014	R17842
Naphthalene	ND	0.50		µg/L	1	3/26/2014	R17842
Acetone	42	2.5		µg/L	1	3/26/2014	R17842
Bromobenzene	ND	0.50		µg/L	1	3/26/2014	R17842
Bromodichloromethane	ND	0.50		µg/L	1	3/26/2014	R17842
Bromoform	ND	0.50		µg/L	1	3/26/2014	R17842
Bromomethane	ND	0.50		µg/L	1	3/26/2014	R17842
Carbon disulfide	5.6	0.50		µg/L	1	3/26/2014	R17842
Carbon Tetrachloride	ND	0.50		µg/L	1	3/26/2014	R17842
Chlorobenzene	ND	0.50		µg/L	1	3/26/2014	R17842
Chloroethane	ND	0.50		µg/L	1	3/26/2014	R17842
Chloroform	0.64	0.50		µg/L	1	3/26/2014	R17842
Chloromethane	ND	0.50		µg/L	1	3/26/2014	R17842
2-Chlorotoluene	ND	0.50		µg/L	1	3/26/2014	R17842
4-Chlorotoluene	ND	0.50		µg/L	1	3/26/2014	R17842
cis-1,2-DCE	ND	0.50		µg/L	1	3/26/2014	R17842
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	3/26/2014	R17842
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	3/26/2014	R17842
Dibromochloromethane	ND	0.50		µg/L	1	3/26/2014	R17842
Dibromomethane	ND	0.50		µg/L	1	3/26/2014	R17842
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/26/2014	R17842
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/26/2014	R17842
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/26/2014	R17842
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/26/2014	R17842
1,1-Dichloroethane	ND	0.50		µg/L	1	3/26/2014	R17842
1,1-Dichloroethene	ND	0.50		µg/L	1	3/26/2014	R17842
1,2-Dichloropropane	ND	0.50		µg/L	1	3/26/2014	R17842
1,3-Dichloropropane	ND	0.50		µg/L	1	3/26/2014	R17842
2,2-Dichloropropane	ND	0.50		µg/L	1	3/26/2014	R17842
1,1-Dichloropropene	ND	0.50		µg/L	1	3/26/2014	R17842
Hexachlorobutadiene	ND	0.50		µg/L	1	3/26/2014	R17842
2-Hexanone	ND	0.50		µg/L	1	3/26/2014	R17842
Isopropylbenzene	ND	0.50		µg/L	1	3/26/2014	R17842
4-Isopropyltoluene	ND	0.50		µg/L	1	3/26/2014	R17842
Methylene Chloride	ND	2.5		µg/L	1	3/26/2014	R17842
n-Butylbenzene	ND	0.50		µg/L	1	3/26/2014	R17842
n-Propylbenzene	ND	0.50		µg/L	1	3/26/2014	R17842
sec-Butylbenzene	ND	0.50		µg/L	1	3/26/2014	R17842
Styrene	ND	0.50		µg/L	1	3/26/2014	R17842

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Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2 & 3 Qtrly Inj Well
Lab ID: 1403871-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1, 2 & 3 Effluent
Collection Date: 3/20/2014 9:00:00 AM
Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: **SUB**
tert-Butylbenzene	ND	0.50		µg/L	1	3/26/2014	R17842
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/26/2014	R17842
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/26/2014	R17842
Tetrachloroethene (PCE)	ND	0.50		µg/L	1	3/26/2014	R17842
trans-1,2-DCE	ND	0.50		µg/L	1	3/26/2014	R17842
trans-1,3-Dichloropropene	ND	0.50		µg/L	1	3/26/2014	R17842
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/26/2014	R17842
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/26/2014	R17842
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/26/2014	R17842
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/26/2014	R17842
Trichloroethene (TCE)	ND	0.50		µg/L	1	3/26/2014	R17842
Trichlorofluoromethane	ND	0.50		µg/L	1	3/26/2014	R17842
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/26/2014	R17842
Vinyl chloride	ND	0.50		µg/L	1	3/26/2014	R17842
mp-Xylenes	ND	1.0		µg/L	1	3/26/2014	R17842
o-Xylene	ND	0.50		µg/L	1	3/26/2014	R17842
tert-Amyl methyl ether	ND	0.50		µg/L	1	3/26/2014	R17842
tert-Butyl alcohol	ND	20		µg/L	1	3/26/2014	R17842
Acrolein	ND	10		µg/L	1	3/26/2014	R17842
Acrylonitrile	ND	10		µg/L	1	3/26/2014	R17842
Bromochloromethane	ND	0.50		µg/L	1	3/26/2014	R17842
2-Chloroethyl vinyl ether	ND	1.0		µg/L	1	3/26/2014	R17842
Iodomethane	ND	0.50		µg/L	1	3/26/2014	R17842
trans-1,4-Dichloro-2-butene	ND	0.50		µg/L	1	3/26/2014	R17842
Vinyl acetate	ND	0.50		µg/L	1	3/26/2014	R17842
1,4-Dioxane	ND	20		µg/L	1	3/26/2014	R17842
Surr: 1,2-Dichloroethane-d4	116	70-130		%REC	1	3/26/2014	R17842
Surr: 4-Bromofluorobenzene	104	70-130		%REC	1	3/26/2014	R17842
Surr: Toluene-d8	101	70-130		%REC	1	3/26/2014	R17842
EPA 8270C: SEMIVOLATILES/MOD							Analyst: **SUB**
1,1-Biphenyl	ND	1.0		µg/L	1	3/28/2014	R17842
Caprolactam	ND	0.10		µg/L	1	3/28/2014	R17842
N-Nitroso-di-n-butylamine	ND	1.0		µg/L	1	3/28/2014	R17842
Acetophenone	ND	10		µg/L	1	3/28/2014	R17842
1-Methylnaphthalene	ND	10		µg/L	1	3/28/2014	R17842
2,3,4,6-Tetrachlorophenol	ND	10		µg/L	1	3/28/2014	R17842
2,4,5-Trichlorophenol	ND	10		µg/L	1	3/28/2014	R17842
2,4,6-Trichlorophenol	ND	10		µg/L	1	3/28/2014	R17842
2,4-Dichlorophenol	ND	10		µg/L	1	3/28/2014	R17842

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Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2 & 3 Qtrly Inj Well
Lab ID: 1403871-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1, 2 & 3 Effluent
Collection Date: 3/20/2014 9:00:00 AM
Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 8270C: SEMIVOLATILES/MOD						Analyst: **SUB**	
2,4-Dimethylphenol	ND	10		µg/L	1	3/28/2014	R17842
2,4-Dinitrophenol	ND	10		µg/L	1	3/28/2014	R17842
2,4-Dinitrotoluene	ND	10		µg/L	1	3/28/2014	R17842
2,6-Dinitrotoluene	ND	10		µg/L	1	3/28/2014	R17842
2-Chloronaphthalene	ND	10		µg/L	1	3/28/2014	R17842
2-Chlorophenol	ND	10		µg/L	1	3/28/2014	R17842
2-Methylnaphthalene	ND	10		µg/L	1	3/28/2014	R17842
2-Methylphenol	ND	10		µg/L	1	3/28/2014	R17842
2-Nitroaniline	ND	10		µg/L	1	3/28/2014	R17842
2-Nitrophenol	ND	10		µg/L	1	3/28/2014	R17842
3,3'-Dichlorobenzidine	ND	10		µg/L	1	3/28/2014	R17842
3-Nitroaniline	ND	10		µg/L	1	3/28/2014	R17842
4,6-Dinitro-2-methylphenol	ND	10		µg/L	1	3/28/2014	R17842
4-Bromophenyl phenyl ether	ND	10		µg/L	1	3/28/2014	R17842
4-Chloro-3-methylphenol	ND	5.0		µg/L	1	3/28/2014	R17842
4-Chloroaniline	ND	10		µg/L	1	3/28/2014	R17842
4-Chlorophenyl phenyl ether	ND	10		µg/L	1	3/28/2014	R17842
4-Nitroaniline	ND	10		µg/L	1	3/28/2014	R17842
4-Nitrophenol	ND	10		µg/L	1	3/28/2014	R17842
Acenaphthene	ND	10		µg/L	1	3/28/2014	R17842
Acenaphthylene	ND	10		µg/L	1	3/28/2014	R17842
Anthracene	ND	10		µg/L	1	3/28/2014	R17842
Benzo(g,h,i)perylene	ND	1.0		µg/L	1	3/28/2014	R17842
Benz(a)anthracene	ND	1.0		µg/L	1	3/28/2014	R17842
Benzo(a)pyrene	ND	1.0		µg/L	1	3/28/2014	R17842
Benzo(b)fluoranthene	ND	1.0		µg/L	1	3/28/2014	R17842
Benzo(k)fluoranthene	ND	1.0		µg/L	1	3/28/2014	R17842
Bis(2-chloroethoxy)methane	ND	10		µg/L	1	3/28/2014	R17842
Bis(2-chloroethyl)ether	ND	10		µg/L	1	3/28/2014	R17842
Bis(2-chloroisopropyl)ether	ND	10		µg/L	1	3/28/2014	R17842
Bis(2-ethylhexyl)phthalate	ND	5.0		µg/L	1	3/28/2014	R17842
Butyl benzyl phthalate	ND	10		µg/L	1	3/28/2014	R17842
Carbazole	ND	10		µg/L	1	3/28/2014	R17842
Chrysene	ND	0.10		µg/L	1	3/28/2014	R17842
Dibenz(a,h)anthracene	ND	1.0		µg/L	1	3/28/2014	R17842
Dibenzofuran	ND	10		µg/L	1	3/28/2014	R17842
Diethyl phthalate	ND	10		µg/L	1	3/28/2014	R17842
Dimethyl phthalate	ND	10		µg/L	1	3/28/2014	R17842
Di-n-butyl phthalate	ND	10		µg/L	1	3/28/2014	R17842

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Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2 & 3 Qtrly Inj Well
Lab ID: 1403871-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1, 2 & 3 Effluent
Collection Date: 3/20/2014 9:00:00 AM
Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 8270C: SEMIVOLATILES/MOD							Analyst: **SUB**
Di-n-octyl phthalate	ND	10		µg/L	1	3/28/2014	R17842
Fluoranthene	ND	10		µg/L	1	3/28/2014	R17842
Fluorene	ND	10		µg/L	1	3/28/2014	R17842
Hexachlorobenzene	ND	1.0		µg/L	1	3/28/2014	R17842
Hexachlorobutadiene	ND	10		µg/L	1	3/28/2014	R17842
Hexachlorocyclopentadiene	ND	10		µg/L	1	3/28/2014	R17842
Hexachloroethane	ND	10		µg/L	1	3/28/2014	R17842
Indeno(1,2,3-cd)pyrene	ND	1.0		µg/L	1	3/28/2014	R17842
Isophorone	ND	10		µg/L	1	3/28/2014	R17842
Naphthalene	ND	10		µg/L	1	3/28/2014	R17842
Nitrobenzene	ND	10		µg/L	1	3/28/2014	R17842
N-Nitrosodi-n-propylamine	ND	10		µg/L	1	3/28/2014	R17842
N-Nitrosodiphenylamine	ND	2.0		µg/L	1	3/28/2014	R17842
Pentachlorophenol	ND	10		µg/L	1	3/28/2014	R17842
Phenanthrene	ND	10		µg/L	1	3/28/2014	R17842
Phenol	ND	5.0		µg/L	1	3/28/2014	R17842
Pyrene	ND	10		µg/L	1	3/28/2014	R17842
o-Toluidine	ND	1.0		µg/L	1	3/28/2014	R17842
Pyridine	ND	1.0		µg/L	1	3/28/2014	R17842
1,2,4,5-Tetrachlorobenzene	ND	10		µg/L	1	3/28/2014	R17842
Surr: 2,4,6-Tribromophenol	90.5	10-123		%REC	1	3/28/2014	R17842
Surr: 2-Fluorobiphenyl	84.5	19-130		%REC	1	3/28/2014	R17842
Surr: 2-Fluorophenol	79.4	21-110		%REC	1	3/28/2014	R17842
Surr: Nitrobenzene-d5	84.7	25-130		%REC	1	3/28/2014	R17842
Surr: Phenol-d5	80.6	10-125		%REC	1	3/28/2014	R17842
Surr: Terphenyl-d14	101	33-141		%REC	1	3/28/2014	R17842
CORROSIVITY							Analyst: **SUB**
pH	7.45	0.100		pH Units	1	3/25/2014	R17842
IGNITABILITY METHOD 1010							Analyst: **SUB**
Ignitability	>200	0		°F	1	4/2/2014	R17842
CYANIDE, REACTIVE							Analyst: **SUB**
Reactive Cyanide	ND	1.00		mg/Kg	1	4/2/2014	R17842
SULFIDE, REACTIVE							Analyst: **SUB**
Reactive Sulfide	5.1	1.0		mg/Kg	1	3/25/2014	R17842
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**
Conductivity	7000	0.010		µmhos/cm	1	3/20/2014 3:57:42 PM	R17458

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2 & 3 Qtrly Inj Well
Lab ID: 1403871-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1, 2 & 3 Effluent
Collection Date: 3/20/2014 9:00:00 AM
Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
SM4500-H+B: PH						Analyst: **JML**	
pH	7.45	1.68	H	pH units	1	3/20/2014 3:57:42 PM	R17458
SM2320B: ALKALINITY						Analyst: **JML**	
Bicarbonate (As CaCO3)	270	20		mg/L CaCO3	1	3/20/2014 3:57:42 PM	R17458
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	3/20/2014 3:57:42 PM	R17458
Total Alkalinity (as CaCO3)	270	20		mg/L CaCO3	1	3/20/2014 3:57:42 PM	R17458
SPECIFIC GRAVITY						Analyst: **SRM**	
Specific Gravity	1.006	0			1	3/24/2014 11:49:00 AM	R17512
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	6180	100	*	mg/L	1	3/25/2014 5:22:00 PM	12342

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2 & 3 Qtrly Inj Well
Lab ID: 1403871-002
Client Sample ID: Trip Blank
Collection Date:
Matrix: TRIP BLANK
Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **SUB**	
Acetonitrile	ND	10		µg/L	1	3/26/2014	R17842
Allyl chloride	ND	0.50		µg/L	1	3/26/2014	R17842
Chloroprene	ND	0.50		µg/L	1	3/26/2014	R17842
Cyclohexane	ND	0.50		µg/L	1	3/26/2014	R17842
Diethyl ether	ND	0.50		µg/L	1	3/26/2014	R17842
Diisopropyl ether	ND	0.50		µg/L	1	3/26/2014	R17842
Epichlorohydrin	ND	5.0		µg/L	1	3/26/2014	R17842
Ethyl acetate	ND	0.50		µg/L	1	3/26/2014	R17842
Ethyl methacrylate	ND	0.50		µg/L	1	3/26/2014	R17842
Ethyl tert-butyl ether	ND	0.50		µg/L	1	3/26/2014	R17842
Freon-113	ND	0.50		µg/L	1	3/26/2014	R17842
Isobutanol	ND	20		µg/L	1	3/26/2014	R17842
Isopropyl acetate	ND	0.50		µg/L	1	3/26/2014	R17842
Methacrylonitrile	ND	0.50		µg/L	1	3/26/2014	R17842
Methyl acetate	ND	0.50		µg/L	1	3/26/2014	R17842
Methyl ethyl ketone	ND	2.5		µg/L	1	3/26/2014	R17842
Methyl isobutyl ketone	ND	2.5		µg/L	1	3/26/2014	R17842
Methyl methacrylate	ND	0.50		µg/L	1	3/26/2014	R17842
Methylcyclohexane	ND	1.0		µg/L	1	3/26/2014	R17842
n-Amyl acetate	ND	0.50		µg/L	1	3/26/2014	R17842
n-Hexane	ND	0.50		µg/L	1	3/26/2014	R17842
Nitrobenzene	ND	5.0		µg/L	1	3/26/2014	R17842
Pentachloroethane	ND	5.0		µg/L	1	3/26/2014	R17842
p-isopropyltoluene	ND	0.50		µg/L	1	3/26/2014	R17842
Propionitrile	ND	0.50		µg/L	1	3/26/2014	R17842
Tetrahydrofuran	ND	0.50		µg/L	1	3/26/2014	R17842
Benzene	ND	0.50		µg/L	1	3/26/2014	R17842
Toluene	ND	0.50		µg/L	1	3/26/2014	R17842
Ethylbenzene	ND	0.50		µg/L	1	3/26/2014	R17842
Methyl tert-butyl ether (MTBE)	ND	10		µg/L	1	3/26/2014	R17842
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/26/2014	R17842
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/26/2014	R17842
1,2-Dichloroethane (EDC)	ND	0.50		µg/L	1	3/26/2014	R17842
1,2-Dibromoethane (EDB)	ND	0.50		µg/L	1	3/26/2014	R17842
Naphthalene	ND	0.50		µg/L	1	3/26/2014	R17842
Acetone	ND	2.5		µg/L	1	3/26/2014	R17842
Bromobenzene	ND	0.50		µg/L	1	3/26/2014	R17842
Bromodichloromethane	ND	0.50		µg/L	1	3/26/2014	R17842
Bromoform	ND	0.50		µg/L	1	3/26/2014	R17842

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
E	Value above quantitation range
J	Analyte detected below quantitation limits
O	RSD is greater than RSDlimit
R	RPD outside accepted recovery limits
S	Spike Recovery outside accepted recovery limits
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2.
RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: Trip Blank
Project: WDW-1, 2 & 3 Qtrly Inj Well
Collection Date:
Lab ID: 1403871-002
Matrix: TRIP BLANK
Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: **SUB**
Bromomethane	ND	0.50		µg/L	1	3/26/2014	R17842
Carbon disulfide	ND	0.50		µg/L	1	3/26/2014	R17842
Carbon Tetrachloride	ND	0.50		µg/L	1	3/26/2014	R17842
Chlorobenzene	ND	0.50		µg/L	1	3/26/2014	R17842
Chloroethane	ND	0.50		µg/L	1	3/26/2014	R17842
Chloroform	ND	0.50		µg/L	1	3/26/2014	R17842
Chloromethane	ND	0.50		µg/L	1	3/26/2014	R17842
2-Chlorotoluene	ND	0.50		µg/L	1	3/26/2014	R17842
4-Chlorotoluene	ND	0.50		µg/L	1	3/26/2014	R17842
cis-1,2-DCE	ND	0.50		µg/L	1	3/26/2014	R17842
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	3/26/2014	R17842
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	3/26/2014	R17842
Dibromochloromethane	ND	0.50		µg/L	1	3/26/2014	R17842
Dibromomethane	ND	0.50		µg/L	1	3/26/2014	R17842
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/26/2014	R17842
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/26/2014	R17842
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/26/2014	R17842
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/26/2014	R17842
1,1-Dichloroethane	ND	0.50		µg/L	1	3/26/2014	R17842
1,1-Dichloroethene	ND	0.50		µg/L	1	3/26/2014	R17842
1,2-Dichloropropane	ND	0.50		µg/L	1	3/26/2014	R17842
1,3-Dichloropropane	ND	0.50		µg/L	1	3/26/2014	R17842
2,2-Dichloropropane	ND	0.50		µg/L	1	3/26/2014	R17842
1,1-Dichloropropene	ND	0.50		µg/L	1	3/26/2014	R17842
Hexachlorobutadiene	ND	0.50		µg/L	1	3/26/2014	R17842
2-Hexanone	ND	0.50		µg/L	1	3/26/2014	R17842
Isopropylbenzene	ND	0.50		µg/L	1	3/26/2014	R17842
4-Isopropyltoluene	ND	0.50		µg/L	1	3/26/2014	R17842
Methylene Chloride	ND	2.5		µg/L	1	3/26/2014	R17842
n-Butylbenzene	ND	0.50		µg/L	1	3/26/2014	R17842
n-Propylbenzene	ND	0.50		µg/L	1	3/26/2014	R17842
sec-Butylbenzene	ND	0.50		µg/L	1	3/26/2014	R17842
Styrene	ND	0.50		µg/L	1	3/26/2014	R17842
tert-Butylbenzene	ND	0.50		µg/L	1	3/26/2014	R17842
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/26/2014	R17842
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/26/2014	R17842
Tetrachloroethene (PCE)	ND	0.50		µg/L	1	3/26/2014	R17842
trans-1,2-DCE	ND	0.50		µg/L	1	3/26/2014	R17842
trans-1,3-Dichloropropene	ND	0.50		µg/L	1	3/26/2014	R17842

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2 & 3 Qtrly Inj Well
Lab ID: 1403871-002
Client Sample ID: Trip Blank
Collection Date:
Matrix: TRIP BLANK
Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: **SUB**
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/26/2014	R17842
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/26/2014	R17842
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/26/2014	R17842
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/26/2014	R17842
Trichloroethene (TCE)	ND	0.50		µg/L	1	3/26/2014	R17842
Trichlorofluoromethane	ND	0.50		µg/L	1	3/26/2014	R17842
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/26/2014	R17842
Vinyl chloride	ND	0.50		µg/L	1	3/26/2014	R17842
mp-Xylenes	ND	1.0		µg/L	1	3/26/2014	R17842
o-Xylene	ND	0.50		µg/L	1	3/26/2014	R17842
tert-Amyl methyl ether	ND	0.50		µg/L	1	3/26/2014	R17842
tert-Butyl alcohol	ND	20		µg/L	1	3/26/2014	R17842
Acrolein	ND	10		µg/L	1	3/26/2014	R17842
Acrylonitrile	ND	10		µg/L	1	3/26/2014	R17842
Bromochloromethane	ND	0.50		µg/L	1	3/26/2014	R17842
2-Chloroethyl vinyl ether	ND	1.0		µg/L	1	3/26/2014	R17842
Iodomethane	ND	0.50		µg/L	1	3/26/2014	R17842
trans-1,4-Dichloro-2-butene	ND	0.50		µg/L	1	3/26/2014	R17842
Vinyl acetate	ND	0.50		µg/L	1	3/26/2014	R17842
1,4-Dioxane	ND	20		µg/L	1	3/26/2014	R17842
Surr: 1,2-Dichloroethane-d4	111	70-130		%REC	1	3/26/2014	R17842
Surr: 4-Bromofluorobenzene	103	70-130		%REC	1	3/26/2014	R17842
Surr: Toluene-d8	100	70-130		%REC	1	3/26/2014	R17842

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1403871**

09-Apr-14

Client: Navajo Refining Company

Project: WDW-1, 2 & 3 Qtrly Inj Well

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R17472**	RunNo: **17472**
Prep Date:	Analysis Date: **3/20/2014**	SeqNo: **503279** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Bromide	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Phosphorus, Orthophosphate (As P	ND	0.50								
Sulfate	ND	0.50								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R17472**	RunNo: **17472**
Prep Date:	Analysis Date: **3/20/2014**	SeqNo: **503281** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.51	0.10	0.5000	0	102	90	110			
Chloride	4.8	0.50	5.000	0	95.7	90	110			
Nitrogen, Nitrite (As N)	0.95	0.10	1.000	0	95.3	90	110			
Bromide	2.5	0.10	2.500	0	99.2	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	101	90	110			
Phosphorus, Orthophosphate (As P	4.9	0.50	5.000	0	97.9	90	110			
Sulfate	9.7	0.50	10.00	0	96.7	90	110			

Qualifiers:

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- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1403871

09-Apr-14

Client: Navajo Refining Company

Project: WDW-1, 2 & 3 Qtrly Inj Well

Sample ID **MB-R17842**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R17842**	RunNo: **17842**
Prep Date:	Analysis Date: **3/26/2014**	SeqNo: **514551** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acetonitrile	ND	0.50								
Allyl chloride	ND	0.50								
Chloroprene	ND	0.50								
Ethyl methacrylate	ND	0.50								
Isobutanol	ND	0.50								
Methacrylonitrile	ND	0.50								
Methyl ethyl ketone	ND	2.5								
Methyl isobutyl ketone	ND	2.5								
Methyl methacrylate	ND	0.50								
Propionitrile	ND	0.50								
Benzene	ND	0.50								
Toluene	ND	0.50								
Ethylbenzene	ND	0.50								
1,2-Dichloroethane (EDC)	ND	0.50								
1,2-Dibromoethane (EDB)	ND	0.50								
Acetone	ND	2.5								
Bromodichloromethane	ND	0.50								
Bromoform	ND	0.50								
Bromomethane	ND	0.50								
Carbon disulfide	ND	0.50								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	0.50								
Chloroethane	ND	0.50								
Chloroform	ND	0.50								
Chloromethane	ND	0.50								
cis-1,2-DCE	ND	0.50								
cis-1,3-Dichloropropene	ND	0.50								
1,2-Dibromo-3-chloropropane	ND	0.50								
Dibromochloromethane	ND	0.50								
Dibromomethane	ND	0.50								
1,2-Dichlorobenzene	ND	0.50								
1,4-Dichlorobenzene	ND	0.50								
Dichlorodifluoromethane	ND	0.50								
1,1-Dichloroethane	ND	0.50								
1,1-Dichloroethene	ND	0.50								
1,2-Dichloropropane	ND	0.50								
1,3-Dichloropropane	ND	0.50								
2,2-Dichloropropane	ND	0.50								
1,1-Dichloropropene	ND	0.50								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1403871**

09-Apr-14

Client: Navajo Refining Company

Project: WDW-1, 2 & 3 Qtrly Inj Well

Sample ID **MB-R17842**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R17842**	RunNo: **17842**
Prep Date:	Analysis Date: **3/26/2014**	SeqNo: **514551** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Hexanone	ND	0.50								
Methylene Chloride	ND	2.5								
Styrene	ND	0.50								
1,1,1,2-Tetrachloroethane	ND	0.50								
1,1,2,2-Tetrachloroethane	ND	0.50								
Tetrachloroethene (PCE)	ND	0.50								
trans-1,2-DCE	ND	0.50								
trans-1,3-Dichloropropene	ND	0.50								
1,1,1-Trichloroethane	ND	0.50								
1,1,2-Trichloroethane	ND	0.50								
Trichloroethene (TCE)	ND	0.50								
Trichlorofluoromethane	ND	0.50								
1,2,3-Trichloropropane	ND	0.50								
Vinyl chloride	ND	0.50								
mp-Xylenes	ND	1.0								
o-Xylene	ND	0.50								
Acrolein	ND	0.50								
Acrylonitrile	ND	0.50								
Bromochloromethane	ND	0.50								
Iodomethane	ND	0.50								
trans-1,4-Dichloro-2-butene	ND	0.50								
Vinyl acetate	ND	0.50								

Sample ID **LCS-R17842**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R17842**	RunNo: **17842**
Prep Date:	Analysis Date: **3/26/2014**	SeqNo: **514552** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	4.9	0.50	5.000	0	97.2	80	120			
Toluene	4.9	0.50	5.000	0	98.2	80	120			
Ethylbenzene	5.0	0.50	5.000	0	99.0	80	120			
Chlorobenzene	4.9	0.50	5.000	0	98.2	80	120			
1,1-Dichloroethene	4.5	0.50	5.000	0	89.4	80	120			
Tetrachloroethene (PCE)	4.4	0.50	5.000	0	87.8	80	120			
Trichloroethene (TCE)	4.6	0.50	5.000	0	93.0	80	120			
o-Xylene	5.2	0.50	5.000	0	105	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1403871**

09-Apr-14

Client: Navajo Refining Company

Project: WDW-1, 2 & 3 Qtrly Inj Well

Sample ID **MB-R17842**	SampType: **MBLK**	TestCode: **EPA 8270C: Semivolatiles/Mod**
Client ID: **PBW**	Batch ID: **R17842**	RunNo: **17842**
Prep Date:	Analysis Date: **3/28/2014**	SeqNo: **515354** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1-Methylnaphthalene	ND	0.50								
2,3,4,6-Tetrachlorophenol	ND	0.50								
2,4,5-Trichlorophenol	ND	0.50								
2,4,6-Trichlorophenol	ND	0.50								
2,4-Dichlorophenol	ND	0.50								
2,4-Dimethylphenol	ND	0.50								
2,4-Dinitrophenol	ND	0.50								
2,4-Dinitrotoluene	ND	0.50								
2,6-Dinitrotoluene	ND	0.50								
2-Chloronaphthalene	ND	0.50								
2-Chlorophenol	ND	0.50								
2-Methylnaphthalene	ND	0.50								
2-Methylphenol	ND	0.50								
2-Nitroaniline	ND	0.50								
2-Nitrophenol	ND	0.50								
3,3'-Dichlorobenzidine	ND	0.50								
3-Nitroaniline	ND	0.50								
4,6-Dinitro-2-methylphenol	ND	0.50								
4-Bromophenyl phenyl ether	ND	0.50								
4-Chloro-3-methylphenol	ND	0.50								
4-Chloroaniline	ND	0.50								
4-Chlorophenyl phenyl ether	ND	0.50								
4-Nitroaniline	ND	0.50								
4-Nitrophenol	ND	0.50								
Acenaphthene	ND	0.50								
Acenaphthylene	ND	0.50								
Anthracene	ND	0.50								
Benzo(g,h,i)perylene	ND	0.50								
Benz(a)anthracene	ND	0.50								
Benzo(a)pyrene	ND	0.50								
Benzo(b)fluoranthene	ND	0.50								
Benzo(k)fluoranthene	ND	0.50								
Bis(2-chloroethoxy)methane	ND	0.50								
Bis(2-chloroethyl)ether	ND	0.50								
Bis(2-chloroisopropyl)ether	ND	0.50								
Bis(2-ethylhexyl)phthalate	ND	0.50								
Butyl benzyl phthalate	ND	0.50								
Carbazole	ND	0.50								
Chrysene	ND	0.50								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1403871**

09-Apr-14

Client: Navajo Refining Company
Project: WDW-1, 2 & 3 Qtrly Inj Well

Sample ID **MB-R17842**	SampType: **MBLK**	TestCode: **EPA 8270C: Semivolatiles/Mod**
Client ID: **PBW**	Batch ID: **R17842**	RunNo: **17842**
Prep Date:	Analysis Date: **3/28/2014**	SeqNo: **515354** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dibenz(a,h)anthracene	ND	0.50								
Dibenzofuran	ND	0.50								
Diethyl phthalate	ND	0.50								
Dimethyl phthalate	ND	0.50								
Di-n-butyl phthalate	ND	0.50								
Di-n-octyl phthalate	ND	0.50								
Fluoranthene	ND	0.50								
Fluorene	ND	0.50								
Hexachlorobenzene	ND	0.50								
Hexachlorobutadiene	ND	0.50								
Hexachlorocyclopentadiene	ND	0.50								
Hexachloroethane	ND	0.50								
Isophorone	ND	0.50								
Naphthalene	ND	0.50								
Nitrobenzene	ND	0.50								
N-Nitrosodi-n-propylamine	ND	0.50								
N-Nitrosodiphenylamine	ND	0.50								
Pentachlorophenol	ND	0.50								
Phenanthrene	ND	0.50								
Phenol	ND	0.50								
Pyrene	ND	0.50								

Sample ID **LCS-R17842**	SampType: **LCS**	TestCode: **EPA 8270C: Semivolatiles/Mod**
Client ID: **LCSW**	Batch ID: **R17842**	RunNo: **17842**
Prep Date:	Analysis Date: **3/28/2014**	SeqNo: **515355** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	6.6	1.0	5.000	0	131	42	143			
2-Chlorophenol	5.8	1.0	5.000	0	116	50	131			
4-Chloro-3-methylphenol	5.5	1.0	5.000	0	110	42	139			
4-Nitrophenol	4.7	1.0	5.000	0	94.6	19	137			
Acenaphthene	5.9	1.0	5.000	0	118	45	129			
Bis(2-ethylhexyl)phthalate	6.6	1.0	5.000	0	131	43	142			
N-Nitrosodi-n-propylamine	6.0	1.0	5.000	0	120	46	135			
Pentachlorophenol	5.2	1.0	5.000	0	104	22	138			
Phenol	5.3	1.0	5.000	0	106	45	134			
Pyrene	6.3	1.0	5.000	0	126	45	139			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1403871**

09-Apr-14

Client: Navajo Refining Company

Project: WDW-1, 2 & 3 Qtrly Inj Well

Sample ID **MB-12328**	SampType: **MBLK**	TestCode: **EPA Method 7470: Mercury**
Client ID: **PBW**	Batch ID: **12328**	RunNo: **17527**
Prep Date: **3/24/2014**	Analysis Date: **3/24/2014**	SeqNo: **505323** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID **LCS-12328**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **12328**	RunNo: **17527**
Prep Date: **3/24/2014**	Analysis Date: **3/24/2014**	SeqNo: **505324** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0050	0.00020	0.005000	0	100	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
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- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1403871**

09-Apr-14

Client: Navajo Refining Company

Project: WDW-1, 2 & 3 Qtrly Inj Well

Sample ID **MB-12307**	SampType: **MBLK**	TestCode: **MERCURY, TCLP**
Client ID: **PBW**	Batch ID: **12307**	RunNo: **17489**
Prep Date: **3/21/2014**	Analysis Date: **3/21/2014**	SeqNo: **503698** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID **LCS-12307**	SampType: **LCS**	TestCode: **MERCURY, TCLP**
Client ID: **LCSW**	Batch ID: **12307**	RunNo: **17489**
Prep Date: **3/21/2014**	Analysis Date: **3/21/2014**	SeqNo: **503699** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	101	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1403871**

09-Apr-14

Client: Navajo Refining Company

Project: WDW-1, 2 & 3 Qtrly Inj Well

Sample ID **MB-12293**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **12293**	RunNo: **17477**
Prep Date: **3/20/2014**	Analysis Date: **3/21/2014**	SeqNo: **503513** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID **LCS-12293**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **12293**	RunNo: **17477**
Prep Date: **3/20/2014**	Analysis Date: **3/21/2014**	SeqNo: **503514** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	104	80	120			
Barium	ND	100	0.5000	0	102	80	120			
Cadmium	ND	1.0	0.5000	0	102	80	120			
Chromium	ND	5.0	0.5000	0	102	80	120			
Lead	ND	5.0	0.5000	0	100	80	120			
Selenium	ND	1.0	0.5000	0	101	80	120			
Silver	ND	5.0	0.1000	0	105	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1403871

09-Apr-14

Client: Navajo Refining Company

Project: WDW-1, 2 & 3 Qtrly Inj Well

Sample ID **MB-12293**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Metals**
Client ID: **PBW**	Batch ID: **12293**	RunNo: **17477**
Prep Date: **3/20/2014**	Analysis Date: **3/21/2014**	SeqNo: **503563** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020								
Antimony	ND	0.050								
Arsenic	ND	0.020								
Barium	ND	0.020								
Beryllium	ND	0.0030								
Cadmium	ND	0.0020								
Calcium	ND	1.0								
Chromium	ND	0.0060								
Cobalt	ND	0.0060								
Copper	ND	0.0060								
Iron	ND	0.050								
Lead	ND	0.0050								
Magnesium	ND	1.0								
Manganese	ND	0.0020								
Nickel	ND	0.010								
Potassium	ND	1.0								
Selenium	ND	0.050								
Silver	ND	0.0050								
Thallium	ND	0.050								
Vanadium	ND	0.050								
Zinc	ND	0.020								

Sample ID **LCS-12293**	SampType: **LCS**	TestCode: **EPA 6010B: Total Metals**
Client ID: **LCSW**	Batch ID: **12293**	RunNo: **17477**
Prep Date: **3/20/2014**	Analysis Date: **3/21/2014**	SeqNo: **503564** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.55	0.020	0.5000	0	111	80	120			
Antimony	0.50	0.050	0.5000	0	99.3	80	120			
Arsenic	0.52	0.020	0.5000	0	104	80	120			
Barium	0.51	0.020	0.5000	0	102	80	120			
Beryllium	0.54	0.0030	0.5000	0	107	80	120			
Cadmium	0.51	0.0020	0.5000	0	102	80	120			
Calcium	53	1.0	50.00	0	106	80	120			
Chromium	0.51	0.0060	0.5000	0	102	80	120			
Cobalt	0.50	0.0060	0.5000	0	100	80	120			
Copper	0.52	0.0060	0.5000	0	104	80	120			
Iron	0.52	0.050	0.5000	0	103	80	120			
Lead	0.50	0.0050	0.5000	0	100	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1403871**

09-Apr-14

Client: Navajo Refining Company

Project: WDW-1, 2 & 3 Qtrly Inj Well

Sample ID **LCS-12293**	SampType: **LCS**	TestCode: **EPA 6010B: Total Metals**
Client ID: **LCSW**	Batch ID: **12293**	RunNo: **17477**
Prep Date: **3/20/2014**	Analysis Date: **3/21/2014**	SeqNo: **503564** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	52	1.0	50.00	0	104	80	120			
Manganese	0.51	0.0020	0.5000	0	103	80	120			
Nickel	0.50	0.010	0.5000	0	99.5	80	120			
Potassium	50	1.0	50.00	0	101	80	120			
Selenium	0.50	0.050	0.5000	0	101	80	120			
Silver	0.11	0.0050	0.1000	0	105	80	120			
Thallium	0.51	0.050	0.5000	0	102	80	120			
Vanadium	0.53	0.050	0.5000	0	105	80	120			
Zinc	0.51	0.020	0.5000	0	102	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1403871**

09-Apr-14

Client: Navajo Refining Company

Project: WDW-1, 2 & 3 Qtrly Inj Well

Sample ID **LCS-R17842**	SampType: **LCS**	TestCode: **CYANIDE, Reactive**							
Client ID: **LCSS**	Batch ID: **R17842**	RunNo: **17842**							
Prep Date:	Analysis Date: **4/2/2014**	SeqNo: **515168**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Reactive Cyanide	0.533	0.100	0.5000	0	107	80	120			

Sample ID **MB-R17842**	SampType: **MBLK**	TestCode: **CYANIDE, Reactive**							
Client ID: **PBS**	Batch ID: **R17842**	RunNo: **17842**							
Prep Date:	Analysis Date: **4/2/2014**	SeqNo: **515169**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Reactive Cyanide	ND	1.00								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
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- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1403871**

09-Apr-14

Client: Navajo Refining Company

Project: WDW-1, 2 & 3 Qtrly Inj Well

Sample ID **MB-R17842**	SampType: **MBLK**	TestCode: **SULFIDE, Reactive**
Client ID: **PBS**	Batch ID: **R17842**	RunNo: **17842**
Prep Date:	Analysis Date: **3/25/2014**	SeqNo: **515170** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Reactive Sulfide	ND	1.0								

Sample ID **LCS-R17842**	SampType: **LCS**	TestCode: **SULFIDE, Reactive**
Client ID: **LCSS**	Batch ID: **R17842**	RunNo: **17842**
Prep Date:	Analysis Date: **3/25/2014**	SeqNo: **515171** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Reactive Sulfide	0.16	0.10	0.2000	0	80.0	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1403871**

09-Apr-14

Client: Navajo Refining Company

Project: WDW-1, 2 & 3 Qtrly Inj Well

Sample ID **mb-1**	SampType: **mblk**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R17458**	RunNo: **17458**							
Prep Date:	Analysis Date: **3/20/2014**	SeqNo: **502901**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R17458**	RunNo: **17458**							
Prep Date:	Analysis Date: **3/20/2014**	SeqNo: **502902**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	81	20	80.00	0	101	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1403871**

09-Apr-14

Client: Navajo Refining Company

Project: WDW-1, 2 & 3 Qtrly Inj Well

Sample ID **MB-12342**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **12342**	RunNo: **17558**
Prep Date: **3/24/2014**	Analysis Date: **3/25/2014**	SeqNo: **505731** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **LCS-12342**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **12342**	RunNo: **17558**
Prep Date: **3/24/2014**	Analysis Date: **3/25/2014**	SeqNo: **505732** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1030	20.0	1000	0	103	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: NAVAJO REFINING COM Work Order Number: 1403871 RcptNo: 1

Received by/date: AT 03/20/14

Logged By: Michelle Garcia 3/20/2014 1:50:00 PM Michelle Garcia

Completed By: Michelle Garcia 3/20/2014 2:03:05 PM Michelle Garcia

Reviewed By: 03/20/14

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	Courier		

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 2 12 (<2 or >12 unless noted)

Adjusted? No

Checked by: MJ

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date:

By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.3	Good	Yes			

Chain of Custody Record

Client: Navajo Refining Co.	☐ Standar ☐ Rush
	Project Name: WDW-1, 2, & 3 Qtrly Inj Well
Mailing Address: P.O. Box 159 Artesia,	Project #:
NM 88211-0159	
Phone #: 575-748-3311	
email or Fax#: 575-746-5451	Project Manager: Mike Holder
QA/QC Package: ☐ Standard ☐ Level 4 (Full Validation) ☐ Other ☐ EDD (Type)	Sampler: Jerry Sosa
	On Ice: ☑ Yes ☐ No
	Sample Temperature: 2.3

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1403871	Specific Gravity,HCO3, CO3, Cl, SO4, TDS, pH, cond.,Fl, Cation/anion bal., Br, Eh/40	VOCs/SW-846 Method 8260C (see attached list 'VOCs')	SVOCs/SW-846 Method 8270D (see attached list 'SVOCs')	R,C,I/40 CFR part 261	Metals/SW-846 Mthd 6010, 7470 (see attached list 'Metals')	Ca, K, Mg, Na/40 CFR 136.3	TCLP Metals, only /40 CFR Part 261/ SW-846 Method 1311
3/20/14	9:00	Liquid	WDW-1, 2, & 3 Effluent	3	Neat/H2SO4	-001	X						X
3/20/14	9:00	Liquid	WDW-1, 2, & 3 Effluent	1	HNO3	-001					X	X	
3/20/14	9:00	Liquid	WDW-1, 2, & 3 Effluent	3	HCL	-001		X					
3/20/14	9:00	Liquid	WDW-1, 2, & 3 Effluent	2	Neat	-001			X				
3/20/14	9:00	Liquid	WDW-1, 2, & 3 Effluent	2	Neat	-001		X					
3/20/14	9:00	Liquid	Trip Blank	2	Neat	-002		X					
3/20/14	9:00	Liquid	Temperature Blank	1	Neat								

Date: 3/20/14	Time: 10:00	Relinquished by: Jerry Sosa / Robert Pava	Received by:	Date	Time
Date:	Time:	Relinquished by:	Received by:	Date: 03/21/14	Time: 13:50

Remarks: Report these results separately from all other Chain of Custody kits provided.

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

July 17, 2014

Dan Crawford
Navajo Refining Company
P.O. Box 159
Artesia, NM 88211-0159
TEL: (575) 748-3311
FAX

RE: WDW-1, 2, & 3 Qtrly Inj Well OrderNo.: 1406935

Dear Dan Crawford:

Hall Environmental Analysis Laboratory received 2 sample(s) on 6/19/2014 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Case Narrative

WO#: **1406935**
Date: **7/17/2014**

CLIENT: Navajo Refining Company
Project: WDW-1, 2, & 3 Qtrly Inj Well

The following compounds were also scanned for by NIST library search and not detected. The detection level for these compounds would be ~10ppb:
Allyl alcohol
t-amyl ethyl ether
Bis(2-chloroethyl)sulfide
Bromoacetone
Chloral hydrate
1-chlorobutane
1-chlorohexane
2-chloroethanol
Crotonaldehyde
Cis-1,4-Dichloro-2butene
1,3-Dichloro-2-propanol
1,2,3,4-Depoxybutane
Ethanol
Ethylene oxide
Malonitrile
Methanol
Methyl acrylate
2-Nitropropane
Paraldehyde
Pentafluorobenzene
2-Pentanone
2-picoline
1-propanol
2-propanol
Propargyl alcohol
Beta-propiolactone
n-propylamine

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2, & 3 Qtrly Inj Well
Lab ID: 1406935-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1, 2, & 3 Effluent
Collection Date: 6/19/2014 9:30:00 AM
Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **JRR**	
Fluoride	28	2.0	*	mg/L	20	6/19/2014 5:43:17 PM	R19410
Chloride	290	10		mg/L	20	6/19/2014 5:43:17 PM	R19410
Nitrogen, Nitrite (As N)	1.5	0.50		mg/L	5	6/19/2014 5:30:53 PM	R19410
Bromide	0.72	0.50		mg/L	5	6/19/2014 5:30:53 PM	R19410
Nitrogen, Nitrate (As N)	ND	0.50		mg/L	5	6/19/2014 5:30:53 PM	R19410
Phosphorus, Orthophosphate (As P)	ND	2.5		mg/L	5	6/19/2014 5:30:53 PM	R19410
Sulfate	2600	50		mg/L	100	7/7/2014 4:18:15 PM	R19725
EPA METHOD 7470: MERCURY						Analyst: **MMD**	
Mercury	ND	0.00020		mg/L	1	6/26/2014 9:07:50 AM	13883
MERCURY, TCLP						Analyst: **MMD**	
Mercury	ND	0.020		mg/L	1	7/8/2014 12:50:03 PM	14082
EPA METHOD 6010B: TCLP METALS						Analyst: **ELS**	
Arsenic	ND	5.0		mg/L	1	7/8/2014 12:02:28 PM	14080
Barium	ND	100		mg/L	1	7/8/2014 12:02:28 PM	14080
Cadmium	ND	1.0		mg/L	1	7/8/2014 12:02:28 PM	14080
Chromium	ND	5.0		mg/L	1	7/8/2014 12:02:28 PM	14080
Lead	ND	5.0		mg/L	1	7/8/2014 12:02:28 PM	14080
Selenium	ND	1.0		mg/L	1	7/8/2014 12:02:28 PM	14080
Silver	ND	5.0		mg/L	1	7/8/2014 12:02:28 PM	14080
EPA 6010B: TOTAL METALS						Analyst: **ELS**	
Aluminum	1.2	0.020		mg/L	1	7/11/2014 10:29:51 AM	14172
Antimony	ND	0.050		mg/L	1	7/7/2014 12:25:17 PM	14075
Arsenic	0.027	0.020		mg/L	1	7/7/2014 12:25:17 PM	14075
Barium	ND	0.020		mg/L	1	7/7/2014 12:25:17 PM	14075
Beryllium	ND	0.0030		mg/L	1	7/7/2014 12:25:17 PM	14075
Cadmium	ND	0.0020		mg/L	1	7/7/2014 12:25:17 PM	14075
Calcium	27	1.0		mg/L	1	7/7/2014 12:25:17 PM	14075
Chromium	ND	0.0060		mg/L	1	7/7/2014 12:25:17 PM	14075
Cobalt	ND	0.0060		mg/L	1	7/7/2014 12:25:17 PM	14075
Copper	ND	0.0060		mg/L	1	7/7/2014 12:25:17 PM	14075
Iron	0.21	0.050		mg/L	1	7/7/2014 12:25:17 PM	14075
Lead	ND	0.0050		mg/L	1	7/7/2014 12:25:17 PM	14075
Magnesium	9.2	1.0		mg/L	1	7/7/2014 12:25:17 PM	14075
Manganese	0.032	0.0020		mg/L	1	7/7/2014 12:25:17 PM	14075
Nickel	ND	0.010		mg/L	1	7/7/2014 12:25:17 PM	14075
Potassium	69	1.0		mg/L	1	7/7/2014 12:25:17 PM	14075
Selenium	0.069	0.050		mg/L	1	7/7/2014 12:25:17 PM	14075

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2, & 3 Qtrly Inj Well
Lab ID: 1406935-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1, 2, & 3 Effluent
Collection Date: 6/19/2014 9:30:00 AM
Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 6010B: TOTAL METALS						Analyst: **ELS**	
Silver	ND	0.0050		mg/L	1	7/7/2014 12:25:17 PM	14075
Sodium	1200	20		mg/L	20	7/7/2014 12:31:46 PM	14075
Thallium	ND	0.050		mg/L	1	7/7/2014 12:25:17 PM	14075
Vanadium	ND	0.050		mg/L	1	7/7/2014 12:25:17 PM	14075
Zinc	ND	0.020		mg/L	1	7/7/2014 12:25:17 PM	14075
EPA METHOD 8260B: VOLATILES						Analyst: **SUB**	
Ethyl tert-butyl ether	ND	0.50		µg/L	1	6/26/2014	R19890
Acetonitrile	ND	0.50		µg/L	1	6/26/2014	R19890
Allyl chloride	ND	0.50		µg/L	1	6/26/2014	R19890
Chloroprene	ND	0.50		µg/L	1	6/26/2014	R19890
Cyclohexane	ND	2.5		µg/L	1	6/26/2014	R19890
Diethyl ether	ND	0.50		µg/L	1	6/26/2014	R19890
Diisopropyl ether	ND	0.50		µg/L	1	6/26/2014	R19890
Epichlorohydrin	ND	5.0		µg/L	1	6/26/2014	R19890
Ethyl acetate	ND	0.50		µg/L	1	6/26/2014	R19890
Ethyl methacrylate	ND	2.5		µg/L	1	6/26/2014	R19890
Freon-113	ND	0.50		µg/L	1	6/26/2014	R19890
Isobutanol	ND	50		µg/L	1	6/26/2014	R19890
Isopropyl acetate	ND	0.50		µg/L	1	6/26/2014	R19890
Methacrylonitrile	ND	2.5		µg/L	1	6/26/2014	R19890
Methyl acetate	ND	0.50		µg/L	1	6/26/2014	R19890
Methyl ethyl ketone	ND	2.5		µg/L	1	6/26/2014	R19890
Methyl isobutyl ketone	ND	2.5		µg/L	1	6/26/2014	R19890
Methyl methacrylate	ND	2.5		µg/L	1	6/26/2014	R19890
Methylcyclohexane	ND	1.0		µg/L	1	6/26/2014	R19890
n-Amyl acetate	ND	0.50		µg/L	1	6/26/2014	R19890
n-Hexane	ND	0.50		µg/L	1	6/26/2014	R19890
Nitrobenzene	ND	5.0		µg/L	1	6/26/2014	R19890
Pentachloroethane	ND	5.0		µg/L	1	6/26/2014	R19890
p-isopropyltoluene	ND	0.50		µg/L	1	6/26/2014	R19890
Propionitrile	ND	2.5		µg/L	1	6/26/2014	R19890
Tetrahydrofuran	ND	0.50		µg/L	1	6/26/2014	R19890
Benzene	0.64	0.50		µg/L	1	6/26/2014	R19890
Toluene	ND	0.50		µg/L	1	6/26/2014	R19890
Ethylbenzene	ND	0.50		µg/L	1	6/26/2014	R19890
Methyl tert-butyl ether (MTBE)	ND	10		µg/L	1	6/26/2014	R19890
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	6/26/2014	R19890
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	6/26/2014	R19890
1,2-Dichloroethane (EDC)	ND	0.50		µg/L	1	6/26/2014	R19890

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2, & 3 Qtrly Inj Well
Lab ID: 1406935-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1, 2, & 3 Effluent
Collection Date: 6/19/2014 9:30:00 AM
Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: **SUB**
1,2-Dibromoethane (EDB)	ND	0.50		µg/L	1	6/26/2014	R19890
Naphthalene	ND	0.50		µg/L	1	6/26/2014	R19890
Acetone	15	2.5		µg/L	1	6/26/2014	R19890
Bromobenzene	ND	0.50		µg/L	1	6/26/2014	R19890
Bromodichloromethane	ND	0.50		µg/L	1	6/26/2014	R19890
Bromoform	ND	0.50		µg/L	1	6/26/2014	R19890
Bromomethane	ND	0.50		µg/L	1	6/26/2014	R19890
Carbon disulfide	ND	0.50		µg/L	1	6/26/2014	R19890
Carbon Tetrachloride	ND	0.50		µg/L	1	6/26/2014	R19890
Chlorobenzene	ND	0.50		µg/L	1	6/26/2014	R19890
Chloroethane	ND	0.50		µg/L	1	6/26/2014	R19890
Chloroform	ND	0.50		µg/L	1	6/26/2014	R19890
Chloromethane	ND	0.50		µg/L	1	6/26/2014	R19890
2-Chlorotoluene	ND	0.50		µg/L	1	6/26/2014	R19890
4-Chlorotoluene	ND	0.50		µg/L	1	6/26/2014	R19890
cis-1,2-DCE	ND	0.50		µg/L	1	6/26/2014	R19890
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	6/26/2014	R19890
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	6/26/2014	R19890
Dibromochloromethane	ND	0.50		µg/L	1	6/26/2014	R19890
Dibromomethane	ND	0.50		µg/L	1	6/26/2014	R19890
1,2-Dichlorobenzene	ND	0.50		µg/L	1	6/26/2014	R19890
1,3-Dichlorobenzene	ND	0.50		µg/L	1	6/26/2014	R19890
1,4-Dichlorobenzene	ND	0.50		µg/L	1	6/26/2014	R19890
Dichlorodifluoromethane	ND	0.50		µg/L	1	6/26/2014	R19890
1,1-Dichloroethane	ND	0.50		µg/L	1	6/26/2014	R19890
1,1-Dichloroethene	ND	0.50		µg/L	1	6/26/2014	R19890
1,2-Dichloropropane	ND	0.50		µg/L	1	6/26/2014	R19890
1,3-Dichloropropane	ND	0.50		µg/L	1	6/26/2014	R19890
2,2-Dichloropropane	ND	0.50		µg/L	1	6/26/2014	R19890
1,1-Dichloropropene	ND	0.50		µg/L	1	6/26/2014	R19890
Hexachlorobutadiene	ND	0.50		µg/L	1	6/26/2014	R19890
2-Hexanone	ND	0.50		µg/L	1	6/26/2014	R19890
Isopropylbenzene	ND	0.50		µg/L	1	6/26/2014	R19890
Methylene Chloride	ND	2.5		µg/L	1	6/26/2014	R19890
n-Butylbenzene	ND	0.50		µg/L	1	6/26/2014	R19890
n-Propylbenzene	ND	0.50		µg/L	1	6/26/2014	R19890
sec-Butylbenzene	ND	0.50		µg/L	1	6/26/2014	R19890
Styrene	ND	0.50		µg/L	1	6/26/2014	R19890
tert-Butylbenzene	ND	0.50		µg/L	1	6/26/2014	R19890

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2, & 3 Qtrly Inj Well
Lab ID: 1406935-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1, 2, & 3 Effluent
Collection Date: 6/19/2014 9:30:00 AM
Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: **SUB**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	6/26/2014	R19890
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	6/26/2014	R19890
Tetrachloroethene (PCE)	ND	0.50		µg/L	1	6/26/2014	R19890
trans-1,2-DCE	ND	0.50		µg/L	1	6/26/2014	R19890
trans-1,3-Dichloropropene	ND	0.50		µg/L	1	6/26/2014	R19890
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	6/26/2014	R19890
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	6/26/2014	R19890
1,1,1-Trichloroethane	ND	0.50		µg/L	1	6/26/2014	R19890
1,1,2-Trichloroethane	ND	0.50		µg/L	1	6/26/2014	R19890
Trichloroethene (TCE)	ND	0.50		µg/L	1	6/26/2014	R19890
Trichlorofluoromethane	ND	0.50		µg/L	1	6/26/2014	R19890
1,2,3-Trichloropropane	ND	0.50		µg/L	1	6/26/2014	R19890
Vinyl chloride	ND	0.50		µg/L	1	6/26/2014	R19890
mp-Xylenes	ND	1.0		µg/L	1	6/26/2014	R19890
o-Xylene	ND	0.50		µg/L	1	6/26/2014	R19890
tert-Amyl methyl ether	ND	0.50		µg/L	1	6/26/2014	R19890
tert-Butyl alcohol	ND	10		µg/L	1	6/26/2014	R19890
Acrolein	ND	2.5		µg/L	1	6/26/2014	R19890
Acrylonitrile	ND	10		µg/L	1	6/26/2014	R19890
Bromochloromethane	ND	0.50		µg/L	1	6/26/2014	R19890
2-Chloroethyl vinyl ether	ND	2.5		µg/L	1	6/26/2014	R19890
Iodomethane	ND	0.50		µg/L	1	6/26/2014	R19890
trans-1,4-Dichloro-2-butene	ND	0.50		µg/L	1	6/26/2014	R19890
Vinyl acetate	ND	0.50		µg/L	1	6/26/2014	R19890
1,4-Dioxane	ND	20		µg/L	1	6/26/2014	R19890
Surr: 1,2-Dichloroethane-d4	104	70-130		%REC	1	6/26/2014	R19890
Surr: 4-Bromofluorobenzene	100	70-130		%REC	1	6/26/2014	R19890
Surr: Toluene-d8	101	70-130		%REC	1	6/26/2014	R19890
EPA 8270C: SEMIVOLATILES/MOD							Analyst: **SUB**
1,1-Biphenyl	ND	0.10		µg/L	1	6/26/2014	R19935
Atrazine	ND	0.10		µg/L	1	6/26/2014	R19935
Benzaldehyde	ND	0.10		µg/L	1	6/26/2014	R19935
Caprolactam	ND	0.10		µg/L	1	6/26/2014	R19935
N-Nitroso-di-n-butylamine	ND	0.10		µg/L	1	6/26/2014	R19935
Acetophenone	ND	10		µg/L	1	6/26/2014	R19935
1-Methylnaphthalene	ND	10		µg/L	1	6/26/2014	R19935
2,3,4,6-Tetrachlorophenol	ND	10		µg/L	1	6/26/2014	R19935
2,4,5-Trichlorophenol	ND	10		µg/L	1	6/26/2014	R19935
2,4,6-Trichlorophenol	ND	10		µg/L	1	6/26/2014	R19935

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2, & 3 Qtrly Inj Well
Lab ID: 1406935-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1, 2, & 3 Effluent
Collection Date: 6/19/2014 9:30:00 AM
Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 8270C: SEMIVOLATILES/MOD							Analyst: **SUB**
2,4-Dichlorophenol	ND	10		µg/L	1	6/26/2014	R19935
2,4-Dimethylphenol	ND	10		µg/L	1	6/26/2014	R19935
2,4-Dinitrophenol	ND	10		µg/L	1	6/26/2014	R19935
2,4-Dinitrotoluene	ND	10		µg/L	1	6/26/2014	R19935
2,6-Dinitrotoluene	ND	10		µg/L	1	6/26/2014	R19935
2-Chloronaphthalene	ND	10		µg/L	1	6/26/2014	R19935
2-Chlorophenol	ND	10		µg/L	1	6/26/2014	R19935
2-Methylnaphthalene	ND	10		µg/L	1	6/26/2014	R19935
2-Methylphenol	ND	10		µg/L	1	6/26/2014	R19935
2-Nitroaniline	ND	10		µg/L	1	6/26/2014	R19935
2-Nitrophenol	ND	10		µg/L	1	6/26/2014	R19935
3,3'-Dichlorobenzidine	ND	10		µg/L	1	6/26/2014	R19935
3-Nitroaniline	ND	10		µg/L	1	6/26/2014	R19935
4,6-Dinitro-2-methylphenol	ND	10		µg/L	1	6/26/2014	R19935
4-Bromophenyl phenyl ether	ND	10		µg/L	1	6/26/2014	R19935
4-Chloro-3-methylphenol	ND	5.0		µg/L	1	6/26/2014	R19935
4-Chloroaniline	ND	10		µg/L	1	6/26/2014	R19935
4-Chlorophenyl phenyl ether	ND	10		µg/L	1	6/26/2014	R19935
4-Nitroaniline	ND	10		µg/L	1	6/26/2014	R19935
4-Nitrophenol	ND	10		µg/L	1	6/26/2014	R19935
Acenaphthene	ND	10		µg/L	1	6/26/2014	R19935
Acenaphthylene	ND	10		µg/L	1	6/26/2014	R19935
Anthracene	ND	10		µg/L	1	6/26/2014	R19935
Benzo(g,h,i)perylene	ND	10		µg/L	1	6/26/2014	R19935
Benz(a)anthracene	ND	0.10		µg/L	1	6/26/2014	R19935
Benzo(a)pyrene	ND	0.10		µg/L	1	6/26/2014	R19935
Benzo(b)fluoranthene	ND	0.10		µg/L	1	6/26/2014	R19935
Benzo(k)fluoranthene	ND	0.10		µg/L	1	6/26/2014	R19935
Bis(2-chloroethoxy)methane	ND	10		µg/L	1	6/26/2014	R19935
Bis(2-chloroethyl)ether	ND	10		µg/L	1	6/26/2014	R19935
Bis(2-chloroisopropyl)ether	ND	10		µg/L	1	6/26/2014	R19935
Bis(2-ethylhexyl)phthalate	ND	5.0		µg/L	1	6/26/2014	R19935
Butyl benzyl phthalate	ND	10		µg/L	1	6/26/2014	R19935
Carbazole	ND	10		µg/L	1	6/26/2014	R19935
Chrysene	ND	0.10		µg/L	1	6/26/2014	R19935
Dibenz(a,h)anthracene	ND	0.10		µg/L	1	6/26/2014	R19935
Dibenzofuran	ND	10		µg/L	1	6/26/2014	R19935
Diethyl phthalate	ND	10		µg/L	1	6/26/2014	R19935
Dimethyl phthalate	ND	10		µg/L	1	6/26/2014	R19935

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2, & 3 Qtrly Inj Well
Lab ID: 1406935-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1, 2, & 3 Effluent
Collection Date: 6/19/2014 9:30:00 AM
Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 8270C: SEMIVOLATILES/MOD							Analyst: **SUB**
Di-n-butyl phthalate	ND	10		µg/L	1	6/26/2014	R19935
Di-n-octyl phthalate	ND	10		µg/L	1	6/26/2014	R19935
Fluoranthene	ND	10		µg/L	1	6/26/2014	R19935
Fluorene	ND	10		µg/L	1	6/26/2014	R19935
Hexachlorobenzene	ND	1.0		µg/L	1	6/26/2014	R19935
Hexachlorobutadiene	ND	10		µg/L	1	6/26/2014	R19935
Hexachlorocyclopentadiene	ND	10		µg/L	1	6/26/2014	R19935
Hexachloroethane	ND	10		µg/L	1	6/26/2014	R19935
Indeno(1,2,3-cd)pyrene	ND	0.10		µg/L	1	6/26/2014	R19935
Isophorone	ND	10		µg/L	1	6/26/2014	R19935
Naphthalene	ND	10		µg/L	1	6/26/2014	R19935
Nitrobenzene	ND	10		µg/L	1	6/26/2014	R19935
N-Nitrosodi-n-propylamine	ND	10		µg/L	1	6/26/2014	R19935
N-Nitrosodiphenylamine	ND	2.0		µg/L	1	6/26/2014	R19935
Pentachlorophenol	ND	10		µg/L	1	6/26/2014	R19935
Phenanthrene	ND	10		µg/L	1	6/26/2014	R19935
Phenol	ND	5.0		µg/L	1	6/26/2014	R19935
Pyrene	ND	10		µg/L	1	6/26/2014	R19935
o-Toluidine	ND	0.10		µg/L	1	6/26/2014	R19935
Pyridine	ND	0.10		µg/L	1	6/26/2014	R19935
1,2,4,5-Tetrachlorobenzene	ND	10		µg/L	1	6/26/2014	R19935
Surr: 2,4,6-Tribromophenol	101	10-123		%REC	1	6/26/2014	R19935
Surr: 2-Fluorobiphenyl	102	19-130		%REC	1	6/26/2014	R19935
Surr: 2-Fluorophenol	76.2	21-110		%REC	1	6/26/2014	R19935
Surr: Nitrobenzene-d5	91.1	25-130		%REC	1	6/26/2014	R19935
Surr: Phenol-d5	79.3	10-125		%REC	1	6/26/2014	R19935
Surr: Terphenyl-d14	92.2	33-141		%REC	1	6/26/2014	R19935
CORROSIVITY							Analyst: **SUB**
pH	7.90		H	pH Units	1	7/2/2014	R19940
IGNITABILITY METHOD 1010							Analyst: **SUB**
Ignitability	>200	0		°F	1	7/7/2014	R19940
CYANIDE, REACTIVE							Analyst: **SUB**
Cyanide, Reactive	ND	1.00		mg/L	1	7/2/2014	R19940
SULFIDE, REACTIVE							Analyst: **SUB**
Reactive Sulfide	ND	1.0		mg/L	1	6/26/2014	R19940
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JRR**
Conductivity	6000	0.010		µmhos/cm	1	6/23/2014 3:26:39 PM	R19484

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2, & 3 Qtrly Inj Well
Lab ID: 1406935-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1, 2, & 3 Effluent
Collection Date: 6/19/2014 9:30:00 AM
Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
SM4500-H+B: PH						Analyst: **JRR**	
pH	7.91	1.68	H	pH units	1	6/23/2014 3:26:39 PM	R19484
SM2320B: ALKALINITY						Analyst: **JRR**	
Bicarbonate (As CaCO3)	290	20		mg/L CaCO3	1	6/23/2014 3:26:39 PM	R19484
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	6/23/2014 3:26:39 PM	R19484
Total Alkalinity (as CaCO3)	290	20		mg/L CaCO3	1	6/23/2014 3:26:39 PM	R19484
SPECIFIC GRAVITY						Analyst: **SRM**	
Specific Gravity	1.003	0			1	6/30/2014 10:37:00 AM	R19574
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	4440	40.0	*	mg/L	1	6/23/2014 11:26:00 AM	13798

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2, & 3 Qtrly Inj Well
Lab ID: 1406935-002
Matrix: TRIP BLANK
Client Sample ID: Trip Blank
Collection Date:
Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **SUB**	
Ethyl tert-butyl ether	ND	0.50		µg/L	1	6/26/2014	R19890
Acetonitrile	ND	2.5		µg/L	1	6/26/2014	R19890
Allyl chloride	ND	0.50		µg/L	1	6/26/2014	R19890
Chloroprene	ND	0.50		µg/L	1	6/26/2014	R19890
Cyclohexane	ND	0.50		µg/L	1	6/26/2014	R19890
Diethyl ether	ND	0.50		µg/L	1	6/26/2014	R19890
Diisopropyl ether	ND	0.50		µg/L	1	6/26/2014	R19890
Epichlorohydrin	ND	5.0		µg/L	1	6/26/2014	R19890
Ethyl acetate	ND	0.50		µg/L	1	6/26/2014	R19890
Ethyl methacrylate	ND	2.5		µg/L	1	6/26/2014	R19890
Freon-113	ND	0.50		µg/L	1	6/26/2014	R19890
Isobutanol	ND	50		µg/L	1	6/26/2014	R19890
Isopropyl acetate	ND	0.50		µg/L	1	6/26/2014	R19890
Methacrylonitrile	ND	2.5		µg/L	1	6/26/2014	R19890
Methyl acetate	ND	0.50		µg/L	1	6/26/2014	R19890
Methyl ethyl ketone	ND	2.5		µg/L	1	6/26/2014	R19890
Methyl isobutyl ketone	ND	2.5		µg/L	1	6/26/2014	R19890
Methyl methacrylate	ND	2.5		µg/L	1	6/26/2014	R19890
Methylcyclohexane	ND	1.0		µg/L	1	6/26/2014	R19890
n-Amyl acetate	ND	0.50		µg/L	1	6/26/2014	R19890
n-Hexane	ND	0.50		µg/L	1	6/26/2014	R19890
Nitrobenzene	ND	5.0		µg/L	1	6/26/2014	R19890
Pentachloroethane	ND	5.0		µg/L	1	6/26/2014	R19890
p-isopropyltoluene	ND	0.50		µg/L	1	6/26/2014	R19890
Propionitrile	ND	2.5		µg/L	1	6/26/2014	R19890
Tetrahydrofuran	ND	0.50		µg/L	1	6/26/2014	R19890
Benzene	ND	0.50		µg/L	1	6/26/2014	R19890
Toluene	ND	0.50		µg/L	1	6/26/2014	R19890
Ethylbenzene	ND	0.50		µg/L	1	6/26/2014	R19890
Methyl tert-butyl ether (MTBE)	ND	10		µg/L	1	6/26/2014	R19890
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	6/26/2014	R19890
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	6/26/2014	R19890
1,2-Dichloroethane (EDC)	ND	0.50		µg/L	1	6/26/2014	R19890
1,2-Dibromoethane (EDB)	ND	0.50		µg/L	1	6/26/2014	R19890
Naphthalene	ND	0.50		µg/L	1	6/26/2014	R19890
Acetone	ND	2.5		µg/L	1	6/26/2014	R19890
Bromobenzene	ND	0.50		µg/L	1	6/26/2014	R19890
Bromodichloromethane	ND	0.50		µg/L	1	6/26/2014	R19890
Bromoform	ND	0.50		µg/L	1	6/26/2014	R19890

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: Trip Blank
Project: WDW-1, 2, & 3 Qtrly Inj Well
Collection Date:
Lab ID: 1406935-002
Matrix: TRIP BLANK
Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: **SUB**
Bromomethane	ND	0.50		µg/L	1	6/26/2014	R19890
Carbon disulfide	ND	0.50		µg/L	1	6/26/2014	R19890
Carbon Tetrachloride	ND	0.50		µg/L	1	6/26/2014	R19890
Chlorobenzene	ND	0.50		µg/L	1	6/26/2014	R19890
Chloroethane	ND	0.50		µg/L	1	6/26/2014	R19890
Chloroform	ND	0.50		µg/L	1	6/26/2014	R19890
Chloromethane	ND	0.50		µg/L	1	6/26/2014	R19890
2-Chlorotoluene	ND	0.50		µg/L	1	6/26/2014	R19890
4-Chlorotoluene	ND	0.50		µg/L	1	6/26/2014	R19890
cis-1,2-DCE	ND	0.50		µg/L	1	6/26/2014	R19890
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	6/26/2014	R19890
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	6/26/2014	R19890
Dibromochloromethane	ND	0.50		µg/L	1	6/26/2014	R19890
Dibromomethane	ND	0.50		µg/L	1	6/26/2014	R19890
1,2-Dichlorobenzene	ND	0.50		µg/L	1	6/26/2014	R19890
1,3-Dichlorobenzene	ND	0.50		µg/L	1	6/26/2014	R19890
1,4-Dichlorobenzene	ND	0.50		µg/L	1	6/26/2014	R19890
Dichlorodifluoromethane	ND	0.50		µg/L	1	6/26/2014	R19890
1,1-Dichloroethane	ND	0.50		µg/L	1	6/26/2014	R19890
1,1-Dichloroethene	ND	0.50		µg/L	1	6/26/2014	R19890
1,2-Dichloropropane	ND	0.50		µg/L	1	6/26/2014	R19890
1,3-Dichloropropane	ND	0.50		µg/L	1	6/26/2014	R19890
2,2-Dichloropropane	ND	0.50		µg/L	1	6/26/2014	R19890
1,1-Dichloropropene	ND	0.50		µg/L	1	6/26/2014	R19890
Hexachlorobutadiene	ND	0.50		µg/L	1	6/26/2014	R19890
2-Hexanone	ND	0.50		µg/L	1	6/26/2014	R19890
Isopropylbenzene	ND	0.50		µg/L	1	6/26/2014	R19890
Methylene Chloride	ND	2.5		µg/L	1	6/26/2014	R19890
n-Butylbenzene	ND	0.50		µg/L	1	6/26/2014	R19890
n-Propylbenzene	ND	0.50		µg/L	1	6/26/2014	R19890
sec-Butylbenzene	ND	0.50		µg/L	1	6/26/2014	R19890
Styrene	ND	0.50		µg/L	1	6/26/2014	R19890
tert-Butylbenzene	ND	0.50		µg/L	1	6/26/2014	R19890
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	6/26/2014	R19890
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	6/26/2014	R19890
Tetrachloroethene (PCE)	ND	0.50		µg/L	1	6/26/2014	R19890
trans-1,2-DCE	ND	0.50		µg/L	1	6/26/2014	R19890
trans-1,3-Dichloropropene	ND	0.50		µg/L	1	6/26/2014	R19890
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	6/26/2014	R19890

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- O RSD is greater than RSDlimit
- P Sample pH greater than 2.
- R RPD outside accepted recovery limits
- RL Reporting Detection Limit
- S Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: WDW-1, 2, & 3 Qtrly Inj Well
Lab ID: 1406935-002
Matrix: TRIP BLANK
Client Sample ID: Trip Blank
Collection Date:
Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: **SUB**
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	6/26/2014	R19890
1,1,1-Trichloroethane	ND	0.50		µg/L	1	6/26/2014	R19890
1,1,2-Trichloroethane	ND	0.50		µg/L	1	6/26/2014	R19890
Trichloroethene (TCE)	ND	0.50		µg/L	1	6/26/2014	R19890
Trichlorofluoromethane	ND	0.50		µg/L	1	6/26/2014	R19890
1,2,3-Trichloropropane	ND	0.50		µg/L	1	6/26/2014	R19890
Vinyl chloride	ND	0.50		µg/L	1	6/26/2014	R19890
mp-Xylenes	ND	1.0		µg/L	1	6/26/2014	R19890
o-Xylene	ND	0.50		µg/L	1	6/26/2014	R19890
tert-Amyl methyl ether	ND	0.50		µg/L	1	6/26/2014	R19890
tert-Butyl alcohol	ND	0.50		µg/L	1	6/26/2014	R19890
Acrolein	ND	0.50		µg/L	1	6/26/2014	R19890
Acrylonitrile	ND	10		µg/L	1	6/26/2014	R19890
Bromochloromethane	ND	0.50		µg/L	1	6/26/2014	R19890
2-Chloroethyl vinyl ether	ND	0.50		µg/L	1	6/26/2014	R19890
Iodomethane	ND	0.50		µg/L	1	6/26/2014	R19890
trans-1,4-Dichloro-2-butene	ND	0.50		µg/L	1	6/26/2014	R19890
Vinyl acetate	ND	0.50		µg/L	1	6/26/2014	R19890
1,4-Dioxane	ND	20		µg/L	1	6/26/2014	R19890
Surr: 1,2-Dichloroethane-d4	100	70-130		%REC	1	6/26/2014	R19890
Surr: 4-Bromofluorobenzene	102	70-130		%REC	1	6/26/2014	R19890
Surr: Toluene-d8	99.6	70-130		%REC	1	6/26/2014	R19890

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Qualifiers:

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E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1406935

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID **A5**	SampType: **ccv_5**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **BatchQC**	Batch ID: **R19410**	RunNo: **19410**							
Prep Date:	Analysis Date: **6/19/2014**	SeqNo: **561477**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1.4	0.10	1.600	0	90.3	90	110			
Chloride	7.8	0.50	8.000	0	96.9	90	110			
Nitrogen, Nitrite (As N)	3.2	0.10	3.200	0	99.5	90	110			
Bromide	7.9	0.10	8.000	0	98.4	90	110			
Nitrogen, Nitrate (As N)	4.9	0.10	4.800	0	102	90	110			
Phosphorus, Orthophosphate (As P	7.8	0.50	8.000	0	97.4	90	110			

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBW**	Batch ID: **R19410**	RunNo: **19410**							
Prep Date:	Analysis Date: **6/19/2014**	SeqNo: **561479**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Bromide	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Phosphorus, Orthophosphate (As P	ND	0.50								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSW**	Batch ID: **R19410**	RunNo: **19410**							
Prep Date:	Analysis Date: **6/19/2014**	SeqNo: **561480**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.47	0.10	0.5000	0	94.3	90	110			
Chloride	4.7	0.50	5.000	0	94.8	90	110			
Nitrogen, Nitrite (As N)	0.94	0.10	1.000	0	93.7	90	110			
Bromide	2.4	0.10	2.500	0	96.2	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	99.8	90	110			
Phosphorus, Orthophosphate (As P	4.9	0.50	5.000	0	97.6	90	110			

Sample ID **A6**	SampType: **ccv_6**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **BatchQC**	Batch ID: **R19410**	RunNo: **19410**							
Prep Date:	Analysis Date: **6/19/2014**	SeqNo: **561489**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	2.3	0.10	2.400	0	95.4	90	110			
Chloride	12	0.50	12.00	0	102	90	110			
Nitrogen, Nitrite (As N)	4.9	0.10	4.800	0	102	90	110			
Bromide	12	0.10	12.00	0	100	90	110			

Qualifiers:

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- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406935**

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID **A6**	SampType: **ccv_6**			TestCode: **EPA Method 300.0: Anions**					
Client ID: **BatchQC**	Batch ID: **R19410**			RunNo: **19410**					
Prep Date:	Analysis Date: **6/19/2014**			SeqNo: **561489**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	7.8	0.10	7.200	0	108	90	110			
Phosphorus, Orthophosphate (As P	12	0.50	12.00	0	101	90	110			

Sample ID **A4**	SampType: **ccv_4**			TestCode: **EPA Method 300.0: Anions**					
Client ID: **BatchQC**	Batch ID: **R19410**			RunNo: **19410**					
Prep Date:	Analysis Date: **6/19/2014**			SeqNo: **561501**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.94	0.10	1.000	0	93.7	90	110			
Chloride	4.6	0.50	5.000	0	92.9	90	110			
Nitrogen, Nitrite (As N)	2.0	0.10	2.000	0	97.9	90	110			
Bromide	4.8	0.10	5.000	0	96.0	90	110			
Nitrogen, Nitrate (As N)	3.0	0.10	3.000	0	98.7	90	110			
Phosphorus, Orthophosphate (As P	4.8	0.50	5.000	0	95.8	90	110			

Sample ID **A5**	SampType: **ccv_5**			TestCode: **EPA Method 300.0: Anions**					
Client ID: **BatchQC**	Batch ID: **R19410**			RunNo: **19410**					
Prep Date:	Analysis Date: **6/19/2014**			SeqNo: **561513**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1.5	0.10	1.600	0	96.1	90	110			
Chloride	7.8	0.50	8.000	0	97.0	90	110			
Nitrogen, Nitrite (As N)	3.1	0.10	3.200	0	98.3	90	110			
Bromide	7.6	0.10	8.000	0	95.3	90	110			
Nitrogen, Nitrate (As N)	4.9	0.10	4.800	0	102	90	110			
Phosphorus, Orthophosphate (As P	7.7	0.50	8.000	0	96.6	90	110			

Sample ID **A6**	SampType: **ccv_6**			TestCode: **EPA Method 300.0: Anions**					
Client ID: **BatchQC**	Batch ID: **R19410**			RunNo: **19410**					
Prep Date:	Analysis Date: **6/19/2014**			SeqNo: **561525**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	2.3	0.10	2.400	0	97.8	90	110			
Chloride	12	0.50	12.00	0	101	90	110			
Nitrogen, Nitrite (As N)	4.8	0.10	4.800	0	101	90	110			
Bromide	12	0.10	12.00	0	100	90	110			
Nitrogen, Nitrate (As N)	7.7	0.10	7.200	0	107	90	110			
Phosphorus, Orthophosphate (As P	12	0.50	12.00	0	101	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1406935

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R19410**	RunNo: **19410**
Prep Date:	Analysis Date: **6/19/2014**	SeqNo: **561529** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Bromide	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Phosphorus, Orthophosphate (As P	ND	0.50								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R19410**	RunNo: **19410**
Prep Date:	Analysis Date: **6/19/2014**	SeqNo: **561530** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.51	0.10	0.5000	0	101	90	110			
Chloride	4.8	0.50	5.000	0	96.1	90	110			
Nitrogen, Nitrite (As N)	0.97	0.10	1.000	0	97.0	90	110			
Bromide	2.5	0.10	2.500	0	99.2	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	101	90	110			
Phosphorus, Orthophosphate (As P	5.0	0.50	5.000	0	99.0	90	110			

Sample ID **A4**	SampType: **ccv_4**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BatchQC**	Batch ID: **R19410**	RunNo: **19410**
Prep Date:	Analysis Date: **6/20/2014**	SeqNo: **561537** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.96	0.10	1.000	0	95.6	90	110			
Chloride	4.7	0.50	5.000	0	93.1	90	110			
Nitrogen, Nitrite (As N)	2.0	0.10	2.000	0	98.8	90	110			
Bromide	4.8	0.10	5.000	0	96.5	90	110			
Nitrogen, Nitrate (As N)	2.9	0.10	3.000	0	97.9	90	110			
Phosphorus, Orthophosphate (As P	4.8	0.50	5.000	0	96.0	90	110			

Sample ID **A5**	SampType: **ccv_5**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BatchQC**	Batch ID: **R19410**	RunNo: **19410**
Prep Date:	Analysis Date: **6/20/2014**	SeqNo: **561549** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1.5	0.10	1.600	0	96.4	90	110			
Chloride	7.8	0.50	8.000	0	97.5	90	110			
Nitrogen, Nitrite (As N)	3.2	0.10	3.200	0	100	90	110			
Bromide	7.8	0.10	8.000	0	98.0	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406935**

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID **A5**	SampType: **ccv_5**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BatchQC**	Batch ID: **R19410**	RunNo: **19410**
Prep Date:	Analysis Date: **6/20/2014**	SeqNo: **561549** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	4.9	0.10	4.800	0	103	90	110			
Phosphorus, Orthophosphate (As P	7.9	0.50	8.000	0	98.2	90	110			

Sample ID **A6**	SampType: **ccv_6**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BatchQC**	Batch ID: **R19410**	RunNo: **19410**
Prep Date:	Analysis Date: **6/20/2014**	SeqNo: **561555** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	2.3	0.10	2.400	0	97.5	90	110			
Chloride	12	0.50	12.00	0	101	90	110			
Nitrogen, Nitrite (As N)	4.9	0.10	4.800	0	102	90	110			
Bromide	12	0.10	12.00	0	99.7	90	110			
Nitrogen, Nitrate (As N)	7.7	0.10	7.200	0	107	90	110			
Phosphorus, Orthophosphate (As P	12	0.50	12.00	0	101	90	110			

Sample ID **A6**	SampType: **CCV_6**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BatchQC**	Batch ID: **R19725**	RunNo: **19725**
Prep Date:	Analysis Date: **7/7/2014**	SeqNo: **572917** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	30	0.50	30.00	0	101	90	110			

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R19725**	RunNo: **19725**
Prep Date:	Analysis Date: **7/7/2014**	SeqNo: **572919** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R19725**	RunNo: **19725**
Prep Date:	Analysis Date: **7/7/2014**	SeqNo: **572920** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	9.3	0.50	10.00	0	93.5	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1406935

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID **A4**	SampType: **CCV_4**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **BatchQC**	Batch ID: **R19725**	RunNo: **19725**							
Prep Date:	Analysis Date: **7/7/2014**	SeqNo: **572929**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	12	0.50	12.50	0	94.3	90	110			

Sample ID **A5**	SampType: **CCV_5**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **BatchQC**	Batch ID: **R19725**	RunNo: **19725**							
Prep Date:	Analysis Date: **7/7/2014**	SeqNo: **572941**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	20	0.50	20.00	0	98.2	90	110			

Sample ID **A6**	SampType: **CCV_6**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **BatchQC**	Batch ID: **R19725**	RunNo: **19725**							
Prep Date:	Analysis Date: **7/7/2014**	SeqNo: **572953**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	31	0.50	30.00	0	102	90	110			

Sample ID **A4**	SampType: **CCV_4**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **BatchQC**	Batch ID: **R19725**	RunNo: **19725**							
Prep Date:	Analysis Date: **7/7/2014**	SeqNo: **572968**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	12	0.50	12.50	0	95.2	90	110			

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBW**	Batch ID: **R19725**	RunNo: **19725**							
Prep Date:	Analysis Date: **7/7/2014**	SeqNo: **572970**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSW**	Batch ID: **R19725**	RunNo: **19725**							
Prep Date:	Analysis Date: **7/7/2014**	SeqNo: **572971**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	9.5	0.50	10.00	0	95.0	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406935**

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID **A5**	SampType: **CCV_5**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **BatchQC**	Batch ID: **R19725**	RunNo: **19725**							
Prep Date:	Analysis Date: **7/7/2014**	SeqNo: **572980**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	20	0.50	20.00	0	98.6	90	110			

Sample ID **A6**	SampType: **CCV_6**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **BatchQC**	Batch ID: **R19725**	RunNo: **19725**							
Prep Date:	Analysis Date: **7/8/2014**	SeqNo: **572992**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	30	0.50	30.00	0	102	90	110			

Sample ID **A4**	SampType: **CCV_4**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **BatchQC**	Batch ID: **R19725**	RunNo: **19725**							
Prep Date:	Analysis Date: **7/8/2014**	SeqNo: **573004**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	12	0.50	12.50	0	94.7	90	110			

Sample ID **A5**	SampType: **CCV_5**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **BatchQC**	Batch ID: **R19725**	RunNo: **19725**							
Prep Date:	Analysis Date: **7/8/2014**	SeqNo: **573016**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	20	0.50	20.00	0	98.9	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1406935

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID **MB-R19890**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R19890**	RunNo: **19890**
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **578052** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acetonitrile	ND	0.50								
Allyl chloride	ND	0.50								
Chloroprene	ND	0.50								
Ethyl methacrylate	ND	0.50								
Methacrylonitrile	ND	0.50								
Methyl ethyl ketone	ND	2.5								
Methyl isobutyl ketone	ND	2.5								
Methyl methacrylate	ND	0.50								
Propionitrile	ND	0.50								
Benzene	ND	0.50								
Toluene	ND	0.50								
Ethylbenzene	ND	0.50								
1,2-Dichloroethane (EDC)	ND	0.50								
1,2-Dibromoethane (EDB)	ND	0.50								
Acetone	ND	2.5								
Bromodichloromethane	ND	0.50								
Bromoform	ND	0.50								
Bromomethane	ND	0.50								
Carbon disulfide	ND	0.50								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	0.50								
Chloroethane	ND	0.50								
Chloroform	ND	0.50								
Chloromethane	ND	0.50								
cis-1,2-DCE	ND	0.50								
cis-1,3-Dichloropropene	ND	0.50								
1,2-Dibromo-3-chloropropane	ND	0.50								
Dibromochloromethane	ND	0.50								
Dibromomethane	ND	0.50								
1,2-Dichlorobenzene	ND	0.50								
1,4-Dichlorobenzene	ND	0.50								
Dichlorodifluoromethane	ND	0.50								
1,1-Dichloroethane	ND	0.50								
1,1-Dichloroethene	ND	0.50								
1,2-Dichloropropane	ND	0.50								
1,3-Dichloropropane	ND	0.50								
2,2-Dichloropropane	ND	0.50								
1,1-Dichloropropene	ND	0.50								
2-Hexanone	ND	0.50								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1406935

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID **MB-R19890**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R19890**	RunNo: **19890**
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **578052** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methylene Chloride	ND	0.50								
Styrene	ND	0.50								
1,1,1,2-Tetrachloroethane	ND	0.50								
1,1,2,2-Tetrachloroethane	ND	0.50								
Tetrachloroethene (PCE)	ND	0.50								
trans-1,2-DCE	ND	0.50								
trans-1,3-Dichloropropene	ND	0.50								
1,1,1-Trichloroethane	ND	0.50								
1,1,2-Trichloroethane	ND	0.50								
Trichloroethene (TCE)	ND	0.50								
Trichlorofluoromethane	ND	0.50								
1,2,3-Trichloropropane	ND	0.50								
Vinyl chloride	ND	0.50								
mp-Xylenes	ND	0.50								
o-Xylene	ND	0.50								
Acrolein	ND	10								
Bromochloromethane	ND	0.50								
Iodomethane	ND	0.50								
Vinyl acetate	ND	0.50								

Sample ID **LCS-R19890**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R19890**	RunNo: **19890**
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **578053** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	9.6	0.50	10.00	0	95.5	80	120			
Toluene	9.8	0.50	10.00	0	98.2	80	120			
Ethylbenzene	10	0.50	10.00	0	99.9	80	120			
Chlorobenzene	9.8	0.50	10.00	0	97.5	80	120			
1,1-Dichloroethene	9.5	0.50	10.00	0	94.9	80	120			
Tetrachloroethene (PCE)	9.9	0.50	10.00	0	98.9	80	120			
Trichloroethene (TCE)	9.9	0.50	10.00	0	98.8	80	120			
o-Xylene	10	0.50	10.00	0	102	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1406935

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID **MB-R19935**	SampType: **MBLK**	TestCode: **EPA 8270C: Semivolatiles/Mod**	
Client ID: **PBW**	Batch ID: **R19935**	RunNo: **19935**	
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **579511**	Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
N-Nitroso-di-n-butylamine	ND	1.0								
1-Methylnaphthalene	ND	10								
2,3,4,6-Tetrachlorophenol	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
2,4-Dichlorophenol	ND	10								
2,4-Dimethylphenol	ND	10								
2,4-Dinitrophenol	ND	10								
2,4-Dinitrotoluene	ND	10								
2,6-Dinitrotoluene	ND	10								
2-Chloronaphthalene	ND	10								
2-Chlorophenol	ND	10								
2-Methylnaphthalene	ND	10								
2-Methylphenol	ND	10								
2-Nitroaniline	ND	10								
2-Nitrophenol	ND	10								
3,3'-Dichlorobenzidine	ND	10								
3-Nitroaniline	ND	10								
4,6-Dinitro-2-methylphenol	ND	10								
4-Bromophenyl phenyl ether	ND	10								
4-Chloro-3-methylphenol	ND	5.0								
4-Chloroaniline	ND	10								
4-Chlorophenyl phenyl ether	ND	10								
4-Nitroaniline	ND	10								
4-Nitrophenol	ND	10								
Acenaphthene	ND	10								
Acenaphthylene	ND	10								
Anthracene	ND	10								
Benzo(g,h,i)perylene	ND	1.0								
Benz(a)anthracene	ND	1.0								
Benzo(a)pyrene	ND	1.0								
Benzo(b)fluoranthene	ND	1.0								
Benzo(k)fluoranthene	ND	1.0								
Bis(2-chloroethoxy)methane	ND	10								
Bis(2-chloroethyl)ether	ND	10								
Bis(2-chloroisopropyl)ether	ND	10								
Bis(2-ethylhexyl)phthalate	ND	5.0								
Butyl benzyl phthalate	ND	10								
Carbazole	ND	10								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
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- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1406935

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID **MB-R19935**	SampType: **MBLK**	TestCode: **EPA 8270C: Semivolatiles/Mod**
Client ID: **PBW**	Batch ID: **R19935**	RunNo: **19935**
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **579511** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chrysene	ND	0.10								
Dibenz(a,h)anthracene	ND	1.0								
Dibenzofuran	ND	10								
Diethyl phthalate	ND	10								
Dimethyl phthalate	ND	10								
Di-n-butyl phthalate	ND	10								
Di-n-octyl phthalate	ND	10								
Fluoranthene	ND	10								
Fluorene	ND	10								
Hexachlorobenzene	ND	1.0								
Hexachlorobutadiene	ND	10								
Hexachlorocyclopentadiene	ND	10								
Hexachloroethane	ND	10								
Isophorone	ND	10								
Naphthalene	ND	10								
Nitrobenzene	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
Pentachlorophenol	ND	10								
Phenanthrene	ND	10								
Phenol	ND	5.0								
Pyrene	ND	10								

Sample ID **LCS-R19935**	SampType: **LCS**	TestCode: **EPA 8270C: Semivolatiles/Mod**
Client ID: **LCSW**	Batch ID: **R19935**	RunNo: **19935**
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **579512** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	5.3		5.000	0	106	49	134			
2-Chlorophenol	4.4		5.000	0	87.0	50	131			
4-Chloro-3-methylphenol	5.4		5.000	0	108	42	139			
4-Nitrophenol	4.6		5.000	0	92.8	19	137			
Acenaphthene	4.6		5.000	0	93.0	36	122			
Bis(2-ethylhexyl)phthalate	4.9		5.000	0	97.8	43	142			
N-Nitrosodi-n-propylamine	4.5		5.000	0	89.6	46	135			
Pentachlorophenol	4.1		5.000	0	82.6	22	138			
Phenol	6.3		5.000	0	126	45	134			
Pyrene	4.7		5.000	0	93.6	45	138			

Qualifiers:

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- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1406935

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID	MB-13883	SampType:	MBLK		TestCode:	EPA Method 7470: Mercury				
Client ID:	PBW	Batch ID:	13883		RunNo:	19515				
Prep Date:	6/25/2014	Analysis Date:	6/26/2014		SeqNo:	564933	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	LCS-13883	SampType:	LCS		TestCode:	EPA Method 7470: Mercury				
Client ID:	LCSW	Batch ID:	13883		RunNo:	19515				
Prep Date:	6/25/2014	Analysis Date:	6/26/2014		SeqNo:	564934	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0046	0.00020	0.005000	0	92.4	80	120			

Sample ID	1406935-001BMS	SampType:	MS		TestCode:	EPA Method 7470: Mercury				
Client ID:	WDW-1, 2, & 3 Efflu	Batch ID:	13883		RunNo:	19515				
Prep Date:	6/25/2014	Analysis Date:	6/26/2014		SeqNo:	564941	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0048	0.00020	0.005000	0	95.9	75	125			

Sample ID	1406935-001BMSD	SampType:	MSD		TestCode:	EPA Method 7470: Mercury				
Client ID:	WDW-1, 2, & 3 Efflu	Batch ID:	13883		RunNo:	19515				
Prep Date:	6/25/2014	Analysis Date:	6/26/2014		SeqNo:	564944	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0048	0.00020	0.005000	0	95.6	75	125	0.263	20	

Qualifiers:

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- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406935**

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID	**MB-14082**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**14082**	RunNo:	**19737**					
Prep Date:	**7/7/2014**	Analysis Date:	**7/8/2014**	SeqNo:	**573374**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-14082**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**14082**	RunNo:	**19737**					
Prep Date:	**7/7/2014**	Analysis Date:	**7/8/2014**	SeqNo:	**573375**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	100	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1406935

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID MB-14080	SampType: MBLK	TestCode: EPA Method 6010B: TCLP Metals
Client ID: PBW	Batch ID: 14080	RunNo: 19736
Prep Date: 7/7/2014	Analysis Date: 7/8/2014	SeqNo: 573325 Units: mg/L

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID LCS-14080	SampType: LCS	TestCode: EPA Method 6010B: TCLP Metals
Client ID: LCSW	Batch ID: 14080	RunNo: 19736
Prep Date: 7/7/2014	Analysis Date: 7/8/2014	SeqNo: 573326 Units: mg/L

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	99.9	80	120			
Barium	ND	100	0.5000	0	96.7	80	120			
Cadmium	ND	1.0	0.5000	0	97.9	80	120			
Chromium	ND	5.0	0.5000	0	96.1	80	120			
Lead	ND	5.0	0.5000	0	94.4	80	120			
Selenium	ND	1.0	0.5000	0	97.1	80	120			
Silver	ND	5.0	0.1000	0	101	80	120			

Sample ID 1406935-001CMS	SampType: MS	TestCode: EPA Method 6010B: TCLP Metals
Client ID: WDW-1, 2, & 3 Efflu	Batch ID: 14080	RunNo: 19736
Prep Date: 7/7/2014	Analysis Date: 7/8/2014	SeqNo: 573329 Units: mg/L

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0.02968	108	75	125			
Barium	ND	100	0.5000	0.04484	98.2	75	125			
Cadmium	ND	1.0	0.5000	0	103	75	125			
Chromium	ND	5.0	0.5000	0.001840	98.1	75	125			
Lead	ND	5.0	0.5000	0	95.5	75	125			
Selenium	ND	1.0	0.5000	0.09485	103	75	125			
Silver	ND	5.0	0.1000	0	107	75	125			

Sample ID 1406935-001CMSD	SampType: MSD	TestCode: EPA Method 6010B: TCLP Metals
Client ID: WDW-1, 2, & 3 Efflu	Batch ID: 14080	RunNo: 19736
Prep Date: 7/7/2014	Analysis Date: 7/8/2014	SeqNo: 573330 Units: mg/L

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0.02968	109	75	125	0	20	

Qualifiers:

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- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406935**

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID **1406935-001CMSD** SampType: **MSD** TestCode: **EPA Method 6010B: TCLP Metals**

Client ID: **WDW-1, 2, & 3 Efflu** Batch ID: **14080** RunNo: **19736**

Prep Date: **7/7/2014** Analysis Date: **7/8/2014** SeqNo: **573330** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100	0.5000	0.04484	98.1	75	125	0	20	
Cadmium	ND	1.0	0.5000	0	102	75	125	0	20	
Chromium	ND	5.0	0.5000	0.001840	97.8	75	125	0	20	
Lead	ND	5.0	0.5000	0	95.1	75	125	0	20	
Selenium	ND	1.0	0.5000	0.09485	108	75	125	0	20	
Silver	ND	5.0	0.1000	0	107	75	125	0	20	

Qualifiers:

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- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406935**

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID **MB-14075**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Metals**
Client ID: **PBW**	Batch ID: **14075**	RunNo: **19704**
Prep Date: **7/5/2014**	Analysis Date: **7/7/2014**	SeqNo: **572184** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND	0.050								
Arsenic	ND	0.020								
Barium	ND	0.020								
Beryllium	ND	0.0030								
Cadmium	ND	0.0020								
Calcium	ND	1.0								
Chromium	ND	0.0060								
Cobalt	ND	0.0060								
Copper	ND	0.0060								
Iron	ND	0.050								
Lead	ND	0.0050								
Magnesium	ND	1.0								
Manganese	ND	0.0020								
Nickel	ND	0.010								
Potassium	ND	1.0								
Selenium	ND	0.050								
Silver	ND	0.0050								
Thallium	ND	0.050								
Vanadium	ND	0.050								
Zinc	ND	0.020								

Sample ID **LCS-14075**	SampType: **LCS**	TestCode: **EPA 6010B: Total Metals**
Client ID: **LCSW**	Batch ID: **14075**	RunNo: **19704**
Prep Date: **7/5/2014**	Analysis Date: **7/7/2014**	SeqNo: **572185** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.55	0.050	0.5000	0	110	80	120			
Arsenic	0.55	0.020	0.5000	0	110	80	120			
Barium	0.54	0.020	0.5000	0	109	80	120			
Beryllium	0.57	0.0030	0.5000	0	115	80	120			
Cadmium	0.54	0.0020	0.5000	0	109	80	120			
Calcium	57	1.0	50.00	0	114	80	120			
Chromium	0.54	0.0060	0.5000	0	108	80	120			
Cobalt	0.52	0.0060	0.5000	0	104	80	120			
Copper	0.56	0.0060	0.5000	0	112	80	120			
Iron	0.55	0.050	0.5000	0	110	80	120			
Lead	0.53	0.0050	0.5000	0	107	80	120			
Magnesium	57	1.0	50.00	0	113	80	120			
Manganese	0.54	0.0020	0.5000	0	108	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
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- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406935**

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID **LCS-14075**	SampType: **LCS**	TestCode: **EPA 6010B: Total Metals**
Client ID: **LCSW**	Batch ID: **14075**	RunNo: **19704**
Prep Date: **7/5/2014**	Analysis Date: **7/7/2014**	SeqNo: **572185** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nickel	0.52	0.010	0.5000	0	105	80	120			
Potassium	54	1.0	50.00	0	109	80	120			
Selenium	0.53	0.050	0.5000	0	106	80	120			
Silver	0.11	0.0050	0.1000	0	112	80	120			
Thallium	0.53	0.050	0.5000	0	106	80	120			
Vanadium	0.57	0.050	0.5000	0	113	80	120			
Zinc	0.53	0.020	0.5000	0	106	80	120			

Sample ID **MB-14172**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Metals**
Client ID: **PBW**	Batch ID: **14172**	RunNo: **19829**
Prep Date: **7/10/2014**	Analysis Date: **7/11/2014**	SeqNo: **576105** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020								

Sample ID **LCS-14172**	SampType: **LCS**	TestCode: **EPA 6010B: Total Metals**
Client ID: **LCSW**	Batch ID: **14172**	RunNo: **19829**
Prep Date: **7/10/2014**	Analysis Date: **7/11/2014**	SeqNo: **576106** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.48	0.020	0.5000	0	96.2	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
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- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
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- P Sample pH greater than 2.
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1406935

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID	MB-R19940	SampType:	MBLK		TestCode:	CYANIDE, Reactive				
Client ID:	PBW	Batch ID:	R19940		RunNo:	19940				
Prep Date:		Analysis Date:	7/2/2014		SeqNo:	579570	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cyanide, Reactive	ND	1.00								

Sample ID	LCS-R19940	SampType:	LCS		TestCode:	CYANIDE, Reactive				
Client ID:	LCSW	Batch ID:	R19940		RunNo:	19940				
Prep Date:		Analysis Date:	7/2/2014		SeqNo:	579571	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cyanide, Reactive	0.512		0.5000	0	102	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406935**

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID **MB-R19940**	SampType: **MBLK**	TestCode: **SULFIDE, Reactive**							
Client ID: **PBW**	Batch ID: **R19940**	RunNo: **19940**							
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **579573**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Reactive Sulfide	ND	1.0								

Sample ID **LCS-R19940**	SampType: **LCS**	TestCode: **SULFIDE, Reactive**							
Client ID: **LCSW**	Batch ID: **R19940**	RunNo: **19940**							
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **579574**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Reactive Sulfide	0.20		0.2000	0	100	70	130			

Qualifiers:

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- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1406935

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID **mb-1**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R19484**	RunNo: **19484**							
Prep Date:	Analysis Date: **6/23/2014**	SeqNo: **563920**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R19484**	RunNo: **19484**							
Prep Date:	Analysis Date: **6/23/2014**	SeqNo: **563921**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	79	20	80.00	0	98.7	90	110			

Sample ID **mb-2**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R19484**	RunNo: **19484**							
Prep Date:	Analysis Date: **6/23/2014**	SeqNo: **563943**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-2**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R19484**	RunNo: **19484**							
Prep Date:	Analysis Date: **6/23/2014**	SeqNo: **563944**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80	20	80.00	0	100	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406935**

18-Jul-14

Client: Navajo Refining Company

Project: WDW-1, 2, & 3 Qtrly Inj Well

Sample ID **MB-13798**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **13798**	RunNo: **19431**
Prep Date: **6/19/2014**	Analysis Date: **6/23/2014**	SeqNo: **561986** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **LCS-13798**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **13798**	RunNo: **19431**
Prep Date: **6/19/2014**	Analysis Date: **6/23/2014**	SeqNo: **561987** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1010	20.0	1000	0	101	80	120			

Sample ID **1406935-001AMS**	SampType: **MS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **WDW-1, 2, & 3 Efflu**	Batch ID: **13798**	RunNo: **19431**
Prep Date: **6/19/2014**	Analysis Date: **6/23/2014**	SeqNo: **562008** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	6460	40.0	2000	4442	101	80	120			

Sample ID **1406935-001AMSD**	SampType: **MSD**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **WDW-1, 2, & 3 Efflu**	Batch ID: **13798**	RunNo: **19431**
Prep Date: **6/19/2014**	Analysis Date: **6/23/2014**	SeqNo: **562009** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	6460	40.0	2000	4442	101	80	120	0.124	5	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: NAVAJO REFINING CO Work Order Number: 1406935 RcptNo: 1

Received by/date: AT 06/19/14

Logged By: Anne Thorne 6/19/2014 2:35:00 PM Anne Thorne

Completed By: Anne Thorne 6/19/2014 Anne Thorne

Reviewed By: AT 06/19/14

Chain of Custody

1. Custody seals intact on sample bottles? Yes ☐ No ☐ Not Present ☑
2. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
3. How was the sample delivered? Courier

Log In

4. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
6. Sample(s) in proper container(s)? Yes ☑ No ☐
7. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
8. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
9. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
10. VOA vials have zero headspace? Yes ☑ No ☐ No VOA Vials ☐
11. Were any sample containers received broken? Yes ☐ No ☑
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
13. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
14. Is it clear what analyses were requested? Yes ☑ No ☐
15. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

17. Additional remarks:

18. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.6	Good	Yes			

Chain-of-Custody Record

Client: Navajo Refining Co.

Mailing Address: P.O. Box 159 Artesia, NM 88211-0159

Phone #: 575-748-3311

email or Fax#: 575-746-5451

QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)
☐ Other _____
☐ EDD (Type) _____

Turn-Around Time:
☐ Standar ☐ Rush

Project Name:
WDW-1, 2, & 3 Qtrly Inj Well

Project #: P.O. # 167796

Project Manager:
Dan Crawford

Sampler: Jerry Sosa

On Ice: ☒ Yes ☐ No

Sample Temperature: 4.6

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No 1406935	Specific Gravity,HCO3, CO3, Cl, SO4, TDS, pH, cond.,Fl, Cation/anion bal., Br, Eh/40	VOCs/SW-846 Method 8260C (see attached list 'VOCs')	SVOCs/SW-846 Method 8270D (see attached list 'SVOCs')	R,C,I/40 CFR part 261	Metals/SW-846 Mthd 6010, 7470 (see attached list 'Metals')	Ca, K, Mg, Na/40 CFR 136.3	TCLP Metals, only /40 CFR Part 261/ SW-846 Method 1311
6/19/14	9:00	Liquid	WDW-1, 2, & 3 Effluent	3	Neat/H2SO4	-001	X						X
6/19/14	9:00	Liquid	WDW-1, 2, & 3 Effluent	1	HNO3	-001					X	X	
6/19/14	9:00	Liquid	WDW-1, 2, & 3 Effluent	3	HCL	-001		X					
6/19/14	9:00	Liquid	WDW-1, 2, & 3 Effluent	2	Neat	-001			X				
6/19/14	9:00	Liquid	WDW-1, 2, & 3 Effluent	2	Neat	-001				X			
6/19/14	9:00	Liquid	Trip Blank	2	Neat	-002		X					
6/19/14	9:00	Liquid	Temperature Blank	1	Neat								

Date:	Time:	Relinquished by:	Received by:	Date Time
6/19/14	10:00	Jerry Sosa		06/19/14 4:35
Date:	Time:	Relinquished by:	Received by:	Date Time

Remarks: Report these results separately from all other Chain of Custody kits provided.

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Classification	Analyte name	Method	Units	RL
Volatile organics	Acetone	SW-846 Method 8260C	µg/L	10
Volatile organics	Acetonitrile	SW-846 Method 8260C	µg/L	
Volatile organics	Acrolein	SW-846 Method 8260C	µg/L	
Volatile organics	Allyl alcohol	SW-846 Method 8260C	µg/L	
Volatile organics	Allyl chloride	SW-846 Method 8260C	µg/L	
Volatile organics	t-Amyl ethyl ether (TAEE)	SW-846 Method 8260C	µg/L	
Volatile organics	t-Amyl methyl ether (TAME)	SW-846 Method 8260C	µg/L	
Volatile organics	Benzene	SW-846 Method 8260C	µg/L	1
Volatile organics	Benzyl chloride	SW-846 Method 8260C	µg/L	
Volatile organics	Bis(2-chloroethyl)sulfide	SW-846 Method 8260C	µg/L	
Volatile organics	Bromoacetone	SW-846 Method 8260C	µg/L	
Volatile organics	Bromobenzene	SW-846 Method 8260C	µg/L	
Volatile organics	Bromochloromethane	SW-846 Method 8260C	µg/L	5
Volatile organics	Bromodichloromethane	SW-846 Method 8260C	µg/L	1
Volatile organics	4-Bromofluorobenzene (surr)	SW-846 Method 8260C	µg/L	
Volatile organics	Bromoform	SW-846 Method 8260C	µg/L	4
Volatile organics	Bromomethane	SW-846 Method 8260C	µg/L	2
Volatile organics	n-Butanol	SW-846 Method 8260C	µg/L	
Volatile organics	2-Butanone (MEK)	SW-846 Method 8260C	µg/L	10
Volatile organics	n-Butylbenzene	SW-846 Method 8260C	µg/L	
Volatile organics	sec-Butylbenzene	SW-846 Method 8260C	µg/L	
Volatile organics	tert-Butylbenzene	SW-846 Method 8260C	µg/L	
Volatile organics	t-Butyl alcohol	SW-846 Method 8260C	µg/L	
Volatile organics	Carbon disulfide	SW-846 Method 8260C	µg/L	2
Volatile organics	Carbon tetrachloride	SW-846 Method 8260C	µg/L	1
Volatile organics	Chloral hydrate	SW-846 Method 8260C	µg/L	
Volatile organics	Chlorobenzene	SW-846 Method 8260C	µg/L	1
Volatile organics	Chlorobenzene-d5 (IS)	SW-846 Method 8260C	µg/L	
Volatile organics	1-Chlorobutane	SW-846 Method 8260C	µg/L	
Volatile organics	Chlorodibromomethane	SW-846 Method 8260C	µg/L	
Volatile organics	1-Chlorohexane	SW-846 Method 8260C	µg/L	
Volatile organics	Chloroethane	SW-846 Method 8260C	µg/L	1
Volatile organics	2-Chloroethanol	SW-846 Method 8260C	µg/L	
Volatile organics	2-Chloroethyl vinyl ether	SW-846 Method 8260C	µg/L	
Volatile organics	Chloroform	SW-846 Method 8260C	µg/L	1
Volatile organics	Chloromethane	SW-846 Method 8260C	µg/L	1
Volatile organics	Chloroprene	SW-846 Method 8260C	µg/L	
Volatile organics	4-Chlorotoluene	SW-846 Method 8260C	µg/L	
Volatile organics	Crotonaldehyde	SW-846 Method 8260C	µg/L	
Volatile organics	Cyclohexane	SW-846 Method 8260C	µg/L	5
Volatile organics	1,2-Dibromo-3-chloropropane	SW-846 Method 8260C	µg/L	10
Volatile organics	1,2-Dibromoethane	SW-846 Method 8260C	µg/L	2
Volatile organics	Dibromochloromethane	SW-846 Method 8260C	µg/L	1
Volatile organics	Dibromomethane	SW-846 Method 8260C	µg/L	
Volatile organics	1,2-Dichlorobenzene	SW-846 Method 8260C	µg/L	1
Volatile organics	1,3-Dichlorobenzene	SW-846 Method 8260C	µg/L	1

Volatile organics	1,4-Dichlorobenzene	SW-846 Method 8260C	µg/L	1
Volatile organics	1,4-Dichlorobenzene-d4 (IS)	SW-846 Method 8260C	µg/L	
Volatile organics	cis-1,4-Dichloro-2-butene	SW-846 Method 8260C	µg/L	
Volatile organics	trans-1,4-Dichloro-2-butene	SW-846 Method 8260C	µg/L	
Volatile organics	Dichlorodifluoromethane	SW-846 Method 8260C	µg/L	5
Volatile organics	1,1-Dichloroethane	SW-846 Method 8260C	µg/L	1
Volatile organics	1,2-Dichloroethane	SW-846 Method 8260C	µg/L	1
Volatile organics	1,2-Dichloroethane-d4 (surr)	SW-846 Method 8260C	µg/L	
Volatile organics	1,1-Dichloroethene	SW-846 Method 8260C	µg/L	1
Volatile organics	cis-1,2-Dichloroethene	SW-846 Method 8260C	µg/L	1
Volatile organics	trans-1,2-Dichloroethene	SW-846 Method 8260C	µg/L	1
Volatile organics	1,2-Dichloropropane	SW-846 Method 8260C	µg/L	1
Volatile organics	1,3-Dichloropropane	SW-846 Method 8260C	µg/L	
Volatile organics	2,2-Dichloropropane	SW-846 Method 8260C	µg/L	
Volatile organics	1,1-Dichloropropene	SW-846 Method 8260C	µg/L	
Volatile organics	1,3-Dichloro-2-propanol	SW-846 Method 8260C	µg/L	
Volatile organics	cis-1,3-Dichloropropene	SW-846 Method 8260C	µg/L	1
Volatile organics	trans-1,3-Dichloropropene	SW-846 Method 8260C	µg/L	1
Volatile organics	1,2,3,4-Depoxybutane	SW-846 Method 8260C	µg/L	
Volatile organics	Diethyl ether	SW-846 Method 8260C	µg/L	
Volatile organics	Diisopropyl either (DIPE)	SW-846 Method 8260C	µg/L	
Volatile organics	1,4-Difluorobenzene (IS)	SW-846 Method 8260C	µg/L	
Volatile organics	1,4-Dioxane	SW-846 Method 8260C	µg/L	130
Volatile organics	Epichlorohydrin	SW-846 Method 8260C	µg/L	
Volatile organics	Ethanol	SW-846 Method 8260C	µg/L	
Volatile organics	Ethyl acetate	SW-846 Method 8260C	µg/L	
Volatile organics	Ethylbenzene	SW-846 Method 8260C	µg/L	1
Volatile organics	Ethylene oxide	SW-846 Method 8260C	µg/L	
Volatile organics	Ethyl methacrylate	SW-846 Method 8260C	µg/L	
Volatile organics	Fluorobenzene (IS)	SW-846 Method 8260C	µg/L	
Volatile organics	Freon 113	SW-846 Method 8260C	µg/L	5
Volatile organics	Ethyl tert-butyl ether (ETBE)	SW-846 Method 8260C	µg/L	
Volatile organics	Hexachlorobutadiene	SW-846 Method 8260C	µg/L	
Volatile organics	Hexachloroethane	SW-846 Method 8260C	µg/L	
Volatile organics	2-Hexanone	SW-846 Method 8260C	µg/L	5
Volatile organics	Iodomethane	SW-846 Method 8260C	µg/L	
Volatile organics	Isobutyl alcohol	SW-846 Method 8260C	µg/L	
Volatile organics	Isopropylbenzene	SW-846 Method 8260C	µg/L	2
Volatile organics	p-Isopropyltoluene	SW-846 Method 8260C	µg/L	
Volatile organics	Malononitrile	SW-846 Method 8260C	µg/L	
Volatile organics	Methacrylonitrile	SW-846 Method 8260C	µg/L	
Volatile organics	Methanol	SW-846 Method 8260C	µg/L	
Volatile organics	Methyl acetate	SW-846 Method 8260C	µg/L	5
Volatile organics	Methylcyclohexane	SW-846 Method 8260C	µg/L	5
Volatile organics	Methyl acrylate	SW-846 Method 8260C	µg/L	
Volatile organics	Methylene chloride	SW-846 Method 8260C	µg/L	2
Volatile organics	Methyl methacrylate	SW-846 Method 8260C	µg/L	

Volatile organics	4-Methyl-2-pentanone (MIBK)	SW-846 Method 8260C	µg/L	5
Volatile organics	Methyl tert-butyl ether (MTBE)	SW-846 Method 8260C	µg/L	1
Volatile organics	Naphthalene	SW-846 Method 8260C	µg/L	
Volatile organics	Nitrobenzene	SW-846 Method 8260C	µg/L	
Volatile organics	2-Nitropropane	SW-846 Method 8260C	µg/L	
Volatile organics	N-Nitroso-di-n-butylamine	SW-846 Method 8260C	µg/L	
Volatile organics	Paraldehyde	SW-846 Method 8260C	µg/L	
Volatile organics	Pentachloroethane	SW-846 Method 8260C	µg/L	
Volatile organics	Pentafluorobenzene	SW-846 Method 8260C	µg/L	
Volatile organics	2-Pentanone	SW-846 Method 8260C	µg/L	
Volatile organics	2-Picoline	SW-846 Method 8260C	µg/L	
Volatile organics	1-Propanol	SW-846 Method 8260C	µg/L	
Volatile organics	2-Propanol	SW-846 Method 8260C	µg/L	
Volatile organics	Propargyl alcohol	SW-846 Method 8260C	µg/L	
Volatile organics	beta-Propiolactone	SW-846 Method 8260C	µg/L	
Volatile organics	Propionitrile	SW-846 Method 8260C	µg/L	
Volatile organics	n-Propylamine	SW-846 Method 8260C	µg/L	
Volatile organics	n-Propylbenzene	SW-846 Method 8260C	µg/L	
Volatile organics	Pyridine	SW-846 Method 8260C	µg/L	
Volatile organics	Styrene	SW-846 Method 8260C	µg/L	5
Volatile organics	1,1,1,2-Tetrachloroethane	SW-846 Method 8260C	µg/L	
Volatile organics	1,1,2,2-Tetrachloroethane	SW-846 Method 8260C	µg/L	1
Volatile organics	Tetrachloroethene (PCE)	SW-846 Method 8260C	µg/L	1
Volatile organics	Toluene	SW-846 Method 8260C	µg/L	1
Volatile organics	Toluene-d8 (surr)	SW-846 Method 8260C	µg/L	
Volatile organics	o-Toluidine	SW-846 Method 8260C	µg/L	
Volatile organics	1,2,3-Trichlorobenzene	SW-846 Method 8260C	µg/L	5
Volatile organics	1,2,4-Trichlorobenzene	SW-846 Method 8260C	µg/L	5
Volatile organics	1,1,1-Trichloroethane	SW-846 Method 8260C	µg/L	1
Volatile organics	1,1,2-Trichloroethane	SW-846 Method 8260C	µg/L	1
Volatile organics	Trichloroethene (TCE)	SW-846 Method 8260C	µg/L	1
Volatile organics	Trichlorofluoromethane	SW-846 Method 8260C	µg/L	5
Volatile organics	1,2,3-Trichloropropane	SW-846 Method 8260C	µg/L	
Volatile organics	1,2,4-Trimethylbenzene	SW-846 Method 8260C	µg/L	
Volatile organics	1,3,5-Trimethylbenzene	SW-846 Method 8260C	µg/L	
Volatile organics	Vinyl acetate	SW-846 Method 8260C	µg/L	
Volatile organics	Vinyl chloride	SW-846 Method 8260C	µg/L	1
Volatile organics	o-Xylene	SW-846 Method 8260C	µg/L	1
Volatile organics	m-Xylene	SW-846 Method 8260C	µg/L	1
Volatile organics	p-Xylene	SW-846 Method 8260C	µg/L	1
Volatile organics	Xylene, total	SW-846 Method 8260C	µg/L	1

(surr) - Surrogate
(IS) - Internal Standard
Method 8260C Volatile Organic Compounds by Gas Chromatograhy/Mass Spectrometry (GC/MS) (EPA, Revision 3, August 2006)
Constituents with RLs are on the VOC Target Compound List (TCL) (SOMO 1.1)

Classification	Analyte name	Method	Units	RL
Semivolatile organics	1,1'-Biphenyl	SW-864 Method 8270B	µg/L	1
Semivolatile organics	1,2,4,5-Tetrachlorobenzene	SW-864 Method 8270B	µg/L	2
Semivolatile organics	2-Chloronaphthalene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	2-Chlorophenol	SW-864 Method 8270B	µg/L	5
Semivolatile organics	2-Methylphenol	SW-864 Method 8270B	µg/L	5
Semivolatile organics	2-Nitroaniline	SW-864 Method 8270B	µg/L	10
Semivolatile organics	2-Nitrophenol	SW-864 Method 8270B	µg/L	5
Semivolatile organics	2,3,4,6-Tetrachlorophenol	SW-864 Method 8270B	µg/L	5
Semivolatile organics	2,4-Dichlorophenol	SW-864 Method 8270B	µg/L	5
Semivolatile organics	2,4-Dimethylphenol	SW-864 Method 8270B	µg/L	5
Semivolatile organics	2,4-Dinitrophenol	SW-864 Method 8270B	µg/L	10
Semivolatile organics	2,4-Dinitrotoluene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	2,4,5-Trichlorophenol	SW-864 Method 8270B	µg/L	10
Semivolatile organics	2,4,6-Trichlorophenol	SW-864 Method 8270B	µg/L	5
Semivolatile organics	2,6-Dinitrotoluene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	3-Nitroaniline	SW-864 Method 8270B	µg/L	10
Semivolatile organics	3,3'-Dichlrobenzidine	SW-864 Method 8270B	µg/L	5
Semivolatile organics	4-Bromophenyl-phenylether	SW-864 Method 8270B	µg/L	5
Semivolatile organics	4-Chloro-3-methylphenol	SW-864 Method 8270B	µg/L	5
Semivolatile organics	4-Chloroaniline	SW-864 Method 8270B	µg/L	5
Semivolatile organics	4-Chlorophenyl-phenyl ether	SW-864 Method 8270B	µg/L	5
Semivolatile organics	4-Nitroaniline	SW-864 Method 8270B	µg/L	10
Semivolatile organics	4-Nitrophenol	SW-864 Method 8270B	µg/L	10
Semivolatile organics	4,6-Dinitro-2-methylphenol	SW-864 Method 8270B	µg/L	10
Semivolatile organics	Acetophenone	SW-864 Method 8270B	µg/L	2
Semivolatile organics	Acenaphthene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Acenaphthylene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Anthracene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Atrazine	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Benzaldehyde	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Benzo(a)anthracene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Benzo(a)pyrene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Benzo(b)fluoranthene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Benzo(g,h,i)perylene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Benzo(k)fluoranthene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	bis(2-Chloroethoxy)-methane	SW-864 Method 8270B	µg/L	2
Semivolatile organics	bis(2-Chloroethyl) ether	SW-864 Method 8270B	µg/L	2
Semivolatile organics	bis(2-Chloroisopropyl) ether	SW-864 Method 8270B	µg/L	2
Semivolatile organics	bis(2-Ethylhexyl)phthalate	SW-864 Method 8270B	µg/L	2
Semivolatile organics	Butylbenzylphthalate	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Carbazole	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Caprolactam	SW-864 Method 8270B	µg/L	2
Semivolatile organics	Chrysene	SW-864 Method 8270B	µg/L	0.1
Semivolatile organics	Di-n-butylphthalate	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Di-n-octylphthalate	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Dibenz(a,h)anthracene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Dibenzofuran	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Diethylphthalate	SW-864 Method 8270B	µg/L	5

Semivolatile organics	Dimethylphthalate	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Fluroanthene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Fluorene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Hexachlorobenzene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Hexachlorobutadiene	SW-864 Method 8270B	µg/L	1
Semivolatile organics	Hexachlorocyclopentadiene	SW-864 Method 8270B	µg/L	10
Semivolatile organics	Hexachloroethane	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Indeno(1,2,3-cd)peryline	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Isophorone	SW-864 Method 8270B	µg/L	5
Semivolatile organics	1-Methylnaphthalene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	2-Methylnaphthalene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	N-Nitroso-di-n-propylamine	SW-864 Method 8270B	µg/L	5
Semivolatile organics	N-Nitrosodiphenylamine	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Napthtalene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Nitrobenzene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Pentachlorophenol	SW-864 Method 8270B	µg/L	10
Semivolatile organics	Phenanthrene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Phenol	SW-864 Method 8270B	µg/L	5
Semivolatile organics	Pyrene	SW-864 Method 8270B	µg/L	5

Target Compound List 1.5 for SVOCs by SW-846 Method 8270

Classification	Analyte name[1]	Method	Units	RL
Inorganics	Mercury	SW-846 Method 7470		
Inorganics	Arsenic	SW-846 Method 6010		
Inorganics	Silver	SW-846 Method 6010		
Inorganics	Aluminum	SW-846 Method 6010		
Inorganics	Barium	SW-846 Method 6010		
Inorganics	Beryllium	SW-846 Method 6010		
Inorganics	Calcium	SW-846 Method 6010		
Inorganics	Cadmium	SW-846 Method 6010		
Inorganics	Cobalt	SW-846 Method 6010		
Inorganics	Chromium	SW-846 Method 6010		
Inorganics	Copper	SW-846 Method 6010		
Inorganics	Iron	SW-846 Method 6010		
Inorganics	Mercury	SW-846 Method 6010		
Inorganics	Potassium	SW-846 Method 6010		
Inorganics	Magnesium	SW-846 Method 6010		
Inorganics	Manganese	SW-846 Method 6010		
Inorganics	Sodium	SW-846 Method 6010		
Inorganics	Nickel	SW-846 Method 6010		
Inorganics	Lead	SW-846 Method 6010		
Inorganics	Antimony	SW-846 Method 6010		
Inorganics	Selenium	SW-846 Method 6010		
Inorganics	Thallium	SW-846 Method 6010		
Inorganics	Vanadium	SW-846 Method 6010		
Inorganics	Zinc	SW-846 Method 6010		

** dilute elements only if necessary

[1] 23 TAL Metals

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

October 09, 2014

Dan Crawford
Navajo Refining Company
P.O. Box 159
Artesia, NM 88211-0159
TEL: (575) 748-3311
FAX

RE: Quarterly WDW-1, 2, &3 Inj Well OrderNo.: 1409594

Dear Dan Crawford:

Hall Environmental Analysis Laboratory received 1 sample(s) on 9/12/2014 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

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Case Narrative

WO#: **1409594**
Date: **10/9/2014**

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well

The following compounds were also scanned for by NIST library search and not detected. The detection level for these compounds would be ~10ppb:
Allyl alcohol
t-amyl ethyl ether
Bis(2-chloroethyl)sulfide
Bromoacetone
Chloral hydrate
1-chlorobutane
1-chlorohexane
2-chloroethanol
Crotonaldehyde
Cis-1,4-Dichloro-2butene
1,3-Dichloro-2-propanol
1,2,3,4-Depoxybutane
Ethanol
Ethylene oxide
Malonitrile
Methanol
Methyl acrylate
2-Nitropropane
Paraldehyde
Pentafluorobenzene
2-Pentanone
2-picoline
1-propanol
2-propanol
Propargyl alcohol
Beta-propiolactone
n-propylamine

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well
Lab ID: 1409594-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent
Collection Date: 9/11/2014 9:30:00 AM
Received Date: 9/12/2014 9:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGP**	
Fluoride	7.0	2.0	*	mg/L	20	9/13/2014 4:23:10 AM	R21201
Chloride	350	10		mg/L	20	9/13/2014 4:23:10 AM	R21201
Nitrogen, Nitrite (As N)	ND	0.50		mg/L	5	9/13/2014 4:10:46 AM	R21201
Bromide	ND	0.50		mg/L	5	9/13/2014 4:10:46 AM	R21201
Nitrogen, Nitrate (As N)	ND	0.50		mg/L	5	9/13/2014 4:10:46 AM	R21201
Phosphorus, Orthophosphate (As P	ND	10		mg/L	20	9/13/2014 4:23:10 AM	R21201
Sulfate	2500	50		mg/L	100	9/19/2014 12:23:58 AM	R21321
EPA METHOD 7470: MERCURY						Analyst: **MMD**	
Mercury	ND	0.00020		mg/L	1	9/18/2014 1:55:03 PM	15362
MERCURY, TCLP						Analyst: **JLF**	
Mercury	ND	0.020		mg/L	1	9/23/2014 11:17:20 AM	15428
EPA METHOD 6010B: TCLP METALS						Analyst: **ELS**	
Arsenic	ND	5.0		mg/L	1	9/20/2014 10:20:57 AM	15405
Barium	ND	100		mg/L	1	9/20/2014 10:20:57 AM	15405
Cadmium	ND	1.0		mg/L	1	9/20/2014 10:20:57 AM	15405
Chromium	ND	5.0		mg/L	1	9/20/2014 10:20:57 AM	15405
Lead	ND	5.0		mg/L	1	9/20/2014 10:20:57 AM	15405
Selenium	ND	1.0		mg/L	1	9/20/2014 10:20:57 AM	15405
Silver	ND	5.0		mg/L	1	9/25/2014 12:34:33 PM	15405
EPA 6010B: TOTAL METALS						Analyst: **ELS**	
Aluminum	0.18	0.020		mg/L	1	9/20/2014 9:40:32 AM	15405
Antimony	ND	0.050		mg/L	1	9/20/2014 9:40:32 AM	15405
Arsenic	0.061	0.020		mg/L	1	9/20/2014 9:40:32 AM	15405
Barium	0.022	0.020		mg/L	1	9/20/2014 9:40:32 AM	15405
Beryllium	ND	0.0030		mg/L	1	9/20/2014 9:40:32 AM	15405
Cadmium	ND	0.0020		mg/L	1	9/20/2014 9:40:32 AM	15405
Calcium	80	1.0		mg/L	1	9/20/2014 9:40:32 AM	15405
Chromium	ND	0.0060		mg/L	1	9/20/2014 9:40:32 AM	15405
Cobalt	ND	0.0060		mg/L	1	9/20/2014 9:40:32 AM	15405
Copper	ND	0.0060		mg/L	1	9/20/2014 9:40:32 AM	15405
Iron	0.50	0.050		mg/L	1	9/20/2014 9:40:32 AM	15405
Lead	ND	0.0050		mg/L	1	9/20/2014 9:40:32 AM	15405
Magnesium	28	1.0		mg/L	1	9/20/2014 9:40:32 AM	15405
Manganese	0.21	0.0020		mg/L	1	9/20/2014 9:40:32 AM	15405
Nickel	0.012	0.010		mg/L	1	9/20/2014 9:40:32 AM	15405
Potassium	58	1.0		mg/L	1	9/20/2014 9:40:32 AM	15405
Selenium	ND	0.050		mg/L	1	9/20/2014 9:40:32 AM	15405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well
Lab ID: 1409594-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent
Collection Date: 9/11/2014 9:30:00 AM
Received Date: 9/12/2014 9:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 6010B: TOTAL METALS						Analyst: **ELS**	
Silver	ND	0.0050		mg/L	1	9/23/2014 1:35:48 PM	15405
Thallium	ND	0.050		mg/L	1	9/20/2014 9:40:32 AM	15405
Titanium	ND	0.0050		mg/L	1	9/20/2014 9:40:32 AM	15405
Silica	9.8	1.1		mg/L	1	9/20/2014 9:40:32 AM	15405
EPA METHOD 8260B: VOLATILES						Analyst: **SUB**	
Acetonitrile	73	0.50		µg/L	1	9/24/2014	R21755
Allyl chloride	ND	0.50		µg/L	1	9/24/2014	R21755
Chloroprene	ND	0.50		µg/L	1	9/24/2014	R21755
Cyclohexane	ND	0.50		µg/L	1	9/24/2014	R21755
Diethyl ether	ND	0.50		µg/L	1	9/24/2014	R21755
Diisopropyl ether	ND	0.50		µg/L	1	9/24/2014	R21755
Epichlorohydrin	ND	5.0		µg/L	1	9/24/2014	R21755
Ethyl acetate	ND	0.50		µg/L	1	9/24/2014	R21755
Ethyl methacrylate	ND	0.50		µg/L	1	9/24/2014	R21755
Ethyl tert-butyl ether	ND	0.50		µg/L	1	9/24/2014	R21755
Freon-113	ND	0.50		µg/L	1	9/24/2014	R21755
Isobutanol	ND	50		µg/L	1	9/24/2014	R21755
Isopropyl acetate	ND	0.50		µg/L	1	9/24/2014	R21755
Methacrylonitrile	ND	0.50		µg/L	1	9/24/2014	R21755
Methyl acetate	ND	0.50		µg/L	1	9/24/2014	R21755
Methyl ethyl ketone	ND	2.5		µg/L	1	9/24/2014	R21755
Methyl isobutyl ketone	ND	2.5		µg/L	1	9/24/2014	R21755
Methyl methacrylate	ND	0.50		µg/L	1	9/24/2014	R21755
Methylcyclohexane	ND	1.0		µg/L	1	9/24/2014	R21755
n-Amyl acetate	ND	0.50		µg/L	1	9/24/2014	R21755
n-Hexane	ND	0.50		µg/L	1	9/24/2014	R21755
Nitrobenzene	ND	5.0		µg/L	1	9/24/2014	R21755
Pentachloroethane	ND	5.0		µg/L	1	9/24/2014	R21755
p-isopropyltoluene	ND	0.50		µg/L	1	9/24/2014	R21755
Propionitrile	0.97	0.50		µg/L	1	9/24/2014	R21755
Tetrahydrofuran	ND	0.50		µg/L	1	9/24/2014	R21755
Benzene	ND	0.50		µg/L	1	9/24/2014	R21755
Toluene	ND	0.50		µg/L	1	9/24/2014	R21755
Ethylbenzene	ND	0.50		µg/L	1	9/24/2014	R21755
Methyl tert-butyl ether (MTBE)	ND	10		µg/L	1	9/24/2014	R21755
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	9/24/2014	R21755
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	9/24/2014	R21755
1,2-Dichloroethane (EDC)	ND	0.50		µg/L	1	9/24/2014	R21755
1,2-Dibromoethane (EDB)	ND	0.50		µg/L	1	9/24/2014	R21755

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- O RSD is greater than RSDlimit
- P Sample pH greater than 2.
- R RPD outside accepted recovery limits
- RL Reporting Detection Limit
- S Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: WDW-1,2,&3 Effluent
Project: Quarterly WDW-1, 2, &3 Inj Well
Collection Date: 9/11/2014 9:30:00 AM
Lab ID: 1409594-001 **Matrix:** AQUEOUS **Received Date:** 9/12/2014 9:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **SUB**	
Naphthalene	ND	0.50		µg/L	1	9/24/2014	R21755
Acetone	18	2.5		µg/L	1	9/24/2014	R21755
Bromobenzene	ND	0.50		µg/L	1	9/24/2014	R21755
Bromodichloromethane	ND	0.50		µg/L	1	9/24/2014	R21755
Bromoform	ND	0.50		µg/L	1	9/24/2014	R21755
Bromomethane	ND	0.50		µg/L	1	9/24/2014	R21755
Carbon disulfide	0.56	0.50		µg/L	1	9/24/2014	R21755
Carbon Tetrachloride	ND	0.50		µg/L	1	9/24/2014	R21755
Chlorobenzene	ND	0.50		µg/L	1	9/24/2014	R21755
Chloroethane	ND	0.50		µg/L	1	9/24/2014	R21755
Chloroform	ND	0.50		µg/L	1	9/24/2014	R21755
Chloromethane	ND	0.50		µg/L	1	9/24/2014	R21755
2-Chlorotoluene	ND	0.50		µg/L	1	9/24/2014	R21755
4-Chlorotoluene	ND	0.50		µg/L	1	9/24/2014	R21755
cis-1,2-DCE	ND	0.50		µg/L	1	9/24/2014	R21755
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	9/24/2014	R21755
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	9/24/2014	R21755
Dibromochloromethane	ND	0.50		µg/L	1	9/24/2014	R21755
Dibromomethane	ND	0.50		µg/L	1	9/24/2014	R21755
1,2-Dichlorobenzene	ND	0.50		µg/L	1	9/24/2014	R21755
1,3-Dichlorobenzene	ND	0.50		µg/L	1	9/24/2014	R21755
1,4-Dichlorobenzene	ND	0.50		µg/L	1	9/24/2014	R21755
Dichlorodifluoromethane	ND	0.50		µg/L	1	9/24/2014	R21755
1,1-Dichloroethane	ND	0.50		µg/L	1	9/24/2014	R21755
1,1-Dichloroethene	ND	0.50		µg/L	1	9/24/2014	R21755
1,2-Dichloropropane	ND	0.50		µg/L	1	9/24/2014	R21755
1,3-Dichloropropane	ND	0.50		µg/L	1	9/24/2014	R21755
2,2-Dichloropropane	ND	0.50		µg/L	1	9/24/2014	R21755
1,1-Dichloropropene	ND	0.50		µg/L	1	9/24/2014	R21755
Hexachlorobutadiene	ND	0.50		µg/L	1	9/24/2014	R21755
2-Hexanone	ND	0.50		µg/L	1	9/24/2014	R21755
Isopropylbenzene	ND	0.50		µg/L	1	9/24/2014	R21755
4-Isopropyltoluene	ND	0.50		µg/L	1	9/24/2014	R21755
4-Methyl-2-pentanone	ND	0.50		µg/L	1	9/24/2014	R21755
Methylene Chloride	ND	2.5		µg/L	1	9/24/2014	R21755
n-Butylbenzene	ND	0.50		µg/L	1	9/24/2014	R21755
n-Propylbenzene	ND	0.50		µg/L	1	9/24/2014	R21755
sec-Butylbenzene	ND	0.50		µg/L	1	9/24/2014	R21755
Styrene	ND	0.50		µg/L	1	9/24/2014	R21755

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well
Lab ID: 1409594-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent
Collection Date: 9/11/2014 9:30:00 AM
Received Date: 9/12/2014 9:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: **SUB**
tert-Butylbenzene	ND	0.50		µg/L	1	9/24/2014	R21755
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	9/24/2014	R21755
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	9/24/2014	R21755
Tetrachloroethene (PCE)	ND	0.50		µg/L	1	9/24/2014	R21755
trans-1,2-DCE	ND	0.50		µg/L	1	9/24/2014	R21755
trans-1,3-Dichloropropene	ND	0.50		µg/L	1	9/24/2014	R21755
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	9/24/2014	R21755
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	9/24/2014	R21755
1,1,1-Trichloroethane	ND	0.50		µg/L	1	9/24/2014	R21755
1,1,2-Trichloroethane	ND	0.50		µg/L	1	9/24/2014	R21755
Trichloroethene (TCE)	ND	0.50		µg/L	1	9/24/2014	R21755
Trichlorofluoromethane	ND	0.50		µg/L	1	9/24/2014	R21755
1,2,3-Trichloropropane	ND	0.50		µg/L	1	9/24/2014	R21755
Vinyl chloride	ND	0.50		µg/L	1	9/24/2014	R21755
Xylenes, Total	ND	1.0		µg/L	1	9/24/2014	R21755
mp-Xylenes	ND	1.0		µg/L	1	9/24/2014	R21755
o-Xylene	ND	0.50		µg/L	1	9/24/2014	R21755
tert-Amyl methyl ether	ND	0.50		µg/L	1	9/24/2014	R21755
tert-Butyl alcohol	23	0.50		µg/L	1	9/24/2014	R21755
Acrolein	ND	0.50		µg/L	1	9/24/2014	R21755
Acrylonitrile	ND	10		µg/L	1	9/24/2014	R21755
Bromochloromethane	ND	0.50		µg/L	1	9/24/2014	R21755
2-Chloroethyl vinyl ether	ND	0.50		µg/L	1	9/24/2014	R21755
Iodomethane	ND	0.50		µg/L	1	9/24/2014	R21755
trans-1,4-Dichloro-2-butene	ND	0.50		µg/L	1	9/24/2014	R21755
Vinyl acetate	ND	0.50		µg/L	1	9/24/2014	R21755
1,4-Dioxane	ND	20		µg/L	1	9/24/2014	R21755
Surr: 1,2-Dichloroethane-d4	110	70-130		%REC	1	9/24/2014	R21755
Surr: 4-Bromofluorobenzene	99.6	70-130		%REC	1	9/24/2014	R21755
Surr: Toluene-d8	104	70-130		%REC	1	9/24/2014	R21755
EPA 8270C: SEMIVOLATILES/MOD							Analyst: **SUB**
1,1-Biphenyl	ND	5.0		µg/L	1	9/23/2014	R21755
Atrazine	ND	5.0		µg/L	1	9/23/2014	R21755
Benzaldehyde	ND	5.0		µg/L	1	9/23/2014	R21755
Caprolactam	ND	5.0		µg/L	1	9/23/2014	R21755
N-Nitroso-di-n-butylamine	ND	5.0		µg/L	1	9/23/2014	R21755
Acetophenone	ND	10		µg/L	1	9/23/2014	R21755
1-Methylnaphthalene	ND	10		µg/L	1	9/23/2014	R21755
2,3,4,6-Tetrachlorophenol	ND	10		µg/L	1	9/23/2014	R21755

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

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- E Value above quantitation range
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- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- O RSD is greater than RSDlimit
- P Sample pH greater than 2.
- R RPD outside accepted recovery limits
- RL Reporting Detection Limit
- S Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well
Lab ID: 1409594-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent
Collection Date: 9/11/2014 9:30:00 AM
Received Date: 9/12/2014 9:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 8270C: SEMIVOLATILES/MOD							Analyst: **SUB**
2,4,5-Trichlorophenol	ND	10		µg/L	1	9/23/2014	R21755
2,4,6-Trichlorophenol	ND	10		µg/L	1	9/23/2014	R21755
2,4-Dichlorophenol	ND	10		µg/L	1	9/23/2014	R21755
2,4-Dimethylphenol	ND	10		µg/L	1	9/23/2014	R21755
2,4-Dinitrophenol	ND	10		µg/L	1	9/23/2014	R21755
2,4-Dinitrotoluene	ND	10		µg/L	1	9/23/2014	R21755
2,6-Dinitrotoluene	ND	10		µg/L	1	9/23/2014	R21755
2-Chloronaphthalene	ND	10		µg/L	1	9/23/2014	R21755
2-Chlorophenol	ND	10		µg/L	1	9/23/2014	R21755
2-Methylnaphthalene	ND	10		µg/L	1	9/23/2014	R21755
2-Methylphenol	ND	10		µg/L	1	9/23/2014	R21755
2-Nitroaniline	ND	10		µg/L	1	9/23/2014	R21755
2-Nitrophenol	ND	10		µg/L	1	9/23/2014	R21755
3,3'-Dichlorobenzidine	ND	10		µg/L	1	9/23/2014	R21755
3-Nitroaniline	ND	10		µg/L	1	9/23/2014	R21755
4,6-Dinitro-2-methylphenol	ND	10		µg/L	1	9/23/2014	R21755
4-Bromophenyl phenyl ether	ND	10		µg/L	1	9/23/2014	R21755
4-Chloro-3-methylphenol	ND	5.0		µg/L	1	9/23/2014	R21755
4-Chloroaniline	ND	10		µg/L	1	9/23/2014	R21755
4-Chlorophenyl phenyl ether	ND	10		µg/L	1	9/23/2014	R21755
4-Nitroaniline	ND	10		µg/L	1	9/23/2014	R21755
4-Nitrophenol	ND	10		µg/L	1	9/23/2014	R21755
Acenaphthene	ND	10		µg/L	1	9/23/2014	R21755
Acenaphthylene	ND	10		µg/L	1	9/23/2014	R21755
Anthracene	ND	10		µg/L	1	9/23/2014	R21755
Benzo(g,h,i)perylene	ND	10		µg/L	1	9/23/2014	R21755
Benz(a)anthracene	ND	0.10		µg/L	1	9/23/2014	R21755
Benzo(a)pyrene	ND	0.10		µg/L	1	9/23/2014	R21755
Benzo(b)fluoranthene	ND	0.10		µg/L	1	9/23/2014	R21755
Benzo(k)fluoranthene	ND	0.10		µg/L	1	9/23/2014	R21755
Bis(2-chloroethoxy)methane	ND	10		µg/L	1	9/23/2014	R21755
Bis(2-chloroethyl)ether	ND	10		µg/L	1	9/23/2014	R21755
Bis(2-chloroisopropyl)ether	ND	10		µg/L	1	9/23/2014	R21755
Bis(2-ethylhexyl)phthalate	ND	5.0		µg/L	1	9/23/2014	R21755
Butyl benzyl phthalate	ND	10		µg/L	1	9/23/2014	R21755
Carbazole	ND	10		µg/L	1	9/23/2014	R21755
Chrysene	ND	0.10		µg/L	1	9/23/2014	R21755
Dibenz(a,h)anthracene	ND	0.10		µg/L	1	9/23/2014	R21755
Dibenzofuran	ND	10		µg/L	1	9/23/2014	R21755

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well
Lab ID: 1409594-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent
Collection Date: 9/11/2014 9:30:00 AM
Received Date: 9/12/2014 9:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 8270C: SEMIVOLATILES/MOD						Analyst: **SUB**	
Diethyl phthalate	ND	10		µg/L	1	9/23/2014	R21755
Dimethyl phthalate	ND	10		µg/L	1	9/23/2014	R21755
Di-n-butyl phthalate	ND	10		µg/L	1	9/23/2014	R21755
Di-n-octyl phthalate	ND	10		µg/L	1	9/23/2014	R21755
Fluoranthene	ND	10		µg/L	1	9/23/2014	R21755
Fluorene	ND	10		µg/L	1	9/23/2014	R21755
Hexachlorobenzene	ND	1.0		µg/L	1	9/23/2014	R21755
Hexachlorobutadiene	ND	10		µg/L	1	9/23/2014	R21755
Hexachlorocyclopentadiene	ND	10		µg/L	1	9/23/2014	R21755
Hexachloroethane	ND	10		µg/L	1	9/23/2014	R21755
Indeno(1,2,3-cd)pyrene	ND	5.0		µg/L	1	9/23/2014	R21755
Isophorone	ND	10		µg/L	1	9/23/2014	R21755
Naphthalene	ND	10		µg/L	1	9/23/2014	R21755
Nitrobenzene	ND	10		µg/L	1	9/23/2014	R21755
N-Nitrosodi-n-propylamine	ND	10		µg/L	1	9/23/2014	R21755
N-Nitrosodiphenylamine	ND	2.0		µg/L	1	9/23/2014	R21755
Pentachlorophenol	ND	10		µg/L	1	9/23/2014	R21755
Phenanthrene	ND	10		µg/L	1	9/23/2014	R21755
Phenol	ND	5.0		µg/L	1	9/23/2014	R21755
Pyrene	ND	10		µg/L	1	9/23/2014	R21755
o-Toluidine	ND	5.0		µg/L	1	9/23/2014	R21755
Pyridine	ND	5.0		µg/L	1	9/23/2014	R21755
1,2,4,5-Tetrachlorobenzene	ND	10		µg/L	1	9/23/2014	R21755
Surr: 2,4,6-Tribromophenol	80.2	10-123		%REC	1	9/23/2014	R21755
Surr: 2-Fluorobiphenyl	100	19-130		%REC	1	9/23/2014	R21755
Surr: 2-Fluorophenol	77.0	21-110		%REC	1	9/23/2014	R21755
Surr: Nitrobenzene-d5	91.2	25-130		%REC	1	9/23/2014	R21755
Surr: Phenol-d5	94.4	10-125		%REC	1	9/23/2014	R21755
Surr: Terphenyl-d14	39.9	33-141		%REC	1	9/23/2014	R21755
CORROSIVITY						Analyst: **SUB**	
pH	6.61			pH Units	1	9/18/2014	R21755
IGNITABILITY METHOD 1010						Analyst: **SUB**	
Ignitability	>200	0		°F	1	9/24/2014	R21755
CYANIDE, REACTIVE						Analyst: **SUB**	
Cyanide, Reactive	ND	1.00		mg/L	1	9/25/2014	R21755
SULFIDE, REACTIVE						Analyst: **SUB**	
Reactive Sulfide	ND	1.0		mg/L	1	9/30/2014	R21755

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well
Lab ID: 1409594-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent
Collection Date: 9/11/2014 9:30:00 AM
Received Date: 9/12/2014 9:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **JRR**	
Conductivity	5400	0.010		µmhos/cm	1	9/19/2014 8:48:13 PM	R21338
SM2320B: ALKALINITY						Analyst: **JRR**	
Bicarbonate (As CaCO3)	120	20		mg/L CaCO3	1	9/19/2014 8:48:13 PM	R21338
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	9/19/2014 8:48:13 PM	R21338
Total Alkalinity (as CaCO3)	120	20		mg/L CaCO3	1	9/19/2014 8:48:13 PM	R21338
SPECIFIC GRAVITY						Analyst: **SRM**	
Specific Gravity	1.001	0			1	9/23/2014 4:39:00 PM	R21384
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	4700	20.0	*	mg/L	1	9/17/2014 10:23:00 AM	15289

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R21201**	RunNo: **21201**
Prep Date:	Analysis Date: **9/12/2014**	SeqNo: **617354** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Bromide	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Phosphorus, Orthophosphate (As P	ND	0.50								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R21201**	RunNo: **21201**
Prep Date:	Analysis Date: **9/12/2014**	SeqNo: **617355** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.52	0.10	0.5000	0	104	90	110			
Chloride	4.9	0.50	5.000	0	97.9	90	110			
Nitrogen, Nitrite (As N)	0.97	0.10	1.000	0	97.0	90	110			
Bromide	2.4	0.10	2.500	0	96.4	90	110			
Nitrogen, Nitrate (As N)	2.6	0.10	2.500	0	103	90	110			
Phosphorus, Orthophosphate (As P	5.0	0.50	5.000	0	101	90	110			

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R21201**	RunNo: **21201**
Prep Date:	Analysis Date: **9/12/2014**	SeqNo: **617410** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Bromide	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Phosphorus, Orthophosphate (As P	ND	0.50								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R21201**	RunNo: **21201**
Prep Date:	Analysis Date: **9/12/2014**	SeqNo: **617411** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.52	0.10	0.5000	0	103	90	110			
Chloride	4.7	0.50	5.000	0	94.7	90	110			
Nitrogen, Nitrite (As N)	0.94	0.10	1.000	0	93.9	90	110			
Bromide	2.4	0.10	2.500	0	96.7	90	110			

Qualifiers:

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- B Analyte detected in the associated Method Blank
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- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R21201**	RunNo: **21201**
Prep Date:	Analysis Date: **9/12/2014**	SeqNo: **617411** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	99.1	90	110			
Phosphorus, Orthophosphate (As P	5.0	0.50	5.000	0	99.5	90	110			

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R21321**	RunNo: **21321**
Prep Date:	Analysis Date: **9/18/2014**	SeqNo: **622134** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R21321**	RunNo: **21321**
Prep Date:	Analysis Date: **9/18/2014**	SeqNo: **622135** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	9.6	0.50	10.00	0	96.2	90	110			

Qualifiers:

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- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
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- P Sample pH greater than 2.
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **MB-R21755**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R21755**	RunNo: **21755**
Prep Date:	Analysis Date: **9/24/2014**	SeqNo: **638768** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acetonitrile	ND	0.50								
Allyl chloride	ND	0.50								
Chloroprene	ND	0.50								
Cyclohexane	ND	0.50								
Diethyl ether	ND	0.50								
Diisopropyl ether	ND	0.50								
Epichlorohydrin	ND	0.50								
Ethyl acetate	ND	0.50								
Ethyl methacrylate	ND	0.50								
Ethyl tert-butyl ether	ND	0.50								
Freon-113	ND	0.50								
Isobutanol	ND	50								
Isopropyl acetate	ND	0.50								
Methacrylonitrile	ND	0.50								
Methyl acetate	ND	0.50								
Methyl ethyl ketone	ND	2.5								
Methyl isobutyl ketone	ND	2.5								
Methyl methacrylate	ND	0.50								
Methylcyclohexane	ND	1.0								
n-Amyl acetate	ND	0.50								
n-Hexane	ND	0.50								
Nitrobenzene	ND	0.50								
Pentachloroethane	ND	5.0								
p-isopropyltoluene	ND	0.50								
Propionitrile	ND	0.50								
Tetrahydrofuran	ND	0.50								
Benzene	ND	0.50								
Toluene	ND	0.50								
Ethylbenzene	ND	0.50								
Methyl tert-butyl ether (MTBE)	ND	10								
1,2,4-Trimethylbenzene	ND	0.50								
1,3,5-Trimethylbenzene	ND	0.50								
1,2-Dichloroethane (EDC)	ND	0.50								
1,2-Dibromoethane (EDB)	ND	0.50								
Naphthalene	ND	0.50								
Acetone	ND	2.5								
Bromobenzene	ND	0.50								
Bromodichloromethane	ND	0.50								
Bromoform	ND	0.50								

Qualifiers:

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- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
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- P Sample pH greater than 2.
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **MB-R21755**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R21755**	RunNo: **21755**
Prep Date:	Analysis Date: **9/24/2014**	SeqNo: **638768** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Bromomethane	ND	0.50								
Carbon disulfide	ND	0.50								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	0.50								
Chloroethane	ND	0.50								
Chloroform	ND	0.50								
Chloromethane	ND	0.50								
2-Chlorotoluene	ND	0.50								
4-Chlorotoluene	ND	0.50								
cis-1,2-DCE	ND	0.50								
cis-1,3-Dichloropropene	ND	0.50								
1,2-Dibromo-3-chloropropane	ND	0.50								
Dibromochloromethane	ND	0.50								
Dibromomethane	ND	0.50								
1,2-Dichlorobenzene	ND	0.50								
1,3-Dichlorobenzene	ND	0.50								
1,4-Dichlorobenzene	ND	0.50								
Dichlorodifluoromethane	ND	0.50								
1,1-Dichloroethane	ND	0.50								
1,1-Dichloroethene	ND	0.50								
1,2-Dichloropropane	ND	0.50								
1,3-Dichloropropane	ND	0.50								
2,2-Dichloropropane	ND	0.50								
1,1-Dichloropropene	ND	0.50								
Hexachlorobutadiene	ND	0.50								
2-Hexanone	ND	0.50								
Isopropylbenzene	ND	0.50								
4-Isopropyltoluene	ND	0.50								
4-Methyl-2-pentanone	ND	0.50								
Methylene Chloride	ND	2.5								
n-Butylbenzene	ND	0.50								
n-Propylbenzene	ND	0.50								
sec-Butylbenzene	ND	0.50								
Styrene	ND	0.50								
tert-Butylbenzene	ND	0.50								
1,1,1,2-Tetrachloroethane	ND	0.50								
1,1,2,2-Tetrachloroethane	ND	0.50								
Tetrachloroethene (PCE)	ND	0.50								
trans-1,2-DCE	ND	0.50								

Qualifiers:

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- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **MB-R21755**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R21755**	RunNo: **21755**
Prep Date:	Analysis Date: **9/24/2014**	SeqNo: **638768** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
trans-1,3-Dichloropropene	ND	0.50								
1,2,3-Trichlorobenzene	ND	0.50								
1,2,4-Trichlorobenzene	ND	0.50								
1,1,1-Trichloroethane	ND	0.50								
1,1,2-Trichloroethane	ND	0.50								
Trichloroethene (TCE)	ND	0.50								
Trichlorofluoromethane	ND	0.50								
1,2,3-Trichloropropane	ND	0.50								
Vinyl chloride	ND	0.50								
Xylenes, Total	ND	1.0								
mp-Xylenes	ND	1.0								
o-Xylene	ND	0.50								
tert-Amyl methyl ether	ND	0.50								
tert-Butyl alcohol	ND	0.50								
Acrolein	ND	0.50								
Acrylonitrile	ND	10								
Bromochloromethane	ND	0.50								
2-Chloroethyl vinyl ether	ND	0.50								
Iodomethane	ND	0.50								
trans-1,4-Dichloro-2-butene	ND	0.50								
Vinyl acetate	ND	0.50								
1,4-Dioxane	ND	20								

Sample ID **LCS-R21755**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R21755**	RunNo: **21755**
Prep Date:	Analysis Date: **9/24/2014**	SeqNo: **638769** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	9.9		10.00	0	99.2	80	120			
Toluene	10		10.00	0	102	80	120			
Ethylbenzene	10		10.00	0	99.6	80	120			
Chlorobenzene	9.9		10.00	0	99.3	80	120			
1,1-Dichloroethene	9.2		10.00	0	91.9	80	120			
Tetrachloroethene (PCE)	9.8		10.00	0	98.4	80	120			
Trichloroethene (TCE)	9.5		10.00	0	95.2	80	120			
o-Xylene	10		10.00	0	102	80	120			

Qualifiers:

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- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **MB-R21755**	SampType: **MBLK**	TestCode: **EPA 8270C: Semivolatiles/Mod**
Client ID: **PBW**	Batch ID: **R21755**	RunNo: **21755**
Prep Date:	Analysis Date: **9/23/2014**	SeqNo: **638842** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Biphenyl	ND	10								
Atrazine	ND	10								
Caprolactam	ND	10								
N-Nitroso-di-n-butylamine	ND	10								
Acetophenone	ND	10								
1-Methylnaphthalene	ND	10								
2,3,4,6-Tetrachlorophenol	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
2,4-Dichlorophenol	ND	10								
2,4-Dimethylphenol	ND	10								
2,4-Dinitrophenol	ND	10								
2,4-Dinitrotoluene	ND	10								
2,6-Dinitrotoluene	ND	10								
2-Chloronaphthalene	ND	10								
2-Chlorophenol	ND	10								
2-Methylnaphthalene	ND	10								
2-Methylphenol	ND	10								
2-Nitroaniline	ND	10								
2-Nitrophenol	ND	10								
3,3'-Dichlorobenzidine	ND	10								
3-Nitroaniline	ND	10								
4,6-Dinitro-2-methylphenol	ND	10								
4-Bromophenyl phenyl ether	ND	10								
4-Chloro-3-methylphenol	ND	5.0								
4-Chloroaniline	ND	10								
4-Chlorophenyl phenyl ether	ND	10								
4-Nitroaniline	ND	10								
4-Nitrophenol	ND	10								
Acenaphthene	ND	10								
Acenaphthylene	ND	10								
Anthracene	ND	10								
Benzo(g,h,i)perylene	ND	10								
Benz(a)anthracene	ND	0.10								
Benzo(a)pyrene	ND	0.10								
Benzo(b)fluoranthene	ND	0.10								
Benzo(k)fluoranthene	ND	0.10								
Bis(2-chloroethoxy)methane	ND	10								
Bis(2-chloroethyl)ether	ND	10								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **MB-R21755**	SampType: **MBLK**	TestCode: **EPA 8270C: Semivolatiles/Mod**
Client ID: **PBW**	Batch ID: **R21755**	RunNo: **21755**
Prep Date:	Analysis Date: **9/23/2014**	SeqNo: **638842** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Bis(2-chloroisopropyl)ether	ND	10								
Bis(2-ethylhexyl)phthalate	ND	5.0								
Butyl benzyl phthalate	ND	10								
Carbazole	ND	10								
Chrysene	ND	0.10								
Dibenz(a,h)anthracene	ND	0.10								
Dibenzofuran	ND	10								
Diethyl phthalate	ND	10								
Dimethyl phthalate	ND	10								
Di-n-butyl phthalate	ND	10								
Di-n-octyl phthalate	ND	10								
Fluoranthene	ND	10								
Fluorene	ND	10								
Hexachlorobenzene	ND	1.0								
Hexachlorobutadiene	ND	10								
Hexachlorocyclopentadiene	ND	10								
Hexachloroethane	ND	10								
Indeno(1,2,3-cd)pyrene	ND	10								
Isophorone	ND	10								
Naphthalene	ND	10								
Nitrobenzene	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodiphenylamine	ND	2.0								
Pentachlorophenol	ND	10								
Phenanthrene	ND	1.0								
Phenol	ND	5.0								
Pyrene	ND	10								
o-Toluidine	ND	10								
Pyridine	ND	10								
1,2,4,5-Tetrachlorobenzene	ND	10								

Sample ID **LCS-R21755**	SampType: **LCS**	TestCode: **EPA 8270C: Semivolatiles/Mod**
Client ID: **LCSW**	Batch ID: **R21755**	RunNo: **21755**
Prep Date:	Analysis Date: **9/23/2014**	SeqNo: **638843** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	3.1		5.000	0	61.2	49	134			
2-Chlorophenol	3.4		5.000	0	67.6	50	131			
4-Chloro-3-methylphenol	3.3		5.000	0	66.4	42	139			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **LCS-R21755**	SampType: **LCS**	TestCode: **EPA 8270C: Semivolatiles/Mod**
Client ID: **LCSW**	Batch ID: **R21755**	RunNo: **21755**
Prep Date:	Analysis Date: **9/23/2014**	SeqNo: **638843** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
4-Nitrophenol	2.6		5.000	0	53.0	19	137			
Acenaphthene	4.0		5.000	0	79.6	36	122			
Bis(2-ethylhexyl)phthalate	3.9		5.000	0	78.2	43	142			
N-Nitrosodi-n-propylamine	4.1		5.000	0	82.0	46	135			
Pentachlorophenol	2.5		5.000	0	49.6	22	138			
Phenol	3.7		5.000	0	73.4	45	134			
Pyrene	3.6		5.000	0	73.0	45	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID	**MB-15362**	SampType: **MBLK**		TestCode: **EPA Method 7470: Mercury**						
Client ID:	**PBW**	Batch ID: **15362**		RunNo: **21286**						
Prep Date:	**9/18/2014**	Analysis Date: **9/18/2014**		SeqNo: **621116**		Units: **mg/L**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-15362**	SampType: **LCS**		TestCode: **EPA Method 7470: Mercury**						
Client ID:	**LCSW**	Batch ID: **15362**		RunNo: **21286**						
Prep Date:	**9/18/2014**	Analysis Date: **9/18/2014**		SeqNo: **621117**		Units: **mg/L**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0053	0.00020	0.005000	0	105	80	120			

Sample ID	**1409594-001BMS**	SampType: **MS**		TestCode: **EPA Method 7470: Mercury**						
Client ID:	**WDW-1,2,&3 Effluen**	Batch ID: **15362**		RunNo: **21286**						
Prep Date:	**9/18/2014**	Analysis Date: **9/18/2014**		SeqNo: **621119**		Units: **mg/L**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0050	0.00020	0.005000	0	100	75	125			

Sample ID	**1409594-001BMSD**	SampType: **MSD**		TestCode: **EPA Method 7470: Mercury**						
Client ID:	**WDW-1,2,&3 Effluen**	Batch ID: **15362**		RunNo: **21286**						
Prep Date:	**9/18/2014**	Analysis Date: **9/18/2014**		SeqNo: **621120**		Units: **mg/L**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0050	0.00020	0.005000	0	101	75	125	0.392	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **MB-15428**	SampType: **MBLK**	TestCode: **MERCURY, TCLP**
Client ID: **PBW**	Batch ID: **15428**	RunNo: **21367**
Prep Date: **9/22/2014**	Analysis Date: **9/23/2014**	SeqNo: **623963** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID **LCS-15428**	SampType: **LCS**	TestCode: **MERCURY, TCLP**
Client ID: **LCSW**	Batch ID: **15428**	RunNo: **21367**
Prep Date: **9/22/2014**	Analysis Date: **9/23/2014**	SeqNo: **623964** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	98.4	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **MB-15405**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **15405**	RunNo: **21324**
Prep Date: **9/19/2014**	Analysis Date: **9/20/2014**	SeqNo: **626611** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								

Sample ID **LCS-15405**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **15405**	RunNo: **21324**
Prep Date: **9/19/2014**	Analysis Date: **9/20/2014**	SeqNo: **626612** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	106	80	120			
Barium	ND	100	0.5000	0	101	80	120			
Cadmium	ND	1.0	0.5000	0	102	80	120			
Chromium	ND	5.0	0.5000	0	100	80	120			
Lead	ND	5.0	0.5000	0	98.6	80	120			
Selenium	ND	1.0	0.5000	0	104	80	120			

Sample ID **MB-15405**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **15405**	RunNo: **21385**
Prep Date: **9/19/2014**	Analysis Date: **9/23/2014**	SeqNo: **626633** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Silver	ND	5.0								

Sample ID **LCS-15405**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **15405**	RunNo: **21385**
Prep Date: **9/19/2014**	Analysis Date: **9/23/2014**	SeqNo: **626634** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Silver	ND	5.0	0.1000	0	104	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **MB-15405**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Metals**
Client ID: **PBW**	Batch ID: **15405**	RunNo: **21324**
Prep Date: **9/19/2014**	Analysis Date: **9/20/2014**	SeqNo: **622303** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020								
Antimony	ND	0.050								
Arsenic	ND	0.020								
Barium	ND	0.020								
Beryllium	ND	0.0030								
Cadmium	ND	0.0020								
Calcium	ND	1.0								
Chromium	ND	0.0060								
Cobalt	ND	0.0060								
Copper	ND	0.0060								
Iron	ND	0.050								
Lead	ND	0.0050								
Magnesium	ND	1.0								
Manganese	ND	0.0020								
Nickel	ND	0.010								
Potassium	ND	1.0								
Selenium	ND	0.050								
Thallium	ND	0.050								
Titanium	ND	0.0050								
Silica	ND	1.1								

Sample ID **LCS-15405**	SampType: **LCS**	TestCode: **EPA 6010B: Total Metals**
Client ID: **LCSW**	Batch ID: **15405**	RunNo: **21324**
Prep Date: **9/19/2014**	Analysis Date: **9/20/2014**	SeqNo: **622304** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.57	0.020	0.5000	0	114	80	120			
Antimony	0.50	0.050	0.5000	0	100	80	120			
Arsenic	0.53	0.020	0.5000	0	106	80	120			
Barium	0.50	0.020	0.5000	0	101	80	120			
Beryllium	0.53	0.0030	0.5000	0	106	80	120			
Cadmium	0.51	0.0020	0.5000	0	102	80	120			
Calcium	52	1.0	50.00	0	105	80	120			
Chromium	0.50	0.0060	0.5000	0	100	80	120			
Cobalt	0.49	0.0060	0.5000	0	97.9	80	120			
Copper	0.51	0.0060	0.5000	0	102	80	120			
Iron	0.51	0.050	0.5000	0	101	80	120			
Lead	0.49	0.0050	0.5000	0	98.6	80	120			
Magnesium	52	1.0	50.00	0	103	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **LCS-15405**	SampType: **LCS**	TestCode: **EPA 6010B: Total Metals**
Client ID: **LCSW**	Batch ID: **15405**	RunNo: **21324**
Prep Date: **9/19/2014**	Analysis Date: **9/20/2014**	SeqNo: **622304** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.50	0.0020	0.5000	0	100	80	120			
Nickel	0.49	0.010	0.5000	0	98.7	80	120			
Potassium	49	1.0	50.00	0	98.1	80	120			
Selenium	0.52	0.050	0.5000	0	104	80	120			
Thallium	0.49	0.050	0.5000	0	97.7	80	120			
Titanium	0.52	0.0050	0.5000	0	104	80	120			
Silica	5.6	1.1	5.350	0	104	80	120			

Sample ID **MB-15405**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Metals**
Client ID: **PBW**	Batch ID: **15405**	RunNo: **21385**
Prep Date: **9/19/2014**	Analysis Date: **9/23/2014**	SeqNo: **624518** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Silver	ND	0.0050								

Sample ID **LCS-15405**	SampType: **LCS**	TestCode: **EPA 6010B: Total Metals**
Client ID: **LCSW**	Batch ID: **15405**	RunNo: **21385**
Prep Date: **9/19/2014**	Analysis Date: **9/23/2014**	SeqNo: **624519** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Silver	0.10	0.0050	0.1000	0	104	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **MB-R21755**	SampType: **MBLK**	TestCode: **CYANIDE, Reactive**							
Client ID: **PBW**	Batch ID: **R21755**	RunNo: **21755**							
Prep Date:	Analysis Date: **9/25/2014**	SeqNo: **639462**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cyanide, Reactive	ND	1.00								

Sample ID **LCS-R21755**	SampType: **LCS**	TestCode: **CYANIDE, Reactive**							
Client ID: **LCSW**	Batch ID: **R21755**	RunNo: **21755**							
Prep Date:	Analysis Date: **9/25/2014**	SeqNo: **639463**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cyanide, Reactive	0.487		0.5000	0	97.4	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **MB-R21755**	SampType: **MBLK**	TestCode: **SULFIDE, Reactive**							
Client ID: **PBW**	Batch ID: **R21755**	RunNo: **21755**							
Prep Date:	Analysis Date: **9/30/2014**	SeqNo: **639465**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Reactive Sulfide	ND	1.0								

Sample ID **LCS-R21755**	SampType: **LCS**	TestCode: **SULFIDE, Reactive**							
Client ID: **LCSW**	Batch ID: **R21755**	RunNo: **21755**							
Prep Date:	Analysis Date: **9/30/2014**	SeqNo: **639466**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Reactive Sulfide	0.16		0.2000	0	80.0	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **mb-1**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R21338**	RunNo: **21338**							
Prep Date:	Analysis Date: **9/19/2014**	SeqNo: **622910**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R21338**	RunNo: **21338**							
Prep Date:	Analysis Date: **9/19/2014**	SeqNo: **622911**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80	20	80.00	0	99.6	90	110			

Sample ID **mb-2**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R21338**	RunNo: **21338**							
Prep Date:	Analysis Date: **9/19/2014**	SeqNo: **622914**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-2**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R21338**	RunNo: **21338**							
Prep Date:	Analysis Date: **9/19/2014**	SeqNo: **622915**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	81	20	80.00	0	102	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **1409594-001ADUP**	SampType: **DUP**			TestCode: **Specific Gravity**					
Client ID: **WDW-1,2,&3 Effluen**	Batch ID: **R21384**			RunNo: **21384**					
Prep Date:	Analysis Date: **9/23/2014**			SeqNo: **624495**		Units:			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Specific Gravity	1.000	0						0.110	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1409594**

09-Oct-14

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID **MB-15289**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **15289**	RunNo: **21253**
Prep Date: **9/15/2014**	Analysis Date: **9/17/2014**	SeqNo: **619558** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **LCS-15289**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **15289**	RunNo: **21253**
Prep Date: **9/15/2014**	Analysis Date: **9/17/2014**	SeqNo: **619559** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1020	20.0	1000	0	102	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: NAVAJO REFINING COM Work Order Number: 1409594 RcptNo: 1

Received by/date: 09/12/14

Logged By: Lindsay Mangin 9/12/2014 9:45:00 AM

Completed By: Lindsay Mangin 9/12/2014 10:09:46 AM

Reviewed By: 09/12/14

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	Courier		

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 2 (1 2) (<2 or >12 unless noted)

Adjusted? no

Checked by: CS

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date:

By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

17. Additional remarks:

18. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	5.3	Good	Yes			

Chain of Custody Record

Client: Navajo Refining Co.	☐ Standar ☐ Rush	
	Project Name:	
Mailing Address: P.O. Box 159 Artesia,	Quarterly WDW-1, 2, & 3 Inj Well	
NM 88211-0159	Project #: P.O. # 167796	
Phone #: 575-748-3311		
email or Fax#: 575-746-5451	Project Manager:	
QA/QC Package: ☐ Standard ☐ Level 4 (Full Validation) ☐ Other ☐ EDD (Type)	Dan Crawford	
	Sampler: Steven URBAN	
	On Ice: ☑ Yes ☐ No	
	Sample Temperature: 5.3	

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1409534	Analysis Request: Specific Gravity, HCO3, CO3, Cl, SO4, TDS, pH, cond., Fl, Cation/anion bal., Br, Eh/40	VOCs/SW-846 Method 8260C (see attached list 'VOCs')	SVOCs/SW-846 Method 8270D (see attached list 'SVOCs')	R,C,I/40 CFR part 261	Metals/SW-846 Mthd 6010, 7470 (see attached list 'Metals')	Ca, K, Mg, Na/40 CFR 136.3	TCLP Metals, only /40 CFR Part 261/ SW-846 Method 1311
9/11/14	9:30	Liquid	WDW-1, 2, & 3 Effluent	3	Neat/H2SO4	-001	X						X
9/11/14	9:30	Liquid	WDW-1, 2, & 3 Effluent	1	HNO3	-001					X	X	
9/11/14	9:30	Liquid	WDW-1, 2, & 3 Effluent	3	HCL	-001		X					
9/11/14	9:30	Liquid	WDW-1, 2, & 3 Effluent	2	Neat	-001			X				
9/11/14	9:30	Liquid	WDW-1, 2, & 3 Effluent	2	Neat	-001				X			
~~9/11/14~~	~~9:30~~	~~Liquid~~	~~Trip Blank~~	~~2~~	~~Neat~~	-002	CS 09/12/14	X					
9/11/14	9:30	Liquid	Temperature Blank	1	Neat	-							

Date: 9-11-14	Time: 10:05	Relinquished by: Steven URBAN	Received by:	Date: 09/12/14	Time: 09:15
Date:	Time:	Relinquished by:	Received by:	Date:	Time:

Remarks: Report these results separately from all other Chain of Custody kits provided.

The trip blank sample was not recieved.
-CS 09/12/14

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

July 23, 2014

Dan Crawford
Navajo Refining Company
P.O. Box 159
Artesia, NM 88211-0159
TEL: (575) 748-3311
FAX

RE: RO Reject Biannual

OrderNo.: 1406952

Dear Dan Crawford:

Hall Environmental Analysis Laboratory received 2 sample(s) on 6/19/2014 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: RO Reject Biannual
Lab ID: 1406952-001 **Matrix:** AQUEOUS

Client Sample ID: RO Reject
Collection Date: 6/19/2014 8:45:00 AM
Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8082: PCB'S						Analyst: **SCC**	
Aroclor 1016	ND	1.0		µg/L	1	6/23/2014 2:56:46 PM	13828
Aroclor 1221	ND	1.0		µg/L	1	6/23/2014 2:56:46 PM	13828
Aroclor 1232	ND	1.0		µg/L	1	6/23/2014 2:56:46 PM	13828
Aroclor 1242	ND	1.0		µg/L	1	6/23/2014 2:56:46 PM	13828
Aroclor 1248	ND	1.0		µg/L	1	6/23/2014 2:56:46 PM	13828
Aroclor 1254	ND	1.0		µg/L	1	6/23/2014 2:56:46 PM	13828
Aroclor 1260	ND	1.0		µg/L	1	6/23/2014 2:56:46 PM	13828
Surr: Decachlorobiphenyl	62.4	33.2-131		%REC	1	6/23/2014 2:56:46 PM	13828
Surr: Tetrachloro-m-xylene	53.2	34.7-138		%REC	1	6/23/2014 2:56:46 PM	13828
EPA METHOD 8015D: DIESEL RANGE						Analyst: **BCN**	
Diesel Range Organics (DRO)	ND	1.0		mg/L	1	6/24/2014 3:40:24 PM	13837
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	6/24/2014 3:40:24 PM	13837
Surr: DNOP	104	62.7-145		%REC	1	6/24/2014 3:40:24 PM	13837
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	0.050		mg/L	1	6/23/2014 3:05:21 PM	R19452
Surr: BFB	104	70.9-130		%REC	1	6/23/2014 3:05:21 PM	R19452
EPA METHOD 300.0: ANIONS						Analyst: **JRR**	
Fluoride	2.3	2.0		mg/L	20	6/21/2014 12:55:06 AM	R19465
Chloride	36	10		mg/L	20	6/21/2014 12:55:06 AM	R19465
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	6/21/2014 12:42:42 AM	R19465
Nitrogen, Nitrate (As N)	1.2	0.10		mg/L	1	6/21/2014 12:42:42 AM	R19465
Sulfate	1200	25	*	mg/L	50	7/2/2014 5:17:56 AM	R19637
EPA METHOD 7470: MERCURY						Analyst: **MMD**	
Mercury	ND	0.00020		mg/L	1	6/26/2014 9:16:58 AM	13883
EPA METHOD 8260B: VOLATILES						Analyst: **SUB**	
Methyl isobutyl ketone	ND	2.5		µg/L	1	6/26/2014	R19960
p-isopropyltoluene	ND	0.50		µg/L	1	6/26/2014	R19960
Benzene	ND	0.50		µg/L	1	6/26/2014	R19960
Toluene	ND	0.50		µg/L	1	6/26/2014	R19960
Ethylbenzene	ND	0.50		µg/L	1	6/26/2014	R19960
Methyl tert-butyl ether (MTBE)	ND	0.50		µg/L	1	6/26/2014	R19960
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	6/26/2014	R19960
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	6/26/2014	R19960
1,2-Dichloroethane (EDC)	ND	0.50		µg/L	1	6/26/2014	R19960
1,2-Dibromoethane (EDB)	ND	0.50		µg/L	1	6/26/2014	R19960
Naphthalene	ND	0.50		µg/L	1	6/26/2014	R19960
Acetone	ND	2.5		µg/L	1	6/26/2014	R19960

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: RO Reject Biannual
Lab ID: 1406952-001 **Matrix:** AQUEOUS

Client Sample ID: RO Reject
Collection Date: 6/19/2014 8:45:00 AM
Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: **SUB**
Bromodichloromethane	ND	0.50		µg/L	1	6/26/2014	R19960
Bromoform	ND	0.50		µg/L	1	6/26/2014	R19960
Bromomethane	ND	0.50		µg/L	1	6/26/2014	R19960
2-Butanone	ND	5.0		µg/L	1	6/26/2014	R19960
Carbon disulfide	ND	0.50		µg/L	1	6/26/2014	R19960
Carbon Tetrachloride	ND	0.50		µg/L	1	6/26/2014	R19960
Chlorobenzene	ND	0.50		µg/L	1	6/26/2014	R19960
Chloroethane	ND	0.50		µg/L	1	6/26/2014	R19960
Chloroform	ND	0.50		µg/L	1	6/26/2014	R19960
Chloromethane	ND	0.50		µg/L	1	6/26/2014	R19960
cis-1,2-DCE	ND	0.50		µg/L	1	6/26/2014	R19960
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	6/26/2014	R19960
Dibromochloromethane	ND	0.50		µg/L	1	6/26/2014	R19960
1,1-Dichloroethane	ND	0.50		µg/L	1	6/26/2014	R19960
1,1-Dichloroethene	ND	0.50		µg/L	1	6/26/2014	R19960
1,2-Dichloropropane	ND	0.50		µg/L	1	6/26/2014	R19960
2-Hexanone	ND	2.5		µg/L	1	6/26/2014	R19960
Isopropylbenzene	ND	0.50		µg/L	1	6/26/2014	R19960
Methylene Chloride	ND	0.50		µg/L	1	6/26/2014	R19960
n-Butylbenzene	ND	0.50		µg/L	1	6/26/2014	R19960
n-Propylbenzene	ND	0.50		µg/L	1	6/26/2014	R19960
sec-Butylbenzene	ND	0.50		µg/L	1	6/26/2014	R19960
Styrene	ND	0.50		µg/L	1	6/26/2014	R19960
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	6/26/2014	R19960
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	6/26/2014	R19960
Tetrachloroethene (PCE)	ND	0.50		µg/L	1	6/26/2014	R19960
trans-1,2-DCE	ND	0.50		µg/L	1	6/26/2014	R19960
trans-1,3-Dichloropropene	ND	0.50		µg/L	1	6/26/2014	R19960
1,1,1-Trichloroethane	ND	0.50		µg/L	1	6/26/2014	R19960
1,1,2-Trichloroethane	ND	0.50		µg/L	1	6/26/2014	R19960
Trichloroethene (TCE)	ND	0.50		µg/L	1	6/26/2014	R19960
Vinyl chloride	ND	0.50		µg/L	1	6/26/2014	R19960
mp-Xylenes	ND	0.50		µg/L	1	6/26/2014	R19960
o-Xylene	ND	0.50		µg/L	1	6/26/2014	R19960
Surr: 1,2-Dichloroethane-d4	105	70-130		%REC	1	6/26/2014	R19960
Surr: 4-Bromofluorobenzene	100	70-130		%REC	1	6/26/2014	R19960
Surr: Toluene-d8	99.6	70-130		%REC	1	6/26/2014	R19960
EPA 8270D: SEMIVOLATILES							Analyst: **SUB**
1,1-Biphenyl	ND	0.50		µg/L	1	7/1/2014	R19987

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: RO Reject Biannual
Lab ID: 1406952-001 **Matrix:** AQUEOUS

Client Sample ID: RO Reject
Collection Date: 6/19/2014 8:45:00 AM
Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 8270D: SEMIVOLATILES							Analyst: **SUB**
1-Methylnaphthalene	ND	0.50		µg/L	1	7/1/2014	R19987
2-Methylnaphthalene	ND	0.50		µg/L	1	7/1/2014	R19987
Benzo(a)pyrene	ND	0.50		µg/L	1	7/1/2014	R19987
Naphthalene	ND	0.50		µg/L	1	7/1/2014	R19987
Phenol	ND	0.50		µg/L	1	7/1/2014	R19987
Surr: 2,4,6-Tribromophenol	83.4	53-122		%REC	1	7/1/2014	R19987
Surr: 2-Fluorobiphenyl	89.2	12-116		%REC	1	7/1/2014	R19987
Surr: 2-Fluorophenol	81.4	10-139		%REC	1	7/1/2014	R19987
Surr: Nitrobenzene-d5	96.8	68-118		%REC	1	7/1/2014	R19987
Surr: Phenol-d5	91.2	28-154		%REC	1	7/1/2014	R19987
Surr: Terphenyl-d14	86.5	52-144		%REC	1	7/1/2014	R19987
EPA 9014: TOTAL CYANIDE SUBBED							Analyst: **SUB**
Cyanide	ND	0.0100		mg/L	1	7/2/2014	R19963
EPA 6020: DISSOLVED METALS							Analyst: **SUB**
Uranium	0.0034	0.0010		mg/L	1	7/10/2014	R19962
Aluminum	ND	0.10		mg/L	1	7/10/2014	R19962
Arsenic	0.0012	0.0010		mg/L	1	7/10/2014	R19962
Barium	0.045	0.0010		mg/L	1	7/10/2014	R19962
Boron	ND	0.10		mg/L	1	7/10/2014	R19962
Cadmium	ND	0.0010		mg/L	1	7/10/2014	R19962
Calcium	460	1.0		mg/L	1	7/10/2014	R19962
Chromium	0.0016	0.0010		mg/L	1	7/10/2014	R19962
Cobalt	ND	0.0010		mg/L	1	7/10/2014	R19962
Iron	ND	0.10		mg/L	1	7/10/2014	R19962
Lead	ND	0.0010		mg/L	1	7/10/2014	R19962
Manganese	0.0013	0.0010		mg/L	1	7/10/2014	R19962
Molybdenum	0.0084	0.0010		mg/L	1	7/10/2014	R19962
Nickel	0.0013	0.0010		mg/L	1	7/10/2014	R19962
Potassium	1.4	1.0		mg/L	1	7/10/2014	R19962
Selenium	0.0076	0.0010		mg/L	1	7/10/2014	R19962
Silver	ND	0.0010		mg/L	1	7/10/2014	R19962
Sodium	39	0.10		mg/L	1	7/10/2014	R19962
Vanadium	0.0077	0.0010		mg/L	1	7/10/2014	R19962
Zinc	0.21	0.010		mg/L	1	7/10/2014	R19962
EPA 6020: TOTAL METALS							Analyst: **SUB**
Arsenic	0.0036	0.0010		mg/L	1	7/2/2014	R19961
Barium	0.054	0.010		mg/L	1	7/2/2014	R19961
Cadmium	ND	0.0010		mg/L	1	7/2/2014	R19961

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
E	Value above quantitation range
J	Analyte detected below quantitation limits
O	RSD is greater than RSDlimit
R	RPD outside accepted recovery limits
S	Spike Recovery outside accepted recovery limits
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2.
RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: RO Reject Biannual
Lab ID: 1406952-001 **Matrix:** AQUEOUS

Client Sample ID: RO Reject
Collection Date: 6/19/2014 8:45:00 AM
Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 6020: TOTAL METALS						Analyst: **SUB**	
Calcium	470	10		mg/L	1	7/2/2014	R19961
Chromium	ND	0.0010		mg/L	1	7/2/2014	R19961
Iron	ND	0.010		mg/L	1	7/2/2014	R19961
Lead	ND	0.0010		mg/L	1	7/2/2014	R19961
Manganese	ND	0.0010		mg/L	1	7/2/2014	R19961
Nickel	0.0016	0.0010		mg/L	1	7/2/2014	R19961
Potassium	1.2	1.0		mg/L	1	7/2/2014	R19961
Selenium	ND	0.010		mg/L	1	7/2/2014	R19961
Sodium	39	1.0		mg/L	1	7/2/2014	R19961
Vanadium	0.0075	0.0010		mg/L	1	7/2/2014	R19961
EPA 903.1: RA 226 AND EPA 904.0: RA 228-SUBBED						Analyst: **SUB**	
Radium-226	0.667	0.910		pCi/L	1	7/8/2014	R20034
Radium-226 ±	0.599	0.910		pCi/L	1	7/8/2014	R20034
Radium-228	-0.136	0.850		pCi/L	1	7/8/2014	R20034
Radium-228 ±	0.352	0.850		pCi/L	1	7/8/2014	R20034
SM4500-H+B: PH						Analyst: **JRR**	
pH	7.92	1.68	H	pH units	1	6/23/2014 3:50:31 PM	R19484
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	2460	20.0	*	mg/L	1	6/23/2014 12:40:00 PM	13819

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: RO Reject Biannual
Lab ID: 1406952-002
Client Sample ID: TRIP BLANK
Collection Date:
Matrix: TRIP BLANK
Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **SUB**	
Methyl isobutyl ketone	ND	2.5		µg/L	1	6/26/2014	R19960
p-isopropyltoluene	ND	0.50		µg/L	1	6/26/2014	R19960
Benzene	ND	0.50		µg/L	1	6/26/2014	R19960
Toluene	ND	0.50		µg/L	1	6/26/2014	R19960
Ethylbenzene	ND	0.50		µg/L	1	6/26/2014	R19960
Methyl tert-butyl ether (MTBE)	ND	0.50		µg/L	1	6/26/2014	R19960
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	6/26/2014	R19960
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	6/26/2014	R19960
1,2-Dichloroethane (EDC)	ND	0.50		µg/L	1	6/26/2014	R19960
1,2-Dibromoethane (EDB)	ND	0.50		µg/L	1	6/26/2014	R19960
Naphthalene	ND	0.50		µg/L	1	6/26/2014	R19960
Acetone	ND	2.5		µg/L	1	6/26/2014	R19960
Bromodichloromethane	ND	0.50		µg/L	1	6/26/2014	R19960
Bromoform	ND	0.50		µg/L	1	6/26/2014	R19960
Bromomethane	ND	0.50		µg/L	1	6/26/2014	R19960
2-Butanone	ND	5.0		µg/L	1	6/26/2014	R19960
Carbon disulfide	ND	0.50		µg/L	1	6/26/2014	R19960
Carbon Tetrachloride	ND	0.50		µg/L	1	6/26/2014	R19960
Chlorobenzene	ND	0.50		µg/L	1	6/26/2014	R19960
Chloroethane	ND	0.50		µg/L	1	6/26/2014	R19960
Chloroform	ND	0.50		µg/L	1	6/26/2014	R19960
Chloromethane	ND	0.50		µg/L	1	6/26/2014	R19960
cis-1,2-DCE	ND	0.50		µg/L	1	6/26/2014	R19960
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	6/26/2014	R19960
Dibromochloromethane	ND	0.50		µg/L	1	6/26/2014	R19960
1,1-Dichloroethane	ND	0.50		µg/L	1	6/26/2014	R19960
1,1-Dichloroethene	ND	0.50		µg/L	1	6/26/2014	R19960
1,2-Dichloropropane	ND	0.50		µg/L	1	6/26/2014	R19960
2-Hexanone	ND	2.5		µg/L	1	6/26/2014	R19960
Isopropylbenzene	ND	0.50		µg/L	1	6/26/2014	R19960
Methylene Chloride	ND	0.50		µg/L	1	6/26/2014	R19960
n-Butylbenzene	ND	0.50		µg/L	1	6/26/2014	R19960
n-Propylbenzene	ND	0.50		µg/L	1	6/26/2014	R19960
sec-Butylbenzene	ND	0.50		µg/L	1	6/26/2014	R19960
Styrene	ND	0.50		µg/L	1	6/26/2014	R19960
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	6/26/2014	R19960
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	6/26/2014	R19960
Tetrachloroethene (PCE)	ND	0.50		µg/L	1	6/26/2014	R19960
trans-1,2-DCE	ND	0.50		µg/L	1	6/26/2014	R19960

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: RO Reject Biannual
Lab ID: 1406952-002

Client Sample ID: TRIP BLANK
Collection Date:
Matrix: TRIP BLANK **Received Date:** 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: **SUB**
trans-1,3-Dichloropropene	ND	0.50		µg/L	1	6/26/2014	R19960
1,1,1-Trichloroethane	ND	0.50		µg/L	1	6/26/2014	R19960
1,1,2-Trichloroethane	ND	0.50		µg/L	1	6/26/2014	R19960
Trichloroethene (TCE)	ND	0.50		µg/L	1	6/26/2014	R19960
Vinyl chloride	ND	0.50		µg/L	1	6/26/2014	R19960
mp-Xylenes	ND	0.50		µg/L	1	6/26/2014	R19960
o-Xylene	ND	0.50		µg/L	1	6/26/2014	R19960
Surr: 1,2-Dichloroethane-d4	106	70-130		%REC	1	6/26/2014	R19960
Surr: 4-Bromofluorobenzene	100	70-130		%REC	1	6/26/2014	R19960
Surr: Toluene-d8	98.8	70-130		%REC	1	6/26/2014	R19960

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406952**

24-Jul-14

Client: Navajo Refining Company
Project: RO Reject Biannual

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R19637**	RunNo: **19637**
Prep Date:	Analysis Date: **7/1/2014**	SeqNo: **569566** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R19637**	RunNo: **19637**
Prep Date:	Analysis Date: **7/1/2014**	SeqNo: **569567** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	9.4	0.50	10.00	0	93.7	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406952**

24-Jul-14

Client: Navajo Refining Company

Project: RO Reject Biannual

Sample ID **LCS-13837**	SampType: **LCS**			TestCode: **EPA Method 8015D: Diesel Range**					
Client ID: **LCSW**	Batch ID: **13837**			RunNo: **19466**					
Prep Date: **6/23/2014**	Analysis Date: **6/24/2014**			SeqNo: **563499**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	5.9	1.0	5.000	0	117	78.6	146			
Surr: DNOP	0.55		0.5000		109	62.7	145			

Sample ID **LCSD-13837**	SampType: **LCSD**			TestCode: **EPA Method 8015D: Diesel Range**					
Client ID: **LCSS02**	Batch ID: **13837**			RunNo: **19466**					
Prep Date: **6/23/2014**	Analysis Date: **6/24/2014**			SeqNo: **563501**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	5.4	1.0	5.000	0	109	78.6	146	7.80	26.5	
Surr: DNOP	0.50		0.5000		101	62.7	145	0	0	

Qualifiers:

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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406952**

24-Jul-14

Client: Navajo Refining Company

Project: RO Reject Biannual

Sample ID **5ML RB**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBW**	Batch ID: **R19452**	RunNo: **19452**
Prep Date:	Analysis Date: **6/23/2014**	SeqNo: **562717** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	0.050								
Surr: BFB	20		20.00		102	70.9	130			

Sample ID **2.5UG GRO LCS**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSW**	Batch ID: **R19452**	RunNo: **19452**
Prep Date:	Analysis Date: **6/23/2014**	SeqNo: **562718** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.54	0.050	0.5000	0	107	80	120			
Surr: BFB	22		20.00		108	70.9	130			

Sample ID **1406952-001BMS**	SampType: **MS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **RO Reject**	Batch ID: **R19452**	RunNo: **19452**
Prep Date:	Analysis Date: **6/23/2014**	SeqNo: **562727** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.55	0.050	0.5000	0	111	79	121			
Surr: BFB	22		20.00		109	70.9	130			

Sample ID **1406952-001BMSD**	SampType: **MSD**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **RO Reject**	Batch ID: **R19452**	RunNo: **19452**
Prep Date:	Analysis Date: **6/23/2014**	SeqNo: **562728** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.52	0.050	0.5000	0	105	79	121	5.68	20	
Surr: BFB	22		20.00		110	70.9	130	0	0	

Qualifiers:

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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406952**

24-Jul-14

Client: Navajo Refining Company

Project: RO Reject Biannual

Sample ID **MB-13828**	SampType: **MBLK**	TestCode: **EPA Method 8082: PCB's**
Client ID: **PBW**	Batch ID: **13828**	RunNo: **19446**
Prep Date: **6/23/2014**	Analysis Date: **6/23/2014**	SeqNo: **562489** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	ND	1.0								
Aroclor 1221	ND	1.0								
Aroclor 1232	ND	1.0								
Aroclor 1242	ND	1.0								
Aroclor 1248	ND	1.0								
Aroclor 1254	ND	1.0								
Aroclor 1260	ND	1.0								
Surr: Decachlorobiphenyl	2.1		2.500		84.0	33.2	131			
Surr: Tetrachloro-m-xylene	1.8		2.500		73.6	34.7	138			

Sample ID **LCS-13828**	SampType: **LCS**	TestCode: **EPA Method 8082: PCB's**
Client ID: **LCSW**	Batch ID: **13828**	RunNo: **19446**
Prep Date: **6/23/2014**	Analysis Date: **6/23/2014**	SeqNo: **562491** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	3.1	1.0	5.000	0	61.8	15	134			
Aroclor 1260	3.8	1.0	5.000	0	76.0	32.1	148			
Surr: Decachlorobiphenyl	2.0		2.500		79.2	33.2	131			
Surr: Tetrachloro-m-xylene	1.8		2.500		74.0	34.7	138			

Qualifiers:

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- P Sample pH greater than 2.
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406952**

24-Jul-14

Client: Navajo Refining Company

Project: RO Reject Biannual

Sample ID **MB-R19960**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R19960**	RunNo: **19960**
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **580732** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl isobutyl ketone	ND	2.5								
Benzene	ND	0.50								
Toluene	ND	0.50								
Ethylbenzene	ND	0.50								
1,2-Dichloroethane (EDC)	ND	0.50								
1,2-Dibromoethane (EDB)	ND	0.50								
Acetone	ND	2.5								
Bromodichloromethane	ND	0.50								
Bromoform	ND	0.50								
Bromomethane	ND	0.50								
2-Butanone	ND	2.5								
Carbon disulfide	ND	0.50								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	0.50								
Chloroethane	ND	0.50								
Chloroform	ND	0.50								
Chloromethane	ND	0.50								
cis-1,2-DCE	ND	0.50								
cis-1,3-Dichloropropene	ND	0.50								
Dibromochloromethane	ND	0.50								
1,1-Dichloroethane	ND	0.50								
1,1-Dichloroethene	ND	0.50								
1,2-Dichloropropane	ND	0.50								
2-Hexanone	ND	0.50								
Methylene Chloride	ND	0.50								
Styrene	ND	0.50								
1,1,2,2-Tetrachloroethane	ND	0.50								
Tetrachloroethene (PCE)	ND	0.50								
trans-1,2-DCE	ND	0.50								
trans-1,3-Dichloropropene	ND	0.50								
1,1,1-Trichloroethane	ND	0.50								
1,1,2-Trichloroethane	ND	0.50								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.50								
mp-Xylenes	ND	0.50								
o-Xylene	ND	0.50								

Qualifiers:

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- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406952**

24-Jul-14

Client: Navajo Refining Company

Project: RO Reject Biannual

Sample ID **LCS-R19960**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R19960**	RunNo: **19960**
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **580733** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	9.6	0.50	10.00	0	95.5	80	120			
Toluene	9.8	0.50	10.00	0	98.2	80	120			
Ethylbenzene	10	0.50	10.00	0	99.9	80	120			
Chlorobenzene	9.8	0.50	10.00	0	97.5	80	120			
1,1-Dichloroethene	9.5	0.50	10.00	0	94.9	80	120			
Tetrachloroethene (PCE)	9.9	0.50	10.00	0	98.9	80	120			
Trichloroethene (TCE)	9.9	0.50	10.00	0	98.8	80	120			
o-Xylene	10	0.50	10.00	0	102	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
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- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406952**

24-Jul-14

Client: Navajo Refining Company

Project: RO Reject Biannual

Sample ID **MB-R19987**	SampType: **MBLK**	TestCode: **EPA 8270D: Semivolatiles**
Client ID: **PBW**	Batch ID: **R19987**	RunNo: **19987**
Prep Date:	Analysis Date: **7/1/2014**	SeqNo: **580823** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Biphenyl	ND	0.50								
1-Methylnaphthalene	ND	0.50								
2-Methylnaphthalene	ND	0.50								
Benzo(a)pyrene	ND	0.50								
Naphthalene	ND	0.50								
Phenol	ND	0.50								

Sample ID **LCS-R19987**	SampType: **LCS**	TestCode: **EPA 8270D: Semivolatiles**
Client ID: **LCSW**	Batch ID: **R19987**	RunNo: **19987**
Prep Date:	Analysis Date: **7/1/2014**	SeqNo: **580824** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylnaphthalene	5.2	0.50	5.000	0	104	56	128			
Phenol	6.3	0.50	5.000	0	126	45	134			

Qualifiers:

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- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406952**

24-Jul-14

Client: Navajo Refining Company

Project: RO Reject Biannual

Sample ID **MB-R19963**	SampType: **MBLK**	TestCode: **EPA 9014: Total Cyanide Subbed**
Client ID: **PBW**	Batch ID: **R19963**	RunNo: **19963**
Prep Date:	Analysis Date: **7/2/2014**	SeqNo: **579949** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cyanide	ND	0.0100								

Sample ID **LCS-R19963**	SampType: **LCS**	TestCode: **EPA 9014: Total Cyanide Subbed**
Client ID: **LCSW**	Batch ID: **R19963**	RunNo: **19963**
Prep Date:	Analysis Date: **7/2/2014**	SeqNo: **579950** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cyanide	0.507		0.5000	0	101	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
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- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406952**

24-Jul-14

Client: Navajo Refining Company

Project: RO Reject Biannual

Sample ID **MB-13883**	SampType: **MBLK**	TestCode: **EPA Method 7470: Mercury**
Client ID: **PBW**	Batch ID: **13883**	RunNo: **19515**
Prep Date: **6/25/2014**	Analysis Date: **6/26/2014**	SeqNo: **564933** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID **LCS-13883**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **13883**	RunNo: **19515**
Prep Date: **6/25/2014**	Analysis Date: **6/26/2014**	SeqNo: **564934** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0046	0.00020	0.005000	0	92.4	80	120			

Qualifiers:

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- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
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- ND Not Detected at the Reporting Limit
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1406952

24-Jul-14

Client: Navajo Refining Company

Project: RO Reject Biannual

Sample ID **MB-R19962**	SampType: **MBLK**	TestCode: **EPA 6020: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R19962**	RunNo: **19962**
Prep Date:	Analysis Date: **7/10/2014**	SeqNo: **580889** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.10								
Arsenic	ND	0.0010								
Barium	ND	0.0010								
Boron	ND	0.10								
Cadmium	ND	0.0010								
Calcium	ND	1.0								
Chromium	ND	0.0010								
Cobalt	ND	0.0010								
Iron	ND	0.10								
Lead	ND	0.0010								
Manganese	ND	0.0010								
Molybdenum	ND	0.0010								
Nickel	ND	0.0010								
Potassium	ND	1.0								
Selenium	ND	0.0010								
Silver	ND	0.0010								
Sodium	ND	0.10								
Uranium	ND	0.0010								
Vanadium	ND	0.0010								
Zinc	ND	0.010								

Sample ID **LCS-R19962**	SampType: **LCS**	TestCode: **EPA 6020: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R19962**	RunNo: **19962**
Prep Date:	Analysis Date: **7/10/2014**	SeqNo: **580890** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.20	0.10	0.2000	0	98.5	80	120			
Arsenic	0.050	0.0010	0.05000	0	101	80	120			
Barium	0.050	0.0010	0.05000	0	99.0	80	120			
Boron	0.050	0.050	0.05000	0	100	80	120			
Cadmium	0.050	0.0010	0.05000	0	101	80	120			
Calcium	10	1.0	10.00	0	104	80	120			
Chromium	0.046	0.0010	0.05000	0	92.6	80	120			
Cobalt	0.048	0.0010	0.05000	0	96.0	80	120			
Iron	0.19	0.10	0.2000	0	95.5	80	120			
Lead	0.051	0.0010	0.05000	0	101	80	120			
Manganese	0.045	0.0010	0.05000	0	90.6	80	120			
Molybdenum	0.048	0.0010	0.05000	0	97.0	80	120			
Nickel	0.047	0.0010	0.05000	0	93.8	80	120			

Qualifiers:

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- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
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- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406952**

24-Jul-14

Client: Navajo Refining Company

Project: RO Reject Biannual

Sample ID	**LCS-R19962**	SampType:	**LCS**	TestCode:	**EPA 6020: Dissolved Metals**
Client ID:	**LCSW**	Batch ID:	**R19962**	RunNo:	**19962**
Prep Date:		Analysis Date:	**7/10/2014**	SeqNo:	**580890**
Units:	**mg/L**				

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	10	1.0	10.00	0	105	80	120			
Selenium	0.050	0.0010	0.05000	0	99.8	80	120			
Silver	0.049	0.0010	0.05000	0	98.6	80	120			
Sodium	10	0.10	10.00	0	105	80	120			
Uranium	0.048	0.0010	0.05000	0	95.4	80	120			
Vanadium	0.047	0.0010	0.05000	0	94.6	80	120			
Zinc	0.050	0.010	0.05000	0	100	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406952**

24-Jul-14

Client: Navajo Refining Company

Project: RO Reject Biannual

Sample ID **MB-R19961**	SampType: **MBLK**	TestCode: **EPA 6020: Total Metals**
Client ID: **PBW**	Batch ID: **R19961**	RunNo: **19961**
Prep Date:	Analysis Date: **7/2/2014**	SeqNo: **579946** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.0010								
Barium	ND	0.0010								
Cadmium	ND	0.0010								
Calcium	ND	0.10								
Chromium	ND	0.0010								
Iron	ND	0.010								
Lead	ND	0.0010								
Manganese	ND	0.0010								
Nickel	ND	0.0010								
Potassium	ND	0.10								
Selenium	ND	0.0010								
Sodium	ND	0.10								
Vanadium	ND	0.0010								

Sample ID **LCS-R19961**	SampType: **LCS**	TestCode: **EPA 6020: Total Metals**
Client ID: **LCSW**	Batch ID: **R19961**	RunNo: **19961**
Prep Date:	Analysis Date: **7/2/2014**	SeqNo: **579947** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.051		0.05000	0	102	80	120			
Barium	0.052		0.05000	0	104	80	120			
Cadmium	0.053		0.05000	0	106	80	120			
Calcium	9.6		10.00	0	96.5	80	120			
Chromium	0.048		0.05000	0	95.6	80	120			
Iron	0.19		0.2000	0	95.5	80	120			
Lead	0.051		0.05000	0	102	80	120			
Manganese	0.048		0.05000	0	96.2	80	120			
Nickel	0.048		0.05000	0	96.4	80	120			
Potassium	9.6		10.00	0	95.8	80	120			
Selenium	0.050		0.05000	0	99.6	80	120			
Sodium	9.7		10.00	0	97.3	80	120			
Vanadium	0.050		0.05000	0	99.4	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406952**

24-Jul-14

Client: Navajo Refining Company

Project: RO Reject Biannual

Sample ID **MB-R20034**	SampType: **MBLK**	TestCode: **EPA 903.1: Ra 226 and EPA 904.0: Ra 228-Subbed**
Client ID: **PBW**	Batch ID: **R20034**	RunNo: **20034**
Prep Date:	Analysis Date: **7/8/2014**	SeqNo: **582232** Units: **pCi/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Radium-226	-0.228	0.945								
Radium-226 ±	0.511	0.945								
Radium-228	0.00147	0.771								
Radium-228 ±	0.330	0.771								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406952**

24-Jul-14

Client: Navajo Refining Company

Project: RO Reject Biannual

Sample ID **MB-13819**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **13819**	RunNo: **19434**
Prep Date: **6/20/2014**	Analysis Date: **6/23/2014**	SeqNo: **562122** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **LCS-13819**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **13819**	RunNo: **19434**
Prep Date: **6/20/2014**	Analysis Date: **6/23/2014**	SeqNo: **562123** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1020	20.0	1000	0	102	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: NAVAJO REFINING CO Work Order Number: 1406952 RcptNo: 1

Received by/date: 06/19/14

Logged By: Lindsay Mangin 6/19/2014 2:35:00 PM

Completed By: Lindsay Mangin 6/20/2014 7:35:39 AM

Reviewed By: CS 06/20/14

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ✔
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present
3. How was the sample delivered?	Courier		

Log In

4. Was an attempt made to cool the samples?	Yes ✔	No	NA
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ✔	No	NA
6. Sample(s) in proper container(s)?	Yes ✔	No	
7. Sufficient sample volume for indicated test(s)?	Yes ✔	No	
8. Are samples (except VOA and ONG) properly preserved?	Yes ✔	No ✔ CS 06/20/14	
9. Was preservative added to bottles?	Yes ✔	No	NA
10. VOA vials have zero headspace?	Yes	No	No VOA Vials ✔
11. Were any sample containers received broken?	Yes ☐	No ✔	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ✔	No	# of preserved bottles checked for pH: 5, 1 (<2 or >12 unless noted)
13. Are matrices correctly identified on Chain of Custody?	Yes ✔	No	Adjusted? yes
14. Is it clear what analyses were requested?	Yes ✔	No	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ✔	No	Checked by: CS

RAD analysis: Added 1 ml HNO_3 to ~001 L (2 of 2) for an acceptable pH. Also poured off from the Hg bottle into a 500ml w HNO_3 bottle for ICP_TW analysis. — CS 06/20/14

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ✔

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.4	Good	Yes			

Chain-of-Custody Record

Client: Navajo Refining Co.

Mailing Address: P.O. Box 159 Artesia,

NM 88211-0159

Phone #: 575-748-3311

email or Fax#: 575-746-5451

QA/QC Package:

☐ Standard ☐ Level 4 (Full Validation)

Accreditation:

☐ NELAP ☐ Other_____

☐ EDD (Type) _____

Turn-Around Time:

X Standard ☐ Rush_____

Project Name:

RO Reject Biannual

Project #: P.O. # 167796

Project Manager:

Dan Crawford

Sampler: Robert Parra

On Ice: ☑ Yes ☐ No

Sample Temperature: 2.4

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No 1406952	pH	8015 GRO	6020 total metals	7470 Hg	6020 Dissolved Metals	Cyanide	Cl, F, S04, NO2/NO3	TDS	Radium 226/228	8260 see attached list	8270 see attached list	8082 PCBs	8015 DRO	Air Bubbles (Y or N)
6/19/14	8:45Am	AQ	RO REJECT	2 - 500ml P	1-unpres 1-H2SO4	-001	x						x	x						
6/19/14	8:45Am			3-40ml VOA	HCL			x												
6/19/14	8:45Am			1-500ml P	HNO3				x	x										
6/19/14	8:45Am			1-125ml P	HNO3						x									
6/19/14	8:45Am			1-500ml P	NaOH							x								
6/19/14	8:45Am			2- 1L P	HNO3										x					
6/19/14	8:45Am			3-40ml VOA	HCL											x				
6/19/14	8:45Am			2 - 1L Glass	unpres												x			
6/19/14	8:45Am			1 - 1L Glass	unpres													x		
6/19/14	8:45Am			2-40ml VOA	unpres															
			Trip Blank	2-40ml VOA	HCL	-002										x				

Date:	Time:	Relinquished by:	Received by:	Date	Time
6/19/14	8:45Am	Robert Parra		06/19/14	1435
Date:	Time:	Relinquished by:	Received by:	Date	Time

Remarks: 6020 Total Metals - As,Ba,Cd,Ca,Cr,Fe,Pb,Mn,Ni,K,Se,Na,V 6020 Dissolved metals - Al,As,Ba,B,Cd,Ca,Cr,Co,Fe,Pb,Mn,Mo,Ni,K,Se,Ag,Na,U,V,Zn

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

APPENDIX D

FLUIDS AND PRESSURE CALCULATIONS

APPENDIX D-1

PREDICTW EQUATIONS

Mathematical Basis of Equations Used in Modeling Pressure Buildup

The following discussion reviews the mathematical and physical basis of determining reservoir pressure buildup. The model presented is based on the line source solution to the radial diffusivity equation for pressure behavior in a homogeneous reservoir. The model was implemented using the Visual Basic program PredictW.

Exponential-Integral Formulation

The pressure response for radial flow of a slightly compressible fluid in a planar (porous) injection layer with spatially-constant properties is determined by the well known diffusivity equation (Lee, 1982):

$$\frac{\partial^2 p}{\partial r^2} + \frac{1}{r}\frac{\partial p}{\partial r} = \frac{\phi \mu c_t}{0.000264\, k}\frac{\partial p}{\partial t} \qquad \text{Equation 1}$$

where ϕ, μ, c_t, and k refer to porosity, viscosity (cp), compressibility (psi^{-1}), and permeability (md), respectively. The pressure, p, is expressed in psi; radial distance, r, is in feet; and time, t, is indicated in days. For an infinite reservoir of thickness h (ft) with $p \rightarrow p_o$ (initial pressure) as $r \rightarrow \infty$, the transient pressure, p (r, t), for a single line source injector at r = 0 is determined from Equation 1 as (Muskat, 1982):

$$p(r,t) = p_o - \frac{70.6\, q\mu}{kh}\, Ei\left(\frac{-39.5\phi\mu c_t r^2}{kt}\right), \qquad \text{Equation 2}$$

where Ei represents the exponential integral defined by:

$$Ei(-x) = -\int_x^{\infty} \frac{e^{-\varepsilon}}{\varepsilon}\, d\varepsilon \qquad \text{Equation 3}$$

and q represents the (constant) injection rate in barrels per day.

For the general case of multiple wells in a single layer, in which injection from each is represented by a succession of piece-wise constant flow rate intervals, the pressure response is readily obtained by superposition of elementary solutions

given by Equation 2. In terms of Cartesian coordinates, the pressure transient at an arbitrary point (x, y) at time "t" is given by:

$$p(x,y,t) = p_o + \sum_{j=1}^{N} \frac{70.6 q_1^j \mu}{kh} \mathrm{Ei}\left(\frac{-39.5\phi\mu c_t[(x-x_j)^2 + (y-y_j)^2]}{kt}\right)$$
$$+ \sum_{j=1}^{N} \sum_{i=1}^{n_{j-1}} 70.6[(q_{i-1}^j - q_i^j)\mu/kh] \mathrm{Ei}\left(\frac{-39.5\phi\mu c_t[(x-x_j)^2 + (y-y_j)^2]}{k(t-t_i^j)}\right)$$

Equation 4

for all $t_i^j < t$. In Equation 4, the following notation is employed:

N	=	number of wells injecting into the reservoir
n_j	=	number of constant flow rate increments for well j operative over time t
i	=	flow rate summation index ($1 < i < n_j$)
j	=	well number summation index ($1 < j < N$)
t_i	=	cumulative time corresponding to the end of injection rate interval i for well j
x_j, y_j	=	cartesian coordinates of well j
q_i^j	=	flow rate from well j during flow increment i

Equation 4 forms the basis for determining the COI for a general multi-well system.

To determine shutin or flowing pressures at a generic wellbore location, Equation 4 is modified to include a dimensionless skin factor, s_b, which reflects the effects of altered properties in the near-wellbore region (Van Everdingen, 1953). The associated augmentation, Δp_{skin}^b, of the theoretical flowing pressure is assumed to be of the form:

$$\Delta p_{skin}^b \text{ (psi)} = 141.2 \frac{q_i^b \mu}{kh} s_b$$

Equation 5

Incorporation of Equation 5 into Equation 4 and replacement of the quantity $[(x-x_b)^2 + (y-y_b)^2]$ in the Ei-function argument by $r^2_{w,b}$ (wellbore radius squared) leads to the following expression for the transient flowing pressure at a generic wellbore (b):

$$p^b_{wf}(x_b,y_b,t) = p_o + \sum_{j=1}^{N} \frac{70.6q^j_1\mu}{kh} Ei\left(\frac{-39.5\phi\mu c_t[(x_b-x_j)^2+(y_b-y_j)^2]}{kt}\right)$$
$$+ \sum_{j=1(j\neq b)}^{N} \sum_{i=1}^{n_{j-1}} \frac{70.6(q^j_{i+1}-q^j_i)\mu}{kh} Ei\left(\frac{-39.5\phi\mu c_t[x_b-x_j)^2+(y_b-y_j)^2]}{k(t-t^j_i)}\right)$$
$$+ \frac{70.6q^b_1\mu}{kh}\left[Ei\left(\frac{-39.5\phi\mu c_t r^2_{w,b}}{kt}\right)-2s_b\right]$$
$$+ \sum_{i=1}^{n_{j-1}} \frac{70.6(q^b_{i+1}-q^b_i)\mu}{kh}\left[Ei\left(\frac{-39.5\phi\mu c_t r^2_{w,b}}{k(t-t^b_i)}\right)-2s_b\right]$$

Equation 6

where x_b, y_b denote the wellbore coordinates at well b where the pressure response is evaluated.

Application of Equations 4 and 6 to address actual operational conditions often requires inclusion of many wells (including image injectors), each having several hundred flow rate increments. Accordingly, a Visual Basic computer program, PredictW, was created to evaluate these equations. The exponential integral is determined utilizing numerical methods (Abramowitz and Stegun, 1972). When isobaric contours at a given time in a given injection zone (unit) are desired, then Equation 4, actually $p - p_o$, is evaluated at each node of a predefined uniform grid. The resulting Δp-x-y array is then plotted to visualize the COI using Surfer (®Golden Software, Inc.). When the transient wellbore response is desired, Equation 6 is utilized by PredictW. The output in this case consists of a record of $\Delta p = p - p_o$ at a single well location over a specified time interval.

TECHNICAL REFERENCES

Lee, J., Well Testing, SPE Textbook Series, Vol. 1., Dallas, TX, 1982.

Muskat, M., The Flow of Homogeneous Fluids Through Porous Media, International Human Resources Development Corporation, 2nd Ed., Boston, 1982.

Van Everdingen, A.F., "The Skin Effect and its Influence on the Productive Capacity of a Well," Transactions, AIME, 1953.

Abramowitz, M., and Stegun, I.A., Handbook of Mathematical Functions, Dover, New York, 1972.

APPENDIX D-2

VISCOSITY CORRELATIONS

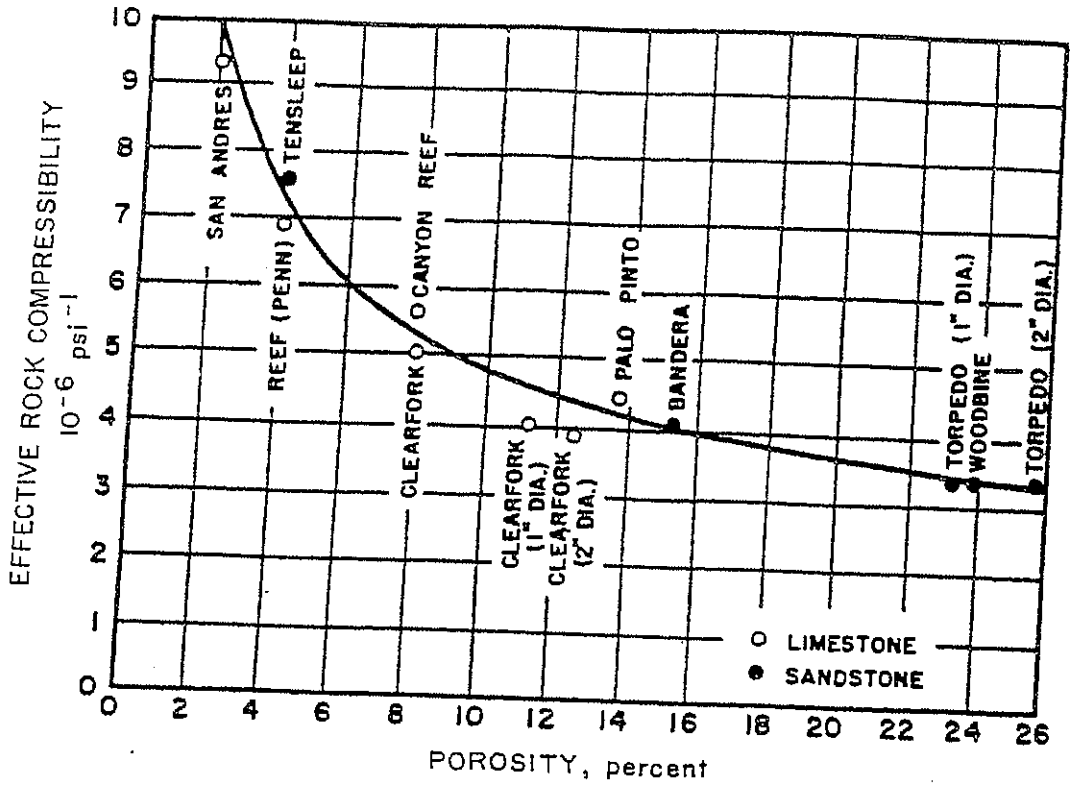

Fig. G.5 Effective formation (rock) compressibility. From Hall, *Trans.*, AIME (1953) **198**, 309.

Source: Matthews and Russell, 1967, Pressure Buildup and Flow Tests in Wells

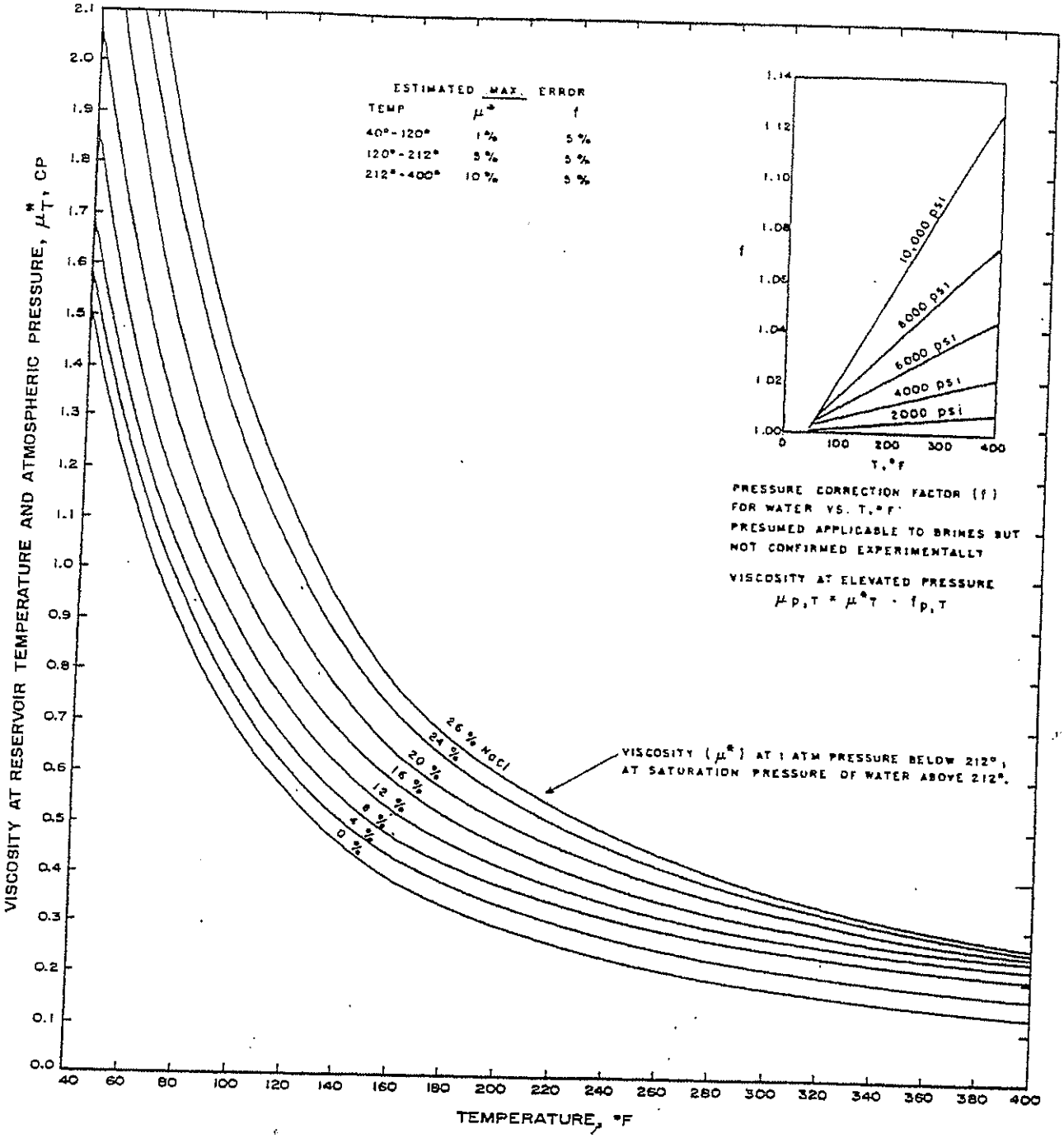

Fig. D-35 Water viscosity at various salinities and temperatures. After Matthews and Russell, data of Chesnut.[18]

FROM: Earlougher, R.C., 1977, "Advances in Well Test Analysis", SPE of AIME, Dallas, Texas

APPENDIX D-3

COMPRESSIBILITY CORRELATIONS

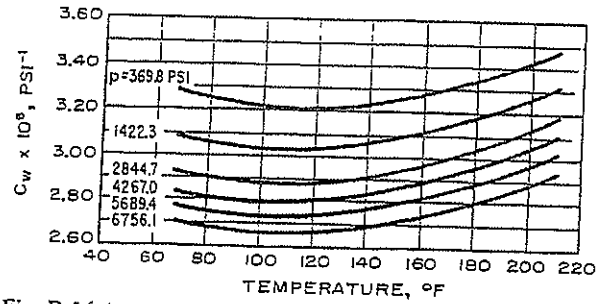

Fig. D.16 Average compressibility of distilled water. After Long and Chierici.[13]

Source: Earlougher, 1977, Advances in Well Test Analysis

COMPRESSIBILITY OF PORE VOLUME AND DISTILLED WATER

APPENDIX D-4

PREDICTED PRESSURE RISE CALCULATIONS

APPENDIX D-4
Predicted Bottomhole Pressure Rise Calculations
Navajo Refining Company, L.L.C.

Permeability	251 md
Porosity	10%
Thickness	85 feet
Compressability	8.4e-6 psi^{-1}

Pressure Buildup at a 2.5-Mile Radius from WDW-4

Modeled Rate: 500 gpm

30-Year Life of Well			Five-Year Permit Duration		
Date	Time (days)	Pressure (psi)	Date	Time (days)	Pressure (psi)
08/01/13	0	0	08/01/13	0	0
10/30/13	90	48.131	08/31/13	30	20.798
01/28/14	180	68.309	09/30/13	60	37.176
04/28/14	270	80.657	10/30/13	90	48.131
07/27/14	360	89.574	11/29/13	120	56.326
10/25/14	450	96.558	12/29/13	150	62.867
01/23/15	540	102.298	01/28/14	180	68.309
04/23/15	630	107.171	02/27/14	210	72.968
07/22/15	720	111.406	03/29/14	240	77.04
10/20/15	810	115.149	04/28/14	270	80.657
01/18/16	900	118.504	05/28/14	300	83.91
04/17/16	990	121.543	06/27/14	330	86.866
07/16/16	1080	124.321	07/27/14	360	89.574
10/14/16	1170	126.879	08/26/14	390	92.073
01/12/17	1260	129.25	09/25/14	420	94.393
04/12/17	1350	131.458	10/25/14	450	96.558
07/11/17	1440	133.526	11/24/14	480	98.586
10/09/17	1530	135.469	12/24/14	510	100.495
01/07/18	1620	137.301	01/23/15	540	102.298
04/07/18	1710	139.036	02/22/15	570	104.005
07/06/18	1800	140.682	03/24/15	600	105.627
10/04/18	1890	142.249	04/23/15	630	107.171
01/02/19	1980	143.743	05/23/15	660	108.645
04/02/19	2070	145.171	06/22/15	690	110.055
07/01/19	2160	146.538	07/22/15	720	111.406
09/29/19	2250	147.85	08/21/15	750	112.702
12/28/19	2340	149.111	09/20/15	780	113.949
03/27/20	2430	150.325	10/20/15	810	115.149
06/25/20	2520	151.495	11/19/15	840	116.307
09/23/20	2610	152.624	12/19/15	870	117.424
12/22/20	2700	153.714	01/18/16	900	118.504
03/22/21	2790	154.77	02/17/16	930	119.549
06/20/21	2880	155.791	03/18/16	960	120.562
09/18/21	2970	156.782	04/17/16	990	121.543
12/17/21	3060	157.743	05/17/16	1020	122.496
03/17/22	3150	158.676	06/16/16	1050	123.421
06/15/22	3240	159.584	07/16/16	1080	124.321
09/13/22	3330	160.466	08/15/16	1110	125.197

APPENDIX D-4
Predicted Bottomhole Pressure Rise Calculations
Navajo Refining Company, L.L.C.

Permeability	251 md
Porosity	10%
Thickness	85 feet
Compressability	8.4e-6 psi^{-1}

Pressure Buildup at a 2.5-Mile Radius from WDW-4

Modeled Rate: 500 gpm

30-Year Life of Well			Five-Year Permit Duration		
Date	Time (days)	Pressure (psi)	Date	Time (days)	Pressure (psi)
12/12/22	3420	161.325	09/14/16	1140	126.049
03/12/23	3510	162.162	10/14/16	1170	126.879
06/10/23	3600	162.977	11/13/16	1200	127.689
09/08/23	3690	163.773	12/13/16	1230	128.479
12/07/23	3780	164.549	01/12/17	1260	129.25
03/06/24	3870	165.308	02/11/17	1290	130.003
06/04/24	3960	166.048	03/13/17	1320	130.739
09/02/24	4050	166.773	04/12/17	1350	131.458
12/01/24	4140	167.481	05/12/17	1380	132.162
03/01/25	4230	168.174	06/11/17	1410	132.851
05/30/25	4320	168.853	07/11/17	1440	133.526
08/28/25	4410	169.518	08/10/17	1470	134.186
11/26/25	4500	170.169	09/09/17	1500	134.834
02/24/26	4590	170.808	10/09/17	1530	135.469
05/25/26	4680	171.434	11/08/17	1560	136.091
08/23/26	4770	172.048	12/08/17	1590	136.702
11/21/26	4860	172.651	01/07/18	1620	137.301
02/19/27	4950	173.242	02/06/18	1650	137.89
05/20/27	5040	173.823	03/08/18	1680	138.468
08/18/27	5130	174.394	04/07/18	1710	139.036
11/16/27	5220	174.955	05/07/18	1740	139.594
02/14/28	5310	175.507	06/06/18	1770	140.143
05/14/28	5400	176.049	07/06/18	1800	140.682
08/12/28	5490	176.582	08/05/18	1830	141.213
11/10/28	5580	177.106			
02/08/29	5670	177.623			
05/09/29	5760	178.131			
08/07/29	5850	178.631			
11/05/29	5940	179.123			
02/03/30	6030	179.609			
05/04/30	6120	180.087			
08/02/30	6210	180.558			
10/31/30	6300	181.022			
01/29/31	6390	181.48			
04/29/31	6480	181.931			
07/28/31	6570	182.376			
10/26/31	6660	182.815			
01/24/32	6750	183.248			

APPENDIX D-4
Predicted Bottomhole Pressure Rise Calculations
Navajo Refining Company, L.L.C.

Permeability	251 md
Porosity	10%
Thickness	85 feet
Compressability	8.4e-6 psi^{-1}

Pressure Buildup at a 2.5-Mile Radius from WDW-4

Modeled Rate: 500 gpm

30-Year Life of Well			Five-Year Permit Duration		
Date	Time (days)	Pressure (psi)	Date	Time (days)	Pressure (psi)
04/23/32	6840	183.676			
07/22/32	6930	184.098			
10/20/32	7020	184.514			
01/18/33	7110	184.925			
04/18/33	7200	185.331			
07/17/33	7290	185.732			
10/15/33	7380	186.128			
01/13/34	7470	186.519			
04/13/34	7560	186.906			
07/12/34	7650	187.288			
10/10/34	7740	187.666			
01/08/35	7830	188.039			
04/08/35	7920	188.408			
07/07/35	8010	188.772			
10/05/35	8100	189.133			
01/03/36	8190	189.49			
04/02/36	8280	189.843			
07/01/36	8370	190.192			
09/29/36	8460	190.537			
12/28/36	8550	190.879			
03/28/37	8640	191.217			
06/26/37	8730	191.551			
09/24/37	8820	191.882			
12/23/37	8910	192.21			
03/23/38	9000	192.535			
06/21/38	9090	192.856			
09/19/38	9180	193.174			
12/18/38	9270	193.489			
03/18/39	9360	193.801			
06/16/39	9450	194.11			
09/14/39	9540	194.416			
12/13/39	9630	194.719			
03/12/40	9720	195.02			
06/10/40	9810	195.317			
09/08/40	9900	195.612			
12/07/40	9990	195.905			
03/07/41	10080	196.194			
06/05/41	10170	196.481			

APPENDIX D-4
Predicted Bottomhole Pressure Rise Calculations
Navajo Refining Company, L.L.C.

Permeability	251 md
Porosity	10%
Thickness	85 feet
Compressability	8.4e-6 psi^{-1}

Pressure Buildup at a 2.5-Mile Radius from WDW-4

Modeled Rate: 500 gpm

30-Year Life of Well			Five-Year Permit Duration		
Date	Time (days)	Pressure (psi)	Date	Time (days)	Pressure (psi)
09/03/41	10260	196.766			
12/02/41	10350	197.048			
03/02/42	10440	197.327			
05/31/42	10530	197.605			
08/29/42	10620	197.879			
11/27/42	10710	198.152			
02/25/43	10800	198.422			
05/26/43	10890	198.69			
08/24/43	10980	198.956			

APPENDIX D-5

PREDICTED PLUME MIGRATION CALCULATIONS

APPENDIX D-5
PLUME RADIUS CALCULATIONS

$r_c = [(0.1337 \text{ v t}) / (0.8 \pi \theta \text{ h})]^{1/2}$

$r_d = 2.3 (C_d r_c)^{0.05} + r_c$

WDW-4

(r_c) Radius of Concentrated Plume	Five-Year Plume	Thirty-Year Plume
(r_d) Radius of Dispersed Plume		
(v) Volume of Injected Fluid in Gallons	262,800,000	262,800,000
Factor to compensate for Immovable Connate Water	0.80	0.80
(θ) Formation Porosity	0.10	0.10
(h) Thickness of the Injection Reservior	85	85
(t) Time of Injection at 500 gpm	5	30
(cd) Coefficient of Dispersion; for limestone = 65	65	65
Constant	2.30	2.30

r_c	r_d	r_c	r_d
2868	2872	7024	7029

APPENDIX E

WDW-4 CONSTRUCTION PROCEDURES

APPENDIX E

Navajo Refining Company, LLC
Artesia, New Mexico

WDW-4 CONSTRUCTION PROCEDURE
(Depths referenced to Ground Level)

1. Survey and stake well location.
2. Level and grade the location with caliche or comparable material, as required.
3. Install a corrugated steel cellar around well location.
4. Drill a fresh water supply well near the well location capable of delivering 50 gpm.
5. Auger a 24 inch hole to approximately 80 feet and set 20 inch, 129.33 lb/ft (0.625 inch wall), API 5LX-56, plain-end, beveled conductor pipe. Cement conductor pipe to the surface using approximately 3 yd^3 of redi-mix cement.
6. Install a 4 inch outlet for draining the conductor pipe after cementing the surface casing.
7. Excavate a rathole and mousehole with an auger.
8. Move in and rig up drilling rig and associated equipment.
9. Move in and rig up a closed-loop system for handling drill cuttings and drilling fluid.
10. Weld a flange to the 20 inch conductor pipe and install an annular blowout preventer (BOP). Install 20 inch riser pipe with bell nipple and flowline to the BOP.
11. Mix a spud mud for the surface hole.
12. Make up a bottomhole assembly (BHA) with a 17½ inch drill bit and drill ahead to 1,500 feet taking deviation surveys at approximately 250 feet intervals and maintaining hole deviation below 2°. Circulate and condition mud for running logs.
13. Move in and rig up an open hole wireline unit. Run the following open hole logs from 1,500 feet to the base of conductor pipe: induction resistivity, compensated neutron, formation density, caliper, gamma ray. Run a 4-arm caliper and revise cement volumes accordingly with 20% excess included for the open hole section.
14. Move in and rig up a casing crew and run centralized 13⅜", 54.50 lb/ft, K-55, ST&C, surface casing to approximately 1,500 feet. Run two bow spring centralizers on the float joint (1 in center of joint on a stop ring and 1 on collar), and 1 centralizer per every third joint at the collars back to surface. The float

joint will consist of a float shoe, 1 joint of casing, and a float collar. Circulate and condition the mud for cementing.

Dimensional data and minimum performance properties of the surface casing are presented below:

Wall Thickness, inches	0.380
Internal Diameter, inches	12.615
Drift ID, inches	12.459
Coupling OD, inches	14.375
Collapse Pressure, psi	1,130
Internal Yield Pressure, psi	2,730
Pipe Body Strength, lb	853,000
Joint Strength, lb	547,000
Capacity, bbl/ft	0.15459

15. Move in and rig up cementing equipment. Cement the surface casing to the surface as follows: pump a freshwater spacer followed by a tuned spacer designed for the rheology of the drilling fluid and lead cement; pump 1,092 ft^3 of a Class A light-weight lead cement blend followed by 206 ft^3 of a Class A tail cement blend. Drop wiper plug, and displace with 226 bbls of drilling fluid. Bump wiper plug and pressurize over final circulating pressure. Monitor pressure for 5 minutes, and bleed off to cement unit to ensure floats are holding. Wait on cement at least 24 hours. (Cement volumes presented above are based on bit size, plus 20% excess for open hole section. Actual cement volumes will be based on calipered hole volume, plus 20% excess.)
16. After waiting at least 24 hours for cement to set, release the 13⅜ inch surface casing and lift the stack to make a rough cut on the 13⅜ inch protection casing. Nipple down the bell nipple, flow line and BOP. If necessary, perform a top out operation between the 20-inch and 13⅜-inch casings using 1-inch tremie pipe to place up to 200 sacks of standard cement. Cut the 20 inch conductor and make a final cut on the 13⅜ inch casing. Weld on a temporary flange to the 13⅜ inch casing. Re-install the BOP. Nipple up the bell nipple with flow line and riser pipe to the top of the BOP and test. Pressure test and function test the BOP.
17. Make up a 12¼ inch drill bit and trip in the hole to the float collar. Drill out the float collar and approximately 30 feet of cement in the shoe track joint.
18. Pull out of the hole and run a cement evaluation log from the top of cement in the surface casing to the surface.

19. Trip in the hole with a 12¼ inch bit and BHA. Pressure test the 13⅜ inch surface casing to 1,000 psi for at least 30 minutes and record the test on a chart recorder. Drill the remainder of the shoe track cement and the float shoe. Drill 10 feet of formation and perform a Formation Integrity Test to 100 psi for 30 minutes. Continue drilling a 12¼ inch hole to the Confining Zone core point in the Mississippian Formation between 9,700 feet and 10,200 feet. Circulate and condition mud for coring. Pull the 12¼ inch drilling assembly out of the hole and pick up an 8½-inch by 4-inch by 30-foot core barrel.
20. Trip in well and cut a 30-foot Confining Zone core. Pull out of the hole and lay down core. Mark core and prepare for shipment to core laboratory.
21. Trip back in the hole with the 12¼ inch drilling assembly and ream the 8½-inch core hole. Continue drilling a 12¼ inch hole to the top of the Injection Zone core point in the Devonian Formation at approximately 10,200 feet, maintaining a low fluid loss mud system. Pull 12¼ inch drilling assembly out of the hole and pick up an 8½-inch by 4-inch by 60-foot core barrel.
22. Trip in well to approximately 10,200 feet and cut an Injection Zone core from approximately 10,200 feet to 10,260 feet. Pull out of the hole and lay down core. Mark core and prepare for shipment to core laboratory.
23. Trip back in the hole with the 12¼ inch drilling assembly and ream the 8½-inch core hole from approximately 10,200 feet to 10,260 feet. Continue drilling a 12¼ inch hole to the total depth of the well at 10,800 feet. Circulate and condition the mud for running logs.
24. Move in and rig up an open hole wireline unit. Run the following open hole logs from 10,200 feet to the base of surface casing at 1,500 feet: laterolog resistivity, compensated neutron, formation density, caliper, and gamma ray. Run a 4-arm caliper and revise cement volumes to include calipered annular volume, plus 20% excess for the open hole section.
25. Move in and rig up a casing crew and run centralized 9⅝ inch, 47 lb/ft, N-80, LT&C protection to 10,800. Run two bow spring centralizers on the float joint (1 in center of joint on a stop ring and 1 on collar), and 1 centralizer per every third joint at the collars back to surface. The float joint will consist of a float shoe, 1 joint of casing, and a float collar. A stage collar will be positioned in the casing string at approximately 5,800 feet for the second cement stage. Circulate and condition the mud for cementing.

    Dimensional data and minimum performance properties of the protection casing are presented below:

Wall Thickness, inches..... 0.472

Internal Diameter, inches	8.681
Drift ID, inches	8.525
Coupling OD, inches	10.625
Collapse Pressure, psi	4,760
Internal Yield Pressure, psi	6,870
Pipe Body Strength, lb	1,086,000
Joint Strength, lb	905,000
Capacity, bbl/ft	0.073206

26. Cement the 9⅝ inch casing back to the surface in the following two stages:
Stage One – Establish circulation and condition the mud for optimum cementing conditions: pump a freshwater spacer followed by a tuned spacer designed for the rheology of the drilling fluid and lead cement; pump 1,579 ft^3 of a Class H light-weight lead cement blend followed by 324 ft^3 of a Class H tail cement blend. Drop wiper plug, and displace with 875 bbls of drilling fluid. Bump wiper plug and pressurize over final circulating pressure. Monitor pressure for 5 minutes, and bleed off to cement unit to ensure floats are holding.
Stage Two – Drop stage collar opening plug and wait for it reach stage collar. Pressure up on casing until stage collar opens. Establish circulation through the stage collar and continue circulating for 8 to 12 hours. Pump a freshwater spacer followed by a tuned spacer designed for the rheology of the drilling fluid and lead cement; pump 2,010 ft^3 of a Class H light-weight lead cement blend followed by 150 ft^3 of a Class H tail cement blend. Drop stage collar wiper/closing plug, and displace with 450 bbls of drilling fluid. Bump wiper/closing plug and close stage collar with required pressure over final circulating pressure. Release pressure and assure that stage collar is holding. Flush and drain surface equipment. Wait on cement at least 24 hours. (Cement volumes presented above are based on bit size, plus 20% excess for open hole section. Actual cement volumes will be based on calipered hole volume, plus 20% excess.)
27. After waiting at least 24 hours for cement to set, release the 9⅝ inch protection casing and lift the stack to make a rough cut on the 9⅝ inch protection casing. Nipple down the bell nipple, flow line and BOP. If necessary, perform a top out operation between the 13⅜ inch and 9⅝ inch casings using 1-inch tremie pipe to place up to 200 sacks of standard cement. Cut the 13⅜ inch surface casing and make a final cut on the 9⅝ inch casing. Weld on a 9⅝ inch by 11 inch, 3,000 psi, Slip-on-Weld (SOW) casing head with a hanger bowl for 7 inch tubing to the 9⅝ inch protection casing. Nipple up an 11 inch by 13⅝ inch DSA to the casing

head and re-install the BOP. Nipple up the bell nipple with flow line and riser pipe to the top of the BOP and test.

28. Make up an 8½ inch bit to the BHA and trip in the hole to the stage collar. Perform a pressure test to 1,500 psi for at least 30 minutes and record the test on a chart recorder. Drill out the stage collar and trip down the float collar at approximately 10,755 feet.
29. Make up a casing scraper for 9⅝ inch, 47 lb/ft casing and trip in the hole to approximately 10,755 feet. Circulate the hole clean and pull out of the hole, laying down the BHA.
30. Move in and rig up a cased hole wireline unit. Run the following cased hole logs from approximately 10,755 feet to the surface: cement evaluation log with gamma ray and casing inspection log. Rig down and move out the wireline unit.
31. Trip in the hole open-ended to approximately 10,755 feet. Perform a pressure test to 1,500 psi for at least 30 minutes and record the test on a chart recorder.
32. Clean the rig mud tanks and displace the drilling mud in the casing with approximately 743 bbl of 9.0 lb/gal brine water. Pull out of the hole.
33. Move in and rig up a casing crew to run the injection tubing. Make up and injection packer to the first joint of tubing. Run 7 inch, 26 lb/ft, K-55, LT&C injection tubing in the hole top approximately 10,100 feet or 100 feet above the top perforation selected for the injection interval. Fill the tubing annulus with approximately 241 bbl of 9.0 lb/gal brine water containing a corrosion inhibitor, a bactericide and an oxygen scavenger. Set the injection packer and set the slips in the casing head after distributing the tubing weight appropriately between the packer and casing head. Rig down and move out the casing crew and equipment.

Dimensional data and minimum performance properties of the injection tubing are presented below:

Wall Thickness, inches	0.362
Internal Diameter, inches	6.276
Drift ID, inches	6.151
Coupling OD, inches	7.656
Collapse Pressure, psi	4,320
Internal Yield Pressure, psi	4,980
Pipe Body Strength, lb	415,000
Joint Strength, lb	401,000
Capacity, bbl/ft	0.038263

34. Cut the 7 inch injection tubing and install an adapter flange with P-seals for the 7 inch tubing. Conduct a preliminary pressure test on the 7 inch tubing annulus to 1,000 psi.
35. Install the upper wellhead assembly.
36. Rig down and move out the drilling rig and associated equipment.

APPENDIX F

WDW-4 TESTING PROCEDURES

APPENDIX F

Navajo Refining Company, LLC
Artesia, New Mexico

WDW-4 COMPLETION & TESTING PROCEDURE

(Depths referenced to Ground Level)

1. Move in and rig up a cased hole wireline unit with pressure control equipment and a crane. Run in the hole with hollow carrier perforating guns and perforate the injection intervals 2 shots/foot at the depths selected from the open hole logs.
2. Run a temperature survey with pressure gauge from the surface to the total depth of the well at approximately 10,755 feet. Pull pressure gauge up to the top perforation and record a static bottomhole pressure for one hour. Pull out of hole with wireline tools and move out the wireline unit and crane.
3. Move in a 2 inch coil tubing unit and associated equipment. Trip in the hole with the 2 inch coil tubing, and nitrogen backwash the well across the perforated interval until a representative sample of formation fluid has been obtained. Rig down and move out the nitrogen truck. Send a sample of the formation fluid to a laboratory for analysis (physical and chemical properties).
4. Move in acid transport trucks. Spot approximately 20 bbl of 15% HCl across the completion interval using the coil tubing unit. Acidize the completion interval with an additional 218 bbl of 15% HCl while moving the end of the coil tubing across the entire perforated interval. Flush the coil tubing and pull out of the hole with coil tubing. Flush the 7 inch tubing and formation with approximately 200 bbl of clean brine water. Rig down and move out coil tubing unit and associated equipment.
5. Move in and rig up a wireline unit, mast truck and pressure control lubricator. Rig up 8 frac tanks and fill each tank with 9.0 lb/gal brine water. Move in a pump truck capable of injecting into the well at approximately 12 bpm.
6. Connect a certified pressure gauge to the annulus and pressurize the casing – tubing annulus to approximately 1,200 psi. Record an annulus pressure test for at least 1 hour. A State representative will be notified at least 48 hours prior to conducting the Annulus Pressure Test for witnessing the test and inspecting the well.
7. Conduct a Radioactive Tracer Survey per regulatory guidelines.

8. Run in the hole with a bottomhole pressure gauge and position the gauge at approximately 10,200 feet or at the top perforation and record the static pressure for approximately 30 minutes.
9. Initiate injection into the well at approximately 12 bpm or at a rate appropriate for the injectivity of the perforated injection interval. Continue injecting at a constant rate until the 4,000 bbl of 9.0 lb/gal brine water have been injected. Terminate injection and record the pressure falloff for at least 24 hour. Rig down and move out the pump truck and frac tanks.
10. At the conclusion of the pressure falloff test, pull out of hole with pressure gauge, making 5 minute gradient stops at 1,000-foot intervals. Rig down the wireline unit, pressure control lubricator and crane or mast unit.
11. Restore location.
12. Prepare a Completion Report for submittal to the State Regulatory Agency.

APPENDIX G

INJECTED FLUID MONITORING PLAN

INJECTED FLUID MONITORING PLAN

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

SUBSURFACE PROJECT NO. 185818-6944

SUBMITTED
NOVEMBER 2014

SUBSURFACE TECHNOLOGY, INC.
HOUSTON, TEXAS

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1.0 INTRODUCTION

This injected fluid monitoring plan (plan) has been prepared per the requirements of 20.6.2.5207B NMAC. This plan allows for consistent characterization of the injected fluids that are being injected into the nonhazardous waste injection wells operated by Navajo Refining Company, L.L.C. (Navajo) at their refinery in Artesia, New Mexico. The plan shall be updated as necessary to remain accurate and the analysis remains representative of the fluids being injected into the three nonhazardous waste injection wells.

2.0 INJECTED FLUID DESCRIPTION

The fluid injected into all Navajo injection wells is comprised of exempt and nonexempt nonhazardous oilfield waste that is generated in the refining process. Waste waters from process units, cooling towers, boilers, streams from water purification units, desalting units, recovered and treated ground water, and general waste waters, all waters will be blended to form the injected fluid into the injection wells.

Navajo anticipates the addition of a new waste stream to be added to the existing waste stream. The new waste stream will originate from a reverse osmosis (RO) unit to be constructed at the refinery. The characteristics of this waste stream will be similar to that already being injected.

3.0 INJECTED FLUID CHARACTERIZATION SAMPLING PROGRAM

The following sampling program shall be used to collect a representative sample of the injected fluid for chemical analysis to demonstrate the consistency of the fluid composition.

3.1 Sampling Frequency

The injected fluid shall be sampled on a quarterly basis unless a change in the injected fluid composition occurs as a result of operating changes at the Navajo refinery. If the injected fluid composition does change, a representative sample of the waste stream shall be collected at that time and reported to OCD.

3.2 Sampling Location

A representative sample of the injected fluid shall be obtained from the discharge side of the wastewater transfer pump that sends wastewater to the wellheads. The sample port is located at the refinery's wastewater treatment unit.

3.3 Sample Collection Equipment

The fluid samples shall be collected directly from the sample port on the wastewater transfer line into appropriately prepared sample containers required for specific analyses.

3.4 Sample Containers

The injected fluid sample shall be collected in new and previously unused sample containers as provided by the off-site commercial laboratory performing the analyses.

3.5 Sampling Methodology

The injected fluid sample shall be poured directly into the new and previously unused sample containers provided by the off-site commercial laboratory performing the analyses.

3.6 Sample Preservation

EPA and/or ASTM sampling protocols shall be used, including provisions for preserving samples when required. Sampling personnel shall verify that appropriate preservatives are present in sample containers if required by analytical protocol.

3.7 Field Measurements

Field measurements of pH, specific conductance, and temperature shall be recorded on a representative sample of the injected fluid during each quarterly monitoring event.

3.8 Sampling Personnel

Navajo environmental staff or qualified contractor sampling personnel shall be responsible for collecting the injected fluid samples in accordance with the procedures presented in this plan.

4.0 FIELD DOCUMENTATION

The following procedures shall be implemented to properly document each injected fluid characterization sampling event as described in Section 3.0.

4.1 Water Sampling Log

A water sampling log shall be completed at the time the sample is collected. The type of information to be recorded on the water sampling log includes, but is not limited to, the following:

- Date and time of sampling
- Weather conditions
- Sampling location
- Sampling method
- Sample identification
- Field measurements
- Laboratory analyses
- Sampling personnel

4.2 Sample Container Label

Each laboratory provided sample container shall have a label adhered to the outside of the container providing pertinent information identifying the sample,

location and time the sample was collected, analytical parameters, preservatives, and sampler identification.

4.3 Chain-of-Custody Form

A chain-of-custody form shall be completed and accompany each shipment of samples to the off-site commercial laboratory. Each transfer of sample custody shall be signed by both parties on the chain-of-custody form.

4.4 Custody Seal

A custody seal shall be affixed over the opening of the ice chest used to store and transport samples to the receiving laboratory. The laboratory shall note in their Check-In Form that the seal is properly attached and has not been broken.

4.5 Field Equipment Calibration Log

Calibration and maintenance of field equipment (pH, specific conductance, turbidity, and temperature meters) shall be in compliance with the manufacturers' recommended calibration or maintenance procedures. Field logs shall be completed in the field to properly document all calibration and maintenance activities to field equipment.

5.0 QUALITY ASSURANCE/QUALITY CONTROL

A trip blank will be prepared during each waste stream characterization sampling event as described in Section 3.0.

6.0 SAMPLE CUSTODY AND TRANSPORT

Injected fluid characterization samples shall be maintained in the custody of the sampling personnel until the samples are transported to the laboratory or transferred to a representative of the receiving laboratory. Upon transfer of custody, the chain-of-custody record shall be completed and signed by the sampling personnel. The signed chain-of-custody record shall be placed in a plastic bag inside the shipment cooler containing the properly labeled injected fluid

samples. A signed and dated custody seal shall be placed over the lid of the opening of the sample cooler to indicate if the cooler has been opened during delivery prior to receipt by the laboratory.

The chain-of-custody record shall be signed and returned by the laboratory no later than the date the analytical results are available. If the samples are delivered in person by the sampling personnel or picked up by a laboratory employee, the chain-of-custody record shall be signed by the laboratory representative immediately upon relinquishment of the samples by the sampling personnel. One of the copies shall be maintained by the sampling personnel and the remaining copies kept with the samples.

7.0 WASTE STREAM ANALYTICAL PROGRAM

The following describes the injected fluid characterization analytical program.

7.1 Laboratory Requirements

The laboratory performing the analytical services for this project shall be an accredited laboratory. The laboratory shall possess a quality control/ quality assurance (QA/QC) manual prepared in accordance with the requirements of the NELAC certification program. A current copy of the plan shall be sent by the laboratory to the project manager in charge. When the manual is updated by the laboratory the updated version of the manual shall be sent to the project manager. The previously issued copy of the manual must be archived by the project manager to insure traceability of the data generated using the applicable QA/QC manual.

Navajo is currently utilizing ALS Environmental, a commercial laboratory located in Houston, Texas. ALS is a NELAC accredited laboratory.

7.2 Analytical Parameters and Methods

The injected fluid samples are analyzed for the following listing of parameters that are representative of the injected fluid:

- pH
- Specific Conductance
- Temperature
- Redox Potential
- Specific Gravity
- Chloride
- Sulfate
- TDS
- Fluoride
- Calcium
- Potassium
- Magnesium
- Sodium Bicarbonate
- Carbonate
- Bromide
- Cations and Anions
- Cation / Anion Balance

The parameter listing shall be updated as necessary to remain accurate and the waste analysis remains representative of the injected fluid being injected.

8.0 REPORTING

The laboratory performing the injected fluid characterization analyses shall generate a report of the analytical results. These analytical results shall be compiled with the field measurement results and tabularized. The results of each waste stream characterization sampling event, including tabularization of analytical results, copies of laboratory reports, and copies of water sampling logs, shall be provided to OCD within 90 days following each sampling episode. The report shall document any obvious fluctuations in the injected fluid composition.

APPENDIX H

INJECTION WELL CLOSURE PLAN

APPENDIX H
INJECTION WELL CLOSURE PLAN
NAVAJO REFINING COMPANY, L.L.C.
(WDW-4)

Final Testing Program

After ceasing injection in the well and prior to commencing physical closure procedures of the injection well, a pressure falloff test will be conducted in order to determine if the transient pressure data have conformed with predicted values within the injection interval. The brine injected for the falloff test will be nonhazardous and will also act as a buffer between the injectate and the well. Appropriate mechanical integrity testing shall also be conducted to ensure the integrity of the long casing string and cement that will remain in the ground after closure. Notify the OCD of mechanical integrity and pressure falloff testing procedures of the long casing string and cement that will remain.

Mechanical Integrity Testing

An annular pressure test and radioactive tracer survey will be conducted prior to removing the injection tubing and packer. Subsequent to tubing and packer removal, a casing inspection and a cement bond/variable density log will be conducted from total depth to the surface.

Pressure Falloff Testing

A wireline unit with pressure control equipment will be rigged up to run in the hole with a surface recording bottom-hole pressure transducer with temperature capabilities to position the transducer at the top of the injection interval. The transducer will be stabilized prior to injecting brine.

Two thousand barrels of brine will be injected at a constant rate. The brine will be compatible with the injection zone reservoir fluid as determined by compatibility testing. The pressure buildup will be recorded. After pumping is ceased, the pressure falloff will be recorded for a minimum of 24 hours after shut in. The pressure derivative curve to will be monitored confirm the test has investigated beyond the wellbore storage effect.

Regulatory Notification

Navajo will notify OCD at least 60 days before commencing plugging and abandonment procedures on any waste disposal well.

Plug and Abandonment Procedures

The balance plug method will be employed to plug and abandon this well. This technique involves displacing the cement through a work string which has been run into the casing. The cement slurry is pumped down the work string and up the annulus to a calculated height which would balance the cement inside and outside the work string. The work string is then slowly pulled out of the cement leaving a solid, uniform plug. After all cement plugs are set, the well casings will be cut off 3 feet below grade and capped by welding a ½ inch steel plate to the outermost casing string.

The plugging and abandonment procedures for a typical well are described as follows:

1. Prepare the well and location for plugging. Remove the well monitoring equipment and wellhead injection piping.
2. Notify the OCD of the MIT schedule. Conduct an annulus pressure test and a radioactive tracer survey to satisfy OCD mechanical integrity requirements.
3. Move in and rig up the frac tanks and pump for the pressure falloff test. Fill frac tanks with 2,000 barrels of brine.
4. Rig up the wireline unit with pressure control equipment. Run into the hole with a surface recording bottom-hole pressure transducer with temperature capabilities and position the transducer at the top of the perforated injection interval. Allow the transducer to stabilize prior to injecting brine.
5. Commence injecting 2,000 barrels of brine at a constant rate. The brine will be compatible with the injection zone reservoir fluid, as determined by compatibility testing. Record the pressure buildup. Cease pumping and record the pressure falloff. Measure the pressure falloff for a minimum of 24 hours after shut in. Monitor the pressure derivative curve to confirm the test has investigated beyond the wellbore storage effect.
6. Rig down the wireline unit.
7. Move in and rig up the well service unit with BOP equipment and a 2 7/8 inch work string.
8. Remove the wellhead and install the BOP equipment and stripper head.
9. Spear the 7 inch injection tubing and unseat the injection packer. Trip out of the hole laying down the 7-inch injection tubing.

APPENDIX H (Continued)

10. Rig up the wireline unit and run a casing inspection log and a cement bond/variable density log from total depth to the surface. Pick up and run a wireline set cement retainer at 10,050 feet. Rig down the wireline unit.
11. Rig up cement service equipment. Cement shall be Class "A" (or comparable), weighing 15.6 pounds/gallon. Pressure test the surface lines as required.
12. Run in the well with the work string and sting into the cement retainer at 10,050 feet. Establish a pump-in rate into the injection perforations and pump 250 sx of Class "A" cement below the retainer. Pull out of the retainer and spot sufficient Class "A" (or comparable) cement slurry to develop a 100-foot plug above the cement retainer (9,950 – 10,050 feet) . Pull the tubing up above the top of cement and reverse out excess cement. Catch a sample of cement to check curing time and compressive strength. Allow the cement to set overnight (8-hour minimum) before tagging top of plug to confirm proper setup and location. Pressure test the plug to the pressure recommended by the OCD.
13. Set a balanced cement plug using Class "A" cement from the top of cement at approximately 9,950 feet to approximately three (3) feet below land surface.
14. Allow cement to set overnight (8-hour minimum), then "top off" cement as needed until the entire top of cement remains approximately three (3) feet below land surface.
15. Cut casing strings ±3 feet below ground level.
16. Weld a ½ inch steel plate across the 13⅜-inch casing. Inscribe on plate, in a permanent manner, the following information: (1) operator name, (2) P&A date, and (3) API number.
17. Release all equipment and clean up the location.
18. Submit closure data to the OCD.

Once closure operations are complete and the well is officially plugged and abandoned, a closure report certifying that the well or wells were closed in accordance with applicable requirements, will be submitted to the OCD within 30 days. The report will include any newly constructed or discovered wells or information, including proposed well data, within the area of review. When plugging and abandonment is complete, Navajo will submit certification to the OCD that the injection well has been closed in accordance with applicable OCD regulations.

APPENDIX I

FINANCIAL ASSURANCE DOCUMENTATION

MARSH

Terri L. Morrison
Assistant Vice President

Marsh USA Inc.
500 Dallas Street
Suite 1500
Houston, TX 77002
713 276 8776 Fax 713 276 8538
Terri.L.Morrison@marsh.com
www.marsh.com

October 30, 2014

Kyle Rogers
HollyFrontier
2828 North Harwood, Suite 1300
Dallas, Texas 75201

Subject: New Bond

Principal: Navajo Refining Company, L.L.C.
Obligee: State of New Mexico
Bond Description: One Well Plugging Bond
Bond Number: 022047750

Dear Kyle:

I am sending you the above-referenced bond in response to your request. The bond is based on the information we received with the request. Please have this bond signed, sealed, and forwarded to the Obligee for acceptance and filing.

In the event that you do not accept and file the bond with the obligee, please return this original document to Marsh within 14 days so that we can notify the surety company that the bond was not filed and appropriate return premium can be processed.

Marsh & McLennan Companies, Inc. and its subsidiaries own equity interests in certain insurers and have contractual arrangements with certain insurers and wholesale brokers. Information regarding such interests and contracts is available at http://global.marsh.com/about/Transparency.php.

If you have any questions, please feel free to contact me. Thank you for allowing Marsh to service your surety needs.

Sincerely,

Terri L. Morrison

Terri L. Morrison
Assistant Vice President

Form O & G B-1
Adopted 6-17-1977
Revised 12-15-05

STATE OF NEW MEXICO
ONE WELL PLUGGING BOND

For CHAVES, EDDY, LEA, MCKINLEY, RIO ARRIBA, ROOSEVELT, SANDOVAL AND SAN JUAN COUNTIES ONLY

BOND NO. 022047750
WELL DEPTH 11,000 ft
AMOUNT OF BOND $140,000.00
COUNTY Eddy

Note: **Bond Amount is $5,000 plus $1 per foot of projected depth of proposed well or measured depth of existing well.**

*Under certain conditions, the appropriate district office of the Division may authorize a well to be drilled as much as **500** feet deeper than the depth provided in the applicable financial assurance. **(See Rule 101)**

File with the Oil Conservation Division, 1220 South St. Francis Drive, Santa Fe, NM 87505

KNOW ALL MEN BY THESE PRESENTS:

That Navajo Refining Company, L.L.C., (an individual – **if dba must read – Example: John Doe dba ABC Services**) (~~a general partnership~~) (~~a corporation~~), (limited liability company) (~~limited partnership~~) organized in the State of New Mexico, and authorized to do business in the State of New Mexico), as PRINCIPAL, and Liberty Mutual Insurance Company, a corporation organized and existing under the laws of the State of Massachusetts and authorized to do business in the State of New Mexico, as SURETY, are firmly bound unto the State of New Mexico, for the use and benefit of the Oil Conservation Division of the Energy, Minerals and Natural Resources Department (or successor agency) (the DIVISION), pursuant to NMSA 1978, Section 70-2-14, as amended, in the sum of One Hundred Forty Thousand ~~and No/100 --~~, for the payment of which the PRINCIPAL and SURETY hereby bind themselves, their successors and assigns, jointly and severally, firmly by these presents.

The conditions of this obligation are such that:

WHEREAS, the PRINCIPAL has commenced or may commence the drilling of one well to a depth not to exceed 11,000 feet, to prospect for and/or produce oil or gas, carbon dioxide gas, helium gas or brine minerals, or as an injection or other service well related to such exploration or production, or does own or operate, or may acquire, own or operate such well, the identification and location of said well being:

WDW #4 (Name of Well) API No. 30- 015-00002,310, located 2310 feet from the North (North/South) line and 1,100 feet from the East (East/West) line of Section 28 Township 17 (~~North~~) (South), Range 27 (East) (~~West~~), NMPM, Eddy County, New Mexico.

NOW, THEREFORE, if the PRINCIPAL and SURETY or either of them, or their successors or assigns or any of them, shall cause said well be properly plugged and abandoned when dry or when no longer productive or useful for other beneficial purpose, in accordance with the rules and orders of the DIVISION, including but not limited to Rules 101 [19.15.3.101 NMAC] and 202 [19.15.4.202 NMAC], as such rules now exist or may hereafter be amended;

THEN AND IN THAT EVENT, this obligation shall be null and void; otherwise and in default of complete compliance with any and all of said obligations, the same shall remain in full force and effect.

Navajo Refining Company, L.L.C.
PRINCIPAL

501 E. Main, Artesia, NM 88210
Address

By Richard D. McKee
Signature

VP + Ref. Mgr. Navajo Ref. Co.
Title

If PRINCIPAL is a corporation, affix Corporate seal here

Liberty Mutual Insurance Company
SURETY

175 Berkeley Street, Boston, MA 02116
Address

Terri L. Morrison, **Attorney-in-Fact**

Corporate surety affix Corporate seal here

ACKNOWLEDGMENT FORM FOR INDIVIDUAL

(If dba, must read – Example: John Doe dba Well Services)

STATE OF _____)
ss.
COUNTY OF_____)

This instrument was acknowledged before me on this _____ day of _____ 20____

by_____.
(Name of Individual)

_____
Notary Public

SEAL

_____
My Commission Expires

ACKNOWLEDGMENT FORM FOR PARTNERSHIP, CORPORATION, OR LIMITED LIABILITY COMPANY

STATE OF_____)
ss.
COUNTY OF_____)

This instrument was acknowledged before me on _____day of _____20____by_____
(Name of Person Signing Instrument)

as _____of_____
(Capacity, e.g., partner, president, manager, member) (Name of partnership, corporation or limited liability company)

_____
Notary Public

SEAL

_____
My Commission Expires

ACKNOWLEDGMENT FORM FOR CORPORATE SURETY

STATE OF Texas)
ss.
COUNTY OF Harris)

This instrument was acknowledged before me on this 21st day of October, 2014,

by Terri L. Morrison, as Attorney-in-Fact for Liberty Mutual Insurance Company
(Name of Attorney-in-Fact) (Name of Corporate Surety)

Mary Pena
Notary Public

SEAL

9-27-2018
My Commission Expires

MARY PENA
Notary Public, State of Texas
My Commission Expires
September 27, 2018

Corporate Surety attach Power of Attorney

APPROVED BY:

OIL CONSERVATION DIVISION OF NEW MEXICO

By_____

Date_____

THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.
This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Certificate No. 6719377

American Fire and Casualty Company
The Ohio Casualty Insurance Company
Liberty Mutual Insurance Company
West American Insurance Company

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That American Fire & Casualty Company and The Ohio Casualty Insurance Company are corporations duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint, Gina A. Rodriguez; Mary Pena; Melissa Haddick; Sandra Parker; Tannis Mattson; Terri L. Morrison

all of the city of Houston, state of TX each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 23rd day of September, 2014.

American Fire and Casualty Company
The Ohio Casualty Insurance Company
Liberty Mutual Insurance Company
West American Insurance Company

By: David M. Carey
David M. Carey, Assistant Secretary

STATE OF PENNSYLVANIA ss
COUNTY OF MONTGOMERY

On this 23rd day of September, 2014, before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of American Fire and Casualty Company, Liberty Mutual Insurance Company, The Ohio Casualty Insurance Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at Plymouth Meeting, Pennsylvania, on the day and year first above written.

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Teresa Pastella, Notary Public
Plymouth Twp., Montgomery County
My Commission Expires March 28, 2017
Member, Pennsylvania Association of Notaries

By: Teresa Pastella
Teresa Pastella , Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of American Fire and Casualty Company, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

ARTICLE IV – OFFICERS – Section 12. Power of Attorney. Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to attach thereto the seal of the Corporation. When so executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

ARTICLE XIII – Execution of Contracts – SECTION 5. Surety Bonds and Undertakings. Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

Certificate of Designation – The President of the Company, acting pursuant to the Bylaws of the Company, authorizes David M. Carey, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization – By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, Gregory W. Davenport, the undersigned, Assistant Secretary, of American Fire and Casualty Company, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 21st day of October, 2014.

By: Gregory W. Davenport
Gregory W. Davenport, Assistant Secretary

Not valid for mortgage, note, loan, letter of credit, currency rate, interest rate or residual value guarantees.

To confirm the validity of this Power of Attorney call 1-610-832-8240 between 9:00 am and 4:30 pm EST on any business day.

APPENDIX J

DRAFT PUBLIC NOTICE

PUBLIC NOTICE

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

In accordance with 20.6.2.3108.F NMAC, Navajo Refining Company, L.L.C. hereby gives public notice of its application to the New Mexico Oil Conservation Division (OCD) for a discharge permit to inject treated non-hazardous waste water effluent from the refinery's on-site wastewater treatment plant into a Class I (non-hazardous) injection well WDW-4. The WDW-4 is to be located in the SE/4, NE/4 of Section 28, Township 17 South, Range 27 East, NMPM, Eddy County, New Mexico. The WDW-4 location is approximately 6.5 miles SE of the intersection of I-285 and Hwy 82 or approximately 2.5 miles SE of the intersection of Hwy 82 and CR-201. The Navajo Refinery is located at 501 E. Main Street, Artesia, New Mexico.

Waste water from the refinery is generated from the treatment of waters from the processing of crude oil and recovered oil, including the removal of water entrained in these oils, the washing of these oils to remove salts and sediment, other process unit waters, water used for heating and cooling during refining, boiler blowdown, recovered and treated groundwater, general wash waters, and stormwater collected from process portions of the refinery.

Underground injection at WDW-4 will occur into undifferentiated Devonian age strata within the injection interval from approximately 10,200 to 10,700 feet below ground surface (log depth). The injection rate into WDW-4 will not exceed 500 gallons per minute (gpm) and the maximum allowable surface injection pressure is 2,040 pounds per square inch gauge (psig). The injected refinery waste water quality is approximately 3,400 mg/L total dissolved solids (TDS). Naturally occurring formation fluid within the proposed injection interval exceeds 10,000 mg/L TDS. Groundwater is first encountered in the area of WDW-4 at a depth of approximately 50 to 150 feet below land surface. The naturally occurring groundwater quality at this depth ranges from about 1,500 to 2,200 mg/L TDS.

Persons interested in obtaining further information, submitting comments, or requesting to be on a facility-specific mailing list for future notices may contact the Environmental Bureau Chief of the New Mexico Oil Conservation Division.

Comments and inquiries on regulations should be directed to:

Director
Conservation Division
Energy Minerals and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
Telephone: (505) 476-3440

When corresponding, please reference the name of the applicant and the well name.

AVISO PUBLICO
ESTADO DE MEXICO
DEPARTMENTO DE ENERGIA, MINERALES Y RECURSO NATURALES
DIVISION DE CONSERVACION DE PETROLEO

Por medio de la presente La Navajo Company anuncia que de conformidad con los requisitos de las regulaciones de la Comisíon de Control de Calidad del Agua de Nuevo Mexico 20.6.2.3108.F NMAC, esta solicitando a la Division de Conservacíon del Petroleo de Nuevo Mexico (NMOCD) . Departamento del Medio Ambiente, un permiso de descarga para inyectar aguas residuales de la planta Artesia de la Navajo Refining Company hacia un pozo de inyección que se llama WDW-4. El WDW-4 esta localizado en SE/4, NE/4 de Sección 28, Municipio 17 sur, 27 Este, Condado Eddy, Nuevo Mexico. El WDW-4 esta localizado aproximadamente 6.5 millas SE de la unidad de I-285 y Hwy 82 (Refineria Artesia) o aproximadamente 2.5 millas SE de Hwy. 82 y CR-201. La Refineria Navajo se encuentra ubicada en 501 E. Main Street, Artesia, Nuevo Mexico.

La generacion de aguas residuals de la Refineria Artesia es el resultado del agua que se encuentran en al abastecimiento de crudo y aceite recuperado, el agua que se usa para el enfriamiento y calentamiento, recuperado y trartar las aguas subterraneas, agua de lavado, el agua que se usa para retirar las sales del abastecimiento de crudo, y para purgar la caldera.

Las aguas residuals de WDW-4 se injectaran hacia las Devonian estrados de edad, ubicadas entre 10,200 y 10,700 pies abajo de superficie del suelo (produndidad de registro). La tasa de inyeccion de WDW-4 no excedera los 500 gallones por minute (gpm) a una presion de inyeccion que no excedera los 2,040 libras por indicador de pulgadas cuadradas (psig). Estas aguas residuals tendran un contendido de total de solidos disueltos (TDS) de 3,400 milligramos per litro (mg/L). Formacion natural de fluido dentro del propuesta interval supera 10,000 mg/L TDS. En el area en donde se encuentran el pozo (WDW-4), el agua fresco se encuentra a esta profundidad de 50 a 150 pies por debajo de la superficie de la tierra con un TDS de 1,500 a 2,200 mg/L.

Personas interesadas en obtener mayores informes, presentar sus comentarios o solicitar que se les incluya en las listas de direcciones de una planta en especial para futuros avisos pueden ponerse en contacto con el Jefe del Departamento del Medio Ambiente de la División de Conservacíon de Petroleo de Nuevo Mexico.

Por Favor envien los comentarios y las preguntas a:

Director
Conservation Division
Energy Minerals and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
Telefono: (505) 476-3440

Cuando escriban, por favor pongan de referencia el nombre del applicante y del pozo.

ATTACHMENT 1

OCD WELL FILES FOR API 30-015-00472 (WELL ID NO. 14) and API 30-015-20159 (WELL ID NO. 157)

30-015-00472

Ogrid - 20451
prop - 25541
pool - 51300

4 Mg CK

1-9-80
Comp. Resistivity
401-10284
Microlog
8828-10285
Sonic
0-10,282

1058810
1058830
1058850

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NEW MEXICO OIL CONSERVATION COMMISSION

FORM C-128
Revised 5/1/57

WELL LOCATION AND ACREAGE DEDICATION PLAT

SEE INSTRUCTIONS FOR COMPLETING THIS FORM ON THE REVERSE SIDE

SECTION A

Operator	Lease	Well No.
Ralph Lowe	Federal (Perry) NM 025527A	1

Unit Letter	Section	Township	Range	County
F	23	T-17-S	R-27-E	Eddy

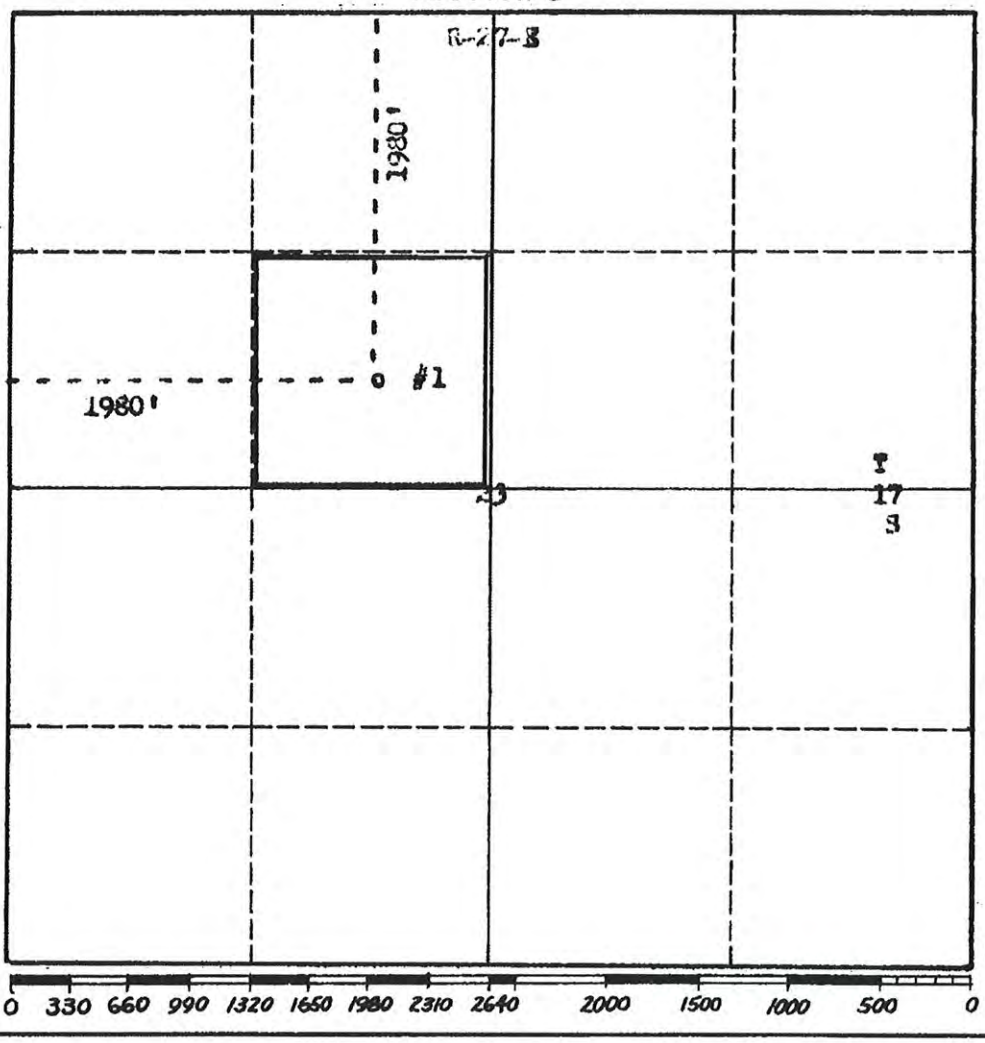
Actual Footage Location of Well:
1980 feet from the North line and 1980 feet from the West line

Ground Level Elev.	Producing Formation	Pool	Dedicated Acreage:
3525	Devonian	Undesignated	40 Acres

1. Is the Operator the only owner in the dedicated acreage outlined on the plat below? YES X 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.

E. L. Murray
Name

Agent
Position

Ralph Lowe
Company

January 11, 1962
Date

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
January 8, 1962
Registered Professional Engineer and/or Land Surveyor

Jno. W. Hewett Jr.
Certificate No.
3280

INSTRUCTIONS FOR COMPLETION OF FORM C-128

1. Operator shall furnish and certify to the information called for in Section A.

2. Operator shall outline the dedicated acreage for *both* oil and gas wells on the plat in Section B.

3. A registered professional engineer or land surveyor registered in the State of New Mexico or approved by the Commission shall show on the plat the location of the well and certify this information in the space provided.

4. All distances shown on the plat must be from the outer boundaries of the Section.

5. If additional space is needed for listing owners and their respective interests as required in question 3 of Section A, please use space below.

N. M. O. C. C. COPY

STATE WATER ENGINEER COPY

Form 9-331a
(Feb. 1951)

Artesia
Budget Bureau No. 42-R358.4.
Approval expires 12-31-60.
Land Office New Mexico
Lease No. NM 025527A
Unit F

(SUBMIT IN TRIPLICATE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

APPROVED
JAN 17 1962
JAMES A. KNAUF
DISTRICT ENGINEER

RECEIVED
JAN 22 1962
O. C. C.
ARTESIA, OFFICE

SUNDRY NOTICES AND REPORTS ON WELLS

NOTICE OF INTENTION TO DRILL	X	SUBSEQUENT REPORT OF WATER SHUT-OFF	
NOTICE OF INTENTION TO CHANGE PLANS		SUBSEQUENT REPORT OF SHOOTING OR ACIDIZING	
NOTICE OF INTENTION TO TEST WATER SHUT-OFF		SUBSEQUENT REPORT OF ALTERING CASING	
NOTICE OF INTENTION TO RE-DRILL OR REPAIR WELL		SUBSEQUENT REPORT OF RE-DRILLING OR REPAIR	
NOTICE OF INTENTION TO SHOOT OR ACIDIZE		SUBSEQUENT REPORT OF ABANDONMENT	
NOTICE OF INTENTION TO PULL OR ALTER CASING		SUPPLEMENTARY WELL HISTORY	
NOTICE OF INTENTION TO ABANDON WELL			

(INDICATE ABOVE BY CHECK MARK NATURE OF REPORT, NOTICE, OR OTHER DATA)

FEDERAL (BERRY) January 11, 19 62

Well No. 1 is located 1980 ft. from {N/S} line and 1980 ft. from {E/W} line of sec. 23

SE/4 ~~SE~~ NW/4 (¼ Sec. and Sec. No.) | 17-S (Twp.) | 27-E (Range) | N.M.P.M. (Meridian)

Undesignated (Field) | Eddy (County or Subdivision) | New Mexico (State or Territory)

The elevation of the ~~derrick floor~~ G.L. above sea level is 3535 ft.

DETAILS OF WORK

(State names of and expected depths to objective sands; show sizes, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work)

We Plan to drill a 10,500' test to the Devonian Formation, and plan to test all shows of oil and gas between 3000' and T.D. 13 3/8" 48# surface casing will be set at 400' in Seven Rivers anhydrite and cemented to the surface. 9 5/8" 36# Intermediate casing will be set at 1700' in the San Andres dolomite and will be cemented to the surface or to the surface string. If production seems possible, 5 1/2" 17# casing will be run to the producing horizon.

RECEIVED
JAN 12 1962
U. S. GEOLOGICAL SURVEY
ARTESIA, NEW MEXICO

I understand that this plan of work must receive approval in writing by the Geological Survey before operations may be commenced.

Company Ralph Lowe

Address Box 832,

Midland, Texas

By [signature]

Title Agent

GPO 862040

N. M. O. C. C. COPY

Form 9-331a
(Feb. 1951)

APPROVED
APR 24 1963
RONNIE E. SHOOK
ACTING DISTRICT ENGINEER

(SUBMIT IN TRIPLICATE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Budget Bureau No. 42-R358.4.
Form Approved.
Land Office New Mexico
Lease No. NM 025527A
Unit E

SUNDRY NOTICES AND REPORTS ON WELLS

NOTICE OF INTENTION TO DRILL		SUBSEQUENT REPORT OF WATER SHUT-OFF	
NOTICE OF INTENTION TO CHANGE PLANS		SUBSEQUENT REPORT OF SHOOTING OR ACIDIZING	
NOTICE OF INTENTION TO TEST WATER SHUT-OFF		SUBSEQUENT REPORT OF ALTERING CASING	
NOTICE OF INTENTION TO RE-DRILL OR REPAIR WELL		SUBSEQUENT REPORT OF RE-DRILLING OR REPAIR	
NOTICE OF INTENTION TO SHOOT OR ACIDIZE		SUBSEQUENT REPORT OF ABANDONMENT	
NOTICE OF INTENTION TO PULL OR ALTER CASING		SUPPLEMENTARY WELL HISTORY	X
NOTICE OF INTENTION TO ABANDON WELL			

(INDICATE ABOVE BY CHECK MARK NATURE OF REPORT, NOTICE, OR OTHER DATA)

Berry (Federal) April 22, 19 63

Well No. 1 is located 1980 ft. from {N/S} line and 1980 ft. from {E/W} line of sec. 23

SE/4 NW/4 Sec. 23 (¼ Sec. and Sec. No.) | 17-S (Twp.) | 27-E (Range) | NMPM (Meridian)

Undesignated (Field) | G.L. | Eddy (County or Subdivision) | New Mexico (State or Territory)

The elevation of the derrick floor above sea level is 3535 ft.

DETAILS OF WORK

(State names of and expected depths to objective sands; show sizes, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work)

We are blowing well occasionally trying to clean it up. Well could be classified as temporarily abandoned, until we decide to either complete as a gas well or abandon.

RECEIVED
APR 25 1963
O. C. C.
ARTESIA, OFFICE

RECEIVED
APR 24 1963
U. S. GEOLOGICAL SURVEY
ARTESIA, NEW MEXICO

I understand that this plan of work must receive approval in writing by the Geological Survey before operations may be commenced.

Company RALPH LOWE

Address Box 832

Midland, Texas

By [signature] Agent

Title

GPO 914974

Ralph Lowe
Berry-Federal NM 025527A
Well No. 1, Unit F
Section 23, TWP-17-S, R-27-E
Eddy County, New Mexico

DEVIATION SURVEY

Degree	Feet	Degree	Feet
1-1/2	861	1	8050
0	1318	1	8244
1/4	1413	1	8382
1/4	2306	1	8480
1-1/4	3054	1	8662
1/4	3555	1	8743
1/4	3850	1	8828
3/4	4437	1	8965
1/2	4751	3/4	9027
3/4	5131	3/4	9096
3/4	5701	1/2	9250
1-1/2	5987	1-1/4	9325
1-1/4	6305	1-1/4	9405
1-1/4	6622	1/2	9461
1-1/2	7085	3/4	9669
1	7198	1	9736
3/4	7537	1/2	9798
1	7650	3/4	9956
1	7789	3/4	10083
1	7898	1/2	10189

RECEIVED
OCT 28 1963
O. C. C.
ARTESIA, OFFICE

STATE OF TEXAS)
COUNTY OF MIDLAND)

Before me, the undersigned authority, on this day personally appeared C. W. Murray, known to me to be the person whose name is subscribed to this instrument, who after by me duly sworn on oath, states that to the best of his knowledge the facts stated above are true and correct.

C. W. Murray

Subscribed and sworn to before me on this the 23rd. day of October, 1963

Jeanne Coughran, Notary Public
in and for Midland County, Texas

It is of the greatest importance to have a complete history of the well. Please state in detail the dates of redrilling, together with the reasons for the work and its results. If there were any changes made in the casing, state fully, and if any casing was "sidetracked" or left in the well, give the size and location. If the well has been dynamited, give date, size, position, and number of shots. If plugs or bridges were put in to test for water, state kind of material used, position, and results of pumping or bailing.

Drill Stem Tests

9096'-9162' Gas 5 Min. open 1 hrs. rec. 30' Mud. (SIP 323/-2770#) FP 46# (Hyd 4786#)

9318-9405' open 17 Min. rec 3000' Mud (ISIP 2280#) (IFP 220#).

9490-9537' open 1 hr Gas 17 Min rec 650' gas cut mud, (SIP 2746-2781) (FP 384-360#) (Hyd 5054-5054#)

9989-9669' 2 hrs. 40 min Gas 13 Mcf Made 650 MCF rec 2450' GCM. (SIP 5790-5675#) (FP 1200-1500#) (Hyd 5835-5815#)

10278-10318 op 1 hr. rec. 100' Mud (SIP 1154#) FP 100# - 170#)

10285-10385' op 1 hr. rec. 230' Mud (SIP 1380-290#) (FP 197#)

10277-10427 op 1 hr. rec. 500' Mud 9700' SW (SIP 4360#) FP 3380-4360#) Set retainer @ 10200' Squeeze Perf. 9541-9550, 9578-9584 Treated w 500 gal acid 1 to 3 BPM - 5700# 5500# well flwg. 1 MCF TBG Pressure 0 to 4

frac w 3000 gal. Tel Kero w 1500# sd - Max pressure 8100# - Trt w 3 BPM @ 7350# Swb dry @ Rec. 2180 gal.

Set ret. @ 9300' Perf 9154-9164 Trt. w 590 gal acid Swb dry. frac w 5000 gal oil - 3500# Sd 3 BPM Max 6400# - 6400#

Perf 9192-9198, 9313-9318, 9328-9332, 9376-86, 9400-9406, 9445-9453 Trt w 500 gal Mud acid, 10000 gal Telaid w 3500# sd 800# Walnut Hulls. Tested well Made 660 MCF in 7 hrs. after Testing well Several months, well declined and was not a Commercial Producer.

FORM 9-330

LEASE OR PERMIT TO PROSPECT

SERIAL NUMBER

U. S. LAND OFFICE

Approval expires 12-31-60.
Budget Bureau No. 42-R-355.5.

DEPARTMENT OF THE INTERIOR
UNITED STATES

RECEIVED
OCT 28 1963
O. C. C.
ARTESIA, OFFICE

FOLD

PLUGS AND ADAPTERS

Heaving plug—Material ..... Length ..... Depth set .....

Adapters—Material ..... Size .....

SHOOTING RECORD

Size	Shell used	Explosive used	Quantity	Date	Depth shot	Depth cleaned out

TOOLS USED

Rotary tools were used from 0 feet to 10427 feet, and from ..... feet to ..... feet

Cable tools were used from ..... feet to ..... feet, and from ..... feet to ..... feet

DATES

....., 19..... Put to producing Dry Hole, 19.....

The production for the first 24 hours was ..... barrels of fluid of which .....% was oil; .....% emulsion; .....% water; and .....% sediment. Gravity, °Bé. .....

If gas well, cu. ft. per 24 hours ..... Gallons gasoline per 1,000 cu. ft. of gas .....

Rock pressure, lbs. per sq. in. .....

EMPLOYEES

Percy Wirt, Driller G.W. Mallard, Driller

Frank Cromwell, Driller ....., Driller

FORMATION RECORD

FROM—	TO—	TOTAL FEET	FORMATION
0	155	155	Red Shale, Gypsum, & Dolomite
155	400	245	Sand
400	880	480	Dolomite
880	1670	790	Dolomite and Sand (Elev. 3548 DF)
1670	3050	1380	Dolomite
3050	5150	2100	Dolomite & Sand
5150	6325	1175	Shale & Dolomite
6325	9290	2965	Lime and Shale
9290	9740	450	Shale, Lime, & Sand
9740	10245	505	Limestone
10245	10253	8	Shale
10253	10428	175	Dolomite

RECEIVED
OCT 28 1963
O. C. C.
ARTESIA, OFFICE

L. Morrow 9320
Up Miss 9593
L. Miss. 9738
Woodford 10243

Geol. Tops

Yates	156
7R	396
Qn	880
Grybg	1313
SA	1667
Glor.	3048
Tubb	4455
Abo	5149
WC	6325
Cisco	7588
Canyon	8179
L. Str. Ls	8532
Bend	9020
Morrow Ls.	9218

FROM— TO— TOTAL FEET FORMATION

(OVER) FORMATION RECORD

S-Dev. 10253

E.L.

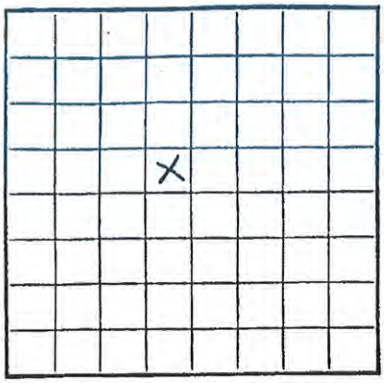
Form 9-330

Budget Bureau No. 42-R355.4.

U. S. LAND OFFICE New Mexico

SERIAL NUMBER NM 025527 A

LEASE OR PERMIT TO PROSPECT



LOCATE WELL CORRECTLY

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

LOG OF OIL OR GAS WELL

Company Ralph Lowe Address Box 837, Midland, Texas

Lessor or Tract Berry (Federal) Field Undesignated State New Mexico

Well No. 1 Sec. 23 T. 17-S R. 27-E Meridian NMPM County Eddy

Location 1980 ft. {N./S.} of N. Line and 1980 ft. {E./W.} of W. Line of Sec. 23 Elevation 3535
(Derrick floor relative to sea level)

The information given herewith is a complete and correct record of the well and all work done thereon so far as can be determined from all available records.

Signed

Date October 23, 1963 Title Agent

The summary on this page is for the condition of the well at above date.

Commenced drilling January 22, 1963 Finished drilling April 18, 1963

RECEIVED
OCT 28 1963
O. C. C.
ARTESIA, OFFICE

OIL OR GAS SANDS OR ZONES

(Denote gas by G)

No. 1, from 9541- to 9550 (G) No. 4, from to

No. 2, from 9578 to 9581 (G) No. 5, from to

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

IMPORTANT WATER SANDS

No. 1, from to No. 3, from to

No. 2, from to No. 4, from to

CASING RECORD

Size casing	Weight per foot	Threads per inch	Make	Amount	Kind of shoe	Cut and pulled from	Perforated From—	Perforated To—	Purpose
13 3/8	48#	8	Spang	400			See attached sheet		
9 5/8	36#	8	Lone Star	1690					
5 1/2	17#	LT&C	CF&I	10278		8200			

MUDDING AND CEMENTING RECORD

Size casing	Where set	Number sacks of cement	Method used	Mud gravity	Amount of mud used
13 3/8	400	400	Pump		
9 5/8	1690	950	Pump		
5 1/2	10278	525	Pump		

MARK

N. M. O. C. C. Hobbs

Form 9-331a
(Feb. 1951)

Budget Bureau No. 42-R358.4.
Form Approved.

Land Office New Mexico
Lease No. NM 025527 A
Unit F

(SUBMIT IN TRIPLICATE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

RECEIVED DEC 3 1963 U.S. GEOLOGICAL SURVEY ROSWELL, NEW MEXICO

SUNDRY NOTICES AND REPORTS ON WELLS

NOTICE OF INTENTION TO DRILL		SUBSEQUENT REPORT OF WATER SHUT-OFF	
NOTICE OF INTENTION TO CHANGE PLANS		SUBSEQUENT REPORT OF SHOOTING OR ACIDIZING	
NOTICE OF INTENTION TO TEST WATER SHUT-OFF		SUBSEQUENT REPORT OF ALTERING CASING	
NOTICE OF INTENTION TO RE-DRILL OR REPAIR WELL		SUBSEQUENT REPORT OF RE-DRILLING OR REPAIR	
NOTICE OF INTENTION TO SHOOT OR ACIDIZE		SUBSEQUENT REPORT OF ABANDONMENT	
NOTICE OF INTENTION TO PULL OR ALTER CASING		SUPPLEMENTARY WELL HISTORY	
NOTICE OF INTENTION TO ABANDON WELL			
Notice of Intention to plug back	X		

(INDICATE ABOVE BY CHECK MARK NATURE OF REPORT, NOTICE, OR OTHER DATA)

Berry (Federal) October 21, 1963

Well No. 1 is located 1980 ft. from [N/S] line and 1980 ft. from [E/W] line of sec. 23

SE/4 NW/4 Sec. 23 (¼ Sec. and Sec. No.) 17-S (Twp.) 27-E (Range) NMPM (Meridian)

Undesignated (Field) Eddy (County or Subdivision) New Mexico (State or Territory)

The elevation of the ~~derrick~~ GL floor above sea level is 3535 ft.

DETAILS OF WORK

(State names of and expected depths to objective sands; show sizes, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work)

Well to be Plugged back to 3000', and turned over to Leonard Latch for Completion. Well to be plugged back per instructions of U.S.G.S.

RECEIVED NOV 1963 U.S. GEOLOGICAL SURVEY ROSWELL, NEW MEXICO

Formerly TD 3500'

I understand that this plan of work must receive approval in writing by the Geological Survey before operations may be commenced.

Company Ralph Lowe

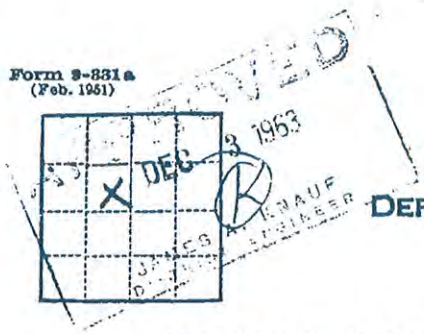
Address Box 837
Midland, Texas

By [signature]

Title agent

GPO 914974

Form 9-331a
(Feb. 1951)



(SUBMIT IN TRIPLICATE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Budget Bureau No. 42-R358.4.
Form Approved.

Land Office New Mexico
Lease No. NM 025527A
Unit F

copy to 57

SUNDRY NOTICES AND REPORTS ON WELLS

NOTICE OF INTENTION TO DRILL		SUBSEQUENT REPORT OF WATER SHUT-OFF	
NOTICE OF INTENTION TO CHANGE PLANS		SUBSEQUENT REPORT OF SHOOTING OR ACIDIZING	
NOTICE OF INTENTION TO TEST WATER SHUT-OFF		SUBSEQUENT REPORT OF ALTERING CASING	
NOTICE OF INTENTION TO RE-DRILL OR REPAIR WELL		SUBSEQUENT REPORT OF RE-DRILLING OR REPAIR	
NOTICE OF INTENTION TO SHOOT OR ACIDIZE		SUBSEQUENT REPORT OF ~~ABANDONMENT~~ Plug back	X
NOTICE OF INTENTION TO PULL OR ALTER CASING		SUPPLEMENTARY WELL HISTORY	
NOTICE OF INTENTION TO ABANDON WELL			

(INDICATE ABOVE BY CHECK MARK NATURE OF REPORT, NOTICE, OR OTHER DATA)

Berry Federal October 23, 1963

Well No. 1 is located 1980 ft. from ~~S~~ N line and 1980 ft. from ~~E~~ W line of sec. 23

SE/4 NW/4 Sec. 23 (¼ Sec. and Sec. No.) 17-S (Twp.) 27-E (Range) N.M.P.M. (Meridian)

Undesignated (Field) Eddy (County or Subdivision) New Mexico (State or Territory)

The elevation of the ~~derrick floor~~ GL above sea level is 3535 ft.

DETAILS OF WORK

(State names of and expected depths to objective sands; show sizes, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work)

Well plugged back to 3000' and turned over to Leonard Latch. 35 sacks at 9200'-8920', 40 sacks at 7664'-7384', 35 sacks at 6370'-6090', 35 sacks at 5200'-4920', and 35 sacks at 3280-3000'. as per instructions of U.S.G.S.

RECEIVED
DEC 6 1963
ARTESIA, OFFICE

I understand that this plan of work must receive approval in writing by the Geological Survey before operations may be commenced.

Company Ralph Lowe

Address Box 832

Midland, Texas

By [signature]

Title agent

GPO 914974

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

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—" for such proposals.)

RECEIVED
DEC 20 1963
O. C. C.
ARTESIA, OFFICE

1. OIL WELL ☐ GAS WELL ☒ OTHER

2. NAME OF OPERATOR
Leonard Latch

3. ADDRESS OF OPERATOR
1317 Texas Ave. Lubbock, Texas 79401

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.)
At surface
1980/N+W

5. LEASE DESIGNATION AND SERIAL NO.
NM 025527-A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

7. UNIT AGREEMENT NAME

8. FARM OR LEASE NAME
Berry

9. WELL NO.
1

10. FIELD AND POOL, OR WILDCAT
Empire

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
23-17S-27E

12. COUNTY OR PARISH
Eddy

13. STATE
N. Mex.

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)
3545DF

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☐	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	X	(Other)			
(Other)				(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.) *

Well drilled by Ralph Lowe as a deep test. Set intermediate string of 9 5/8" casing at 1690', circulated cement. A cement plug was set at 3000'.

Leonard Latch attempted to log hole in early December, 1963---found mud so heavy that logging instruments would not go down. Will move on drilling rig early in 1964 and attempt to complete in Greyburg or San Andres between the depth of 1690 & 3000ft.

RECEIVED
DEC 19 1963
U. S. GEOLOGICAL SURVEY
ARTESIA, NEW MEXICO

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

SIGNED Chester L. Anderson TITLE Agent DATE 12-17-63

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

APPROVED
DEC 19 1963
R. L. BEERS
ACTING DISTRICT ENGINEER

*See Instructions on Reverse Side

Instructions

General: 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, and, if approved or accepted by any State, on all lands in such State, pursuant to applicable State 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 and/or State office.

Item 4: If there are no applicable State requirements, locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local State or Federal office for specific instructions.

Item 17: Proposals to abandon a well and subsequent reports of abandonment should include such special information as is required by local Federal and/or State offices. 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.

U.S. GOVERNMENT PRINTING OFFICE : 1963—O-685229

Form 9-330
(Rev. 5-63)

N. M. O. C. C. COPY

SUBMIT IN DUPL. TE* (See other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R355.5.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

copy to J.

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

5. LEASE DESIGNATION AND SERIAL NO.: NM025527A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

RECEIVED
AUG 13 1965
O. C. C.
ARTESIA, OFFICE

1a. TYPE OF WELL: OIL WELL ☐ GAS WELL ☒ DRY ☐ Other

b. TYPE OF COMPLETION: NEW WELL ☐ WORK OVER ☐ DEEP-EN ☐ PLUG BACK ☒ DIFF. RESVR. ☒ Other

7. UNIT AGREEMENT NAME:

2. NAME OF OPERATOR: Leonard Latch

8. FARM OR LEASE NAME: Berry

3. ADDRESS OF OPERATOR: 1317 Texas Ave. Lubbock, Texas 79401

9. WELL NO.: 29

4. LOCATION OF WELL (*Report location clearly and in accordance with any State requirements*)*
At surface: 1980' N & W.
At top prod. interval reported below
At total depth

10. FIELD AND POOL, OR WILDCAT: Empire Yates

11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: Sec. 23 T17S R 27E

14. PERMIT NO. | DATE ISSUED

12. COUNTY OR PARISH: Eddy | 13. STATE: New Mexico

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (*Ready to prod.*)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
Turned in by Ralph Lowe		8-9-65	3545DF	3535DF

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
	1550'	None	→	X	

RECEIVED
AUG 10 1965
U. S. GEOLOGICAL SURVEY
ARTESIA, NEW MEXICO

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*: 1148'-49' & 1162-63'

25. WAS DIRECTIONAL SURVEY MADE:

26. TYPE ELECTRIC AND OTHER LOGS RUN: Gamaray- Nurton Filed by Ralph Lowe.

27. WAS WELL CORED:

28. CASING RECORD (*Report all strings set in well*)

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
9 5/8"		1690'		Cement Circulated	

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)
2"	1100'	No

31. PERFORATION RECORD (*Interval, size and number*): 1148'-49' & 1162-63'

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

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
1148-49-62-63	1000 Gal. Acid

33.* PRODUCTION

DATE FIRST PRODUCTION	PRODUCTION METHOD (*Flowing, gas lift, pumping—size and type of pump*)	WELL STATUS (*Producing or shut-in*)
4-10-65	Flowing	Small gas well. Shut in

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD →	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO
							Small Gas well

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE →	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)

34. DISPOSITION OF GAS (*Sold, used for fuel, vented, etc.*): Shut in

TEST WITNESSED BY

35. LIST OF ATTACHMENTS

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records

SIGNED Chester L. Anderson TITLE Agent DATE 8-9-65

*(See Instructions and Spaces for Additional Data on Reverse Side)

INSTRUCTIONS

General: This form is designed for submitting a complete and correct well completion report and log on all types of lands and leases to either a Federal agency or a State agency, or both, pursuant to applicable Federal and/or State laws 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 and/or State office. See instructions on items 22 and 24, and 33, below regarding separate reports for separate completions.

If not filed prior to the time this summary record is submitted, copies of all currently available logs (drillers, geologists, sample and core analysis, all types electric, etc.), formation and pressure tests, and directional surveys, should be attached hereto, to the extent required by applicable Federal and/or State laws and regulations. All attachments should be listed on this form, see item 35.

Item 4: If there are no applicable State requirements, locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local State or Federal office for specific instructions.

Item 18: Indicate which elevation is used as reference (where not otherwise shown) for depth measurements given in other spaces on this form and in any attachments.

Items 22 and 24: If this well is completed for separate production from more than one interval zone (multiple completion), so state in item 22, and in item 24 show the producing interval, or intervals, top(s), bottom(s) and name(s) (if any) for only the interval reported in item 33. Submit a separate report (page) on this form, adequately identified, for each additional interval to be separately produced, showing the additional data pertinent to such interval.

Item 29: "*Sacks Cement*": Attached supplemental records for this well should show the details of any multiple stage cementing and the location of the cementing tool.

Item 33: Submit a separate completion report on this form for each interval to be separately produced. (See instruction for items 22 and 24 above.)

37. SUMMARY OF POROUS ZONES: SHOW ALL IMPORTANT ZONES OF POROSITY AND CONTENTS THEREOF; CORED INTERVALS; AND ALL DRILL-STEM TESTS, INCLUDING DEPTH INTERVAL TESTED, CUSHION USED, TIME TOOL OPEN, FLOWING AND SHUT-IN PRESSURES, AND RECOVERIES				38. GEOLOGIC MARKERS		
FORMATION	TOP	BOTTOM	DESCRIPTION, CONTENTS, ETC.	NAME	TOP	
					MEAS. DEPTH	TRUE VERT. DEPTH

U.S. GOVERNMENT PRINTING OFFICE: 1963—O-683636

N. M. O. C. C. COPY

Copy to J.T.

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

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—" for such proposals.)

1. OIL WELL [X] GAS WELL [ ] OTHER

2. NAME OF OPERATOR: Leonard Latch

3. ADDRESS OF OPERATOR: 1317 Texas Ave. Lubbock, Texas 79401

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: 1980/N + W

5. LEASE DESIGNATION AND SERIAL NO.: NM-25527A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

7. UNIT AGREEMENT NAME:

8. FARM OR LEASE NAME: Berry

9. WELL NO.: 29

10. FIELD AND POOL, OR WILDCAT: Empire Yates

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec. 23 T. 17S R. 27E

12. COUNTY OR PARISH: Eddy

13. STATE: N. Mex.

14. PERMIT NO.:

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 3545 DF

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[X]	(Other)			
(Other)				(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.) *

Drilled out cement from 1700 to 2120' well started making a bail and one half of water in 10 hrs. no oil.

Put 20 sack cement plug from 1750 to 1600'

Put 20 sack cement plug from 1500 to 1550'

Plan to attempt completion in Queen Sand approximatly 1150'.

RECEIVED
FEB 2 1965
O. C. C.
ARTESIA, OFFICE

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

SIGNED Chester J. Anderson TITLE Agent DATE 1-28-65

(This space for Federal or State office use)

APPROVED BY Rudolph C. Baier Jr. TITLE ACTING DISTRICT ENGINEER DATE FEB 1 1965

CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side

Instructions

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U.S. GOVERNMENT PRINTING OFFICE: 1963—O-685229

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Copy to Roswell

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

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—" for such proposals.)

5. LEASE DESIGNATION AND SERIAL NO.: NMO25527A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

1. OIL WELL [X] GAS WELL [ ] OTHER

7. UNIT AGREEMENT NAME:

2. NAME OF OPERATOR: Leonard Latch

8. FARM OR LEASE NAME: Berry

3. ADDRESS OF OPERATOR: 1317 Texas Ave. Lubbock, Texas 79401

9. WELL NO.: 1

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: SE 1/4 NW 1/4 Sec.23 T.17S R 27E

10. FIELD AND POOL, OR WILDCAT: Empire

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec.23 T17S R27E

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 3545DF

12. COUNTY OR PARISH: Eddy

13. STATE: N.Mex.

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other)			
(Other) To Change Operator Name & Well No.				(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.) *

To Change the Operator Name from Ralph Lowe to Leonard Latch

and change the well Number from Well # 1 to Well No. 29

RECEIVED
JAN 26 1965
O. C. C.
ARTESIA, OFFICE

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

SIGNED Charles L Robinson TITLE Agent DATE 1-21-65

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

APPROVED
JAN 25 1965
R. L. BEERMAN
ACTING DISTRICT ENGINEER

*See Instructions on Reverse Side

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U.S. GOVERNMENT PRINTING OFFICE: 1963—O-685229

N. M. O. C. C. Copy to Roswell

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

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—" for such proposals.)

1. OIL WELL [ ] GAS WELL [X] OTHER

2. NAME OF OPERATOR: Leonard Latch

3. ADDRESS OF OPERATOR:

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: SE1/4 NW 1/4 Sec. 23 T.17S R 27E

5. LEASE DESIGNATION AND SERIAL NO.: NM025527A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

7. UNIT AGREEMENT NAME:

8. FARM OR LEASE NAME: Perry

9. WELL NO.: 29

10. FIELD AND POOL, OR WILDCAT: Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec.23 T.17S R. 27E

12. COUNTY OR PARISH: Eddy

13. STATE: N.Mex.

14. PERMIT NO.:

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 3545DF

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[X]	(Other)			
(Other)				(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.) *

Well drilled by Ralph Lowe as a deep test. Set Intermediate string of 9 5/8" Casing at 1690', circulated cement. A cement plug was set at 3000'

Leonard Latch will go into well with cable tool and drill out mud and attempt to complete in Greyburg or San Andres between the depth of 1690' & 3000'. Will move rig on well about 1-28-65.

RECEIVED
JAN 26 1965
O. C. C.
ARTESIA, OFFICE

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

SIGNED: [signature] TITLE: Agent DATE: 1-21-65

(This space for Federal or State office use)

APPROVED BY: TITLE: DATE:

CONDITIONS OF APPROVAL, IF ANY:

APPROVED
JAN 25 1965
R. L. BEERMAN
ACTING DISTRICT ENGINEER

*See Instructions on Reverse Side

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U.S. GOVERNMENT PRINTING OFFICE: 1963—O—685229

N. M. O. C. C. COPY

Copy

Form 9-331
(May 1963)

NITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN [illegible]LICATE* (Other instru[illegible] on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

5. LEASE DESIGNATION AND SERIAL NO.: NM025527A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

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—" for such proposals.)

1. OIL WELL [X] GAS WELL [ ] OTHER

7. UNIT AGREEMENT NAME:

2. NAME OF OPERATOR: Leonard Latch

8. FARM OR LEASE NAME: Berry

3. ADDRESS OF OPERATOR: 1317 Texas Ave. Lubbock, Texas 79401

9. WELL NO.: 29

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface

SE/4 NW/4 Sec. 23 T.17S R.27E

1980/North

10. FIELD AND POOL, OR WILDCAT: Empire and

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec.23T.17S R.27E

14. PERMIT NO.:

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 3545GR

12. COUNTY OR PARISH: Eddy

13. STATE: New Mex

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[X]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[X]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other)			
(Other)	[ ]						

(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.) *

Perforated 9 5/8" casing at 1148-49' and from 1162-63'

3-9-65 Treated w/1,000 Gal. acid and frac well w/ 20,000gal. water and 10,000# sand well now in process of cleaning up after frac. job.

RECEIVED
MAR 23 1965
O. C. C.
ARTESIA, OFFICE

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

SIGNED Charles E Anderson TITLE Agent DATE 3-18-65

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

APPROVED
MAR 22 1965
H. L. [illegible]
ACTING DISTRICT ENGINEER

*See Instructions on Reverse Side

Instructions

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U.S. GOVERNMENT PRINTING OFFICE: 1963—O—685229

N. M. O. C. C. COPY

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Copy to S. F.

Form approved.
Budget Bureau No. 42-R1424.

5. LEASE DESIGNATION AND SERIAL NO.
NM025527A

SUNDRY NOTICES AND REPORTS ON WELLS

RECEIVED
MAY 19 1965
O. C. C.
ARTESIA, OFFICE

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

1. OIL WELL [X] GAS WELL [ ] OTHER

7. UNIT AGREEMENT NAME

2. NAME OF OPERATOR
Leonard Latch

8. FARM OR LEASE NAME
Berry

3. ADDRESS OF OPERATOR
1317 Texas Ave. Lubbock, Texas 79401

9. WELL NO.
29

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.)
At surface
1980 N & W

10. FIELD AND POOL, OR WILDCAT
Empire

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec. 23T. 17S R 27E

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)
3545DF

12. COUNTY OR PARISH
Eddy

13. STATE
New Mexico

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other) or less report after acid			
(Other)				(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.) *

5-15-65 Well still cleaning up after acid job 3-9-65 shows small amount of Sweet Gas.

(Note this well originally drilled in name of Ralph Lowe well # 1 you should have filed in your office form 9-330 also the Geologic logs should also be filed) Our office does not have this information.

RECEIVED
MAY 18 1965
U. S. GEOLOGICAL SURVEY
ARTESIA, NEW MEXICO

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

SIGNED Chester L Anderson TITLE Agent DATE 5-15-65

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

APPROVED
MAY 18 1965
RUDOLPH C. BAIER, JR.
ACTING DISTRICT ENGINEER

*See Instructions on Reverse Side

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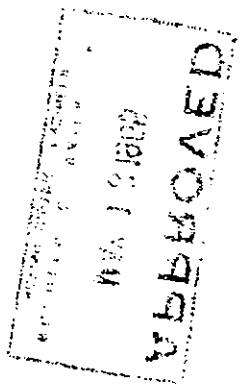
U.S. GOVERNMENT PRINTING OFFICE: 1963—O-685229



N. M. O. C. C. COPY

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

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—" for such proposals.)

5. LEASE DESIGNATION AND SERIAL NO.: NM025527A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

1. OIL WELL ☐ GAS WELL ☒ OTHER

7. UNIT AGREEMENT NAME:

2. NAME OF OPERATOR: Leonard Latch

8. FARM OR LEASE NAME: Berry

3. ADDRESS OF OPERATOR: 1317 Texas Ave. Lubbock, Texas 79401

9. WELL NO.: 29

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: 1980 N & W

10. FIELD AND POOL, OR WILDCAT: Empire Yeso

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec 23 T17S R27E

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)

12. COUNTY OR PARISH: Eddy

13. STATE: New Mexico

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☐	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	☐	(Other)			
(Other) Well Status			X	(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.) *

Well still shut in. Not producing enough gas for a 4-point test.

We are XX trying to find a market for gas before we go any XXXXXX XXXXX further with treating this well.

RECEIVED
MAR 21 1966
U. S. GEOLOGICAL SURVEY
ARTESIA, NEW MEXICO

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

SIGNED Christine F. Anderson TITLE Bookkeeper DATE 3-17-66

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

APPROVED
MAR 18 1966
R. L. BEERMAN
ACTING DISTRICT ENGINEER

*See Instructions on Reverse Side

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U.S. GOVERNMENT PRINTING OFFICE: 1963—O—685229

847-851

C. C. COPY

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

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—" for such proposals.)

1. OIL WELL ☐ GAS WELL ☒ OTHER

2. NAME OF OPERATOR: Leonard Latch

3. ADDRESS OF OPERATOR: 1812 Texas Ave. Lubbock, Texas 79401

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: SE-NW

5. LEASE DESIGNATION AND SERIAL NO.: 025527

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

7. UNIT AGREEMENT NAME:

8. FARM OR LEASE NAME: Perry

9. WELL NO.: 29

10. FIELD AND POOL, OR WILDCAT: Undesignated Empire

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: 23-17-27

14. PERMIT NO.:

15. ELEVATIONS (Show whether DF, RT, GR, etc.):

12. COUNTY OR PARISH: Eddy

13. STATE: New Mexico

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☐	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	☐	(Other) Temporary Abandon.			
(Other)				(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

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We have shut this well in and it will continue to be shut in until we can find a sale for the gas.

RECEIVED
JUL 24 1969
U. S. GEOLOGICAL SURVEY
ARTESIA, OFFICE

RECEIVED
JUL 23 1969
U. S. GEOLOGICAL SURVEY
ARTESIA, NEW MEXICO

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

SIGNED Charles Anderson TITLE Bookkeeper DATE 7-17-69

(This space for Federal or State office use)

APPROVED BY: TITLE DATE

CONDITIONS OF APPROVAL, IF ANY:

APPROVED
JUL 23
R. L. BEEKMA

*See Instructions on Reverse Side

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U.S. GOVERNMENT PRINTING OFFICE: 1963—O-685229
GPO 837-499 867-851

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

5. LEASE DESIGNATION AND SERIAL NO.: NM025527A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

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—" for such proposals.)

1. OIL WELL ☐ GAS WELL ☒ OTHER

7. UNIT AGREEMENT NAME:

2. NAME OF OPERATOR: Leonard Latch

8. FARM OR LEASE NAME: Berry

3. ADDRESS OF OPERATOR: 1812 Texas Ave. Lubbock, Texas 79401

9. WELL NO.: 29

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: 1980 N & W

10. FIELD AND POOL, OR WILDCAT: ~~Empire~~ Loco Hills

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec. 23 T17S R27E

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 3545 DF

12. COUNTY OR PARISH: Eddy

13. STATE: New Mexico

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☐	REPAIRING WELL	☐
FRACTURE TREAT	☒	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	☐	(Other)			
(Other) Return to Production			☒	(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Well has been Temp. Abd.
Will treat Queen Sand Peforations 1148-49 and 1162-63 with Approx. 18,000 lbs sand and jelled water. and ~~return~~ put in production

RECEIVED
SEP 14 1971
O. C. C.
ARTESIA, OFFICE

RECEIVED
SEP 10 1971
U. S. GEOLOGICAL SURVEY
ARTESIA, NEW MEXICO

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

SIGNED Chester L Anderson TITLE Agent DATE 9-9-71

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

APPROVED
SEP 13 1971
H. L. BEEKMAN
ACTING DISTRICT ENGINEER

*See Instructions on Reverse Side

Instructions

General: 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, and, if approved or accepted by any State, on all lands in such State, pursuant to applicable State 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 and/or State office.

Item 4: If there are no applicable State requirements, locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local State or Federal office for specific instructions.

Item 17: Proposals to abandon a well and subsequent reports of abandonment should include such special information as is required by local Federal and/or State offices. 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.

U.S. GOVERNMENT PRINTING OFFICE: 1963—O—685229

687-851

OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO
P. O. DRAWER DD - ARTESIA
88210

GOVERNOR
BRUCE KING
CHAIRMAN

LAND COMMISSIONER
ALEX J. ARMIJO
MEMBER

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY – DIRECTOR

September 12, 1972

Leonard Latch
1812 Texas Avenue
Lubbock, Texas 79401

Re: Berry #29-F, 23-17-27
Berry A #22-K, 24-17-27
Berry B #25-G, 25-17-27

Dear Mr. Latch:

This will acknowledge receipt of Form C-104, Request for an Allowable, on the above captioned wells. However, no allowable will be assigned the wells until notice of gas connection is received from Southern Union Gas Company.

Very truly yours,

OIL CONSERVATION COMMISSION

W. A. Gressett

W. A. Gressett
Supervisor, District II

WAG:jw

N. M. O. C. C. COPY

Copy

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

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—" for such proposals.)

RECEIVED
OCT 4 - 1972
O. C. C.
ARTESIA, OFFICE

5. LEASE DESIGNATION AND SERIAL NO.: NM025527A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

1. OIL WELL ☐ GAS WELL ☒ OTHER

7. UNIT AGREEMENT NAME:

2. NAME OF OPERATOR: Leonard Latch

8. FARM OR LEASE NAME: Berry

3. ADDRESS OF OPERATOR: 1812 Texas Ave. Lubbock, Texas 79401

9. WELL NO.: 29

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: 1980N & W

10. FIELD AND POOL, OR WILDCAT: Redlake

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec. 23 T17S R 27E

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 3545DF

12. COUNTY OR PARISH: Eddy

13. STATE: New Mexico

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☐	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	X	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	☐	(Other)			☐
(Other)	☐			(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.) *

We treated the Queen Sand Perforations 1140-49 and 1162-63 with 18,000 lbs. sand and jelled water. Well will make 70,000 MCF in 24 hr. test. The well is now shut in waiting on a pipe line connection with Southern Union Gas Co. who has contracted the gas.

RECEIVED
OCT - 2 1972
U. S. GEOLOGICAL SURVEY
ARTESIA, NEW MEXICO

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

SIGNED Chester L. Anderson TITLE Accountant DATE 9-29-72

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

APPROVED
OCT - 3 1972
/s/ R. L. BEEKMAN
R. L. BEEKMAN
ACTING DISTRICT ENGINEER

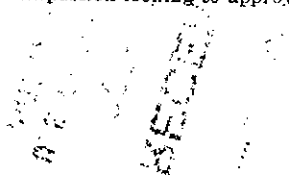
*See Instructions on Reverse Side

Instructions

General: 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, and, if approved or accepted by any State, on all lands in such State, pursuant to applicable State 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 and/or State office.

Item 4: If there are no applicable State requirements, locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local State or Federal office for specific instructions.

Item 17: Proposals to abandon a well and subsequent reports of abandonment should include such special information as is required by local Federal and/or State offices. 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.



U.S. GOVERNMENT PRINTING OFFICE: 1963—O-685229

847 - 485

N. M. O. C. C. Copy to O. C. C.

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

5. LEASE DESIGNATION AND SERIAL NO.: 025527A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

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—" for such proposals.)

RECEIVED
APR 26 1973
O. C. C.
ARTESIA, OFFICE

1. OIL WELL ☐ GAS WELL ☒ OTHER

7. UNIT AGREEMENT NAME:

2. NAME OF OPERATOR: Leonard Latch

8. FARM OR LEASE NAME: Derry

3. ADDRESS OF OPERATOR: 1812 Texas Ave. Lubbock, Texas 79401

9. WELL NO.: 29

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements. See also space 17 below.) At surface: 1980' N & W

10. FIELD AND POOL, OR WILDCAT: Redlake [illegible]

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: 23-17S-27E

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)

12. COUNTY OR PARISH: Eddy

13. STATE: New Mex.

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☐	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	☐	(Other)			
(Other) Well Status			☒	(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.) *

We reported on 9-21-72 that this well shut in waiting on pipe line connection from Southern Union Gas Co.
4-24-73 have gas connection from Southern Union Gas Company and we started producing this well.

RECEIVED
APR 25 1973
U. S. GEOLOGICAL SURVEY
ARTESIA, NEW MEXICO

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

SIGNED Chester L. Anderson TITLE Accountant DATE 4-24-73

(This space for Federal or State office use)

APPROVED BY [signature] TITLE DISTRICT ENGINEER DATE APR 25 1973
CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side

Instructions

General: 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, and, if approved or accepted by any State, on all lands in such State, pursuant to applicable State 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 and/or State office.

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U.S. GOVERNMENT PRINTING OFFICE: 1963—O—685229

847 - 485

MEXICO OIL CONSERVATION COMMISS

RECEIVED

JUL 5 1972

File
USGS

Form C-102
Supersedes C-128
Effective 1-1-65

WELL LOCATION AND ACREAGE DEDICATION PLAT

All distances must be from the outer boundaries of the Section

Operator	Lease	Well No.
Leonard Leteh	Bezzy	29

Unit Letter	Section	Township	Range	County
F	23	17S	27E	Eddy

Actual Footage Location of Well:
1980 feet from the N line and 1980 feet from the W line

Ground Level Elev.	Producing Formation	Pool	Dedicated Acreage:
3545	Queen Sand	Red Lake	40 Acres

1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below.

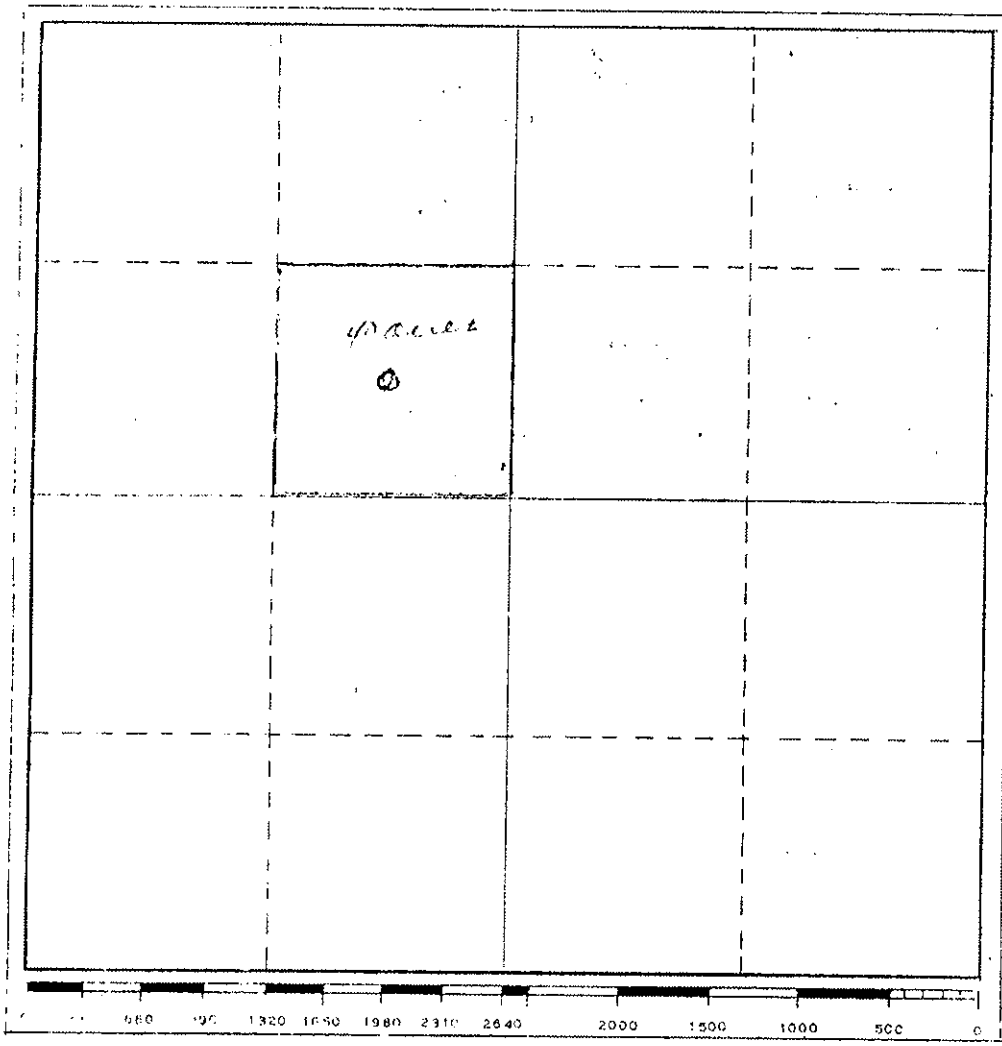
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

3. If more than one lease of different ownership is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling, etc?

☐ Yes ☐ No If answer is "yes," type of consolidation _____

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 interests, has been approved by the Commission.



CERTIFICATION

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

Chester L Anderson

Name: Chester L. Anderson

Position: Accountant

Company: Leonard Leteh

Date: 7-3-72

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.

See Original Survey
By James H. Brown

Date Surveyed

Registered Professional Engineer and/or Land Surveyor

Certificate No.

OIL CONSERVATION COMMISSION

BOX 2045

ARTESIA, NEW MEXICO

RECEIVED

APR 30 1973

O. C. C.

NOTICE OF GAS CONNECTION

DATE April 27, 1973

This is to notify the Oil Conservation Commission that connection for the purchase of gas from the Leonard Latch (Operator), Group #1 Lands (Lease), Unknown (Well Unit), 23 - 17S - 27E (S.T.R.), unknown (Pool), Southern Union Gas Co. (Name of Purchaser) was made on April 24, 1973.

Producer is gathering, compressing, and delivering gas to us at a Central Location, do not know how many or location of wells from gas is being gathered.

Berry #29-F-23-17-27
Berry A #22 K-24-17-27
Berry B #25 G-25-17-27

Southern Union Gas Company
Purchaser

James F. Cocon
Representative

Transmission Manager
Title

cc: To operator: Leonard Latch, 1812 Texas Avenue, Lubbock, Tx. 79401
Oil Conservation Commission - Santa Fe
E. R. Corliss - Dallas - Engineering
W. B. Richardson - Gas Meas.- Dallas
R. J. McCrary - Dallas - Purchase & Prorations
E. H. Redden - Carlsbad - Dispatch Office

NO. OF COPIES RECEIVED	4	
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FILE	1	✓
U.S.G.S.		
LAND OFFICE		
TRANSPORTER OIL		
TRANSPORTER GAS	1	
OPERATOR	1	
PRORATION 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 C-110
Effective 1-1-65

RECEIVED.

AUG 16 1972

O. C. C.
ARTESIA, OFFICE

I.

Operator: Leonard Latch ✓

Address: 1812 Texas Ave. Lubbock, Texas 79401

Reason(s) for filing *(Check proper box)*

New Well	X	Change in Transporter of:			
Recompletion	X	Oil		Dry Gas	X
Change in Ownership		Casinghead Gas		Condensate	

Other *(Please explain)*

If change of ownership give name and address of previous owner _____

II. DESCRIPTION OF WELL AND LEASE

Lease Name	Well No.	Pool Name, Including Formation	Kind of Lease	Lease No.
Berry	29	~~Redlake Queen Gas~~	State, Federal or Fee Federal	025527A

Location
Unit Letter F ; 1980' Feet From The N Line and 1980' Feet From The W

Line of Section 23 Township 17S Range 27E , NMPM, Eddy County

III. DESIGNATION OF TRANSPORTER OF OIL AND NATURAL GAS

Name of Authorized Transporter of Oil ☐ or Condensate ☐	Address *(Give address to which approved copy of this form is to be sent)*
Name of Authorized Transporter of Casinghead Gas ☐ or Dry Gas X: Southern Union Gas Co.	Address *(Give address to which approved copy of this form is to be sent)*: Fidelity Union Tower, Dallas, Texas 75201 Attention Gene L. Hazeltine

If well produces oil or liquids, give location of tanks.	Unit	Sec.	Twp.	Rge.	Is gas actually connected?	When
					~~No~~ yes	~~Name Future~~ 4-24-73

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			~~1550'~~		

Date Spudded	Date Compl. Ready to Prod.	Total Depth	P.B.T.D.
	8-9-65	~~1690'~~ 10427	1550
Elevations *(DF, RKB, RT, GR, etc.)*	**Name of Producing Formation**	**Top Oil/Gas Pay**	**Tubing Depth**
3545DF	Queen Sand	1148'	1100'
Perforations			**Depth Casing Shoe**
1148-49' & 1162-63'			1690

TUBING, CASING, AND CEMENTING RECORD

HOLE SIZE	CASING & TUBING SIZE	DEPTH SET	SACKS CEMENT
	~~5 3/8"~~	~~1690~~	~~Not Available~~
	13 3/8"	400	400
	9 5/8"	1690	950

V. TEST DATA AND REQUEST FOR ALLOWABLE *(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)*

OIL WELL

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
78,808	24 hrs.	Dry Gas	
Testing Method *(pitot, back pr.)*	**Tubing Pressure** (Shut-in)	**Casing Pressure** (Shut-in)	**Choke Size**
Flow	~~378~~	~~488~~	1/2"

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.

Chester L Anderson
(Signature)
Agent
(Title)
Aug. 15, 1972
(Date)

OIL CONSERVATION COMMISSION
APPROVED APR 27 1973, 19____
BY W. A. Gressett
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 deepened well, this form must be accompanied by a tabulation of the deviation tests taken on the well in accordance with RULE 111.

All sections of this form must be filled out completely for allowable on new and recompleted wells.

Fill out only Sections I, II, III, and VI for changes of owner, well name or number, or transporter, or other such change of condition.

Separate Forms C-104 must be filed for each pool in multiply

4

FILE	1	1
U.S.G.S.		
LAND OFFICE		
TRANSPORTER OIL		
TRANSPORTER GAS	1	
OPERATOR	1	
PRORATION OFFICE		

REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT OIL AND NATURAL GAS

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

RECEIVED
SEP - 1 1976
O. C. C.
ARTESIA, OFFICE

Operator: Leonard Latch ✓

Address: 1812 Texas Ave. Lubbock, Texas 79401

Reason(s) for filing (Check proper box)

New Well		Change in Transporter of:			
Recompletion		Oil		Dry Gas	X
Change in Ownership		Casinghead Gas		Condensate	

Other (Please explain): from 54

If change of ownership give name and address of previous owner _____

II. DESCRIPTION OF WELL AND LEASE

Lease Name	Well No.	Pool Name, Including Formation	Kind of Lease	Lease No.
Berry	29	Redlake; Q-G-SA	State, Federal or Fee Federal	025527A

Location

Unit Letter F : 1980 Feet From The North Line and 1980 Feet From The West

Line of Section 23 Township 17S Range 27E , NMPM, Eddy County

III. DESIGNATION OF TRANSPORTER OF OIL AND NATURAL GAS

Name of Authorized Transporter of Oil ☐ or Condensate ☐	Address (Give address to which approved copy of this form is to be sent)
Name of Authorized Transporter of Casinghead Gas ☐ or Dry Gas ☑	Address (Give address to which approved copy of this form is to be sent)
Gas Company of New Mexico	Fidelity Union Tower Dallas, Tex. 75201

If well produces oil or liquids, give location of tanks.	Unit	Sec.	Twp.	Rge.	Is gas actually connected?	When
					Yes	4-24-73

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.

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

(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)

OIL WELL

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.

Clinton L. Kleeman
(Signature)

Accountant
(Title)

Aug. 31, 1976
(Date)

OIL CONSERVATION COMMISSION

APPROVED SEP 14 1976, 19____

BY W. A. Gressett

TITLE SUPERVISOR, DISTRICT II

This form is to be filed in compliance with RULE 1104.

If this is a request for allowable for a newly drilled or deepened well, this form must be accompanied by a tabulation of the deviation tests taken on the well in accordance with RULE 111.

All sections of this form must be filled out completely for allowable on new and recompleted wells.

Fill out only Sections I, II, III, and VI for changes of owner, well name or number, or transporter, or other such change of condition.

Separate Forms C-104 must be filed for each pool in multiply

Form 3160-5
November 1983)
(Formerly 9-331)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Form approved.
Budget Bureau No. 1004-0135
Expires August 31, 1985

5. LEASE DESIGNATION AND SERIAL NO.: NM 025527-A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

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—" for such proposals.)

RECEIVED
JUL 30 1984
O. C. D.
ARTESIA, OFFICE

1. OIL WELL ☐ GAS WELL ☒ OTHER

7. UNIT AGREEMENT NAME:

2. NAME OF OPERATOR: Marbob Energy Corporation

8. FARM OR LEASE NAME: Berry A

3. ADDRESS OF OPERATOR: P.O. Drawer 217, Artesia, N.M. 88210

9. WELL NO.: 29

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: 1980 FNL 1980 FWL

10. FIELD AND POOL, OR WILDCAT: Red Lake Qn Grbg SA

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec. 23-T17S-R27E

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)

12. COUNTY OR PARISH: Eddy

13. STATE: N.M.

16. **Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data**

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☐	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	☐	(Other) Change of operator			X
(Other)	☐			(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

This is to change operator from Latch Operations, P.O. Box 10108, Lubbock, Texas 79408, to Marbob Energy Corporation, effective 7/1/84.

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

SIGNED Carolyn Morris TITLE Production Clerk DATE 7/2/84

ACCEPTED FOR RECORD

(This space for Federal or State office use)

APPROVED BY GWO TITLE DATE

CONDITIONS OF APPROVAL, IF ANY:

JUL 26 1984

Carlsbad, New Mexico

*See Instructions on Reverse Side

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.

NO. OF COPIES RECEIVED	5	
DISTRIBUTION		
SANTA FE	1	
FILE	1	
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LAND OFFICE		
TRANSPORTER OIL		
TRANSPORTER GAS	1	
OPERATOR	2	
PRORATION 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 C-110
Effective 1-1-65

RECEIVED
MAR 27 1978
O. C. D.
ARTESIA, OFFICE

Operator
LEONARD LATCH

Address
Suite 507 Texas Commerce Bank Bldg. Lubbock, Texas 79401

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)*

If change of ownership give name and address of previous owner _____

II. DESCRIPTION OF WELL AND LEASE

Lease Name	Well No.	Pool Name, Including Formation	Kind of Lease	Lease No.
Berry	20	Redlake Q-G-SA	State, Federal or Fee Federal	025507A

Location
Unit Letter F ; 1980 Feet From The North Line and 1980 Feet From The West

Line of Section 23 Township 17S Range 27E , NMPM, Eddy County

III. DESIGNATION OF TRANSPORTER OF OIL AND NATURAL GAS

Name of Authorized Transporter of Oil ☐ or Condensate ☐	Address *(Give address to which approved copy of this form is to be sent)*
Name of Authorized Transporter of Casinghead Gas ☐ or Dry Gas XX	Address *(Give address to which approved copy of this form is to be sent)*
Phillips Petroleum Co.	Bartlesville, Oklahoma 74004

If well produces oil or liquids, give location of tanks.	Unit	Sec.	Twp.	Rge.	Is gas actually connected?	When
					Yes	2-23-78

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 Resv.	Diff. Resv.

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

(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)

OIL WELL

Date First New Oil Run To Tanks	Date of Test	Producing Method *(Flow, pump, gas lift, etc.)*	
		Pump	
Length of Test	Tubing Pressure	Casing Pressure	Choke Size
24 hrs			
Actual Prod. During Test	Oil - Bbls.	Water - Bbls.	Gas - MCF
4/14/78			Chart

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.

Chester L. Anderson
(Signature)

Accountant
(Title)

3-23-78
(Date)

OIL CONSERVATION COMMISSION

APPROVED APR 14 1978, 19

BY W. A. Gressett

TITLE SUPERVISOR, DISTRICT II

This form is to be filed in compliance with RULE 1104.

If this is a request for allowable for a newly drilled or deepened well, this form must be accompanied by a tabulation of the deviation tests taken on the well in accordance with RULE 111.

All sections of this form must be filled out completely for allowable on new and recompleted wells.

Fill out only Sections I, II, III, and VI for changes of owner, well name or number, or transporter, or other such change of condition.

NO. OF COPIES RECEIVED		
DISTRIBUTION	4	
SANTA FE	1	
FILE	1	✓
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LAND OFFICE		
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TRANSPORTER GAS	1	
OPERATOR	1	
PRORATION OFFICE		

NEW MEXICO OIL CONSERVATION COMM. ON

REQUEST FOR ALLOWABLE

AND

AUTHORIZATION TO TRANSPORT OIL AND NATURAL GAS

Form C-104
Supersedes Old C-104 and C-110
Effective 1-1-65

RECEIVED

MAR 6 1979

O. C. C.
ARTESIA, OFFICE

I. Operator ✓

LATCH OPERATIONS

Address

Suite 507 Texas Commerce Bank Bldg. - Lubbock, Texas 79401

Reason(s) for filing *(Check proper box)*

New Well ☐
Recompletion ☐
Change in Ownership ☐

Change in Transporter of:
Oil ☐ Dry Gas ☐
Casinghead Gas ☐ Condensate ☐

Other *(Please explain)* Change in name operator. Leonard Latch deceased. Business now carried on by his estate in the name of Latch Operations.

If change of ownership give name and address of previous owner Leonard Latch-Suite 507 Texas Comm. Bank Bldg.-Lubbock, Texas 79401

II. DESCRIPTION OF WELL AND LEASE

Lease Name	Well No.	Pool Name, Including Formation	Kind of Lease	Lease No.
Berry A	29	Redlake Queen Gas C-Sr	State, Federal or Fee Federal	025527A

Location

Unit Letter F ; 1980 Feet From The North Line and 1980 Feet From The West

Line of Section 23 Township 17S Range 27E , NMPM, Eddy County

III. DESIGNATION OF TRANSPORTER OF OIL AND NATURAL GAS

Name of Authorized Transporter of Oil ☐ or Condensate ☐	Address *(Give address to which approved copy of this form is to be sent)*
Name of Authorized Transporter of Casinghead Gas ☐ or Dry Gas ☐ XX	Address *(Give address to which approved copy of this form is to be sent)*
Phillips Petroleum Co.	Bartlesville, Oklahoma 74004

If well produces oil or liquids, give location of tanks.	Unit	Sec.	Twp.	Rge.	Is gas actually connected?	When
					Yes	2-23-78

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 Resv.	Diff. Resv.

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 *(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)*

OIL WELL

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.

Leonard Latch
(Signature)

Agent
(Title)

2-28-79
(Date)

OIL CONSERVATION COMMISSION

APPROVED APR 19 1979, 19

BY W. A. Gressett

TITLE SUPERVISOR, DISTRICT II

This form is to be filed in compliance with RULE 1104.

If this is a request for allowable for a newly drilled or deepened well, this form must be accompanied by a tabulation of the deviation tests taken on the well in accordance with RULE 111.

All sections of this form must be filled out completely for allowable on new and recompleted wells.

Fill out only Sections I, II, III, and VI for changes of owner, well name or number, or transporter, or other such change of condition.

NEW MEXICO
OIL CONSERVATION COMMISSION
P. O. DRAWER DD
ARTESIA, NEW MEXICO

Sept. thru Dec. 1974

No. 2190 G

SUPPLEMENT TO THE OIL PRORATION SCHEDULE

DATE 11/12/74

PURPOSE: ALLOWABLE ASSIGNMENT FOR GAS WELLS IN AN OIL POOL

The following Leonard Latch wells located in the Red Lake Q-G-SA Pol Pool have been completed as gas wells and effective 11-1-74 a casinghead gas allowable is hereby assigned.

Berry #27-E, 24-17-27
" #29-F, "
Berry A #22-K, 24-17-27
" #26-O, "

WAG:jw

Leonard Latch

Southern Union

OIL CONSERVATION COMMISSION

W. A. Gressett

Supervisor, District No. 2

OPERATOR'S COPY

OIL CONSERVATION COMMISSION
BOX 1980
HOBBS, NEW MEXICO

RECEIVED
MAR - 1 1978
O. C. C.
ARTESIA, OFFICE

NOTICE OF GAS CONNECTION

DATE February 28, 1978

This is to notify the Oil Conservation Commission that connection for the purchase of gas from the Leonard Latch Operator

Lease	Well Unit	S.T.R.	Pool
Berry "A" Well #22	K	24-17-27	
Berry "A" Well #26	O	24-17-27	
Berry "A" Well #27	E	24-17-27	
Berry "B" Well #29	F	23-17-27	
Berry "B" Well #25	G	25-17-27	Red Lake/Queen

Phillips Petroleum Company, Name of Purchaser was made on February 23, 1978

Phillips Petroleum Company
Purchaser

J. E. Whitson
Representative

Prod. Records Supr.
Title

cc: To Operator
Oil Conservation Commission - Santa Fe

N.M. Oil Cons. Division
311 S. 1st Street
Artesia, NM 88210-2834

Form 3160-5
(November 1994)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB No. 1004-0135
Expires July 31, 1996

C/S/T

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

5. Lease Serial No.
NM 02527-A

6. If Indian, Allottee or Tribe Name

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

1. Type of Well
☐ Oil Well ☒ Gas Well ☐ Other

8. Well Name and No.
Berry B #29

2. Name of Operator
Hanson Energy

9. API Well No.
30015004720

3a. Address
P 342 S. Halderman Rd. Artesia

3b. Phone No. *(include area code)*
N.M. (505) 746-2262

10. Field and Pool, or Exploratory Area
Rd-Lake Qn, 66SA

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
1980 FNL 1980' FWL Sec. 23 T17S R27E

11. County or Parish, State
Eddy, N.M.

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	

13. 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 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.)

Well Returned to production 3/1/00

ACCEPTED FOR RECORD
MAR 08 2000
BLM

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

Title Operator

Signature
Warren Hanson

Date 3/6/2000

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by	Title	Date
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	

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
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-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	2 OGRID Number
SDX Resources, Inc. PO Box 5061 Midland, TX 79704	020451
	3 Reason for Filing Code Change of Operator Effective 2/1/00

4 API Number	5 Pool Name	6 Pool Code
30 - 0 15-00472	Redlake, QN-GB-SA	51300
7 Property Code	**8 Property Name**	**9 Well Number**
25541	Berry	29

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
F	23	17S	27E		1980	N	1980	W	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	14 Gas Connection Date	15 C-129 Permit Number	16 C-129 Effective Date	17 C-129 Expiration Date
SF	S				

III. Oil and Gas Transporters

18 Transporter OGRID	19 Transporter Name and Address	20 POD	21 O/G	22 POD ULSTR Location and Description
015694	Navajo PO Box 159 Artesia, NM 88211		O	
009171	GPM 4001 Penbrook Odessa, TX 79762		G	

RECEIVED
OCD
ARTESIA

IV. Produced Water

23 POD	24 POD ULSTR Location and Description

V. Well Completion Data

25 Spud Date	26 Ready Date	27 TD	28 PBTD	29 Perforations	30 DHC, DC, MC

31 Hole Size	32 Casing & Tubing Size	33 Depth Set	34 Sacks Cement
			Sacked 4-7-00

VI. Well Test Data

35 Date New Oil	36 Gas Delivery Date	37 Test Date	38 Test Length	39 Tbg. Pressure	40 Csg. Pressure

41 Choke Size	42 Oil	43 Water	44 Gas	45 AOF	46 Test Method

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: John Pool

Printed name: John Pool

Title: Vice-President

Date: 02/02/00 Phone: 915/685-1761

OIL CONSERVATION DIVISION

Approved by: ORIGINAL SIGNED BY TIM W. GUM

Title: DISTRICT II SUPERVISOR

Approval Date: MAR 27 2000

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

009946 Hanson Energy

Previous Operator Signature	Printed Name	Title	Date
Warren Hanson	WARREN HANSON.		02/02/00

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

Energy, Minerals and Natural Resources Department

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

Revised 1-1-89
See Instructions at Bottom of Page

RECEIVED
AUG - 9 1993
O. C. D.

REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT OIL AND NATURAL GAS

I.

Operator	Well API No.
Hanson energy	300150047200

Address: P.O. 342 S. Haldeman Rd. Artesia, N.M. 88210

Reason(s) for Filing (Check proper box)

- New Well [ ]
- Recompletion [ ]
- Change in Operator [X]
- Other (Please explain) [ ]

Change in Transporter of: Oil [ ] Dry Gas [ ] Casinghead Gas [ ] Condensate [ ]

Effective 8/1/93

If change of operator give name and address of previous operator: Marbob Energy Corporation, Drawer 217, Artesia, N.M. 88210

II. DESCRIPTION OF WELL AND LEASE

Lease Name	Well No.	Pool Name, Including Formation	Kind of Lease (State, Federal or Fee)	Lease No.
Berry	29	Red Lk, Qn, Grb, SA		NM025527-A

Location

Unit Letter F : 1980 Feet From The North Line and 1980 Feet From The West Line

Section 23 Township 17S Range 27E , NMPM, Eddy County

III. DESIGNATION OF TRANSPORTER OF OIL AND NATURAL GAS

Name of Authorized Transporter of Oil [ ] or Condensate [ ]	Address (Give address to which approved copy of this form is to be sent)
Name of Authorized Transporter of Casinghead Gas [ ] or Dry Gas [X]	Address (Give address to which approved copy of this form is to be sent)
GPM Gas Corp	4001 Penbrook, Odessa, Tx. 79762

If well produces oil or liquids, give location of tanks.	Unit	Sec.	Twp.	Rge.	Is gas actually connected?	When ?
					Yes	2/23/78

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

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
			Pmt ED-3
			8-20-93
			circ up

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	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. 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.

Kathie Hanson
Signature

Kathie Hanson Secretary
Printed Name Title

7/30/93 746-2262
Date Telephone No.

OIL CONSERVATION DIVISION

Date Approved AUG 11 1993

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.

District II
1301 W. Grand Ave., Artesia, NM 88210
Phone:(505) 748-1283 Fax:(505) 748-9720

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

Form C-104A
Permit 16648

Change of Operator

RECEIVED
OCT 14 2005
OCD-ARTESIA

Previous Operator Information		New Operator Information	
		Effective Date:	9/1/2005
OGRID:	20451	OGRID:	9946
Name:	SDX RESOURCES INC	Name:	HANSON ENERGY
Address:	PO Box 5061	Address:	PO BOX 1348
Address:		Address:	
City, State, Zip:	Midland , TX 79704	City, State, Zip:	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 certified list of wells is true to the best of my knowledge and belief.

Previous Operator		New Operator	
Signature:		Signature:	Warren Hanson
Printed Name:	John Pool	Printed Name:	Warren Hanson
Title:	Vice President	Title:	Hanson Energy
Date:	10/10/05	Date:	
Phone:	432/685-1761	Phone:	505/746-2262

NMOCD Approval
Electronic Signature: Carmen Reno, District 2
Date: October 25, 2005

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Mark E. Fesmire, P.E.
Director
Oil Conservation Division

29-May-07

HANSON ENERGY
PO BOX 1348
ARTESIA NM 88210

LOV NO. 52/3007

LETTER OF VIOLATION - Inspection

Dear Operator:

The following inspection(s) indicate that the well, equipment, location or operational status of the well(s) failed to meet standards of the New Mexico Oil Conservation Division as described in the detail section below. To comply with standards imposed by Rules and Regulations of the Division, corrective action must be taken immediately and the situation brought into compliance. The detail section indicates preliminary findings and/or probable nature of the violation. This determination is based on an inspection of your well or facility by an inspector employed by the Oil Conservation Division on the date(s) indicated.

Please notify the proper district office of the Division, in writing, of the date corrective actions are scheduled to be made so that arrangements can be made to reinspect the well and/or facility.

INSPECTION DETAIL SECTION

BERRY FEDERAL **No.029** F-23-17S-27E **30-015-00472-00-00**

Inspection Date	Type Inspection	Inspector	Violation?	*Significant Non-Compliance?	Corrective Action Due By:	Inspection No.
05/21/2007	Inactive Well Verification	Richard Inge	Yes	No	6/14/2007	iREI0714141197

Comments on Inspection: Violation of rule 19.15.4.201. Last report of production 1/1/2005. Pull rod in hole.

SAUNDERS A No.007 B-13-17S-27E **30-015-01244-00-00**

Inspection Date	Type Inspection	Inspector	Violation?	*Significant Non-Compliance?	Corrective Action Due By:	Inspection No.
05/21/2007	Inactive Well Verification	Richard Inge	Yes	No	6/14/2007	iREI0714148764

Comments on Inspection: Violation of rule 19.15.4.201. Reporting one barrel of oil since 4/1/2006. No pumping equipment on site. Pull rod in hole. New high pressure hose connected to casing valve. Well does not appear capable of producing. Please indicate how production is being accomplished.

SAUNDERS A No.002 B-13-17S-27E **30-015-01247-00-00**

Inspection Date	Type Inspection	Inspector	Violation?	*Significant Non-Compliance?	Corrective Action Due By:	Inspection No.
05/21/2007	Inactive Well Verification	Richard Inge	Yes	No	6/14/2007	iREI0714148206

Comments on Inspection: Violation of rule 19.15.4.201. Last injection reported 5/1/2004.

BERRY FEDERAL **No.030** O-23-17S-27E **30-015-21510-00-00**

Inspection Date	Type Inspection	Inspector	Violation?	*Significant Non-Compliance?	Corrective Action Due By:	Inspection No.
05/21/2007	Inactive Well Verification	Richard Inge	Yes	No	6/14/2007	iREI0714140576

Comments on Inspection: Violation of rule 19.15.4.201. Last production report 1/1/2005. Electricity turned off.

SAUNDERS B No.003 A-13-17S-27E **30-015-22725-00-00**

Inspection Date	Type Inspection	Inspector	Violation?	*Significant Non-Compliance?	Corrective Action Due By:	Inspection No.
05/21/2007	Inactive Well Verification	Richard Inge	Yes	No	6/14/2007	iREI0714149746

Comments on Inspection: violation of rule 19.15.4.201. Last production report 9/01/2005. Does not appear to be any recent activity. Road to site almost overgrown.

SAUNDERS A No.011 B-13-17S-27E **30-015-24123-00-00**

Inspection Date	Type Inspection	Inspector	Violation?	*Significant Non-Compliance?	Corrective Action Due By:	Inspection No.
05/21/2007	Inactive Well Verification	Richard Inge	Yes	No	6/14/2007	iREI0714147816

Comments on Inspection: violation of rule 19.15.4.201. Last production report 9/01/1988. Pumpjack disassembled. Tubing in hole capped with bull plug. Electric meter removed.

BERRY FEDERAL **No.034** G-23-17S-27E **30-015-31113-00-00**

Inspection Date	Type Inspection	Inspector	Violation?	*Significant Non-Compliance?	Corrective Action Due By:	Inspection No.
05/21/2007	Inactive Well Verification	Richard Inge	Yes	No	6/14/2007	iREI0714141778

Comments on Inspection: Violation of rule 19.15.4.201. Last production reported 1/1/2005. Only casing sticking out of hole. Growth in front of tank battery.

In the event that a satisfactory response is not received to this letter of direction by the "Corrective Action Due By:" date shown above, further enforcement will occur. Such enforcement may include this office applying to the Division for an order summoning you to a hearing before a Divison Examiner in Santa Fe to show cause why you should not be ordered to permanently plug and abandon this well. Such a hearing may result in imposition of CIVIL PENALTIES for your violation of OCD rules.

Sincerely,

RICHARD INGE

Artesia OCD District Office

Note: Information in Detail Section comes directly from field inspector data entries - not all blanks will contain data.
*Significant Non-Compliance events are reported directly to the EPA, Region VI, Dallas, Texas.

Form 3160-5
(April 2004)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OCD-ARTESIA

FORM APPROVED
OMB No 1004-0137
Expires: March 31, 2007

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.

5. Lease Serial No.
NM025527

6 If Indian, Allottee or Tribe Name

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

1. Type of Well
☐ Oil Well ☑ Gas Well ☐ Other

8 Well Name and No.
BERRY FEDERAL #29

2. Name of Operator
HANSON ENERGY

9. API Well No.
30-015-00472

3a Address
P.O. BOX 1348 ARTESIA, NM 88211

3b Phone No *(include area code)*
575-746-2262

10. Field and Pool, or Exploratory Area
RED LAKE,QN,GB,SA

4 Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
UNIT F 1980 FNL 1980 FWL SEC 23-17S-27E

FEB 12 2008
OCD-ARTESIA

11. County or Parish, State
EDDY NM

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	

13 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 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.)

INSTALLED COMPRESSOR

TURNED GAS DOWN LINE

ACCEPTED FOR RECORD
FEB 10 2008
J. Amos
BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

* Submit date returned to prod

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

Title PRODUCTION CLERK

Signature Kathie Hanson

Date 01/30/2008

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

Title

Date

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

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.

(Instructions on page 2)

Accepted for record - NMOCD

District II
1301 W Grand Ave., Artesia, NM 88210
Phone (505) 748-1283 Fax (505) 748-9720

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

Form C-145
Permit 79544

Change of Operator

Previous Operator Information		New Operator Information	
		Effective Date:	8/1/2008
OGRID:	9946	OGRID:	261198
Name:	HANSON ENERGY	Name:	DORAL ENERGY CORP.
Address:	PO BOX 1348	Address:	3000 N.GARFIELD ST, SUITE 210
Address:		Address:	
City, State, Zip:	ARTESIA, NM 88210	City, State, Zip:	MIDLAND, TX 79705

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

Previous Operator		New Operator	
Signature:	Warren Hanson	Signature:	Joanne Keating
Printed Name:	WARREN HANSON	Printed Name:	Joanne Keating
Title:	OWNER/OPERATOR	Title:	Regulatory Affairs Manager
Date:	07/31/2008 Phone: 575/746-1262	Date:	07/31/2008 Phone: 432-218-9824

http://www.emnrd.state.nm.us/OCD/OCDPermitting/Report/C104A/C104AReport.aspx?PermitID... 8/1/2008

NMOCD Approval
Electronic Signature: Carmen Reno, District 2
Date: August 04, 2008

District II
1301 W Grand Ave., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720

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

Form C-145
Permit 120455

Change of Operator

Previous Operator Information		New Operator Information	
		Effective Date:	Effective on the date of approval by the OCD
OGRID:	261198	OGRID:	274841
Name:	DORAL ENERGY CORP	Name:	ALAMO PERMIAN RESOURCES, LLC
Address:	415 W. WALL ST. SUITE 500	Address:	820 GESSNER RD
			SUITE 1650
City, State, Zip:	MIDLAND , TX 79701	City, State, Zip:	HOUSTON , TX 77024

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

Additionally, by signing below, ALAMO PERMIAN RESOURCES, LLC certifies that it has read and understands the following synopsis of applicable rules.

Previous Operator		New Operator	
Signature:	E.W. Gray II	Signature:	
Printed Name:	E.W. GRAY II	Printed Name:	CARL D. CAMPBELL
Title:	CHAIRMAN & CEO	Title:	EVP/COO
Date:	9-16-2010 Phone: 432.789.1180	Date:	17-SEPT-10 Phone: 713-224-2500

NMOCD Approval
Electronic Signature: Randy Dade, District 2
Date: October 26, 2010

ALAMO PERMIAN RESOURCES, LLC certifies that all below-grade tanks constructed and installed prior to June 16, 2008 associated with the selected wells are in compliance with 19.15.17 NMAC, have been closed pursuant to 19.15.17.13 NMAC, or have been retrofitted to comply with Paragraphs (1) through (4) of Subsection I of 19.15.17.11 NMAC.

ALAMO PERMIAN RESOURCES, LLC understands that the OCD's approval of this operator change:

1. constitutes approval of the transfer of the permit for any permitted pit, below-grade tank or closed-loop system associated with the selected wells; and
2. constitutes approval of the transfer of any below-grade tanks constructed and installed prior to June 16, 2008 associated with the selected wells, regardless of whether the transferor has disclosed the existence of those below-grade tanks to the transferee or to the OCD, and regardless of whether the below-grade tanks are in compliance with 19.15.17 NMAC.

As the operator of record of wells in New Mexico, ALAMO PERMIAN RESOURCES, LLC agrees to the following statements:

1. I am responsible for ensuring that the wells and related facilities comply with applicable statutes and rules, and am responsible for all regulatory filings with the OCD. I am responsible for knowing all applicable statutes and rules, not just the rules referenced in this list. I understand that the OCD's rules are available on the OCD website under "Rules," and that the Water Quality Control Commission rules are available on the OCD website on the "Publications" page.
2. I understand that if I acquire wells from another operator, the OCD must approve the operator change before I begin operating those wells. See 19.15.9.9.B NMAC. I understand that if I acquire wells or facilities subject to a compliance order addressing inactive wells or environmental cleanup, before the OCD will approve the operator change it may require me to enter into an enforceable agreement to return those wells to compliance. See 19.15.9.9.C(2) NMAC.
3. I must file a monthly C-115 report showing production for each non-plugged well completion for which the OCD has approved an allowable and authorization to transport, and injection for each injection well. See 19.15.7.24 NMAC. I understand that the OCD may cancel my authority to transport from or inject into all the wells I operate if I fail to file C-115 reports. See 19.15.7.24.C NMAC.
4. I understand that New Mexico requires wells that have been inactive for certain time periods to be plugged or placed on approved temporary abandonment. See 19.15.25.8 NMAC. I understand the requirements for plugging and approved temporary abandonment in 19.15.25 NMAC. I understand that I can check my compliance with the basic requirements of 19.15.25.8 NMAC by using the "Inactive Well List" on OCD's website.
5. I must keep current with financial assurances for well plugging. I understand that New Mexico requires each state or fee well that has been inactive for more than two years and has not been plugged and released to be covered by a single-well financial assurance, even if the well is also covered by a blanket financial assurance and even if the well is on approved temporary abandonment status. See 19.15.8.9.C NMAC. I understand that I can check my compliance with the single-well financial assurance requirement by using the "Inactive Well Additional Financial Assurance Report" on the OCD's website.
6. I am responsible for reporting releases as defined by 19.15.29 NMAC. I understand the OCD will look to me as the operator of record to take corrective action for releases at my wells and related facilities, including releases that occurred before I became operator of record.
7. I have read 19.15.5.9 NMAC, commonly known as "Part 5.9," and understand that to be in compliance with its requirements I must have the appropriate financial assurances in place, comply with orders requiring corrective action, pay penalties assessed by the courts or agreed to by me in a settlement agreement, and not have too many wells out of compliance with the inactive well rule (19.15.25.8 NMAC). If I am in violation of Part 5.9, I may not be allowed to drill, acquire or produce any additional wells, and will not be able to obtain any new injection permits. See 19.15.16.19 NMAC, 19.15.26.8 NMAC, 19.15.9.9 NMAC and 19.15.14.10 NMAC. If I am in violation of Part 5.9 the OCD may, after notice and hearing, revoke my existing injection permits. See 19.15.26.8 NMAC.
8. For injection wells, I understand that I must report injection on my monthly C-115 report and must operate my wells in compliance with 19.15.26 NMAC and the terms of my injection permit. I understand that I must conduct mechanical integrity tests on my injection wells at least once every five years. See 19.15.26.11 NMAC. I understand that when there is a continuous one-year period of non-injection into all wells in an injection or storage project or into a saltwater disposal well or special purpose injection well, authority for that injection automatically terminates. See 19.15.26.12 NMAC. I understand that if I transfer

operation of an injection well to another operator, the OCD must approve the transfer of authority to inject, and the OCD may require me to demonstrate the well's mechanical integrity prior to approving that transfer. See 19.15.26.15 NMAC.

9. I am responsible for providing the OCD with my current address of record and emergency contact information, and I am responsible for updating that information when it changes. See 19.15.9.8.C NMAC. I understand that I can update that information on the OCD's website under "Electronic Permitting."
10. If I transfer well operations to another operator, the OCD must approve the change before the new operator can begin operations. See 19.15.9.9.B NMAC. I remain responsible for the wells and related facilities and all related regulatory filings until the OCD approves the operator change. I understand that the transfer will not relieve me of responsibility or liability for any act or omission which occurred while I operated the wells and related facilities.

ChangeOp Comments

OGRID: [261198] DORAL ENERGY CORP.
Permit Number: 120455
Permit Type: ChangeOp

Created By	Comment	Comment Date
DPHILLIPS	I cannot approve the change of operator as one well on you list requires additional bonding - Spruce State No. 9 - $7980. Upon receipt of the bond, I continue with the processing. Questions? Call me at 505-476-3461.	9/27/2010
DPHILLIPS	Received the bond.	10/15/2010

Form 3160-5
(February 2005)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OCD Artesia

FORM APPROVED
OMB No. 1004-0137
Expires: March 31, 2007

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	5. Lease Serial No. NM 025527-A
2. Name of Operator: Alamo Permian Resources, LLC	6. If Indian, Allottee or Tribe Name
3a. Address: 415 W. Wall Street, Suite 500 Midland, TX 79701	3b. Phone No. *(include area code)*: 432.897.0673
4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*: See attached list	7. If Unit or CA/Agreement, Name and/or No.
	8. Well Name and No. Berry A Lease; see attached list
	9. API Well No. See attached list
	10. Field and Pool, or Exploratory Area See attached list
	11. County or Parish, State: Eddy County, NM

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 of Operator
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. 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 must 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 must be filed once testing has been completed. Final Abandonment Notices must 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 is a notification of Change of Operator for the attached referenced wells.

Alamo Permian Resources, LLC, as new operator, accepts all applicable terms, conditions, stipulations and restrictions concerning operations conducted on this lease or portion of lease described.

Bond Coverage: BLM Bond File No.: NMB000709

Change of Operator effective: October 26, 2010

Former Operator: Doral Energy Corp. (ORGID No. 261198)

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

Accepted for record - NMOCD

APPROVED
JAN 18 2011
/s/ JD Whitlock Jr
BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

14. I hereby certify that the foregoing is true and correct
Name *(Printed/Typed)*: Joanne Keating
Title: Regulatory Affairs Coordinator

Signature: Joanne Keating
Date: 11/09/2010

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by	Title	Date
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	

RECEIVED
FEB 07 2011
NMOCD ARTESIA

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.

(Instructions on page 2)

ENTERED
KMG

ALAMO PERMIAN RESOURCES, LLC

Alamo Permian Resources, LLC (OGRID No. 274841)

Doral Energy Corp (OGRID No. 261198) — Hanson Energy Acquisition, Eddy County, New Mexico

LEASE NAME	WELL No.	LEASE TYPE	LEASE NO.	WELL API NUMBER	FIELD; POOL(s)	LOCATION											WELL TYPE
						LOT	UNIT	SEC	TWNSHP	RANGE	Feet	N or S	Feet	E or W	CO	STATE	
BERRY A	6	F	NM 025527-A	3001500512	22230 - EMPIRE; Yates-Seven Rivers		G	24	17.0S	27E	1534	N	1550	E	Eddy	NM	Oil
BERRY A	11	F	NM 025527-A	3001500498	51300 - RED LAKE; Queen-Grayburg-SA		K	24	17.0S	27E	1650	S	2310	W	Eddy	NM	Gas
BERRY A	22	F	NM 025527-A	3001500497	51300 - RED LAKE; Queen-Grayburg-SA		K	24	17.0S	27E	2310	S	1650	W	Eddy	NM	Gas
BERRY A	26	F	NM 025527-A	3001500501	51300 - RED LAKE; Queen-Grayburg-SA		O	24	17.0S	27E	330	S	2310	E	Eddy	NM	Gas
BERRY A	27	F	NM 025527-A	3001500483	51300 - RED LAKE; Queen-Grayburg-SA		E	24	17.0S	27E	1650	N	990	W	Eddy	NM	Gas
BERRY A	29	F	NM 025527-A	3001500472	51300 - RED LAKE; Queen-Grayburg-SA		F	23	17.0S	27E	1980	N	1980	W	Eddy	NM	Gas
BERRY A	32Y	F	NM 025527-A	3001524614	51300 - RED LAKE; Queen-Grayburg-SA		A	24	17.0S	27E	990	N	980	E	Eddy	NM	Oil
BERRY A	33	F	NM 025527-A	3001525154	22230 - EMPIRE; Yates-Seven Rivers		K	24	17.0S	27E	1650	S	2040	W	Eddy	NM	Inj

BUREAU OF LAND MANAGEMENT
Carlsbad Field Office
620 East Greene Street
Carlsbad, New Mexico 88220
575-234-5972

Conditions of Approval Change of Operator 1/25/2011

Alamo Permian Resources, LLC

1. Tank battery must be bermed/diked (must be able to contain 1 1/2 times the volume of the largest tank).
2. All above ground structures and equipment on the lease shall be painted Shale Green (5Y 4/2). This is to be done within 90 days, if you have not already done so.
3. Submit for approval of water disposal method.
4. Submit updated facility diagrams as per Onshore Order #3
5. This agency shall be notified of any spill or discharge as required by NTL-3A.
6. All outstanding environmental issue must be addressed within 90 days. Contact Jim Amos for inspection and to resolve environmental issues. 575-234-5909

Form 3160-5
(August 2007)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OCD-Artesia
RECEIVED
JAN 23 2013
NMOCD ARTESIA

FORM APPROVED
OMB NO. 1004-0135
Expires: July 31, 2010

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.

5. Lease Serial No.
NMNM025527A

6. If Indian, Allottee or Tribe Name

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

1. Type of Well
☐ Oil Well ☒ Gas Well ☐ Other

8. Well Name and No.
BERRY A 029 Jed

2. Name of Operator
ALAMO PERMIAN RESOURCES
Contact: CARIE STOKER
E-Mail: cstoker@alamoresources.com

9. API Well No.
30-015-00472

3a. Address
415 WEST WALL STREET SUITE 500
MIDLAND, TX 79701

3b. Phone No. (include area code)
Ph: 432-897-0673

10. Field and Pool, or Exploratory
RED LAKE; QN-G-SA

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 23 T17S R27E SENW 1980FNL 1980FWL

11. County or Parish, and State
EDDY COUNTY, NM

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	

13. 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 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.).

Proposed P&A Plan

RECLAMATION PROCEDURE ATTACHED

-Notify BLM 24 hrs prior to PU RU.
-Have open top frac tank on location & a 20 lb. bag of sugar in case of circulation.
-RU PU; Install a 2M BOP & TIH w/ tubing to 1500' (TD). SPOT Plug from 1500-1400, WOC Tag
-Circulate hole w/ clean FW.
-Spot a neat Class C cement plug in open hole (1148' to 1163') up to 1000'.
-PUH & WOC for 4 hrs.
-Tag cement plug at 1000' or shallower.
-POOH filling 9 5/8" casing w/ neat Class C cement to 500'.
-MIRU Wireline & shoot 4 perforations at 400'.
-Open all annuli valves; RIH w/ packer and set at 350'; try to establish a rate of cement

SEE ATTACHED FOR CONDITIONS OF APPROVAL

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

Electronic Submission #183331 verified by the BLM Well Information System
For ALAMO PERMIAN RESOURCES, sent to the Carlsbad
Committed to AFMSS for processing by KURT SIMMONS on 01/16/2013 ()

Name *(Printed/Typed)* CARIE STOKER — Title REGULATORY AFFAIRS COORDINATOR

Signature (Electronic Submission) — Date 01/15/2013

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By James A. Amos — Title SEPS — Date 1-20-13

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 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.

**** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED ****

Additional data for EC transaction #183331 that would not fit on the form

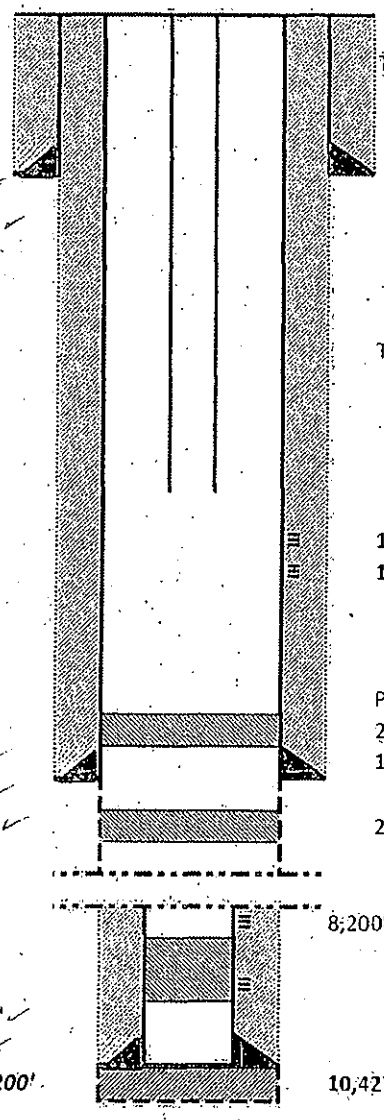
32. Additional remarks, continued

circulaiton; If circulation is established then pump cement until it comes out each annulus valve.
-POOH filling casing w/ cement to surface.
-Removed BOP.
-Get approval from BLM before RD PU.
-Notify BLM 4 hrs prior to WH cut off.
-Cut off welhead; fill any voids w/ cement; Install P&A marker.
-Reclaim location.

ALAMO PERMIAN RESOURCES, LLC
WELLBORE DIAGRAM

Lease/Well No.:	BERRY FEDERAL No. 29	ELEVATION, GL:	3,535 ft
Location:	1,980' FNL & 1,980' FWL		
	UL: F, SEC: 23, T: 17-S, R: 27-E	FIELD:	RED LAKE; QN-GB-SA
	EDDY County, NM		Original Hole / Re-Entry
LEASE No.:	NM - 02557-A	Spudded:	6/22/1962 / 1/28/1965
API No.:	30-015-00472	Drlg Stopped:	4/18/1962 / 4/9/1965
		Completed:	/ 4/9/1965
		LAT:	
		LONG:	

ROTARY TOOLS



17-1/2" HOLE

Surface Csg:
13-3/8" 48#
Csg Set @ 400'
Cmt'd w/ 400 sx

12-1/4" HOLE

Intermediate Csg:
9-5/8" 36# J-55
Csg Set @ 1,690'
Cmt'd w/ 950 sx

7-7/8" HOLE
Production Csg:
5-1/2" 17# J-55
Csg Set @ 10,278'
Cmt'd w/ 525 sx
Cut & Pulled @ 8,200'

TOC Est'd @ Surface
Calculated 75% SF

400'

TOC - 9-5/8" csg = Surface
Calculated 75% SF

8,200'

10,427' TD

TOPS	DEPTH, ft
SALT	
YATES	156
SEVEN RIVERS	396
BOWERS	
QUEEN	880
GRAYBURG	1,313
SAN ANDRES	1,667

1,148' - 1,149'	**QUEEN**	**1 spf - 2 perfs**
1,162' - 1,163'	**QUEEN**	**1 spf - 2 perfs**

PBTD = 1500'
20 sx Cmt Plug: 1500'-1550'
1,690' Csg Set

20 sx Cmt Plug: 1750'-1800'

35 sx Cmt Plug: 3000'-3280'
35 sx Cmt Plug: 4920'-5200'
35 sx Cmt Plug: 6090'-6370'
40 sx Cmt Plug: 7384'-7664'
35 sx Cmt Plug: 8920'-9200'

Well was originally drilled as Berry Fed #1 to 10,427' in 1962 by Ralph Lowe - Dry Hole.
Well was P&A'd as Dry Hole in October 1963 - 5-1/2" csg cut & pulled @ 8200'.
Well was acquired by Leonard Latch in January 1965 & Re-Entered 01/28/1965 & Completed as a Queen Gas Well. Re-Named Berry Fed #29 - 01/25/65.
Initial Gas Sales to Southern Union Gas Co. 04/24/1973.

Cumulative Prod. (12/31/11):	
OIL	0.000 MBO
GAS	65.578 MMCF
WATER	0.000 MBW
INJECT.	---- MBW

HPS: 11/15/2012

Form 3160-5
(August 2007)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

RECEIVED
OCD Artesia
FEB 20 2013
NMOCD ARTESIA

FORM APPROVED
OMB NO. 1004-0135
Expires: July 31, 2010

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.

5. Lease Serial No.
NMNM025527A

6. If Indian, Allottee or Tribe Name

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

1. Type of Well
☐ Oil Well ☒ Gas Well ☐ Other

8. Well Name and No.
BERRY A 29

2. Name of Operator
ALAMO PERMIAN RESOURCES LLC
Contact: CARIE STOKER
E-Mail: cstoker@helmsoil.com

9. API Well No.
30-015-00472-00-S1

3a. Address
415 WEST WALL STREET SUITE 500
MIDLAND, TX 79701

3b. Phone No. (include area code)
Ph: 432-664-7659

10. Field and Pool, or Exploratory
RED LAKE

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 23 T17S R27E SENW 1980FNL 1980FWL

11. County or Parish, and State
EDDY COUNTY, NM

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	

13. 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 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.)

1/25/2013
Laid down polish rod, POOH w/ 4' 8' 2' sub(5/8), (50) 5/8 rods, (1) 12' X 1.5 pump. ND well head. NU BOP. RIH picking up 5 joints of 2 3/8 tbg and tagged bottom. PUH laying down 5 joints tbg. POOH w/ (1) 4 ft 2 3/8 sub, then POOH into derrick w/ 41 joints of 2 3/8 tbg. Closed BOP. Strapped pipe @1492'.

RECLAMATION
DUE 8-4-13
RDade 2/21/13
Accepted for record
NMOCD

1/29/2013
Open BOP, well had 0 psi. RIH w/ 44 joints @1461'. Pumped 85 bbl FW and broke circulation. Switched to cement. Pumped 11 1/2 bbl =48 sx w/ 2% calcium. Switched to FW water, pumped 38 bbl. PUH with 3 stands. Reversed out with fresh water. POOH out of hole with tubing into derrick. Rigged up wireline. RIH. Tagged cement plug @1060'. PUH. Shot perf @400'. POOH with wireline. RIH with 11 joints of tubing and packer, tried to set packer but couldn't. PUH every stand trying to set packer.

Accepted as to plugging of the well bore. Liability under bond is retained until Surface restoration is completed.

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

Electronic Submission #197402 verified by the BLM Well Information System
For ALAMO PERMIAN RESOURCES LLC, sent to the Carlsbad
Committed to AFMSS for processing by KURT SIMMONS on 02/12/2013 (13KMS4465SE)

Name *(Printed/Typed)* CARIE STOKER — Title REGULATORY AFFAIRS COORDINATOR

Signature (Electronic Submission) — Date 02/07/2013

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By ACCEPTED — JAMES A AMOS, Title SUPERVISOR EPS — Date 02/17/2013

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 Carlsbad

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.

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

Additional data for EC transaction #197402 that would not fit on the form

32. Additional remarks, continued

but couldn't. Finaly set packer @ 8' below ground level. POOH with tubing into derrick and laid down packer. Closed BOP. Pumped FW trying to get a rate. Pumped 4 bbl and well pressured up to 200. Bled well down through bleed off lines. Pumped 1/2 bbl, psi went to 400. Bled well down. RIH w/ 15 joints below perfs and pump 5 bbl FW, got circulation. Switched to cement. Pumped 66 bbls = 278sx. Got cement back to surface. Shut pump down. ND BOP. Topped cement to surface with hose.

1/30/2013
Met w/ Joe from BLM. The welder cut off the 9 5/8 casing even with the surface casing. Cement was visable inside the 9 5/8 casing and between surface casing. Welder welded the well marker on.

2/05/2013
Backhoe pulled out all cellar boards and back filled cellar.

OCD Artesia

Form 3160-5
(August 2007)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0135
Expires: July 31, 2010

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.

5. Lease Serial No.
NMNM025527A

6. If Indian, Allottee or Tribe Name

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

1. Type of Well
☐ Oil Well ☒ Gas Well ☐ Other

8. Well Name and No.
BERRY A 29

2. Name of Operator
ALAMO PERMIAN RESOURCES LLC
Contact: CARIE STOKER
E-Mail: cstoker@helmsoil.com

9. API Well No.
30-015-00472-00-S1

3a. Address
415 WEST WALL STREET SUITE 500
MIDLAND, TX 79701

3b. Phone No. (include area code)
Ph: 432-664-7659

10. Field and Pool, or Exploratory
RED LAKE

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 23 T17S R27E SENW 1980FNL 1980FWL

11. County or Parish, and State
EDDY COUNTY, NM

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	

13. 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 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.)

2/05/2013
Tilled and seeded location with 25 lbs of BLM seed; fenced around location

RECEIVED
APR 11 2013
NMOCD ARTESIA

Accepted for record
NMOCD KDade 4/15/2013

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

Electronic Submission #197398 verified by the BLM Well Information System
For ALAMO PERMIAN RESOURCES LLC, sent to the Carlsbad
Committed to AFMSS for processing by KURT SIMMONS on 02/12/2013 (13KMS4876SE)

Name *(Printed/Typed)* CARIE STOKER — Title REGULATORY AFFAIRS COORDINATOR

Signature (Electronic Submission) — Date 02/07/2013

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By ACCEPTED — JAMES A AMOS — Title SUPERVISOR EPS — Date 04/07/2013

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 Carlsbad

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.

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

30-015-20159

Rec'd 1-31-69
C-122 Multipoin

OGRID 162683
PROP 26031
POOL 80900

MEXICO OIL CONSERVATION COMMISSION

WELL LOCATION AND ACREAGE DEDICATION PLAT

Form C-102
Supersedes C-128
Effective 1-1-65

All distances must be from the outer boundaries of the Section (LC-064050-A)

Operator	Lease	Well No.
PAN AMERICAN PETROLEUM CORP.	TRIGG FEDERAL	2

Unit Letter	Section	Township	Range	County
F	34	17 SOUTH	27 EAST	EDDY

Actual Footage Location of Well:
1980 feet from the NORTH line and 1980 feet from the WEST

Ground Level Elev.	Producing Formation	Pool	Dedicated Acreage
	MISS	WILDCAT	40 Acres

1. Outline the acreage dedicated to the subject well by colored pencil or hachure 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).

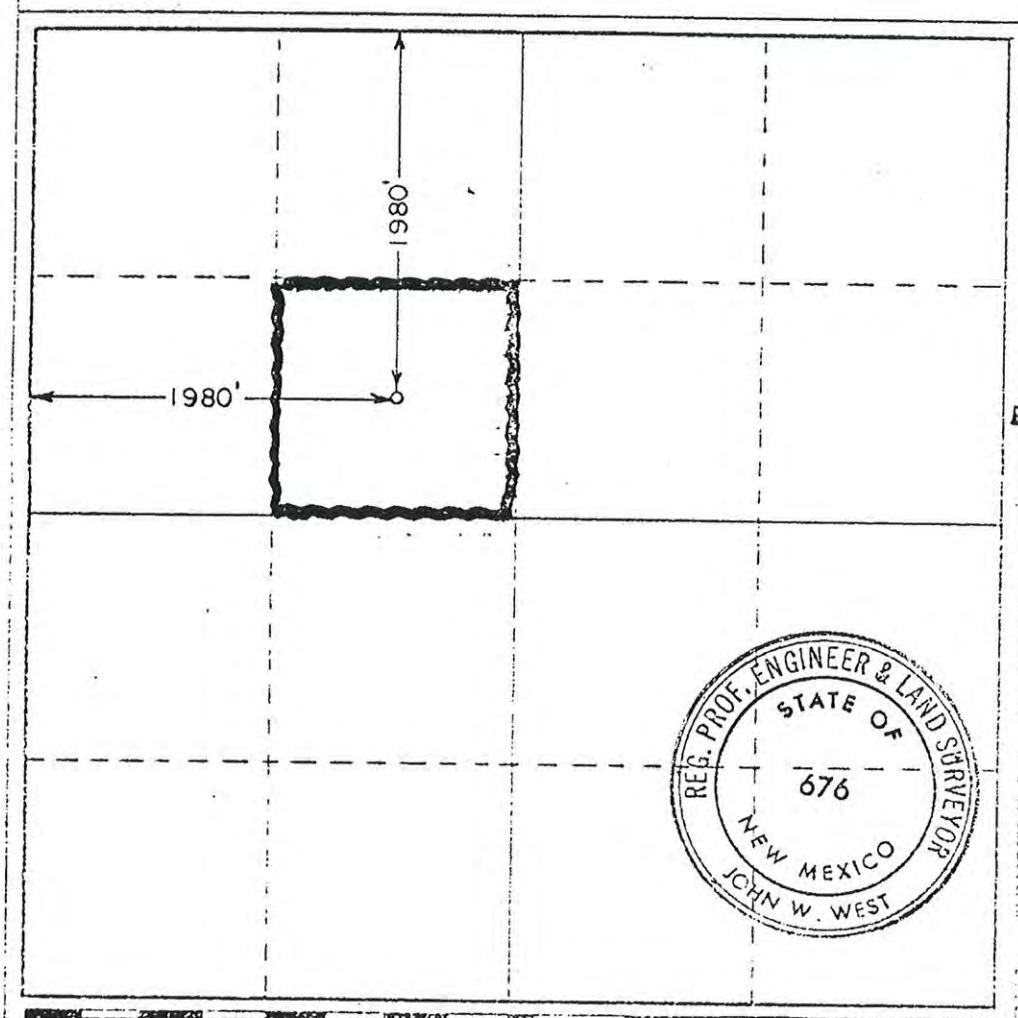
3. If more than one lease of different ownership is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling, etc?

RECEIVED
AUG 9 1968
O. C. C.
ARTESIA, OFFICE

☐ Yes ☐ No If answer is "yes," type of consolidation _____

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 interests, has been approved by the Commission.



CERTIFICATION

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

Name: _____

Position: AREA SUPERINTENDENT

Company: PAN AMERICAN PETROLEUM CORPORATION

Date: AUG 2 1968

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: AUGUST 1, 1968

Registered Professional Engineer and/or Land Surveyor:

John W West

Certificate No. 676

N. M. O. C. C. COPY

Form 9-331 C
(May 1963)

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1425.

30-015-20159

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

copy to O.C.C.

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

5. LEASE DESIGNATION AND SERIAL NO.: LC-064050-A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

1a. TYPE OF WORK: DRILL ☒ DEEPEN ☐ PLUG BACK ☐

7. UNIT AGREEMENT NAME:

b. TYPE OF WELL: OIL WELL ☒ GAS WELL ☐ OTHER — SINGLE ZONE ☒ MULTIPLE ZONE ☐

8. FARM OR LEASE NAME: TRIGG [redacted] FEDERAL

2. NAME OF OPERATOR: PAN AMERICAN PETROLEUM CORPORATION

9. WELL NO.: 4

3. ADDRESS OF OPERATOR: BOX 68, HOBBS, N. M. 88240

10. FIELD AND POOL, OR WILDCAT: WILDCAT

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface: 1980' FNL x 1980' FWL, Sec. 34 (Unit F, SE/4 NW/4)
At proposed prod. zone

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: 34-17-27 NMPM

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*

12. COUNTY OR PARISH: EDDY — 13. STATE: N.M

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. line, if any)	16. NO. OF ACRES IN LEASE	17. NO. OF ACRES ASSIGNED TO THIS WELL
	160 Ac.	40
18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.	19. PROPOSED DEPTH	20. ROTARY OR CABLE TOOLS
	10,100	ROTARY

21. ELEVATIONS (Show whether DF, RT, GR, etc.)

22. APPROX. DATE WORK WILL START*: 8-10-68

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
17½	13 3/8"	48#	300'	circulate
12¼	9 5/8"	32.3-36#	1,600'	circulate
8¾"	7"-5½"	23-26# 15.5-17#	10,100'	Fill 600' above uppermost pay.

After drilling well, logs will be run and evaluations made, perforating and/or stimulating as necessary in attempting commercial production.

RECEIVED
AUG 9 1968
O. C. C.
ARTESIA, OFFICE

RECEIVED
AUG 8 1968
U. S. GEOLOGICAL SURVEY
ROSWELL, NEW MEXICO

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. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

24.

SIGNED _____ TITLE AREA SUPERINTENDENT DATE 8-5-68

(This space for Federal or State office use)

PERMIT NO. _____ APPROVAL DATE _____

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

APPROVED
AUG 8 1968
R. L. DANIEL
DISTRICT ENGINEER

THIS APPROVAL IS RESCINDED IF OPERATIONS ARE NOT COMMENCED WITHIN 3 MONTHS.
EXPIRES NOV 8 - 1968

DECLARED WATER BASIN

CEMENT BEHIND THE 13 3/8" CASING MUST BE CIRCULATED

CEMENT BEHIND THE 9 5/8" CASING MUST BE CIRCULATED

NOTIFY USGS IN SUFFICIENT TIME TO WITNESS CEMENTING THE 9 5/8" CASING.

*See Instructions On Reverse Side

Ok 4- USGS Roswell
1- NSW
1- SUSD
1- 12RV
2- Hondo O&G Roswell

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

5. LEASE DESIGNATION AND SERIAL NO.: LC-064050 A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

Copy to J.

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—" for such proposals.)

RECEIVED
AUG 28 1968
O. C. C.
ARTESIA, OFFICE

1. OIL WELL ☐ GAS WELL ☐ OTHER DRILLING

7. UNIT AGREEMENT NAME:

2. NAME OF OPERATOR: PAN AMERICAN PETROLEUM CORPORATION

8. FARM OR LEASE NAME: TRIGG FEDERAL

3. ADDRESS OF OPERATOR: BOX 68, HOBBS, N. M. 88240

9. WELL NO.: 2

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements. See also space 17 below.) At surface

10. FIELD AND POOL, OR WILDCAT: WILDCAT

1980' FNL x 1980' FWL Sec. 34 (Unit F, SE/4 NW/4)

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: 34-17-27 NMPM

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)

12. COUNTY OR PARISH: EDDY

13. STATE: NM

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☒	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	☐	(Other) Spudding			☒
(Other)	☐			(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Noble Drilling Co. spudded 17½" hole 9:30 PM 8-16-57.[68] On 8-17-68, 13⅜" OD 48# H-40 ST&C casing was set @ 314' w/ 400 sx Incor plus 2% Gel + 100 sx neat + 2% CACL. Cement circulated. WOC 22 hrs. Tested casing 500 psi for 30 minutes. Test O.K.

Reduced hole to 12¼" @ 314'. On 8-21-68, 9⅝" OD 32.3# H40 casing was set @ 1599' w/ 1100 sx Incor + 2% Gel + 100 sx neat + 2% CACL. Cement circulated. WOC 27½ hrs. Tested casing w/ 1000 psi for 30 min. Test O.K.

Reduced hole to 8¾" @ 1599' and resumed drilling

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

SIGNED _____ TITLE AREA SUPERINTENDENT DATE AUG 23 1968

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

APPROVED
AUG 27 1968
R. L. BELLMAN
ACTING DISTRICT ENGINEER

0+4- USGS- ART
1- NSW
1- SUSP
1- RKY
2- HONDO

*See Instructions on Reverse Side

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN [illegible]PLICATE* (Other instructions on reverse side)

Copy to J. G.

Form approved.
Budget Bureau No. [illegible]

5. LEASE DESIGNATION AND SERIAL NO.: LC-064050-A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

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—" for such proposals.)

1. OIL WELL ☐ GAS WELL ☐ OTHER DRILLING

7. UNIT AGREEMENT NAME:

2. NAME OF OPERATOR: PAN AMERICAN PETROLEUM CORPORATION

8. FARM OR LEASE NAME: TRIGG "B" FEDERAL

3. ADDRESS OF OPERATOR: BOX 68, HOBBS, N. M. 88240

9. WELL NO.: 1

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface

10. FIELD AND POOL, OR WILDCAT: WILDCAT

1980' FNL x 1980' FWL Sec. 34 (Unit F, SE/4 NW/4)

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: 34-17-27 NMPM

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 3568' RDB

12. COUNTY OR PARISH: EDDY

13. STATE: N.M.

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☐	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	☐	(Other) Lease Name + Well No Change			☒
(Other)				(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.) *

Lease name and well no changed as follows:

From: TRIGG Federal Well No. 2

TO: TRIGG "B" Federal Well No. 1

RECEIVED
SEP 9 1968
O. C. C.
ARTESIA, OFFICE

RECEIVED
SEP - 6 1968
U. S. GEOLOGICAL SURVEY
ARTESIA, NEW MEXICO

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

SIGNED _____ TITLE AREA SUPERINTENDENT DATE SEP 4 1968

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

APPROVED
SEP 6 - 1968
R. L. BEAUMAN
ACTING DISTRICT ENGINEER

*See Instructions on Reverse Side

04-4- USGS-R
1- NEW
1- SUSD
1- RRY
2- HONDO

N. M. O. C. C.

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

5. LEASE DESIGNATION AND SERIAL NO.: LC-064050-A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

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—" for such proposals.)

1. OIL WELL ☐ GAS WELL ☐ OTHER DRILLING

7. UNIT AGREEMENT NAME:

2. NAME OF OPERATOR: PAN AMERICAN PETROLEUM CORPORATION

8. FARM OR LEASE NAME: TRIGG "B" FEDERAL

3. ADDRESS OF OPERATOR: BOX 68, HOBBS, N. M. 88240

9. WELL NO.: 1

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: 1980' FNL x 1980' FWL Sec. 34 (Unit F, SE/4 NW/4)

10. FIELD AND POOL, OR WILDCAT: WILDCAT

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: 34-17-27 NMPM

14. PERMIT NO.:

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 3568 R.D.B.

12. COUNTY OR PARISH: EDDY

13. STATE: N.M.

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☒	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	☒	(Other)			☐
(Other)				(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.) *

On 10-9-68., 7" OD 23-26# N80 + S-95 casing was set @ 9821 and cemented w/250 sx. Incor neat. After WOC 24 hours, Tested casing w/ 1800 psi for 30 min. Test O.K.

Propose to deepen well to appx 10,500' and test the Devonian Formation. A 6 1/4" hole will be drilled out of the 7". If productive a 4 1/2" OD liner will be set.

RECEIVED
OCT 15 1968
U. S. GEOLOGICAL SURVEY
ARTESIA, NEW MEXICO

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

SIGNED _____ TITLE AREA SUPERINTENDENT DATE OCT 14 1968

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

APPROVED
OCT 15 1968
R. L. BERMAN
ACTING DISTRICT ENGINEER

*See Instructions on Reverse Side

0+4- USGS - ART
1- NSW
1- SUSP
1- ERY
2- HONDO

FORM 470 2-57

PAN AMERICAN PETROLEUM CORPORATION

Post Office Box 68
Hobbs, New Mexico

November 4, 1968

File: VES-433-400.1

Subject: Time Extension on Rule 401
For Trigg Federal "B"
Well No. 1, F-34-17-27
Eddy County, N.M. Wildcat

New Mexico Oil Conservation Commission
District II - Artesia
P. O. Drawer DD
Artesia, New Mexico 88210

Attn: Mr. W. A. Gressett

Dear Sir:

Pan American Petroleum Corporation's Trigg "B" Federal Well No. 1 was completed on 10-31-68 in the Morrow Formation as a flowing gas well. Since the well was a Wildcat and there are no immediate sales connection points, negotiations are now in progress for a gas sales contract.

Testing the well's potential at the present time could only be accomplished by venting the gas to the atmosphere. It is doubtful that a pipeline connection can be accomplished within 30 days after completion of the well, therefore an extension of the 30 days time limitation in Rule 401 is requested until such a connection is made. This will prevent revenue loss due to gas venting and test equipment rental, and will allow us to obtain better test data since the 1 hour flow period restriction for each point does not apply to connected wells. When the well has been connected to a gas gathering system, compliance to Rule 401 will be made.

Yours very truly,

V. E. Staley
Area Superintendent

AML/jt

RECEIVED
NOV 6 1968
O. C. C.
ARTESIA, OFFICE

GOVERNOR
DAVID F. CARGO
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
GUYTON B. HAYS
MEMBER

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

P. O. DRAWER DD
ARTESIA

November 8, 1968

Pan American Petroleum Corporation
P. O. Box 68
Hobbs, New Mexico 88240

Attention: Mr. V. E. Staley

Gentlemen:

In reply to your letter of November 4, 1968, wherein you request an extension of the 30 day time limitation of Rule 401 for testing your Trigg B Federal #1 F, 34-17-27.

Please be advised that said request is hereby approved.

Very truly yours,

OIL CONSERVATION COMMISSION

W. A. Gressett
Supervisor, District II

WAG:gs

N. M. O. C. C. COPY

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

5. LEASE DESIGNATION AND SERIAL NO.: LC-064050-A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

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—" for such proposals.)

1. OIL WELL ☐ GAS WELL ☒ OTHER

7. UNIT AGREEMENT NAME:

2. NAME OF OPERATOR: PAN AMERICAN PETROLEUM CORPORATION

8. FARM OR LEASE NAME: TRIGG "B" FEDERAL

3. ADDRESS OF OPERATOR: BOX 68, HOBBS, N. M. 88240

9. WELL NO.: 1

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface

1980' FNL x 1980' FWL Sec. 34 (UNIT F, SE/4 NW/4)

10. FIELD AND POOL, OR WILDCAT: WILDCAT - PENN

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: 34-17-27 NMPM

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 3568' R.D.B.

12. COUNTY OR PARISH: EDDY

13. STATE: N.M.

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☒	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	☐	(Other) Completion oper.			☒
(Other)	☐			(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

TD-10610'. RAN LOGS. NO SHOWS BELOW 9800'. SET CI Retainer @ 9800' & Sqz 10,610-9800 w/ 175 sx Incorno. PBD-9796'. Ran Tbg w/ Baker Model "N" Pkr @ 9355'. PERF: 9743-48 w/2JSPF 9657-62, 65-70' w/2JSPF. 9626-38' w/2JSPF. Spot 350 gal acid across perfs + displaced. (Tail pipe Tbg @ 9760'.) Evaluated.

EST. OPEN FLOW PT 7.0 MMCF.
COMP AS A SHUT-IN GAS WELL AWAITING MARKET

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NOV 12 1968
U. S. GEOLOGICAL SURVEY
ARTESIA, NEW MEXICO

TD-10610'
PBD-9795'
PERFS 9626-38, 9657-62, 65-70, 9743-48'
ACID: 350 gal

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

SIGNED _____ TITLE AREA SUPERINTENDENT DATE NOV 7 REC'D

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

APPROVED
R. L. BE... AREA MANAGER

*See Instructions on Reverse Side

OK4-USGS-ART
1-NSW
1-SUSP
1-RRV
2-HONDO

NEW MEXICO OIL CONSERVATION COMMISSION

WELL LOCATION AND ACREAGE DEDICATION PLAT

Supersedes C-128 Effective 1-1-65

All distances must be from the outer boundaries of the Section

Operator	Lease	Well No.
PAN AMERICAN PETROLEUM CORP.	TRIGG FEDERAL GAS COM	1

Unit Letter	Section	Township	Range	County
F	34	17 SOUTH	27 EAST	EDDY

Actual Footage Location of Well: 1980 feet from the NORTH line and 1980 feet from the WEST line

Ground Level Elev. 3330 | Producing Formation: MORROW (GAS) | Pool: WILDCAT - PENN | Dedicated Acreage: 320 Acres

1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below.

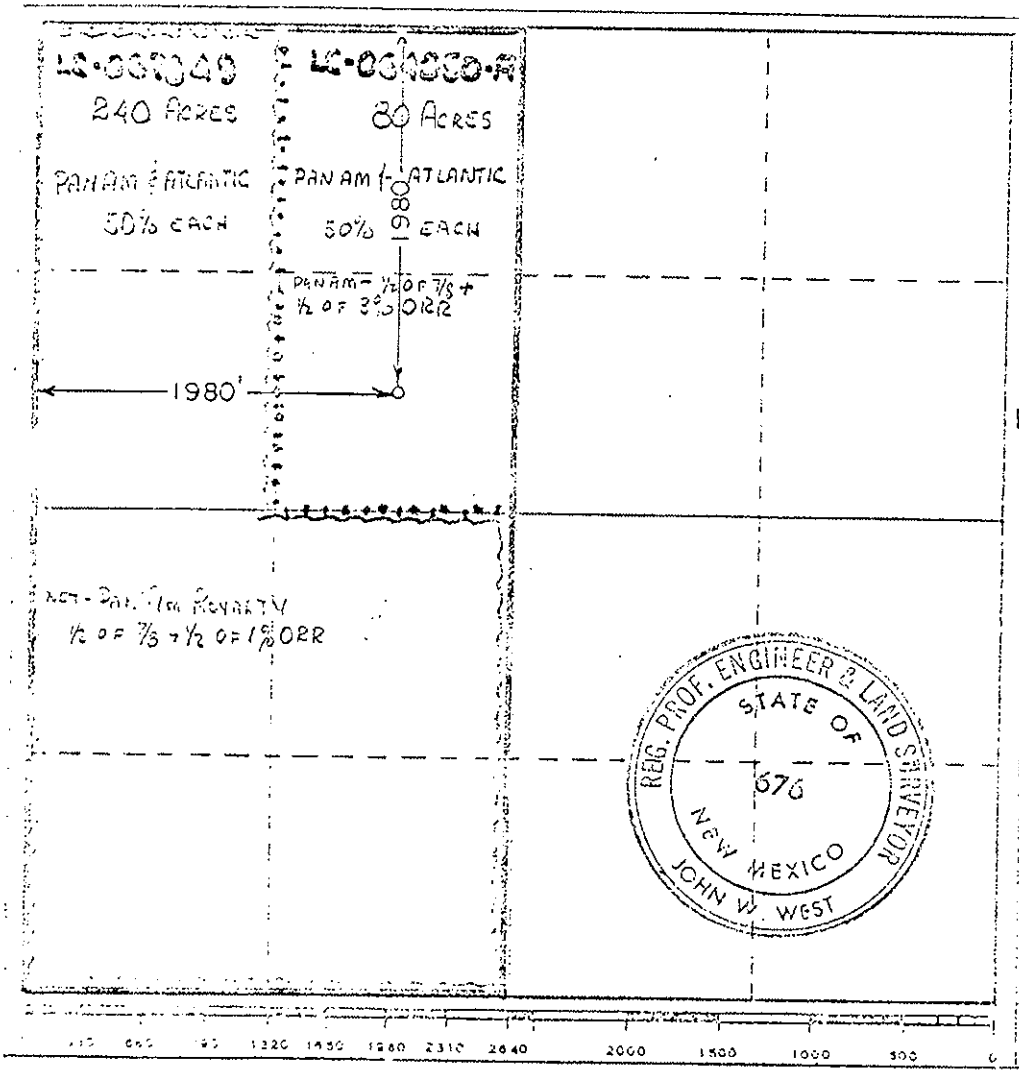
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

3. If more than one lease of different ownership is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling, etc?

X 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 interests, has been approved by the Commission.



CERTIFICATION

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

Name: _____

Position: AREA SUPERINTENDENT

Company: PAN AMERICAN PETROLEUM CORPORATION

Date: NOV 7 1968

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.

RECEIVED
NOV 19 1968

Date Surveyed: AUGUST 1, 1968

Registered Professional Engineer and/or Land Surveyor: John W West

Certificate No. 676

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

5. LEASE DESIGNATION AND SERIAL NO.: LC-064050-A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

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—" for such proposals.)

7. UNIT AGREEMENT NAME:

OIL WELL ☐ GAS WELL ☒ OTHER

2. NAME OF OPERATOR: PAN AMERICAN PETROLEUM CORPORATION

8. FARM OR LEASE NAME: TRIGG FEDERAL GAS COM

3. ADDRESS OF OPERATOR: BOX 68, HOBBS, N. M. 88240

9. WELL NO.: 1

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: 1980' FNL x 1980' FWL Sec. 34 (Unit F, SE/4 NW/4)

10. FIELD AND POOL, OR WILDCAT: WILDCAT - PENN

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: 34-17-27 NMPM

14. PERMIT NO.:

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 3568' RDB

12. COUNTY OR PARISH: EDDY

13. STATE: N.M.

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☐	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	☐	(Other) Change of name			☒
(Other)			☐	(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Last name changed:

From: TRIGG "B" FEDERAL

To: TRIGG FEDERAL GAS COM

RECEIVED
NOV 21 1969
O. C. C.
ARTESIA, N. M.

RECEIVED
NOV 17 1969
U. S. GEOLOGICAL SURVEY
ARTESIA, N. M.

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

SIGNED _____ TITLE AREA SUPERINTENDENT DATE NOV 15 1969

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

APPROVED
R. L. BEAUCHAMP
ACTING DISTRICT ENGINEER

*See Instructions on Reverse Side

OCC - USGS - ART
1 - NMOCD
1 - SUSP
1 - RDV
1 - HONDO

INSTRUCTIONS

General: This form is designed for submitting a complete and correct well completion report and log on all types of lands and leases to either a Federal agency or a State agency, or both, pursuant to applicable Federal and/or State laws 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 furnished by, or may be obtained from, the local Federal and/or State office. See instructions on items 22 and 24, and 33, below regarding separate reports for separate completions.

If not filed prior to the time this summary record is submitted, copies of all currently available logs (drillers, geologist, sample and core analysis, all types electric, etc.), formation and pressure tests, and directional surveys, should be attached hereto, to the extent required by applicable Federal and/or State laws and regulations. All attachments should be listed on this form, see item 35.

Item 4: If there are no applicable State requirements, locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local State or Federal office for specific instructions.

Item 18: Indicate which elevation is used as reference (where not otherwise shown) for depth measurements given in other spaces on this form and in any attachments.

Items 22 and 24: If this well is completed for separate production from more than one interval zone (multiple completion), so state in item 22, and in item 24 show the producing interval, or intervals, top(s), bottom(s) and name(s) (if any) for only the interval reported in item 33. Submit a separate report (page) on this form, adequately identified, for each additional interval to be separately produced, showing the additional data pertinent to such interval.

Item 29: "*Sacks Cement*": Attached supplemental records for this well should show the details of any multiple stage cementing and the location of the cementing tool.

Item 33: Submit a separate completion report on this form for each interval to be separately produced. (See instruction for items 22 and 24 above.)

37. SUMMARY OF POROUS ZONES:
SHOW ALL IMPORTANT ZONES OF POROSITY AND CONTENTS THEREOF; CORED INTERVALS; AND ALL DRILL-STEM TESTS, INCLUDING DEPTH INTERVAL TESTED, CUSHION USED, TIME TOOL OPEN, FLOWING AND SHUT-IN PRESSURES, AND RECOVERIES

FORMATION	TOP	BOTTOM	DESCRIPTION, CONTENTS, ETC.
MISSISSIPPIAN	9626	9748	Gas Zone

38. GEOLOGIC MARKERS

NAME	TOP MEAS. DEPTH	TOP TRUE VERT. DEPTH
GUTSON	8583	
SOUTH GILCHRIST	1972	
CHOKECHERRY	2915	
MADISON	3065	
DARWIN "A"	4953	
ASH	5057	
WEBER	6230 ✓	
CISCO	7620	
CROUCH	8225	
STRAWN	8525	
ATOKA MISSISSIPPIAN	9130	
CLASTIC	9773	

U.S. GOVERNMENT PRINTING OFFICE: 1953 O-[illegible]

RECEIVED
NOV 21 1968
O. C. C.
ARTESIA, OFFICE

Form 9-330
(Rev. 5-63)

N. M. O. C. C.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN DUPLICATE* (See other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R355.5.

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

RECEIVED
NOV 19 1968
U. S. GEOLOGICAL SURVEY
ARTESIA, NEW MEXICO

5. LEASE DESIGNATION AND SERIAL NO.: LC-064050-A
6. IF INDIAN, ALLOTTEE OR TRIBE NAME:
7. UNIT AGREEMENT NAME:
8. FARM OR LEASE NAME: Higgs Federal Gas Com
9. WELL NO.: 1
10. FIELD AND POOL, OR WILDCAT: WILDCAT - PENN
11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: 34-17-27 NMPM
12. COUNTY OR PARISH: EDDY
13. STATE: N.M.

1a. TYPE OF WELL: OIL WELL ☐ GAS WELL ☒ DRY ☐ Other
b. TYPE OF COMPLETION: NEW WELL ☒ WORK OVER ☐ DEEP-EN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ Other

2. NAME OF OPERATOR: PAN AMERICAN PETROLEUM CORPORATION
3. ADDRESS OF OPERATOR: BOX 68, HOBBS, N. M. 88240
4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)*
At surface: 1980' FN x FW Lines Sec. 34 (Unit F, SE/4 NW/4)
At top prod. interval reported below
At total depth

14. PERMIT NO.: — DATE ISSUED:

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (Ready to prod.)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
8-16-67	10-21-68	10-31-68	3568' RDB	

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
10310'	9795'		→	0-TD	—

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*: 9326-9740 MORROW

25. WAS DIRECTIONAL SURVEY MADE: No.

26. TYPE ELECTRIC AND OTHER LOGS RUN: Sonic-GR, Porosity, Prox-Mll, Ind-LL

27. WAS WELL CORED: YES

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

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13 3/8"	48#	314'	17½"	Circ	
9 5/8"	32.3#	1599'	12¼"	Circ	
7"	23-26#	9821'	8¾"	250	
			6¼"		

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)
2⅜"	9760	9765

31. PERFORATION RECORD (Interval, size and number)
9626-38, 57-62, 65-70, 9743-48

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

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
9626-9748	350 gal acid

33.* PRODUCTION

DATE FIRST PRODUCTION	PRODUCTION METHOD (Flowing, gas lift, pumping—size and type of pump)	WELL STATUS (Producing or shut-in)
11-1-68	Flow	SHUT-IN

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD →	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO
11-1-68	3	0.22"		—	—	—	—

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE →	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)
500			—	7M	—	

RECEIVED
NOV 2 1968
O. C. C.
ARTESIA, N. M.

34. DISPOSITION OF GAS (Sold, used for fuel, vented, etc.): TO BE SOLD - MARKET PENDING
TEST WITNESSED BY

35. LIST OF ATTACHMENTS: None

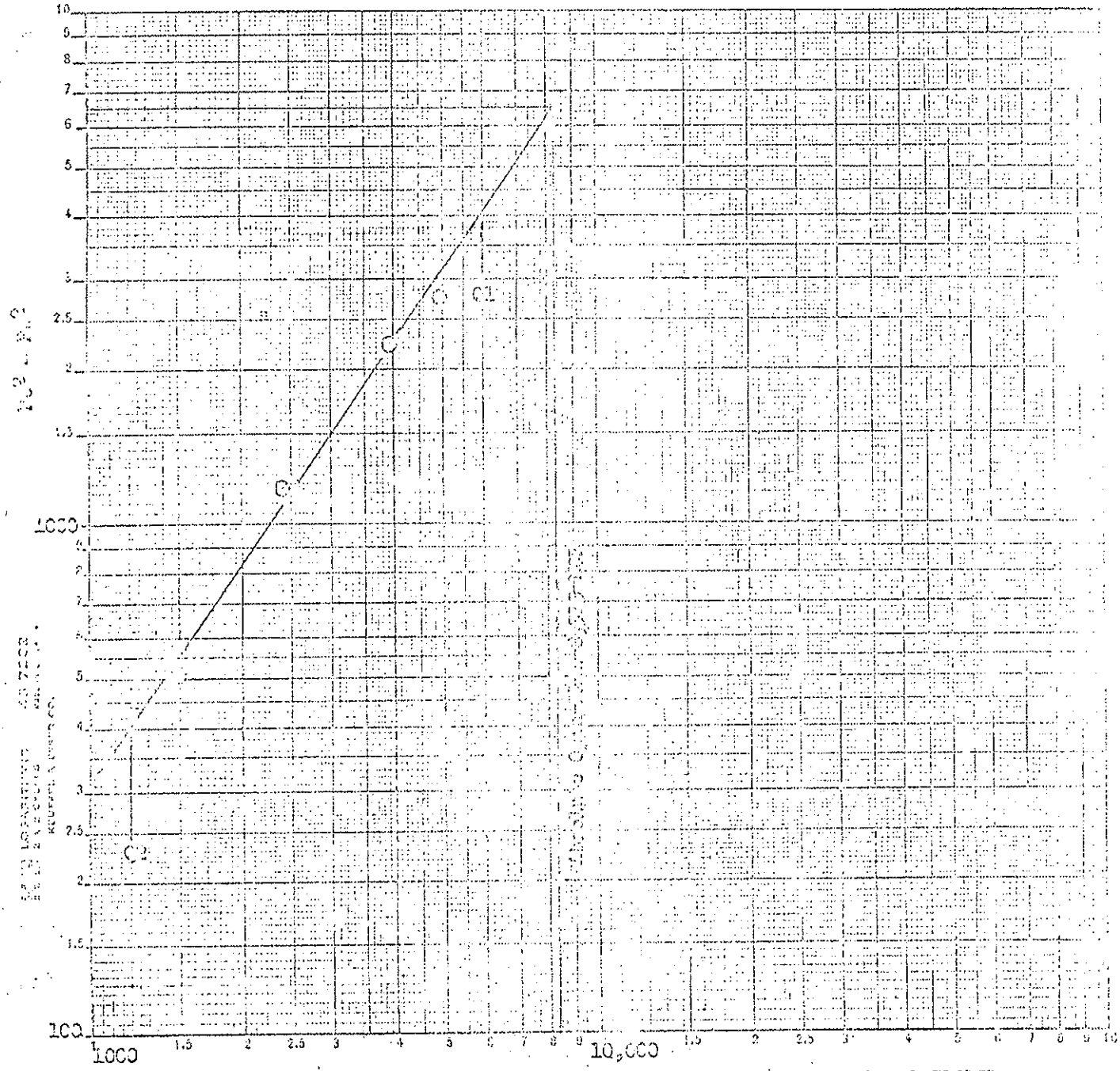
36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records.

SIGNED _____ TITLE AREA SUPERINTENDENT DATE NOV 15 1968

*(See Instructions and Spaces for Additional Data on Reverse Side)

Pan American Petroleum Corporation
Trigg Federal Gas Com. No. 1
Unit F, Sec. 34, T17S, R27E
Eddy County, New Mexico
January 23, 1969

RECEIVED
JAN 3 1969
O. C. D.
ARTESIA, OFFICE



Log C1 = 3.77615
Log C2 = 3.07[illegible]
n = 0.69[illegible]

N . MEXICO OIL CONSERVATION COMMI ON

Form C-122
Revised 9-1-65

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

RECEIVED
JAN 3 1969
O. C. C.
ARTESIA, OFFICE

Type Test: [X] Initial [ ] Annual [ ] Special				Test Date: 1/23/69	
Company: Pan American Pet. Corp.		Connection: Southern Union Gas Company			
Pool: Undesignated		Formation: Morrow		Unit: F	
Completion Date: 11/1/68	Total Depth: 10,610	Plug Back TD: 9795	Elevation: 3568 RDB	Farm or Lease Name: Trigg Fed. Gas Com.	
Csg. Size: 7" / Wt.: 26# / d: 6.276 / Set At: 9821		Perforations: From 9626 To 9748		Well No.: 1	
Tbg. Size: 2 3/8 / Wt.: 4.7# / d: 1.995 / Set At: 9761		Perforations: From Open End To		Unit: F / Sec.: 34 / Twp.: 17S / Rge.: 27E	
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: Single		Packer Set At: 9355		County: Eddy	
Producing Thru: Tubing	Reservoir Temp. °F: 145 @ 9663	Mean Annual Temp. °F: 60°	Baro. Press. – P_a: 13.2	State: New Mexico	

L	H	Gg	% CO_2	% N_2	% H_2S	Prover	Meter Run	Taps
9761	9761	.630	0	0.24	0		X	Flange

NO.	FLOW DATA: Prover Line Size	X	Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	TUBING DATA: Press. p.s.i.g.	Temp. °F	CASING DATA: Press. p.s.i.g.	Temp. °F	Duration of Flow
SI							2510	62			120 hrs
1.	4	x	2.250	675	3.0	97	2363	62			1
2.	4	x	2.250	630	7.5	87	2285	62			1
3.	4	x	2.250	690	19	72	1960	62			1
4.	4	x	2.250	700	29	72	1760	62			1
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, Fpv	Rate of Flow Q, Mcfd
1	25.64	45.44	688.2	.9940	1.260	1.054	1495
2.	25.64	72.10	693.2	.9930	1.260	1.056	2398
3.	25.64	115.6	703.2	.9910	1.260	1.063	3825
4.	25.64	143.8	713.2	.9890	1.260	1.065	4856
5							

NO.	P_r	Temp. °R	T_r	Z
1	1.03	557	1.51	0.901
2.	1.03	547	1.49	0.897
3.	1.05	532	1.45	0.885
4.	1.06	531	1.44	0.881
5.				

Gas Liquid Hydrocarbon Ratio 166.9 Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons 54.0 Deg.
Specific Gravity Separator Gas .630 XXXXXXXXX
Specific Gravity Flowing Fluid XXXXX .7628
Critical Pressure 670 P.S.I.A. 667 P.S.I.A.
Critical Temperature 368 R 411 R

P_c 2553.2 P_c^2 6518.8

NO	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1		2451.3	6008.9	509.9
2		2311.5	5343.0	1175.8
3		2071.2	4289.9	2228.9
4		1938.3	3757.0	2761.8
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = 2.225$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 2.118$

AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 6313$

Absolute Open Flow 6313 Mcfd @ 15.025 Angle of Slope θ Slope, n 0.699

Remarks: Initial Test

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	D. C. Pendergrass	Warren Hobbs	H. L. Kendrick

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LAND OFFICE		
TRANSPORTER	OIL	
	GAS	
OPERATOR		
PRORATION OFFICE		

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

RECEIVED
JAN 19 1971
O. C. C.
ARTESIA, OFFICE

Form C-104
Supersedes Old C-104 and C-110
Effective 1-1-65

I.

Operator: AMOCO PRODUCTION COMPANY

Address: BOX 68, HOBBS, N. M. 88240

Reason(s) for filing (Check proper box)
- New Well: ☐
- Recompletion: ☐
- Change in Ownership: ☐
- Change in Transporter of: NAME
  - Oil: ☒
  - Casinghead Gas: ☒
  - Dry Gas: ☐
  - Condensate: ☐

Other (Please explain)
EFFECTIVE 2-1-71 CHANGE IN NAME OF OPERATOR, TRANSPORTER OF OIL & GAS
FROM: PAN AMERICAN PETROLEUM CORPORATION
TO: AMOCO PRODUCTION COMPANY

If change of ~~ownership~~ NAME OPERATOR give name and address of previous owner PAN AMERICAN PETROLEUM CORPORATION BOX 68, HOBBS, N. M. 88240

II. DESCRIPTION OF WELL AND LEASE

COM AGR #SW-481

Lease Name	Well No.	Pool Name, including Formation	Kind of Lease	Lease No.
TRIGG FEDERAL GAS COM	1	LOGAN DRAW MORROW-GAS	State, Federal or Fee FED	LC 060405(a)-A

Location
Unit Letter F : 1980 Feet From The NORTH Line and 1980 Feet From The WEST
Line of Section 34 Township 17-S Range 27-E , NMPM, EDDY County

III. DESIGNATION OF TRANSPORTER OF OIL AND NATURAL GAS

Name of Authorized Transporter of Oil ☒ or Condensate ☐	Address (Give address to which approved copy of this form is to be sent)
AMOCO PRODUCTION COMPANY (TRUCKS)	Box 1725, MIDLAND TEXAS 79701
Name of Authorized Transporter of Casinghead Gas ☐ or Dry Gas ☐	Address (Give address to which approved copy of this form is to be sent)
AMOCO PRODUCTION COMPANY	BOX 68, HOBBS, N. M. 88240

If well produces oil or liquids, give location of tanks.	Unit	Sec.	Twp.	Rge.	Is gas actually connected?	When
	F	34	17	27	YES	12-20-68

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 Resv.	Diff. Resv.

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 (*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*)

OIL WELL

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.

04-4-NMOCC-ART
1-ACJr
1-OGD
1-SusP
1-PRN

(Signature)
AREA SUPERINTENDENT
(Title)
2-1-71
(Date)

OIL CONSERVATION COMMISSION

APPROVED FEB 8 1971, 19

BY W. A. Gressett

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 deepened well, this form must be accompanied by a tabulation of the deviation tests taken on the well in accordance with RULE 111.

All sections of this form must be filled out completely for allowable on new and recompleted wells.

Fill out only Sections I, II, III, and VI for changes of owner, well name or number, or transporter, or other such change of condition.

Separate Forms C-104 must be filed for each pool in multiply completed wells.

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

RECEIVED
SEP 13 1976
O. C. C.
ARTESIA, OFFICE

Form C-104
Supersedes Old C-104 and C-110
Effective 1-1-65

I.

Operator
AMOCO PRODUCTION COMPANY

Address
P.O. DRAWER A, LEVELLAND, TEXAS 79336

Reason(s) for filing *(Check proper box)*
New Well ☐
Recompletion ☐
Change in Ownership ☐
Change in Transporter of:
Oil ☐ Dry Gas ☒
Casinghead Gas ☐ Condensate ☐

Other *(Please explain)* EFF 8-1-76
FROM: AMOCO PRODUCTION COMPANY
TO: GAS COMPANY OF NEW MEXICO

If change of ownership give name and address of previous owner _____

II. DESCRIPTION OF WELL AND LEASE

Com AGR # SW-481

Lease Name	Well No.	Pool Name, Including Formation	Kind of Lease	Lease No.
TRIGG FEDERAL GAS COM	1	LOGAN DRAW MORROW - GAS	State, Federal or Fee FEDERAL	LC 060405D-A

Location
Unit Letter F ; 1980 Feet From The NORTH Line and 1980 Feet From The WEST
Line of Section 34 Township 17-S Range 27-E , NMPM, EDDY County

III. DESIGNATION OF TRANSPORTER OF OIL AND NATURAL GAS

Name of Authorized Transporter of Oil ☐ or Condensate ☒	Address *(Give address to which approved copy of this form is to be sent)*
AMOCO PRODUCTION COMPANY - TRUCKS	BOX 1183 - HOUSTON, TEXAS 77001
Name of Authorized Transporter of Casinghead Gas ☐ or Dry Gas ☒	Address *(Give address to which approved copy of this form is to be sent)*
GAS COMPANY OF NEW MEXICO	FIRST INTERNATIONAL BLDG. SUITE 1800 DALLAS, TEXAS 75270

If well produces oil or liquids, give location of tanks.	Unit	Sec.	Twp.	Rge.	Is gas actually connected?	When
	F	34	17	27	YES	12-20-68

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 Resv.	Diff. Resv.

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 *(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)*

OIL WELL

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.

Ray W. Cox
(Signature)
Administrative Assistant
(Title)
9-3-76
(Date)

OIL CONSERVATION COMMISSION

APPROVED SEP 14 1976, 19 _____

BY W. A. Gressett

TITLE SUPERVISOR, DISTRICT II

This form is to be filed in compliance with RULE 1104.

If this is a request for allowable for a newly drilled or deepened well, this form must be accompanied by a tabulation of the deviation tests taken on the well in accordance with RULE 111.

All sections of this form must be filled out completely for allowable on new and recompleted wells.

Fill out only Sections I, II, III, and VI for changes of owner, well name or number, or transporter, or other such change of condition.

Separate Forms C-104 must be filed for each pool in multiply completed wells.

O+G-NMOCC ARC
1-DIV
1-DMG
1-SUSP
1-RC

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TRANSPORTER OIL	/	
TRANSPORTER GAS	/	
OPERATOR	/	
PRORATION 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 C-110
Effective 1-1-65

RECEIVED
JAN 28 1977
O. C. C.
ARTESIA, OFFICE

Operator
AMOCO PRODUCTION COMPANY
Address
P.O. Drawer A, Levelland, Texas 79336

Reason(s) for filing *(Check proper box)*

New Well	☐	Change in Transporter	☐	Dry Gas	☒
Recompletion	☐	Oil	☐	Casinghead Gas	☐
Change in Ownership	☐	Casinghead Gas	☐	Condensate	☐

Other *(Please explain)* Eff. 8-1-76
From: Gas Company of New Mexico
To: Amoco Production Company

If change of ownership give name and address of previous owner _____

DESCRIPTION OF WELL AND LEASE

Com AGR #SW-481

Lease Name	Well No.	Pool Name, Including Formation	Kind of Lease	Lease No.
Trigg Federal Gas Com	1	Logan Draw Morrow Gas	State, Federal or Fee Federal	LC 0604050-A

Location
Unit Letter F : 1980 Feet From The North Line and 1980 Feet From The West
Line of Section 34 Township 17-S Range 27-E , NMPM, Eddy County

DESIGNATION OF TRANSPORTER OF OIL AND NATURAL GAS

Name of Authorized Transporter of Oil ☐ or Condensate ☒	Address *(Give address to which approved copy of this form is to be sent)*
Amoco Production Company - Trucks	Box 1183 Houston, Texas 77001
Name of Authorized Transporter of Casinghead Gas ☐ or Dry Gas ☒	Address *(Give address to which approved copy of this form is to be sent)*
Amoco Production Company	P.O. Drawer A, Levelland, Texas 79336

If well produces oil or liquids, give location of tanks.	Unit	Sec.	Twp.	Rge.	Is gas actually connected?	When
	F	34	17	27	Yes	12-20-68

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

COMPLETION DATA

Designate Type of Completion – (X)	Oil Well	Gas Well	New Well	Workover	Deepen	Plug Back	Same Res'v.	Diff. Res'v.

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

TEST DATA AND REQUEST FOR ALLOWABLE

(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)

OIL WELL

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 POSTED I.D. 2
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

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.

Ray W. Cox
(Signature)
Administrative Assistant
(Title)
1-26-77
(Date)

0&4 NMOCC-Art 1-JMG
1-Div 1-Susp
1-RC

OIL CONSERVATION COMMISSION

APPROVED JAN 31 1977, 19____
BY W. A. Gressett
TITLE ~~SUPERVISOR, DISTRICT II~~

This form is to be filed in compliance with RULE 1104.

If this is a request for allowable for a newly drilled or deepened well, this form must be accompanied by a tabulation of the deviation tests taken on the well in accordance with RULE 111.

All sections of this form must be filled out completely for allowable on new and recompleted wells.

Fill out only Sections I, II, III, and VI for changes of owner, well name or number, or transporter, or other such change of condition.

Separate Forms C-104 must be filed for each pool in multiply completed wells.

DISTRIBUTION		
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	GAS	
OPERATOR		
PRORATION 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 C-11
Effective 1-1-65

RECEIVED
DEC 19 1978
O. C. C.
ARTESIA, OFFICE

Operator: Amoco Production Company

Address: P.O. Drawer "A" Levelland, Texas 79336

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)

If change of ownership give name and address of previous owner _____

DESCRIPTION OF WELL AND LEASE

Lease Name	Well No.	Pool Name, Including Formation	Kind of Lease	Lease No.
Trigg Federal Gas Com	1	Logan Draw Morrow Gas	State, Federal or Fee Federal	LC-060250

Location
Unit Letter F : 1980 Feet From The North Line and 1980 Feet From The West

Line of Section 34 Township 17-S Range 27-E , NMPM, Eddy County

DESIGNATION OF TRANSPORTER OF OIL AND NATURAL GAS

Name of Authorized Transporter of Oil ☐ or Condensate ☒	Address (Give address to which approved copy of this form is to be sent)
The Permian Corporation (trucks)	P.O. Box 1183, Houston, Tx 77251.
Name of Authorized Transporter of Casinghead Gas ☐ or Dry Gas ☒	Address (Give address to which approved copy of this form is to be sent)
Amoco Production Co.	P.O. Drawer 'A' Levelland, Tx. 79336

If well produces oil or liquids, give location of tanks.	Unit	Sec.	Twp.	Rge.	Is gas actually connected?	When
	F	34	17	27	yes	12-20-78

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

COMPLETION DATA

Designate Type of Completion – (X)	Oil Well	Gas Well	New Well	Workover	Deepen	Plug Back	Same Resv.	Diff. Resv.

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

TEST DATA AND REQUEST FOR ALLOWABLE (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)

OIL WELL

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
			Pkr to 3
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

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.

Dennis Evans
(Signature)

Assistant Administrative Analyst
(Title)

December 14, 1978
(Date)

OIL CONSERVATION COMMISSION

APPROVED DEC 20 1978, 19

BY W. A. Gressett

TITLE ~~SUPERVISOR, DISTRICT II~~

This form is to be filed in compliance with RULE 1104.

If this is a request for allowable for a newly drilled or deepened well, this form must be accompanied by a tabulation of the deviation tests taken on the well in accordance with RULE 111.

All sections of this form must be filled out completely for allowable on new and recompleted wells.

Fill out only Sections I, II, III, and VI for changes of operator, well name or number, or transporter, or other such change of condition.

34-17S-27E

well file

(Form C-123)
(Revised 7/1/52)

REQUEST FOR THE EXTENSION OF AN EXISTING POOL OR THE CREATION OF A NEW POOL

RECEIVED
JAN 21 1969
O. C. C.
ARTESIA, OFFICE

Date JAN 20 1969, 19

TO: The Oil Conservation Commission
State of New Mexico

The PAN AMERICAN PETROLEUM CORPORATION (Name of Operator) TRIGG FEDERAL GAS COM (Name of Lease)

1 (Well No.) Located 1980 feet from the NORTH line and 1980 feet from the WEST line of 34 (Section) 17-S (Township) 27-E (Range)

is outside the boundaries of any pool producing from the same formation. On the basis of the information submitted herewith on form C-105, we hereby request that the

pool be extended to include the following described area

or that a new pool be created to include the following described area

W/2 Sec. 34, T-17-S, R-27-E

Suggested name: TRIGG PENN GAS POOL or Malco Penn

PAN AMERICAN PETROLEUM CORPORATION
Operator

Name of Producing Formation:
PENN-MORROW

AREA SUPERINTENDENT
Representative

NAME CHANGED
FROM: PAN AMERICAN PETR. COR.
TO: AMOCO PRODUCTION CO.
EFFECTIVE: 2-1-71

O-1 AMOCO, P
1-RCW
1-J.E.S
1-RLY

FORM 470 2-57

PAN AMERICAN PETROLEUM CORPORATION

RECEIVED

DEC 29 1969

O. C. C.
ARTESIA, OFFICE

Post Office Box 68
Hobbs, New Mexico

December 23, 1969

File: VES-614-400

Subject: Theft of Condensate
Trigg Federal Gas COM
(F-34-17-27)
Empire Atoka Gas Pool
Eddy County, New Mexico
(COM Agr. #SW-481)

United States Geological Survey
Drawer U
Artesia, New Mexico 88210

New Mexico Oil Conservation Commission
Drawer DD
Artesia, New Mexico 88210

Hondo Oil & Gas
Security National Bank Bldg.
Roswell, New Mexico 88201

NAME CHANGED:
FROM: PAN AMERICAN PETR. CORP.
TO: AMOCO PRODUCTION CO.
EFFECTIVE: 2-1-71

Gentlemen:

Over the weekend of December 20-21, 1969, approximately 454 net barrels of condensate was stolen from subject lease by parties unknown. Theft was, apparently, from and through the bleeder line from storage tanks to the pits.

Law enforcement officials have been notified.

Yours very truly,

Original Signed by
V. E. STALEY

V. E. Staley
Area Superintendent

RRY/bsh

NEW MEXICO OIL CONSERVATION COMMISSION

REQUEST FOR ALLOWABLE
AND
AUTHORIZATION TO TRANSPORT OIL AND NATURAL GAS

Supersedes Old C-104 and C-110
Effective 1-1-65

FILE	
U.S.G.S.	
LAND OFFICE	
TRANSPORTER OIL	
TRANSPORTER GAS	
OPERATOR	
PRORATION OFFICE	

(DEVIATION SURVEYS- BACK SIDE)

I.

Operator: ~~PAN AMERICAN PETROLEUM CORPORATION~~ ✓
NAME CHANGED:
FROM: PAN AMERICAN PETR. CORP.
TO: AMCCO PRODUCTION CO.
EFFECTIVE: 2-1-71

Address: BOX 68, HOBBS, N. M. 88240.

Reason(s) for filing (Check proper box)

New Well	X	Change in Transporter of:	
Recompletion		Oil	Dry Gas
Change in Ownership		Casinghead Gas	Condensate

Other (Please explain): ~~WELL FORMERLY KNOWN AS TRIGG "B" FEDERAL No. 1~~

If change of ownership give name and address of previous owner _____

II. DESCRIPTION OF WELL AND LEASE

Lease Name	Well No.	Pool Name, Including Formation	Kind of Lease	Lease No.
TRIGG FEDERAL GAS COM	1	WILDCAT PENN	State, Federal or Fee FED	LC-060405(a)

Location: Unit Letter F ; 1980 Feet From The NORTH Line and 1980 Feet From The WEST

Line of Section 34 Township 17-S Range 27-E , NMPM, EDDY County

III. DESIGNATION OF TRANSPORTER OF OIL AND NATURAL GAS

Name of Authorized Transporter of Oil X or Condensate ☐	Address (Give address to which approved copy of this form is to be sent)
PAN AMERICAN PETROLEUM CORPORATION (TRUCKS)	BOX 1725, MIDLAND TEXAS
Name of Authorized Transporter of Casinghead Gas ☐ or Dry Gas X	Address (Give address to which approved copy of this form is to be sent)
PAN AMERICAN PETROLEUM CORPORATION	BOX 68, HOBBS, N. M. 88240

If well produces oil or liquids, give location of tanks.	Unit	Sec.	Twp.	Rge.	Is gas actually connected?	When
	F	34	17	27	YES	12-20-68

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	Date Compl. Ready to Prod.	Total Depth	P.B.T.D.
8-16-67	11-1-68	10610'	9795'

Elevations (DF, RKB, RT, GR, etc.)	Name of Producing Formation	Top Oil/Gas Pay	Tubing Depth
3568 RDB	MORROW - (PENN)	9626'	9760'

Perforations	Depth Casing Shoe
9626-38, 57-62, 65-70, 9713-18'	9821'

TUBING, CASING, AND CEMENTING RECORD

HOLE SIZE	CASING & TUBING SIZE	DEPTH SET	SACKS CEMENT
17½"	13 3/8"	314	Circ.
12¼"	9 5/8"	1599	Circ.
8¾"	7 "	9821	250
6¼"	—	—	

V. TEST DATA AND REQUEST FOR ALLOWABLE (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)

OIL WELL

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 4-PT TO BE CONDUCTED AT LATER DATE

Actual Prod. Test-MCF/D	Length of Test	Bbls. Condensate/MMCF	Gravity of Condensate
7 MM	3 hrs.		
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.

04-4-NMOCC-ART
1-USGS
1-OGP
1-RCH

(Signature)
AREA SUPERINTENDENT
(Title)
12-20-68
(Date)

OIL CONSERVATION COMMISSION

APPROVED JAN 6 1969, 19____

BY W. A. Gressett

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 deepened well, this form must be accompanied by a tabulation of the deviation tests taken on the well in accordance with RULE 111.

All sections of this form must be filled out completely for allowable on new and recompleted wells.

Fill out only Sections I, II, III, and VI for changes of owner, well name or number, or transporter, or other such change of condition.

Separate Forms C-104 must be filed for each pool in multiply completed wells.

DEVIATION SURVEYS

DEPTH	DEGREES OFF
120 -	¼
514 -	½
553 -	1 -
1010 -	1 ¼
1005 -	½
1530 -	"
1008 -	"
2320 -	"
2585 -	1 -
3072 -	"
3591 -	1 ¼
4075 -	"
4575 -	1 ½
4775 -	¾
5060 -	1 ¼
5150 -	"
5300 -	"
5595 -	1 ¾
5645 -	1 -
6980 -	1 ¼
6483 -	"
7020 -	"
7530 -	"
7600 -	½
8088 -	1 -
8358 -	½
8586 -	1 -
8751 -	1 ¼
8915 -	1 -
9004 -	¾
9400 -	1 ¼
9515 -	1 -
9740 -	2 ½
9850 -	"
9975 -	"
10587 -	2 ¼

The above are true to the best of my knowledge.

Sworn to this date, the 20th day of December, 1968.

Notary Public In & For Lea Co. N.M.

My Commission expires 2-5-70

RECEIVED BY
JUL 13 1987
O. C. D.
ARTESIA, OFFICE

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

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TRANSPORTER	OIL	✓
	GAS	✓
OPERATOR	✓	
PRORATION OFFICE		

OIL CONSERVATION DIVISION

P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Form C-104
Revised 10-01-78
Format 06-01-83
Page 1

REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT OIL AND NATURAL GAS

I.

Operator: AMOCO PRODUCTION COMPANY

Address: P. O. Box 68, Hobbs, NM 88240

Reason(s) for filing (Check proper box)

- [ ] New Well
- [ ] Recompletion
- [ ] Change in Ownership

Change in Transporter of:

- [ ] Oil
- [ ] Casinghead Gas
- [X] Dry Gas
- [ ] Condensate

Other (Please explain)

If change of ownership give name and address of previous owner _____

II. DESCRIPTION OF WELL AND LEASE

Lease Name	Well No.	Pool Name, Including Formation	Kind of Lease (State, Federal or Fee)	Lease No.
Trigg Fed. Gas Com	1	Logan Draw Morrow	Federal	LC-064050A

Location: Unit Letter F : 1980 Feet From The North Line and 1980 Feet From The West

Line of Section 34 Township 17-S Range 27-E , NMPM, Eddy County

III. DESIGNATION OF TRANSPORTER OF OIL AND NATURAL GAS

Name of Authorized Transporter of Oil [ ] or Condensate [X]	Address (Give address to which approved copy of this form is to be sent)
The Permian Corp.	Box 1183 Houston, Tx. 77251
Name of Authorized Transporter of Casinghead Gas [ ] or Dry Gas [X]	Address (Give address to which approved copy of this form is to be sent)
Phillips Petroleum Co.	4001 Penbrook, Odessa, TX 79762 Part ED-3
If well produces oil or liquids, give location of tanks. Unit F Sec. 34 Twp. 17 Rge. 27	Is gas actually connected? Yes When 7-1-87 7-17-87 sby GT: AMS

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

NOTE: *Complete Parts IV and V on reverse side if necessary.*

VI. 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 is true and complete to the best of my knowledge and belief.

Benton Green
(Signature)
Sr. Adminstrative Analyst
(Title)
7-9-87
(Date)

OIL CONSERVATION DIVISION

APPROVED JUL 14 1987, 19____
Original Signed By
BY Les A. Clements
TITLE Supervisor District II

This form is to be filed in compliance with RULE 1104.

If this is a request for allowable for a newly drilled or deepened well, this form must be accompanied by a tabulation of the deviation tests taken on the well in accordance with RULE 111.

All sections of this form must be filled out completely for allowable on new and recompleted wells.

Fill out only Sections I, II, III, and VI for changes of owner, well name or number, or transporter, or other such change of condition.

Separate Forms C-104 must be filed for each pool in multiply completed wells.

043, NMOCD-A 1-RAS 1-OMM 1-WF

IV. COMPLETION DATA

Designate Type of Completion – (X)	Oil Well	Gas Well	New Well	Workover	Deepen	Plug Back	Same Res'v.	Diff. Res'v.

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

(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)

OIL WELL

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

Submit to Appropriate
District Office
State Lease - 4 copies
Fee Lease - 3 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-102
Revised 1-1-89

OIL CONSERVATION DIVISION

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

WELL LOCATION AND ACREAGE DEDICATION PLAT

All Distances must be from the outer boundaries of the section

Operator	Lease	Well No.
Amoco Production Company	Trigg Federal Gas Com	1

Unit Letter	Section	Township	Range	County
F	34	17-S	27-E NMPM	Eddy

Actual Footage Location of Well:
1980 feet from the North line and 1980 feet from the West line

Ground level Elev.	Producing Formation	Pool	Dedicated Acreage:
3568' RDB	East Logan Draw Wolfcamp	Wolfcamp	320 Acres

1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below.

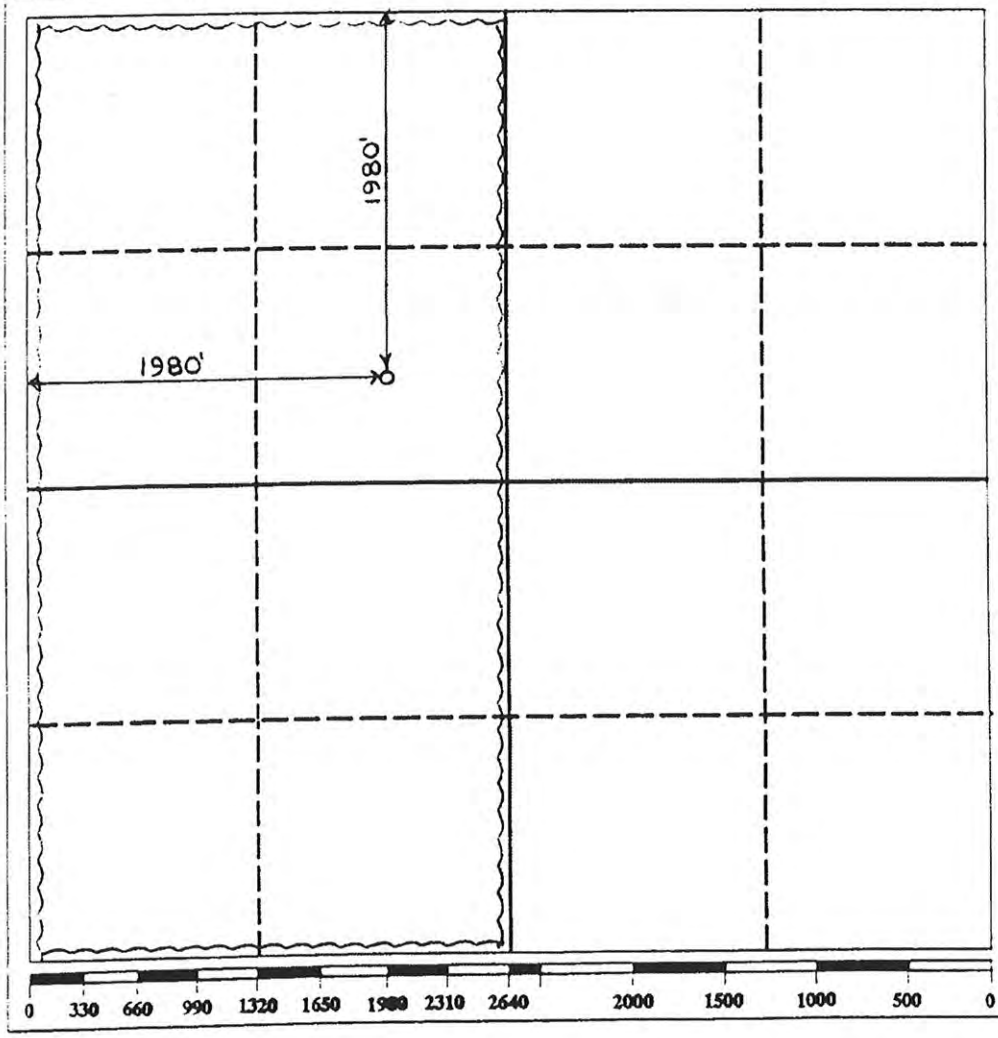
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

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.?

[X] Yes [ ] No If answer is "yes" type of consolidation Communitication

If answer is "no" list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if neccessary. _____

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 in true and complete to the best of my knowledge and belief.

Signature
Phillip W. Hill
Printed Name
Asst. Admin. Analyst
Position
Amoco Production Company
Company
11/12/90
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 supervison, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed

Signature & Seal of
Professional Surveyor

Certificate No.

12. Swab to clean up X test.
13. Turn over to production.

Form 3160-3
(November 1983)
(formerly 9-331C)

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 1004-0136
Expires August 31, 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

5. LEASE DESIGNATION AND SERIAL NO.: LC-064050A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

7. UNIT AGREEMENT NAME:

1a. TYPE OF WORK: DRILL ☐ DEEPEN ☐ PLUG BACK ☒

b. TYPE OF WELL: OIL WELL ☐ GAS WELL ☒ OTHER — SINGLE ZONE ☒ MULTIPLE ZONE ☐

8. FARM OR LEASE NAME: Trigg Federal Gas Com

2. NAME OF OPERATOR: Amoco Production Company — Phone: 713/596-7614

9. WELL NO.: 1

3. ADDRESS OF OPERATOR: P. O. Box 3092 Houston, TX 77253

10. FIELD AND POOL, OR WILDCAT: East Logan Draw Wolfcamp

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface: Unit F, 1980 FNL and 1980 FWL
At proposed prod. zone

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: 34-17S-27E

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*

12. COUNTY OR PARISH: Eddy — 13. STATE: NM

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any)	16. NO. OF ACRES IN LEASE	17. NO. OF ACRES ASSIGNED TO THIS WELL
	320	320
18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.	19. PROPOSED DEPTH	20. ROTARY OR CABLE TOOLS
	9495'	

21. ELEVATIONS (Show whether DF, RT, GR, etc.): 3568' RDB

22. APPROX. DATE WORK WILL START*: 11/26/90

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
17-1/2"	13-3/8"	48#	300'	400 sx
12-1/4"	9-5/8"	323-36#	1600'	1100 sx
8-3/4"	7"	23-26#		
	5-1/2"	155-17#	10100'	

1. Rig up sevice unit & pull out of hole with production equipment.
2. Set cast iron bridge plug at 9530' and cap with 35' cement.
3. Run pipe recovery log to determine top of cmt & free pipe. The est. top of cmt is 8800'
4. Based on above results, Perf at approx. 7100' & attempt to establish circulation. If unable to circulate, will perf at approx 6000' to circulate cmt around perfs.
5. Run in hole with work string and cmt retainer to 7000'.
6. Establish circulation
7. Cement with cl. H cement to bring cement top to approx. 5000'. Pull out of retainer and cap with cement and clear tubing and pull out of hole.
8. Perforate 6626'-6648' & 6756'-6786' at 4 JSPF with casing gun.
9. Run in hole with production tubing & packer & shear disk to 6590'. Run tubing dry.
10. Drop bar to shear disk
11. If well does not flow, acidize with 3000 gals 15% NEFE HCL with ball sealers (4 balls/bbl. acid). Flush w/tubing volume plus 15 bbls 2% KCL water

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. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

24.

SIGNED _____ TITLE Asst. Admin. Analyst DATE 11/9/90

(This space for Federal or State office use)

PERMIT NO. _____ APPROVAL DATE _____

APPROVED BY Orig. Signed by _____ TITLE PETROLEUM ENGINEER DATE 11-27-90

CONDITIONS OF APPROVAL, IF ANY:

***See Instructions On Reverse Side**

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.

District I
PO Box 1980, Hobbs, NM 88241-1980
District II
PO Drawer DD, Artesia, NM 88211-0719
District III
1000 Rio Brazos Rd., Aztec, 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

RECEIVED
MAR 06 1997
OIL CON. DIV.
DIST. 2

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

1 Operator name and Address	2 OGRID Number
ALTURA Energy Ltd. P.O. Box 4294 Houston, TX 77210-4294	157984
	3 Reason for Filing Code: CH MAR 01 1997

4 API Number	5 Pool Name	6 Pool Code
30-015-20159	LOGAN DRAW-MORROW-GAS	80400
7 Property Code	8 Property Name	9 Well Number
20625	TRUGG FEDERAL GAS COM	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
F	34	17	27		1980	N	1980	W	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	14 Gas Connection Date	15 C-129 Permit Number	16 C-129 Effective Date	17 C-129 Expiration Date
F	P				

III. Oil and Gas Transporters

18 Transporter OGRID	19 Transporter Name and Address	20 POD	21 O/G	22 POD ULSTR Location and Description
020445	Scurlock Permian Corporation P. O. Box 4648 Hobbs, NM 88241	440510	Ø	
009171	GPM Gas Corp. (Attn. C. Taylor) 4044 Penbrook Odessa, TX 79762	440530	G	

IV. Produced Water

23 POD	24 POD ULSTR Location and Description
440550	

V. Well Completion Data

25 Spud Date	26 Ready Date	27 TD	28 PBTD	29 Perforations

30 Hole Size	31 Casing & Tubing Size	32 Depth Set	33 Sacks Cement
			Post ID-3
			3-28-97
			shc gc

VI. Well Test Data

34 Date New Oil	35 Gas Delivery Date	36 Test Date	37 Test Length	38 Tbg. Pressure	39 Csg. Pressure

40 Choke Size	41 Oil	42 Water	43 Gas	44 AOF	45 Test Method

46 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: Tom G. Tullos	Approved by: SUPERVISOR, DISTRICT II
Printed name: Tom G. Tullos	Title:
Title: Sr. Business Analyst	Approval Date: MAR 20 1997
Date: MAR 01 1997 Phone: 713-366-7337	

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

Amoco Production Company OGRID No. 000778

Previous Operator Signature	Printed Name	Title	Date
Tom G. Tullos	Tom G. Tullos	Sr. Business Analyst	

MAR 01 1997

District I
PO Box 1980, Hobbs, NM 88241-1980
District II
PO Drawer DD, Artesia, NM 88211-0719
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-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	2 OGRID Number
RSE Partners-I, L.P. 3141 Hood Street, Suite 350 Dallas, Texas 75219	174423
	3 Reason for Filing Code: CH 01/01/99

4 API Number	5 Pool Name	6 Pool Code
30-0 15-20159	LOGAN DRAW - MORROW - GAS	80400
7 Property Code	**8 Property Name**	**9 Well Number**
24159	TRIGG FEDERAL GAS COM	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
F	34	17S	27E		1980	NORTH	1980	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	14 Gas Connection Date	15 C-129 Permit Number	16 C-129 Effective Date	17 C-129 Expiration Date
F	P				

III. Oil and Gas Transporters

18 Transporter OGRID	19 Transporter Name and Address	20 POD	21 O/G	22 POD ULSTR Location and Description
020445	SCURLOCK PERMIAN CORPORATION P. O. BOX 4648 HOBBS, NM 88241	440510	O	
0009990	ARCO PERMIAN P. O. BOX 1610 MIDLAND, TX 79702	440530	G	

RECEIVED
OCD - ARTESIA

IV. Produced Water

23 POD	24 POD ULSTR Location and Description
440550	

V. Well Completion Data

25 Spud Date	26 Ready Date	27 TD	28 PBTD	29 Perforations	30 DHC, DC, MC

31 Hole Size	32 Casing & Tubing Size	33 Depth Set	34 Sacks Cement
			Posted to-3 2-1-99 Cindy DP

VI. Well Test Data

35 Date New Oil	36 Gas Delivery Date	37 Test Date	38 Test Length	39 Tbg. Pressure	40 Csg. Pressure
41 Choke Size	**42 Oil**	**43 Water**	**44 Gas**	**45 AOF**	**46 Test Method**

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: Michael K. Grimm
Printed name: Michael K. Grimm
Title: President
Date: 12/17/98 Phone: (214) 522-0742

OIL CONSERVATION DIVISION

Approved by:
Title: ~~SUPERVISOR, DISTRICT II~~
Approval Date: JAN 26 1999

48 If this is a change of operator fill in the OGRID number and name of the previous operator
Altura Energy Ltd. OGRID 157984

Previous Operator Signature	Printed Name	Title	Date
	Wm. C. Irons	Attorney-In-Fact	12//7/98

GSF
ST

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-104 LT
Revised October 18, 1994 OP
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	[2] OGRID Number
RICKS EXPLORATION, INC. 210 PARK AVENUE 3000 OKLAHOMA TOWER OKLAHOMA CITY, OK 73102	168489
	[3] Reason for Filing Code CH 3-1-00

[4] API Number	[5] Pool Name	[6] Pool Code
30 - 0 15-20159	LOGAN DRAW - MORROW - GAS	80400
[7] Property Code 26031	[8] Property Name TRIGG FEDERAL GAS COM	[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
F	34	17	27		1980	NORTH	1980	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	[14] Gas Connection Date	[15] C-129 Permit Number	[16] C-129 Effective Date	[17] C-129 Expiration Date
F	P				

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 PL P.O. BOX 702068 TULSA, OK 71470	440510	O	
009990	ARCO PERMIAN P.O. BOX 1610 MIDLAND, TX 79702	440530	G	

IV. Produced Water

[23] POD	[24] POD ULSTR Location and Description
440550	

V. Well Completion Data

[25] Spud Date	[26] Ready Date	[27] TD	[28] PBTD	[29] Perforations	[30] DHC, DC, MC

[31] Hole Size	[32] Casing & Tubing Size	[33] Depth Set	[34] Sacks Cement

VI. Well Test Data

[35] Date New Oil	[36] Gas Delivery Date	[37] Test Date	[38] Test Length	[39] Tbg. Pressure	[40] Csg. Pressure

[41] Choke Size	[42] Oil	[43] Water	[44] Gas	[45] AOF	[46] Test Method

[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:

Printed name: JEFF NELSON

Title: V. P. OPERATIONS

Date: 03/01/2000 Phone: 405-516-1100

OIL CONSERVATION DIVISION

Approved by: SUPERVISOR, DISTRICT II

Title:

Approval Date: JUN 5 2000

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

174423: RSE PARTNERS-1LP

Previous Operator Signature	Printed Name	Title	Date
	ROB LEMMONS	OPERATIONS MGR	03/01/2000

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

Form C-104B
March 19, 2001

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

Change of Operator Name

RECEIVED
JUN 27 2003
Oil Conservation Division

OGRID: 168489
Efective Date: 06/01/2003

Previous Operator Name and Information:

Name: Ricks Exploration, Inc.
Address: 550 W. Texas Ave. Suite 1300
Address:
City, State, Zip: Midland, Texas 79701

New Operator Name and Information:

New Name: Concho Exploration, Inc.
Address: 550 W. Texas Ave. Suite 1300
Address:
City, State, Zip: Midland, Texas 79701

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

Signature: Brenda Coffman

Printed name: Brenda Coffman

Title: Regulatory Analyst

Date: 06/13/2003 Phone: (432)685-4373

JUL 2003
RECEIVED
OCD - ARTESIA

30-015-20159

NMOCD Approval

Signature: Leon W. Gunn

Printed Name: District Supervisor

District:

Date: SEP 15 2003

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

Form C-104A
Revised June 10, 2003

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

Change of Operator

Previous Operator Information:

OGRID: 168489
Name: Concho Exploration Inc.
Address: 550 West Texas Avenue, Suite 1300
Address: P. O. Box 11050
City, State, Zip: Midland, Texas 79702-8050

New Operator Information:

Effective Date: 02/01/2004
New Ogrid: 147179
New Name: Chesapeake Operating, Inc.
Address: P. O. Box 18496
Address:
City, State, Zip: Oklahoma City, OK 73154-0496

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:

Printed name: Henry J. Hood

Title: Senior Vice President, Land & Legal
E-mail Address: hhood@chkenergy.com

Date: 03/25/2004 Phone: (405)879-9400

RECEIVED
APR 0 8 2004
OCD-ARTESIA

Previous operator complete below:

Previous Operator: Concho Exploration Inc.
Previous OGRID: 168489

Signature:
Printed Name: Douglas J. Jacobson

E-mail Address: djacobson@chkenergy.com

NMOCD Approval
Electronic Signature: Chris Williams, District I
Date: April 28, 2004

Form 3160-5
(August 1999)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

NMOCD

FORM APPROVED
OMB NO. 1004-0135
Expires: November 30, 2000

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.

5. Lease Serial No.
NMLC064050A

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.
NMNM71184

1. Type of Well
☐ Oil Well ☒ Gas Well ☐ Other

8. Well Name and No.
TRIGG FED COM 1

2. Name of Operator
CHESAPEAKE OPERATING, INC.
Contact: LINDA GOOD
E-Mail: lgood@chkenergy.com

9. API Well No.
30-015-20159-00-S1

3a. Address
OKLAHOMA CITY, OK 73154-0496

3b. Phone No. (include area code)
Ph: 405.767.4275
Fx: 405.879.9583

RECEIVED
AUG 03 2004
OCD-ARTESIA

10. Field and Pool, or Exploratory
LOGAN DRAW

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 34 T17S R27E SENW 1980FNL 1980FWL

11. County or Parish, and State
EDDY COUNTY, NM

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 Site Facility Diagram/Security Plan
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. 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 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.)

Attached is the site facility diagram for Trigg Federal Gas Com 1.

(PN 890574)

14. I hereby certify that the foregoing is true and correct.
Electronic Submission #33637 verified by the BLM Well Information System
For CHESAPEAKE OPERATING, INC., sent to the Carlsbad
Committed to AFMSS for processing by ARMANDO LOPEZ on 07/27/2004 (04AL0301SE)

Name *(Printed/Typed)* LINDA GOOD — Title AUTHORIZED REPRESENTATIVE

Signature (Electronic Submission) — Date 07/27/2004

Accepted for record

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By ACCEPTED — ALEXIS C SWOBODA
Title PETROLEUM ENGINEER — Date 07/30/2(

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.

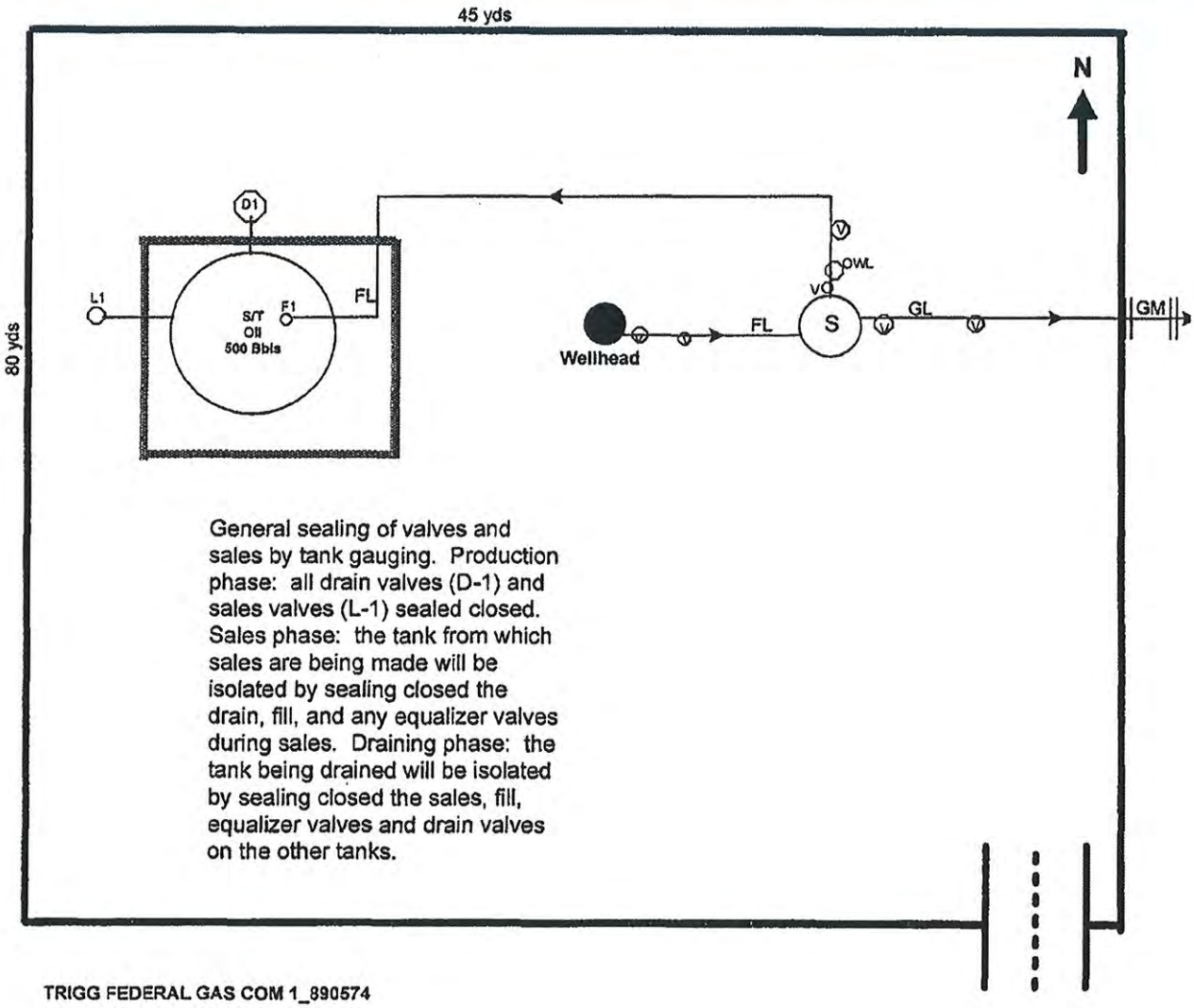
Office Carlsbad

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.

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

CHESAPEAKE OPERATING, INC.

CHK Name & Number:	TRIGG FEDERAL GAS COM 1 890574	Regulatory Agency:	BLM
API number:	30-015-20159	Lease Sign Type:	FEDERAL
County:	EDDY	CA#:	NMNM 71184
State:	NM	APD Lease #:	NMLC 64050A
Field:	LOGAN DRAW EAST	Federal/Indian:	FEDERAL
Qtr Qtr Calls:	SE NW	Last Violation:	UNKNOWN
Sec/Twnshp/Rng:	34-17S-27E	District:	PERMIAN
Number of Acres:	320	Field Office:	HOBBS



General sealing of valves and sales by tank gauging. Production phase: all drain valves (D-1) and sales valves (L-1) sealed closed. Sales phase: the tank from which sales are being made will be isolated by sealing closed the drain, fill, and any equalizer valves during sales. Draining phase: the tank being drained will be isolated by sealing closed the sales, fill, equalizer valves and drain valves on the other tanks.

TRIGG FEDERAL GAS COM 1_890574

This lease is subject to Chesapeake's Site Security Plan located at 6100 N. Western Oklahoma City, OK 73118

Direction of Flow off Site: NE

Prepared by: DEBBIE HERNANDEZ
Date: 7-6-04

Approved by:
Date:

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

Form C-145
Permit 111327

Change of Operator

Previous Operator Information		New Operator Information	
		Effective Date:	Effective on the date of approval by the OCD
OGRID:	147179	OGRID:	272295
Name:	CHESAPEAKE OPERATING, INC.	Name:	THREE RIVERS OPERATING COMPANY LLC
Address:	P. O. BOX 18496	Address:	3821 JUNIPER TRACE
			SUITE 107
City, State, Zip:	OKLAHOMA CITY , OK 731540496	City, State, Zip:	AUSTIN , TX 78738

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

Additionally, by signing below, THREE RIVERS OPERATING COMPANY LLC certifies that it has read and understands the following synopsis of applicable rules.

Previous Operator				New Operator			
Signature:				Signature:			
Printed Name:	Douglas J. Jacobson			Printed Name:	Mike Wichterich		
Title:	Executive Vice President			Title:	President		
Date:	4/19/2010	Phone:	405.935.8000	Date:	4/19/10	Phone:	512.600.4329

NMOCD Approval
Electronic Signature: Jacqueta Reeves, District 2
Date: May 03, 2010

THREE RIVERS OPERATING COMPANY LLC certifies that all below-grade tanks constructed and installed prior to June 16, 2008 associated with the selected wells are in compliance with 19.15.17 NMAC, have been closed pursuant to 19.15.17.13 NMAC, or have been retrofitted to comply with Paragraphs (1) through (4) of Subsection I of 19.15.17.11 NMAC.

THREE RIVERS OPERATING COMPANY LLC understands that the OCD's approval of this operator change:

1. constitutes approval of the transfer of the permit for any permitted pit, below-grade tank or closed-loop system associated with the selected wells; and
2. constitutes approval of the transfer of any below-grade tanks constructed and installed prior to June 16, 2008 associated with the selected wells, regardless of whether the transferor has disclosed the existence of those below-grade tanks to the transferee or to the OCD, and regardless of whether the below-grade tanks are in compliance with 19.15.17 NMAC.

As the operator of record of wells in New Mexico, THREE RIVERS OPERATING COMPANY LLC agrees to the following statements:

1. I am responsible for ensuring that the wells and related facilities comply with applicable statutes and rules, and am responsible for all regulatory filings with the OCD. I am responsible for knowing all applicable statutes and rules, not just the rules referenced in this list. I understand that the OCD's rules are available on the OCD website under "Rules," and that the Water Quality Control Commission rules are available on the OCD website on the "Publications" page.
2. I understand that if I acquire wells from another operator, the OCD must approve the operator change before I begin operating those wells. See 19.15.9.9.B NMAC. I understand that if I acquire wells or facilities subject to a compliance order addressing inactive wells or environmental cleanup, before the OCD will approve the operator change it may require me to enter into an enforceable agreement to return those wells to compliance. See 19.15.9.9.C(2) NMAC.
3. I must file a monthly C-115 report showing production for each non-plugged well completion for which the OCD has approved an allowable and authorization to transport, and injection for each injection well. See 19.15.7.24 NMAC. I understand that the OCD may cancel my authority to transport from or inject into all the wells I operate if I fail to file C-115 reports. See 19.15.7.24.C NMAC.
4. I understand that New Mexico requires wells that have been inactive for certain time periods to be plugged or placed on approved temporary abandonment. See 19.15.25.8 NMAC. I understand the requirements for plugging and approved temporary abandonment in 19.15.25 NMAC. I understand that I can check my compliance with the basic requirements of 19.15.25.8 NMAC by using the "Inactive Well List" on OCD's website.
5. I must keep current with financial assurances for well plugging. I understand that New Mexico requires each state or fee well that has been inactive for more than two years and has not been plugged and released to be covered by a single-well financial assurance, even if the well is also covered by a blanket financial assurance and even if the well is on approved temporary abandonment status. See 19.15.8.9.C NMAC. I understand that I can check my compliance with the single-well financial assurance requirement by using the "Inactive Well Additional Financial Assurance Report" on the OCD's website.
6. I am responsible for reporting releases as defined by 19.15.29 NMAC. I understand the OCD will look to me as the operator of record to take corrective action for releases at my wells and related facilities, including releases that occurred before I became operator of record.
7. I have read 19.15.5.9 NMAC, commonly known as "Part 5.9," and understand that to be in compliance with its requirements I must have the appropriate financial assurances in place, comply with orders requiring corrective action, pay penalties assessed by the courts or agreed to by me in a settlement agreement, and not have too many wells out of compliance with the inactive well rule (19.15.25.8 NMAC). If I am in violation of Part 5.9, I may not be allowed to drill, acquire or produce any additional wells, and will not be able to obtain any new injection permits. See 19.15.16.19 NMAC, 19.15.26.8 NMAC, 19.15.9.9 NMAC and 19.15.14.10 NMAC. If I am in violation of Part 5.9 the OCD may, after notice and hearing, revoke my existing injection permits. See 19.15.26.8 NMAC.
8. For injection wells, I understand that I must report injection on my monthly C-115 report and must operate my wells in compliance with 19.15.26 NMAC and the terms of my injection permit. I understand that I must conduct mechanical integrity tests on my injection wells at least once every five years. See 19.15.26.11 NMAC. I understand that when there is a continuous one-year period of non-injection into all wells in an injection or storage project or into a saltwater disposal well or special purpose injection

well, authority for that injection automatically terminates. See 19.15.26.12 NMAC. I understand that if I transfer operation of an injection well to another operator, the OCD must approve the transfer of authority to inject, and the OCD may require me to demonstrate the well's mechanical integrity prior to approving that transfer. See 19.15.26.15 NMAC.

9. I am responsible for providing the OCD with my current address of record and emergency contact information, and I am responsible for updating that information when it changes. See 19.15.9.8.C NMAC. I understand that I can update that information on the OCD's website under "Electronic Permitting."
10. If I transfer well operations to another operator, the OCD must approve the change before the new operator can begin operations. See 19.15.9.9.B NMAC. I remain responsible for the wells and related facilities and all related regulatory filings until the OCD approves the operator change. I understand that the transfer will not relieve me of responsibility or liability for any act or omission which occurred while I operated the wells and related facilities.

Form 3160-5
(August 2007)

OCD-ARTESIA

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB No. 1004-0137
Expires: July 31, 2010

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 page 2.*

5. Lease Serial No.
NMLC 064050A

6. If Indian, Allottee or Tribe Name

7. If Unit of CA/Agreement, Name and/or No.
NMNM 71184

1. Type of Well
☐ Oil Well ☑ Gas Well ☐ Other

8. Well Name and No.
Trigg Federal Gas Com No. 001

2. Name of Operator
Three Rivers Operating Company LLC

9. API Well No.
30-015-20159

3a. Address
1122 S. Capital of TX Hwy., Suite 325 Austin, TX 78746

3b. Phone No. *(include area code)*
512-600-3196

10. Field and Pool or Exploratory Area
Logan Draw

4. Location of Well *(Footage, Sec., T.,R.,M., or Survey Description)*
F-34-17S-27E SENW 1980 FNL & 1980 FWL

11. Country or Parish, State
Eddy, NM

12. CHECK THE 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
	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☑ Subsequent Report	☐ Casing Repair	☐ New Construction	☐ Recomplete	☑ Other Change of Operator
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
☐ Final Abandonment Notice	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. 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 must 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 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.)

The undersigned accepts all applicable terms, conditions, stipulations, and restrictions concerning operations conducted on the leased land or portion thereof, pursuant to NTL 89-1

Bond Coverage: BLM Bond No. NMB000672
Surety Bond No. RLB0013149
Bond Amount: $25,000.00
Bond Type: Statewide Bond

Effective Date: April 26, 2010

Change of Operator from Chesapeake Operating Inc. to Three Rivers Operating Company LLC

The owners of this CA/Agreement have been notified of the Change of Operator.

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

APPROVED
JAN 18 2011
/s/ JD Whitlock Jr
BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

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

Title V. P. of Operations

Signature

Date 09/27/2010

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

Title

Date

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

RECEIVED
FEB 07 2011
NMOCD ARTESIA

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.

(Instructions on page 2)

Designation of Successor Operator for Communitization Agreement

Designation of Successor Operator, Communitization Agreement No. NMNM 071184, covering the UL "F" Sec. 34, T. 17S, R. 27E, Eddy County, New Mexico.

This indenture, dated as to the 24th day of August, 2010, by and between Chesapeake Operating, Inc., and Three Rivers Operating Company, hereinafter designated as "First Party," and the owners of communitized working interest, hereinafter designated as "Second Parties."

Witnesseth: Whereas under the provision of section 17(j) of the Act of February 25, 1920, as amended (74 Stat. 784; 30 U.S.C. 266(J)), and by authority delegated, Chesapeake Operating on the 9th day of April, 2010, approved communitization agreement no. NMNM 071184 whereby Three Rivers Operating Company is designated as Operator of the communitized area; and

Whereas the designation of a successor operator is now desired pursuant to section No. 3 of the communitization agreement; and

Whereas the First Party has been and hereby is designated by Second Parties as Operator of the communitized area, and said First Party desires to assume all the rights, duties and obligations of Operator under said communitization;

Now, therefore, in consideration of the premises hereinbefore set forth and the promises hereinafter stated, the First party hereby covenants and agrees to fulfill the duties and assume the obligations of Operator of the communitized area under and pursuant to all the terms of communitization agreement no. NMNM 71184 and the Second Parties covenant and agree that effective as of the date herein specified, and upon receipt of this indenture, properly executed, by the Authorized Officer, the First Party shall be granted the exclusive right and privilege of exercising any and all rights and privileges as Operator, pursuant to the terms and conditions of said communitization agreement, said communitization agreement being hereby incorporated herein by reference and made a part hereof as fully and effectively as though said agreement were expressly set forth in this instrument.

In witness whereof, the parties hereto have executed this instrument as of the date hereinabove set forth.

Three Rivers Operating Company, LLC

(Witness) Dakota Gring

(First Party) Russell D. Macaw
Vice President - Operations

Attest:

CHESAPEAKE OPERATING, INC.
(Second Party)

CHESAPEAKE OPERATING, INC. CORPORATE SEAL OKLAHOMA

Anita L. Brodrick

Douglas J. Jacobson
Executive Vice-President

BUREAU OF LAND MANAGEMENT
Carlsbad Field Office
620 East Greene Street
Carlsbad, New Mexico 88220
575-234-5972

Conditions of Approval

Three Rivers Operating Company - Trigg Fed. Gas Com. #1

1. Tank battery must be bermed/diked (must be able to contain 1 1/2 times the volume of the largest tank).
2. All above ground structures and equipment on the lease shall be painted Shale Green (5Y 4/2). This is to be done within 90 days, if you have not already done so.
3. Submit for approval of water disposal method.
4. Submit updated facility diagrams as per Onshore Order #3
5. This agency shall be notified of any spill or discharge as required by NTL-3A.
6. All outstanding environmental issue must be addressed within 90 days. Contact Jim Amos for inspection and to resolve environmental issues. 575-234-5909

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

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

Form C-145
August 1, 2011

Permit 150076

Change of Operator

Previous Operator Information		New Operator Information	
		Effective Date:	Effective on the date of approval by the OCD
OGRID:	272295	OGRID:	229137
Name:	THREE RIVERS OPERATING COMPANY LLC	Name:	COG OPERATING LLC
Address:	1122 S. Capital of Texas Hwy	Address:	550 W TEXAS
	Suite 325		SUITE 1300
City, State, Zip:	Austin, TX 78746	City, State, Zip:	MIDLAND , TX 79701

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

Additionally, by signing below, COG OPERATING LLC certifies that it has read and understands the following synopsis of applicable rules.

PREVIOUS OPERATOR certifies that all below-grade tanks constructed and installed prior to June 16, 2008 associated with the selected wells being transferred are either (1) in compliance with 19.15.17 NMAC, (2) have been closed pursuant to 19.15.17.13 NMAC or (3) have been retrofitted to comply with Paragraphs 1 through 4 of 19.15.17.11(I) NMAC.

COG OPERATING LLC understands that the OCD's approval of this operator change:

1. constitutes approval of the transfer of the permit for any permitted pit, below-grade tank or closed-loop system associated with the selected wells; and
2. constitutes approval of the transfer of any below-grade tanks constructed and installed prior to June 16, 2008 associated with the selected wells, regardless of whether the transferor has disclosed the existence of those below-grade tanks to the transferee or to the OCD, and regardless of whether the below-grade tanks are in compliance with 19.15.17 NMAC.

As the operator of record of wells in New Mexico, COG OPERATING LLC agrees to the following statements:

1. I am responsible for ensuring that the wells and related facilities comply with applicable statutes and rules, and am responsible for all regulatory filings with the OCD. I am responsible for knowing all applicable statutes and rules, not just the rules referenced in this list. I understand that the OCD's rules are available on the OCD website under "Rules," and that the Water Quality Control Commission rules are available on the OCD website on the "Publications" page.
2. I understand that if I acquire wells from another operator, the OCD must approve the operator change before I begin operating those wells. See 19.15.9.9.B NMAC. I understand that if I acquire wells or facilities subject to a compliance order addressing inactive wells or environmental cleanup, before the OCD will approve the operator change it may require me to enter into an enforceable agreement to return those wells to compliance. See 19.15.9.9.C(2) NMAC.
3. I must file a monthly C-115 report showing production for each non-plugged well completion for which the OCD has approved an allowable and authorization to transport, and injection for each injection well. See 19.15.7.24 NMAC. I understand that the OCD may cancel my authority to transport from or inject into all the wells I operate if I fail to file C-115 reports. See 19.15.7.24.C NMAC.
4. I understand that New Mexico requires wells that have been inactive for certain time periods to be plugged or placed on approved temporary abandonment. See 19.15.25.8 NMAC. I understand the requirements for plugging and approved temporary abandonment in 19.15.25 NMAC. I understand that I can check my compliance with the basic requirements of 19.15.25.8 NMAC by using the "Inactive Well List" on OCD's website.
5. I must keep current with financial assurances for well plugging. I understand that New Mexico requires each state or fee well that has been inactive for more than two years and has not been plugged and released to be covered by a single-well financial assurance, even if the well is also covered by a blanket financial assurance and even if the well is on approved temporary abandonment status. See 19.15.8.9.C NMAC. I understand that I can check my compliance with the single-well financial assurance requirement by using the "Inactive Well Additional Financial Assurance Report" on the OCD's website.
6. I am responsible for reporting releases as defined by 19.15.29 NMAC. I understand the OCD will look to me as the operator of record to take corrective action for releases at my wells and related facilities, including releases that occurred before I became operator of record.
7. I have read 19.15.5.9 NMAC, commonly known as "Part 5.9," and understand that to be in compliance with its requirements I must have the appropriate financial assurances in place, comply with orders requiring corrective action, pay penalties assessed by the courts or agreed to by me in a settlement agreement, and not have too many wells out of compliance with the inactive well rule (19.15.25.8 NMAC). If I am in violation of Part 5.9, I may not be allowed to drill, acquire or produce any additional wells, and will not be able to obtain any new injection permits. See 19.15.16.19 NMAC, 19.15.26.8 NMAC, 19.15.9.9 NMAC and 19.15.14.10 NMAC. If I am in violation of Part 5.9 the OCD may, after notice and hearing, revoke my existing injection permits. See 19.15.26.8 NMAC.
8. For injection wells, I understand that I must report injection on my monthly C-115 report and must operate my wells in compliance with 19.15.26 NMAC and the terms of my injection permit. I understand that I must conduct mechanical integrity tests on my injection wells at least once every five years. See 19.15.26.11 NMAC. I understand that when there is a continuous one-year period of non-injection into all wells in an injection or storage project or into a saltwater disposal well or special purpose injection well, authority for that injection automatically terminates. See 19.15.26.12 NMAC. I understand that if I transfer operation of an injection well to another operator, the OCD must approve the transfer of authority to inject, and the OCD may require me to demonstrate the well's mechanical integrity prior to approving that transfer. See 19.15.26.15 NMAC.

9. I am responsible for providing the OCD with my current address of record and emergency contact information, and I am responsible for updating that information when it changes. See 19.15.9.8.C NMAC. I understand that I can update that information on the OCD's website under "Electronic Permitting."
10. If I transfer well operations to another operator, the OCD must approve the change before the new operator can begin operations. See 19.15.9.9.B NMAC. I remain responsible for the wells and related facilities and all related regulatory filings until the OCD approves the operator change. I understand that the transfer will not relieve me of responsibility or liability for any act or omission which occurred while I operated the wells and related facilities.

Previous Operator

Signature: James D Keisling

Printed Name: James D. Keisling

Title: Vice President - Engineering

Date: 07/02/2012 Phone: 512-600-3182

New Operator

Signature: Gayle Burleson

Printed Name: Gayle Burleson

Title: Vice President - New Mexico

Date: 07/02/2012 Phone: 575-748-6940

NMOCD Approval

Electronic Signature: Randy Dade, District 2

Date: July 09, 2012

Form 3160-5
(March 2012)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OCD Artesia

FORM APPROVED
OMB No 1004-0137
Expires October 31, 2014

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 page 2.*

1. Type of Well ☐ Oil Well ☑ Gas Well ☐ Other	5. Lease Serial No. NMLC 064050A
	6 If Indian, Allottee or Tribe Name
	7 If Unit of CA/Agreement, Name and/or No NMNM 71184
	8 Well Name and No TRIGG FEDERAL GAS COM #001
2 Name of Operator COG OPERATING LLC	9. API Well No 30-015-20159
3a. Address 550 W TEXAS AVENUE, SUITE 100 MIDLAND, TX 79701 3b. Phone No. *(include area code)* 432-685-4332	10 Field and Pool or Exploratory Area LOGAN DRAW;MORROW (GAS)
4 Location of Well *(Footage, Sec., T.,R.,M., or Survey Description)* F-34-17S-27E, 1980 FNL & 1980 FWL	11. County or Parish, State Eddy County, NM

12 CHECK THE 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
	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☑ Subsequent Report	☐ Casing Repair	☐ New Construction	☐ Recomplete	☑ Other CHANGE OF OPERATOR
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
☐ Final Abandonment Notice	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13 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 must 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 must be filed once testing has been completed Final Abandonment Notices must 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 is notification of Change of Operator on the above referenced well.

COG Operating LLC, as new operator, accepts all applicable terms, conditions, stipulations and restrictions concerning operations conducted on this lease or portion of lease described.

Bond Coverage: BLM Bond No. NMB000740; NMB000215

Change of Operator Effective: 07-02-2012

Former Operator: Three Rivers Operating Co., LLC

RECEIVED
AUG 22 2012
NMOCD ARTESIA

APPROVED
AUG 18 2012
/s/ JD Whitlock Jr
BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

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

J. STEVE GUTHRIE — Title VICE PRESIDENT OF TEXAS

Signature — Date 6-29-12

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by	Title	Date
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	

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

(Instructions on page 2)

BUREAU OF LAND MANAGEMENT
Carlsbad Field Office
620 East Greene Street
Carlsbad, New Mexico 88220
575-234-5972

Conditions of Approval

COG Operating LLC

August 18, 2012

1. Tank battery must be bermed/diked (must be able to contain 1 1/2 times the volume of the largest tank).
2. Submit for approval of water disposal method.
3. Submit updated facility diagrams as per Onshore Order #3
4. This agency shall be notified of any spill or discharge as required by NTL-3A.
5. All outstanding environmental issue must be addressed within 90 days. Contact Jim Amos for inspection and to resolve environmental issues. 575-234-5909
6. Install legible well sign on location with operator name, well name and number, lease number, unit number, 1/4 1/4, section, township, and range. NMOCD requires the API number on well signs.
7. Subject to like approval by NMOCD.
8. If well is not on production submit Notice of Intent to return well to production or to P&A within 30 days of approval of change of operator.

PERMIT APPLICATION
CLASS I NONHAZARDOUS WASTE INJECTION WELL
WDW NO. 4

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

SUBSURFACE PROJECT NO. 185818-6944

REPORT SUBMITTED:
NOVEMBER 2014

SUBSURFACE TECHNOLOGY, INC.
8212 KELWOOD AVENUE
BATON ROUGE, LA 70806

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ATTACHMENT

ATTACHMENT 1: OCD WELL FILES FOR API 30-015-00472 (WELL ID NO. 14) AND API 30-015-20159 (WELL ID NO. 157)

INTRODUCTION

Navajo Refining Company, L.L.C. (Navajo), located in Artesia, New Mexico, is applying to permit new Class I Nonhazardous Waste Disposal Well No. 4 (WDW-4) to be located approximately seven (7) miles to the southeast of Navajo's Artesia refinery.

Navajo's Artesia refinery is located at 501 East Main Street in Artesia, Eddy County, New Mexico. The new WDW-4 will be the fourth Class I nonhazardous waste injection well operated by Navajo. The three existing injection wells are designated WDW-1, WDW-2 and WDW-3. All three of the existing wells are permitted to inject nonhazardous waste water into a subsurface Injection Zone consisting of the lower portion of the Wolfcamp Formation and the underlying Cisco and Canyon Formations. The depth and thickness of the permitted Injection Zone at the three existing Navajo injection wells are as follows:

- WDW-1: 7,450 to 9,016 ft KB
- WDW-2: 7,270 to 8,894 ft KB
- WDW-3: 7,303 to 8,894 ft KB

WDW-4 will be permitted to inject nonhazardous waste water into a subsurface Injection Zone consisting of undifferentiated Devonian age strata. The depth and thickness of the Devonian Injection Zone into which WDW-4 is to be installed is expected to be approximately 10,200 to 10,700 feet below land surface. The actual depth and thickness of the Injection Zone will be determined when the well is drilled and completed.

Information concerning the locations of oil and gas wells and freshwater wells within the regulatory 2.5-mile radius area of review (AOR) surrounding the planned WDW-4 location were obtained from New Mexico Oil Conservation Division (OCD) and New Mexico Water Rights Reporting System, respectively. A total of 675 non-freshwater (oil and gas) wells were identified within the 2.5-mile radius AOR surrounding the planned WDW-4 location. Only two of the 675 wells were advanced to a depth deep enough to penetrate the top of the planned WDW-4 Injection Zone. The two deep wells are identified as Map ID Nos. 14 and 157 on Table 1 of this application document. Both wells were constructed properly and one of them (Map ID No. 14) has been properly plugged and abandoned. Therefore, no corrective action is needed for any of the artificial penetrations that penetrate the Injection Zone within the 2.5-mile radius AOR.

The regional and local geology have been evaluated, and no problems have been identified that will cause adverse effects as a result of the planned injection operations at WDW-4.

Reservoir characteristics of the Devonian Age Injection Zone indicate the reservoir has sufficient properties to accommodate the planned injection rate, volume and pressure from WDW-4. Based on information gathered from the existing Navajo injection well system which has been operating for an extended period of time, there are no adverse reactions identified between the waste stream and the planned well components of construction or with the Devonian age Injection Zone matrix and formation fluid.

WDW-4 will be constructed and operated to meet or exceed the construction and operating standards set forth in 20.6.2.2505 NMAC. A procedure to permanently plug and abandon the well has been included per the requirements of 20.6.2.5209 NMAC.

District I
1625 N. French Dr., Hobbs, NM 88240
(575) 393-6161
District II
811 S. 1st St., Artesia, NM 88210
(575) 748-1283
District III
1000 Rio Brazos Road, Aztec, NM 87410
(505) 334-6178
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
(505) 476-3470

State of New Mexico
Energy, Minerals and Natural Resources Department
Oil Conservation Division
Environmental Bureau
1220 South St. Francis Dr.
Santa Fe, NM 87505
(505) 476-3440

Revised January 10, 2012

Submit Original
Plus 1 Copy
to Environmental
Bureau
1 Copy to Appropriate
District Office

DISCHARGE PERMIT APPLICATION FOR UNDERGROUND INJECTION CONTROL (UIC) CLASS I (NON-HAZARDOUS), CLASS III SOLUTION MINING, AND CLASS V WELLS

(Refer to WQCC Regulations (20.6.2.5000 through 20.6.2.5299 NMAC)
for assistance in completing this application)

☒ New ☐ Renewal ☐ Modification

The information in items 1 through 6 and items 8 through 14 is required for all Class I, Class III, and Class V Underground Injection Control Wells. The additional information in item 9 is required for Class I and Class III Underground Injection Control Wells (see 20.6.2.5006 and 20.6.2.5101 NMAC).

1. **Underground Injection Control Well Class:**
☒ Class I (NH) ☐ Class III - Brine Well
☐ Class V - Geothermal ☐ Class V - Ground Water Management ☐ Class V - Other

2. **Operator:** Navajo Refining Company, L.L.C.
Address: 501 E Main
Artesia, NM 88210
Contact Person: Micki Schultz Phone: 575-746-5281 E-mail: Micki.Schultz@hollyfrontier.com

3. **Location:** SE /4 NE /4 Section 28 Township 17S Range 27E
Latitude: 32.8062099 Longitude: -104.2777764 NAD: ☒ 1927 ☐ 1983
Submit 7.5 Minute U.S.G.S. Quadrangle Topographic Map showing exact location of the facility.

4. **Landowner(s):** Attach the name, address, and telephone number of the landowner of the facility site.
Surface Owner: ☐ Federal ☒ State ☐ Private ☐ Tribal Trust or Indian Allotment

5. **Facility Description:** Attach a description of the facility with a diagram depicting pertinent features, *i.e.*, facility/property boundaries, buildings, roads, fences, process areas, areas of discharge, aboveground piping, underground piping, wells (all types), pits, ponds, dikes, sumps, above and below-grade tanks, landfarms, landfills, surface and/or ground water contamination abatement devices, *etc.*

6. **Proposed discharge plan (see 20.6.2.3106C NMAC):** Specify the methods or techniques that the owner/operator will use to ensure compliance with the regulations. At a minimum include the following information::
(a) Quantity, quality and flow characteristics of the discharge;
(b) Location of the discharge and of any bodies of water, watercourses and ground water discharge sites within one mile of the outside perimeter of the discharge site, and existing or proposed wells to be used for monitoring;
(c) Depth to and TDS concentration of the ground water most likely to be affected by the discharge;
(d) Flooding potential of the site;
(e) Location and design of site(s) and method(s) to be available for sampling, and for measurement or calculation of flow;
(f) Depth to and lithological description of rock at base of alluvium below the discharge site if such information is available; and,
(g) Any additional information that may be necessary to demonstrate that the discharge permit will not result in concentrations in excess of the standards of Section 20.6.2.3103 NMAC or the presence of any toxic pollutant at

any place of withdrawal of water for present or reasonably foreseeable future use. OCD may require additional detailed information on site geologic and hydrologic conditions.

7. **INFORMATION FOR CLASS I NONHAZARDOUS WASTE INJECTION WELLS AND CLASS III BRINE WELLS (20.6.2.5210 NMAC):** For Class I and III injection wells, attach the information required in Subsection B of Section 20.6.2.5210 NMAC. Include sources and an appropriate analysis of injection fluid and compatibility with the receiving formation produced water and 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.*).

(a) Area of Review: A map showing the Class I non-hazardous waste injection well, or Class III well or well fields and the applicable area of review. Within the AOR, the map must show the number, name, and location of all producing wells, injection wells, abandoned wells, dry holes, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells and other pertinent surface features, including residences and roads;

(b) Data Tabulation: A tabulation of data on all wells within the AOR which may penetrate into the proposed injection zone. Such data shall include a description of each well's type, the distance and direction to the injection well or well field, construction, date drilled, location, depth, record of plugging and/or completion information;

(c) Corrective Action: For wells within the area of review which penetrate the injection zone, but are not properly completed or plugged, the corrective action proposed to be taken under Section 20.6.2.5203 NMAC;

(d) Maps and Cross-Sections: Maps and cross-sections indicating the general vertical and lateral limits of all ground water having 10,000 mg/l or less TDS within the AOR, the position of such ground water within the AOR relative to the injection formation, and the direction of water movement in each zone of ground water which may be affected by the proposed injection;

(e) **Geology:** Maps and cross-sections detailing the geology and geologic structure of the local area, including faults and the regional geologic setting;

(f) Proposed Operating Data: including;

- Average and maximum daily flow rate and volume of the fluid to be injected;
- Average and maximum injection pressure;
- Source of injection fluids and an analysis or description of their chemical, physical, radiological and biological characteristics;

(g) Formation Testing Program: Results of the formation testing program to obtain an analysis or description of the chemical, physical, and radiological characteristics of the receiving formation;

(h) Fluids and Pressure: Expected pressure changes, native fluid displacement, and direction of movement of the injected fluid;

(i) Stimulation Program: Proposed stimulation program;

(j) Injection Procedure: Proposed or actual injection procedure;

(k) Drawings: Schematic or other appropriate drawings of the surface and subsurface construction details of the well;

(l) Construction: Pursuant to 20.6.2.5205 NMAC, the owner/operator must demonstrate that the construction and operation of Class I non-hazardous waste injection wells and Class III brine wells will not cause or allow movement of fluids into ground water having 10,000 mg/l or less TDS except for fluid movement approved pursuant to Section 20.6.2.5103NMAC. The owner/operator must provide the following information:

- Depth to the injection zone;
- Injection pressure, external pressure, annular pressure, axial loading, and other stresses that may cause well failure;
- Hole size;
- Size and grade of all casing strings, including wall thickness, diameter, nominal weight, length, joint specification, and construction material;
- Type and grade of cement;
- Rate, temperature, and volume of injected fluid;
- Chemical and physical characteristics of the injected fluid, including corrosiveness, density, and temperature;
- Chemical and physical characteristics of the formation fluids including pressure and temperature;
- Chemical and physical characteristics of the receiving formation and confining zones including lithology and stratigraphy, and fracture pressure; and
- Depth, thickness and chemical characteristics of penetrated formations which may contain ground water.

Include a cementing and casing program (provide details on liners, tubing, packers, size, setting depth, sacks of cement used, hole size, top of cement, and how top was determined, etc.), logging procedures, deviation checks, and a drilling, testing, and coring program for new wells.

Include the name of the injection formation and, if applicable, the field or pool name; the injection interval and whether it is perforated or open-hole; state if the well was drilled for injection or, if not, the original purpose of the well; give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations; and 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.

(m) **Contingency plans:** Contingency plans to cope with all shut-ins or well failures so as to prevent movement of fluids into ground water having 10,000 mg/l or less TDS;
(n) **MIT Monitoring Plans:** MIT Monitoring Plans, including maps, for meeting the monitoring requirements of Section 20.6.2.5207 NMAC; and
(o) **Additional Fluid Monitoring Plans For Class I Non-Hazardous Waste Injection Wells:** Provide a fluid monitoring plan for the analysis of the injected fluids for Class I Wells at least quarterly to determine their characteristics. (See 20.6.2.5207B NMAC).
(p) **Additional Fluid Monitoring Plans For Class III Wells:** Provide a quarterly fluid monitoring plan for Class III wells that meets 20.6.2.5207C NMAC.
(q) **Financial Assurance:** Provide an instrument that documents the ability of the owner/operator to undertake measures necessary to prevent contamination of ground water after the cessation of operation, including the proper closing, plugging and abandonment of a well, ground water restoration if applicable, and any post-operational monitoring as may be needed. The Owner/Operator shall submit one of the following:

- A surety bond;
- A trust fund with a New Mexico bank in the name of the State of New Mexico, with the State as Beneficiary;
- A non-renewable letter of credit made out to the State of New Mexico;
- Liability insurance specifically covering the contingencies listed in this paragraph; or
- A performance bond, generally in conjunction with another type of financial assurance.

(r) **Logging and testing data:** Provide all available logging and testing program data on the well (if well logs have been filed with the Division, they need not be resubmitted).;
(s) **Mechanical Integrity Data:** Provide mechanical integrity data (see 20.6.2.5204 NMAC);
(t) **Maximum Pressure and Flow Rate:** Specify the anticipated maximum pressure and flow rates;
(u) **Formation Testing Program Data:** Provide the results of the formation testing program;
(v) **Compatibility:** Discuss the physical, chemical, and biological interactions between the injected fluids and fluids in the injection zone, and minerals in both the injection zone and the confining zone; and
(w) **Area of review corrective actions:** Discuss the status of corrective action(s) on defective wells in the area of review.

8. **Modification(s):** Attach a description of proposed modifications to existing discharge processes.

9. **Inspection/Maintenance and Reporting:** Attach a routine inspection, operation, and maintenance plan to ensure permit compliance.

10. **Contingency plans:** Attach a contingency plan for reporting and taking corrective action(s) to address any spills and/or releases.

11. **Other information:** Attach any additional information that may be necessary to demonstrate that the discharge permit will not result in concentrations in excess of the standards of Section 20.6.2.3103 NMAC or the presence of any toxic pollutant at any place of withdrawal of water for present or reasonably foreseeable future use.

12. **Filing Fee:** Attach application filing fee of $100.00. The check or money order must be made payable to Water Quality Management Fund. The permit fee will be required prior to permit issuance.

13. **Draft Public Notice:** Attach a draft of your public notice as specified in Subsection F of 20.6.2.3108 NMAC. 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 injection well is to be located and to each leasehold operator within one-third mile of the well location. Proof of public notice must be submitted in accordance with 20.6.2.3108 NMAC for new and renewal applications for discharge permits.

14. CERTIFICATION:

I hereby certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Name: Michael G. McKee

Title: VP + Refinery Manager NAVAJO Refining Co., LLC

Signature: Michael G. McKee

Date: 3 November 2014

E-mail Address: Michael.McKee@Hollyfrontier.com

Disclaimer: Note that some of the above information may include non-WQCC or OCD Regulated items, i.e., pits, ponds, below-grade tanks, sumps, etc. that may require a separate application and/or permit process than WQCC regulated items through the OCD.

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

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

Form C-101
Revised July 18, 2013

☐ AMENDED REPORT

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

1. Operator Name and Address	2. OGRID Number
Navajo Refining Company, L.L.C. 501 E. Main Artesia NM 88210	15694
	3. API Number

4. Property Code	5. Property Name	6. Well No.
	Waste Disposal Well	WDW-4

7. Surface Location

UL - Lot	Section	Township	Range	Lot Idn	Feet from	N/S Line	Feet From	E/W Line	County
—	28	17S	27E	—	2,310	FNL	1,100	FEL	Eddy

8. Proposed Bottom Hole Location

UL - Lot	Section	Township	Range	Lot Idn	Feet from	N/S Line	Feet From	E/W Line	County
—	28	17S	27E	—	2,310	FNL	1,100	FEL	Eddy

9. Pool Information

Pool Name	Pool Code
Devonian (Undifferentiated)	

Additional Well Information

11. Work Type	12. Well Type	13. Cable/Rotary	14. Lease Type	15. Ground Level Elevation
N	I	R	S	3,450'±
16. Multiple	**17. Proposed Depth**	**18. Formation**	**19. Contractor**	**20. Spud Date**
N	10,800'	Devonian	TDB	TDB

Depth to Ground water	Distance from nearest fresh water well	Distance to nearest surface water
500'±	Unknown	3 miles ±

☒ We will be using a closed-loop system in lieu of lined pits

21. Proposed Casing and Cement Program

Type	Hole Size	Casing Size	Casing Weight/ft	Setting Depth	Sacks of Cement	Estimated TOC
Conductor	24"	20"	129.33	80'	3 cu yd	Surface
Surface	17 ½"	13 3/8"	54.5	1,500'	1,298 cu ft	Surface
Protection	12 ¼"	9 5/8"	47	10,800	4,063 cu ft	Surface

Casing/Cement Program: Additional Comments

See attached Construction Procedure and Proposed Well Schematic

22. Proposed Blowout Prevention Program

Type	Working Pressure	Test Pressure	Manufacturer
TDB	TDB	TDB	TDB

23. I hereby certify that the information given above is true and complete to the best of my knowledge and belief. I further certify that I have complied with 19.15.14.9 (A) NMAC ☐ and/or 19.15.14.9 (B) NMAC ☐, if applicable.	OIL CONSERVATION DIVISION	
Signature: Robert C Boans	Approved By:	
Printed name: Robert E. Boans	Title:	
Title: Operations Manager	Approved Date:	Expiration Date:
E-mail Address: robert.boans@hollyfrontier.com		
Date: 11-21-2014 Phone: 505-746-5248	Conditions of Approval Attached	

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
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District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

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 August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number	2 Pool Code	3 Pool Name
		Devonian (undifferentiated)

4 Property Code	5 Property Name	6 Well Number
	Waste Disposal Well	WDW-4

7 OGRID No.	8 Operator Name	9 Elevation
15694	Navajo Refining Company, L.L.C.	3,430'

10 Surface Location

U L or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
	28	17S	27E		2,310'	FNL	1,100'	FEL	Eddy

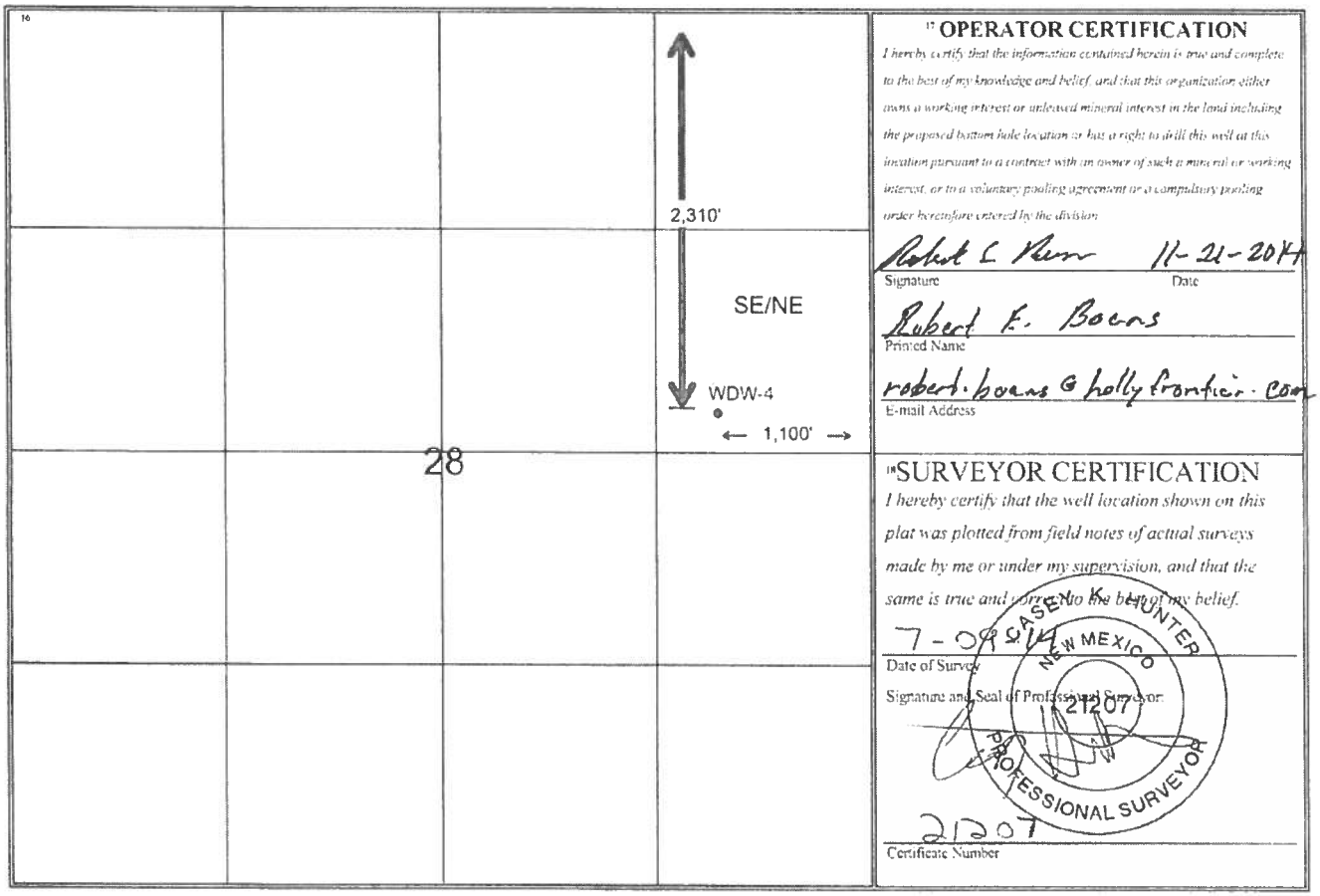
11 Bottom Hole Location If Different From Surface

U L 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.
2.500	N		

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, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Robert C Rees 11-21-2014
Signature Date

Robert E. Boens
Printed Name

robert.boens@hollyfrontier.com
E-mail Address

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.

7-08-14
Date of Survey

Signature and Seal of Professional Surveyor:

GARY L. JONES — NEW MEXICO — 7977 — PROFESSIONAL SURVEYOR

21207
Certificate Number

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

FORM C-108
Revised June 10, 2003

APPLICATION FOR AUTHORIZATION TO INJECT

I. PURPOSE: _____Secondary Recovery _____Pressure Maintenance ___X___Disposal _____Storage
Application qualifies for administrative approval? _____Yes _____No

II. OPERATOR: Navajo Refining Company, L.L.C.

ADDRESS: 501 E. Main, Artesia, New Mexico 88210

CONTACT PARTY: Mike Holder PHONE: (214) 954-6536

III. WELL DATA: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project? _____Yes ___X___No
If yes, give the Division order number authorizing the project: _____

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

Please refer to Section 7(a) Area of Review of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

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.

Please refer to Section 7(a) Area of Review of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

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.).

Please refer to Section 7 of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

*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.

Please refer to Section 7(e) Geology of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

IX. Describe the proposed stimulation program, if any.

Please refer to Section 7(i) Stimulation Program of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

*X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted).

Please refer to Section 7r Logging and Testing of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

*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.

A diligent search of public records did not located any groundwater quality data in the area of the location where WDW-4 will be installed.

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.

Navajo Refining Company, L.L.C. has examined available geologic and engineering data and has found 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.

Please refer to Section 13 Draft Public Notice of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

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: Robert E. Boans TITLE: Operation Manager

SIGNATURE: Robert E Boans DATE: 11-21-2014

E-MAIL ADDRESS: _____

* 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

Side 2

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.

Please refer to Sections 3.0 Location and 4.0 Landowner(s) Geology of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(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.

Please refer to Section 7(l) Construction Procedures of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(3) A description of the tubing to be used including its size, lining material, and setting depth.

Please refer to Section 7(l) Construction Procedures of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Please refer to Section 7(l) Construction Procedures of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

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.

Please refer to Section 7(e) Geology of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(2) The injection interval and whether it is perforated or open-hole.

Please refer to Section 7(e) Geology of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(3) State if the well was drilled for injection or, if not, the original purpose of the well.

WDW-4 is being drilled specifically for injection of liquid wastes originating at the Navajo Artesia Refinery as described in Section 7(f) Proposed Operating Parameters of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(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.

Please refer to Section 7(l) Construction Procedures of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(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.

Oil and gas production in the area where WDW-4 will be installed occurs in the Queen, Grayburg and San Andres Formation at depths of approximately 2,500 feet and the Morrow Formation at a depth of approximately 9,500 feet. The planned Devonian age Injection Interval in the Navajo WDW-4 injection wells is expected to be encountered below 10,000 feet, approximately 10,200 to 10,700 feet. There are no deeper oil or gas zones in the area.

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.

Please refer to Section 13 Draft Public Notice of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

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.

Side 1

INJECTION WELL DATA SHEET

OPERATOR: Navajo Refining Company, L.L.C.

WELL NAME & NUMBER: Waste Disposal Well No. 4 (WDW-4)

WELL LOCATION: 2,310' FNL and 1,100' FEL of Section 28, Township 17 South Range 27 East

FOOTAGE LOCATION | UNIT LETTER | SECTION | TOWNSHIP | RANGE

Refer to Figure 12 in the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

WELLBORE SCHEMATIC

WELL CONSTRUCTION DATA

Surface Casing

Hole Size: _____ Casing Size: _____

Cemented with: _____ sx. *or* _____ ft^3

Top of Cement: _____ Method Determined: _____

Intermediate Casing

Hole Size: _____ Casing Size: _____

Cemented with: _____ sx. *or* _____ ft^3

Top of Cement: _____ Method Determined: _____

Production Casing

Hole Size: _____ Casing Size: _____

Cemented with: _____ sx. *or* _____ ft^3

Top of Cement: _____ Method Determined: _____

Total Depth: _____

Injection Interval

_____ feet to _____

(Perforated or Open Hole; indicate which)

Side 2

INJECTION WELL DATA SHEET

Refer to Figure 12 in the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

Tubing Size: _____ Lining Material: _____

Type of Packer: _____

Packer Setting Depth: _____

Other Type of Tubing/Casing Seal (if applicable): _____

Additional Data

1. Is this a new well drilled for injection? X Yes _____ No

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

   _____

2. Name of the Injection Formation: Devonian (undifferentiated)

3. Name of Field or Pool (if applicable): Not applicable

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

   _____

5. Give the name and depths of any oil or gas zones underlying or overlying the proposed injection zone in this area: Queen, Grayburg and San Andres (approximately 2,500 feet) and Morrow (approximately 9,500 feet)

1.0 Underground Well Control Well Class

Waste Disposal Well No. 4 (WDW-4) will be classified as a Class I Nonhazardous Waste Injection Well.

2.0 Operator

The operator information for WDW-4 is provided below:

Facility Address
Navajo Refining Company, L.L.C.
501 East Main
Artesia, New Mexico 88210
(575) 748-3310

Contact Person
Micki Schultz, Environmental Specialist
(575) 746-5281
Micki.Schultz@hollyfrontier.com

3.0 Location

WDW-4 will be located in the SE/4, NE/4, Section 28, Township 17 South, Range 27 East (approximately 2,310 feet from the north line and 1,100 feet from the east line of Section 28).

A topographic map showing the location of the Navajo's Artesia refinery and the location where WDW-4 will be installed is provided as Figure 1. An enlarged version of the topographic map showing the planned location of WDW-4 is provided as Figure 2.

4.0 Landowner(s)

The parcel of land where WDW-4 will be located is owned by the following:

State of New Mexico
State Land Office
PO Box 1148
Santa Fe, NM 87504-1148

The parcel of land where WDW-4 will be located is surrounded by additional land owned by the New Mexico State Land Office, the Federal Bureau of Land Management, and other private owners as shown on the map included in Appendix A.

5.0 Facility Description

WDW-4 will be located approximately seven (7) miles southeast of Navajo's Artesia refinery, the largest refinery in the State of New Mexico. Drawing 1 presents an aerial photograph of the refinery's location with respect to the planned WDW-4, identifying pertinent features between the two sites. The injection well facility will be located on a 2.5 acre tract of State-owned land. The well location will be surrounded by a security fence that encloses the well, injection pumps, filters and piping, wellhead annulus measurement system (WAMS) on a contained concrete pad, a well control system that provides real-time, continuous monitoring of key operating parameters (pressure, flow rate, etc.) to the Refinery Control Room responsible for well operations and a power panel. The pumps and filters will be located on a separate, contained concrete pad from the wellhead. There will be no buildings or tanks, other than a 250-gallon glycol tank, associated with the WAMS unit.

6.0 Proposed Discharge Plan (see 20.6.2.3106C NMAC)

This permit application is for a new Class I nonhazardous waste injection well. Those portions of 20.6.2.3106C that are relevant to underground injection, especially 20.6.2.3103C (8), are addressed within Section 7.0 of this document.

6(a) is addressed in 7(f)
6(b) is addressed in 7(a)
6(c) is addressed in 7(d)
6(d) is addressed in 7(e)
6(e) measurement of flow is a flow meter at the wellhead with information transmitted electronically to the refinery control room.
6(f) is addressed in 7(e)
6(g) is addressed in 7(e)

7.0 Information for Class I Nonhazardous Waste Injection Well and Class III Brine Wells (20.6.2.5210 NMAC)

The following sections present the information required in Subsection B of Section 20.6.2.5210 NMAC.

7 (a) Area of Review

The WDW-4 Area of Review (AOR) consists of the area within a 2.5-mile radius surrounding the planned well location as shown on Drawing 2. All potential sources of information relevant to the location of non-freshwater artificial penetrations (oil and gas wells, exploratory tests, disposal wells, etc.) and freshwater wells within the AOR were reviewed.

Non-Freshwater Wells in Area of Review

The locations of non-freshwater artificial penetrations (oil and gas wells, exploratory tests, disposal wells, etc.) within the 2.5-mile radius AOR surrounding WDW-4 are identified in Drawing 2. A total of 675 non-freshwater artificial penetrations are present in the 2.5-mile radius AOR as shown on the map. Each artificial penetration is identified by a Map ID number. Table 1 presents a tabulation of the 675 non-freshwater artificial penetrations in the WDW-4 AOR. Only two (2) of the 675 non-freshwater artificial penetrations identified within the AOR (Map ID Nos. 14 and 157) were advanced to a depth to penetrate the top of the planned WDW-4 Devonian age Injection Zone.

Freshwater Wells in Area of Review

Based upon information obtained from records maintained by the New Mexico Water Rights Reporting System, there are 15 freshwater wells within the 2.5-mile radius AOR surrounding the planned WDW-4 (refer to Table 2).

Drawing 3 presents a topographic map depicting the 2.5-mile radius AOR and the locations of the 15 water wells listed on Table 2. The map contains all surface bodies of water, mines (surface and subsurface), quarries, springs, and other surface features, including roads and residences. There are no subsurface faults in the AOR known to have surface expression; therefore, no surface fault traces have been included on this map.

7 (b) Data Tabulation

Table 1 presents a tabulation of the 675 non-freshwater artificial penetrations in the 2.5-mile radius AOR surrounding the planned location of WDW-4. Only two (2) of the 675 non-freshwater artificial penetrations identified within the AOR (Map ID Nos. 14 and 157) were advanced to a depth deep enough to penetrate the top of the planned WDW-4 Injection Zone.

7 (c) Corrective Action

Corrective action is not required. The two (2) artificial penetrations identified within the AOR that were advanced to a depth to penetrate the top of the planned WDW-4 Injection Zone (Map ID Nos. 14 and 157) have been constructed properly and one of them (Map ID No. 14) has been plugged and abandoned properly. Copies of OCD well files for these two artificial penetrations are provided in Attachment 1 to this application.

7 (d) Maps and Cross-Sections

The base of the Underground Source of Drinking Water (USDW), groundwater with total dissolved solids concentration with less than 10,000 milligrams per liter (mg/L), is projected to occur at a depth of approximately 450 to 500 feet below land surface in the area of WDW-4 location which is situated at an elevation of

approximately 3,430 feet above mean sea level. Figure 3 presents a generalized hydrogeologic cross-section for the local area. Figure 4 presents a published map indicating the direction of shallow groundwater movement in the local area.

The top of the WDW-4 Injection Zone is separated from the base of the USDW by several thousand feet of low permeability carbonates, siltstones and shale as depicted on the geologic cross-sections presented on Drawings 5 and 6. Drawing 4 is a cross-section index map.

7 (e) Geology

WDW-4 will be located in Eddy County, New Mexico on the Northwest Shelf of the larger Permian Basin as shown on Figure 5. Figure 6 is stratigraphic column presenting the geologic formations relevant to the planned underground injection operations. WDW-4 will be located on the southern flank of the Artesia-Vacuum anticline (also referred to as the Vacuum Arch), which trends east to west across the area as shown Figure 7. Figure 8 is a published regional structural map of the top of the undifferentiated Silurian-Devonian age strata.

As depicted on the two geologic cross-sections presented on Drawings 5 and 6, the subsurface geology in the area where WDW-4 will be located is rather simplistic. As presented on Drawings 7 and 8, structural dip of all geologic formations is about 125 feet/mile to the southeast away from the Vacuum Arch depicted on Figure 7.

Injection Zone

The Injection Zone into which WDW-4 will be injecting is composed of undifferentiated Devonian age strata expected to be encountered at depths of approximately 10,200 to 10,700 feet below land surface at the point of injection. The top of the Devonian Injection Zone is over 1,000 feet below the base of the Injection Zone into which the three existing injection wells operated by Navajo are injecting. The three existing injection wells are injecting into an Injection Zone composed of the lower portion of the Permian age Wolfcamp Formation and the underlying Pennsylvanian age Cisco and Canyon Formations that are encountered at depths of 7,270 to 9,016 feet KB.

The Devonian age strata that comprises the WDW-4 Injection Zone is composed of dolomite. Drawing 7 presents a structure contour map of the WDW-4 Injection Zone. Most artificial penetrations drilled deep enough to encounter the Devonian were not advanced to a sufficient depth to fully ascertain the thickness of the Devonian, therefore an isopach map of the Injection Zone could not be constructed. However, the thickness of the Injection Zone is expected to remain fairly consistent throughout the Eddy County area; approximately 500 feet thick as depicted on the two geologic cross-sections presented on Drawings 5 and 6.

Confining Zone

The Confining Zone overlying the WDW-4 Injection Zone is composed of the upper Devonian Woodford Formation and the overlying undifferentiated Mississippian strata. The Woodford Formation consists of low permeability shale and the undifferentiated Mississippian age strata are low permeability carbonates. Both formations are laterally continuous throughout the region as depicted on the two geologic cross-sections presented on Drawings 5 and 6.

Drawing 8 presents a structure contour map of the WDW-4 Confining Zone and Drawing 9 presents an isopach map of the WDW-4 Confining Zone.

Faulting

No evidence has been found of any subsurface faulting within and immediately surrounding the 2.5-mile radius AOR surrounding the planned location of WDW-4 that would provide hydraulic connection between the WDW-4 Injection Zone and the shallow USDW. The nearest documented subsurface fault is the “K-M” fault located approximately 15 miles to the northwest, well outside the geologic study area for WDW-4.

Seismicity

The southeastern portion of New Mexico is historically an area of low seismicity with naturally occurring earthquakes being rare and of low magnitude. WDW-4 will be located in one of the areas recognized as having the lowest level of seismic risk in the continental United States (Figure 9).

The potential for earthquakes to occur in the vicinity of the planned WDW-4 well site is minimal. Appendix B presents a listing of all recorded seismic events within 200 miles of the planned WDW-4 well site for the period from 1973 through 2012.

The planned injection operations do not have the potential to cause any seismic activity which could alter the confining capability of the subsurface Injection Zone and overlying Confining Zone.

Surface Geology and Flooding Potential

The surface geology of the local area is shown on Figure 10. The Pecos River, located about three miles east of Artesia is the only surface water body in the area of the planned WDW-4 well site. Local annual rainfall is approximately 13.5 inches. As indicated on the topographic map on Figure 2, the land surface elevation of approximately 3,450 ft msl at the planned well location is higher than the 100-year flood elevation of approximately 3,400 ft msl in Logan Draw; therefore the potential for flooding at the planned WDW-4 well site is minimal.

7 (f) Proposed Operating Parameters

Source and Description of Injection Fluid

The fluid to be injected into WDW-4 is the same waste stream that is currently injected into the three existing Navajo injection wells, WDW-1, WDW-2 and WDW-3. This waste stream is comprised of exempt and nonexempt nonhazardous oilfield waste that is generated in the refining process at Navajo's Artesia refinery; e.g., process units, cooling towers, etc. Waste waters from process units, cooling towers and boilers, streams from water purification units and desalting units, recovered and treated groundwater, and general wash waters are blended to form the waste stream injected into WDW-4, consistent with the authorized waste stream injected into WDW-1, WDW-2 and WDW-3. Table 3A and Appendix C present data characterizing the injection fluid.

Navajo anticipates the addition of another waste stream to the existing waste stream being injected into the three existing injection wells and the planned WDW-4. The new waste stream will originate from a reverse osmosis (RO) unit

to be constructed within the refinery. Table 3B and Appendix C present data characterizing the planned new waste stream from the RO unit.

Average and Maximum Daily Flow Rate and Volume

The estimated average injection rate into WDW-4 is 400 gpm (576,000 gallons per day) and the maximum permitted injection rate into WDW-4 will be 500 gpm (720,000 gallons per day).

Average and Maximum Surface Injection Pressure

The estimated average injection pressure is approximately 1,000 pounds per square inch gauge (psig) and the estimated maximum surface injection pressure is 2,040 psig (see Maximum Allowable Surface Injection Pressure Calculation below).

Maximum Allowable Surface Injection Pressure (MASIP) Calculation

The maximum operating injection wellhead pressure (MASIP) will not exceed 2,040 psi or 0.2 psi per foot of depth to the top of the Injection Interval at 10,200 feet, as required by the OCD Proposed Rule 21.B(7), dated October 6, 1997.

The depth to the top of injection interval in WDW-4 is expected to be approximately 10,200 feet. The maximum allowable surface injection pressure is calculated as follows:

- 10,200 feet x 0.2 psi/ft = 2,040 psi

The actual depth to the top of the WDW-4 injection interval will be determined when the well is being drilled and completed. The MASIP will be revised at that time to correspond to the actual top of the Devonian age injection interval.

7 (g) Formation Testing Program

Formation testing will be conducted during the installation of WDW-4 to obtain site-specific data relating to the chemical, physical and radiological characteristics of the Devonian age Injection Zone.

7 (h) Fluids and Pressure

The following are calculations of the predicted pressure changes over the initial 5-year permit life for WDW-4 and over the expected 30-year life of the well due to emplacement of the permitted maximum volume into the Devonian Injection Zone at the maximum permitted injection rate of 500 gpm.

The interface between injected waste and the formation brine (the waste front) will expand radially away from the WDW-4 wellbore. As fluid is injected, the Injection Zone will continue to pressurize due to the resistance of fluid movement and the compression of the fluid and rock matrix.

Future Cone of Influence and Waste Plume Front

The maximum lateral spread of the waste front and the predicted pressure rise during the initial 5-year permit time frame and the projected 30-year life of WDW-4 were calculated using the software program PredictW. The equations used in the program are presented in Appendix D-1.

Calculated Cone of Influence (5-Years)

The projected cone of influence within the Injection Zone at the end of the initial 5-year permit period is presented on Drawing 10. The cone of influence is based on emplacement of the permitted maximum volume at the maximum permitted injection rate of 500 gpm. The cone of influence calculations are included in Appendix D-4 (output from PredictW).

Calculated Cone of Influence (30-Years)

The projected cone of influence within the Injection Zone at the end of the projected 30-year life of the well is presented on Drawing 11. The cone of influence is based on emplacement of the permitted maximum volume at the maximum permitted injection rate of 500 gpm. The cone of influence calculations are included in Appendix D-4 (output from PredictW).

The cone of influence is defined as the area with increased Injection Zone pressure caused by injection of wastes that would be sufficient to cause vertical fluid movement through any wellbore or other conduits into a USDW. This demonstration shows that the conservative worst-case cone of influence of the

injection operations is smaller than the regulatory 2.5-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 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 on the USDW is conservative. No wells within the 2.5-mile radius AOR surrounding WDW-4 are open to both the Injection Zone and the USDW.

Because of the limited amount of information available in the records for wells drilled into the Devonian Formation, the estimated initial pressure for WDW-4 was extrapolated from the initial pressure measured in Navajo's injection well WDW-2. Additionally, the reservoir parameters from the WDW-2 permit renewal were used to calculate pressure buildup and plume migration for WDW-4. Once WDW-4 is drilled, the cone of influence and plume migration results will be recalculated using the reservoir parameters determined from the drilling and testing of WDW-4.

The following calculations are based on an average total dissolved solids (TDS) content of 25,000 parts per million (ppm) which corresponds to a specific gravity of approximately 1.02.

The pre-injection pressure, P_i, at the top of the Injection Zone in Navajo's WDW-2 at 7,570 feet below ground level (BGL) was measured on June 5, 1999. The pre-injection pressure was 2,845 pounds per square inch absolute (psia).

The pre-injection pressure, P_i, at the top of the WDW-4 Injection Zone at 10,200 feet BGL is calculated to be 4,007 psia as follows:

$$P_{i(10,200\ \text{feet})} = P_{i(7,570\ \text{feet})} + (10,200\ \text{feet} - 7,570\ \text{feet})(0.433\ \text{psi/ft})(1.02)$$
$$= 2,845\ \text{psia} + 1162\ \text{psi}$$

= 4,007 psia

The hydraulic 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. The base of the USDW is at approximately 450 to 500 feet.

The critical pressure, P_c at 10,200 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 4,457 psia, and is calculated as follows:

P_c = (Top of Injection Zone - Base of USDW) (0.433 psi/ft)(specific gravity)
+ (Base of USDW - Head of USDW) (0.433 psi/ft)
= (10,200 feet - 500 feet) (0.433 psi/ft) (1.02)
+ (500 feet - 100 feet) (0.433 psi/ft)
= 4,457 psia

The critical increase in reservoir pressure, ΔP_c, above the native pressure that is necessary to raise the hydrostatic head of the WDW-4 injection zone to the head of the lowermost USDW is 450 psi, and is calculated as follows:

$\Delta P_c = P_c - P_i$
= 4,457 psia – 4,007 psia
= 450 psi

An increase in reservoir pressure greater than 450 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 well within which the increase in reservoir pressure caused by injection is greater than 450 psi.

The gridded pressure increases created with PredictW were contoured using Surfer, a commercial contouring software package. The contour plots of the predicted pressure increase in the injection zone (Drawings 10 and 11) were generated using the permitted maximum injection rate of 500 gpm over the initial 5-year permit time frame and the 30-year expected life of the well.

Conservative values for reservoir thickness and permeability were used to overestimate the predicted increase in reservoir pressure. The porosity was assumed to be 10 percent. The reservoir was assumed to have a consistent thickness of 85 feet. The permeability of the reservoir was assumed to be 251 millidarcies (md).

Using a low kh yields a predicted pressure increase that is greater than expected and a cone of influence that is larger than expected.

The viscosity of the formation fluid with TDS concentration of 25,000 ppm at 130°F is 0.57 cp (Appendix D-2). The compressibility of the pore volume of the formation is c_r, is 5.5×10^{-6} psi^{-1}. The compressibility of the formation fluid is 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} (Appendix D-3).

WDW-4 was modeled as injecting for a 5-year period at a continuous rate of 500 gpm.

The 450-psi pressure-increase contour, which defines the outline of the worst-case Cone of Influence, is located less than 2.5 miles from WDW-4 as shown on Drawing 10. An improperly abandoned wellbore or other conduit filled with formation fluid that is located farther than 2.5 miles from the WDW-4 location 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 2.5-mile radius AOR. Information is presented in Section 7 (b) that demonstrates that each of the artificial penetrations that penetrate into the Injection Zone is properly constructed to prevent migration of fluids into the USDW. The output from PredictW is presented in Appendix D-4.

Modeled Plume Front Migration (5-Years)

The lithologic character of the Injection Zone, with the resulting hydrodynamic characteristics, is expected to be horizontally uniform. Given the anticipated homogeneity of the Injection Zone, plume geometry during the active injection phase is expected to be cylindrical.

Approximately 500 feet of formation is anticipated to exist in the Injection Zone at the location of WDW-4. For a conservative estimate of the injection plume size, the plume radius is calculated on the basis of all flow emplaced in an 85-foot thick interval. Assuming a continuous maximum injection rate of 500 gpm over a 5-year injection period, the volume of fluid injected into WDW-4 is 1,314,000,000 gallons. Using the total volume of fluid injected and the following equation, the radius of the concentrated plume will be approximately 2,868 feet at the end of the initial 5-year permit period.

$$r_c = \left[\frac{(0.1337 v t)}{(0.80)(p)(\phi)(h)} \right]^{1/2}$$

where:

0.1337	=	factor to convert gallons to cubic feet
r_c	=	radius of the concentrated plume, feet
v	=	annual injected volume, 1,314,000,000 gallons
0.80	=	factor to compensate for immovable connate water
ϕ	=	formation porosity, 10%
h	=	thickness of the injection reservoir, 85 feet
t	=	time of injection, 1 year (the total volume of fluid injected is used)

$$rc = \left[\frac{(0.1337)\ (1{,}314{,}000{,}000)\ (1)}{(0.80)\ (3.1416)\ (\ 0.10)\ (85)} \right]^{1/2}$$

= 2,868 feet

The radius of the dispersed plume from WDW-4 on at the end of the initial 5-year injection period is calculated to be 2,872 feet as follows:

$$r_d = 2.3\ (C_d)(r_c)^{0.05} + r_c$$

where:

2.3	=	constant
r_d	=	radius of the dispersed plume, feet

c_d = coefficient of dispersion; for sandstone = 3, for limestone = 65
r_c = concentrated plume radius, 2,868 feet

$$r_d = (2.3)\left[(65)(2{,}868)\right]^{0.05} + 2{,}868$$
$$= 2{,}872 \text{ feet}$$

The plume radius calculations for WDW-4 are presented in Appendix D-5. Drawing 12 presents the projected plume radius following the initial 5-year injection period.

Modeled Plume Front Migration (30-Years)

Assuming a continuous maximum injection rate of 500 gpm over a 30-year life of the injection well, the volume of fluid injected into WDW-4 is 7,884,000,000 gallons. Using the total volume of fluid injected and the following equation, the radius of the concentrated plume will be approximately 7,024 feet at the end of the 30-year life of the well.

$$r_c = \left[\frac{(0.1337\, v\, t)}{(0.80)(p)(\phi)(h)}\right]^{1/2}$$

where:

0.1337 = factor to convert gallons to cubic feet
r_c = radius of the concentrated plume, feet
v = annual injected volume, 7,884,000,000 gallons
0.80 = factor to compensate for immovable connate water
ϕ = formation porosity, 10%
h = thickness of the injection reservoir, 85 feet
t = time of injection, 1 year (the total volume of fluid injected is used)

$$rc = \left[\frac{(0.1337)\ (1{,}314{,}000{,}000)\ (1)}{(0.80)\ (3.1416)\ (\ 0.10)\ (85)}\right]^{1/2}$$

= 7,024 feet

The radius of the dispersed plume from WDW-4 on at the end of the projected 30-year well life is calculated to be 7,028 feet as follows:

$$(r_d = (2.3)(C_d)(r_c)^{0.05} + r_c$$

where:

2.3 = constant
r_d = radius of the dispersed plume, feet
c_d = coefficient of dispersion; for sandstone = 3, for limestone = 65
r_c = concentrated plume radius, 7,024 feet

$$r_d = (2.3)\left[(65)(7{,}024)\right]^{0.05} + 7{,}024$$
$$= 7{,}028 \text{ feet}$$

The plume radius calculations for WDW-4 are presented in Appendix D-5. Drawing 13 presents the projected plume radius following the projected 30-year life of the well.

7 (i) Stimulation Program

The need for any type of stimulation program will be determined after the well has been drilled and tested. Should the results of the injectivity testing program performed after the well has been constructed indicate stimulation is necessary to achieve the desired injection rate, Form C-103 will be completed and submitted describing the planned stimulation program. The most likely stimulation would be an acid fracture of the dolomite Injection Interval.

7 (j) Injection Procedure

Injection into WDW-4 will occur on a continuous basis. The injection fluid will be routed from the refinery process areas via pipeline to the injection well. Figure 11 presents the pre-injection facilities for WDW-4.

Predicted Injection Rates and Volumes

The estimated average injection rate is 400 gpm which is equal to 576,000 gallons per day or 210,240,000 gallons per year or 1,051,200,000 gallons into

the injection zone over the initial 5-year permit time frame and 6,307,200,000 gallons over the projected 30-year life of the well.

The maximum permitted injection rate into WDW-4 will be 500 gpm. This rate of injection is equal to 720,000 gallons per day or 262,800,000 gallons per year or 1,314,000,000 into the injection zone over the initial 5-year permit time frame and 7,884,000,000 gallons over the projected 30-year life of the well.

7 (k) Drawings

Figure 11 presents a schematic of the pre-injection surface facilities. Figure 12 presents a diagram of the below ground portions of WDW-4. Figure 13 presents a diagram of the WDW-4 wellhead.

7 (l) Construction

WDW-4 will be drilled and installed utilizing typical oil field well installation procedures. The well has been conservatively designed to meet more stringent hazardous waste injection well standards. Appendix E includes a description of the procedures for drilling and construction of WDW-4. Appendix F includes a description of the procedures for testing WDW-4 following installation.

Figure 12 presents a diagram of the below ground portions of WDW-4. Figure 13 presents a diagram of the WDW-4 wellhead. Pressure gauges to be used to indicate the pressure on the injection tubing and on the tubing-casing annulus are depicted on the wellhead.

Open-Hole Logging and Coring Program

Open-hole electric logs will be run from the base of conductor pipe to the total depth of the drilled borehole advanced for well construction. Conventional cores will be collected from the Injection Zone and Confining Zone. Table 4 summarizes the WDW-4 open-hole logging and coring program.

Casing and Cementing Program

Table 5 summarizes the WDW-4 casing program and design factors. Table 6 provides a summary of the WDW-4 cementing program. Figure 12 presents a proposed diagram of the below ground portions of WDW-4.

Cased-Hole Logging Program

Cased-hole electric logs will be run following the installation of the surface casing and protection casing. Table 7 summarizes the WDW-4 cased-hole logging program.

Injection Tubing, Packer and Annular Fluid

Figure 12 provides a schematic of the proposed below ground construction details for WDW-4. The injection tubing, packer and annular fluid proposed for use in the well are depicted on the schematic.

Depth to Injection Zone

The WDW-4 Injection Zone is expected to be encountered approximately 10,200 to 10,700 feet below land surface. The actual Injection Interval (perforated interval) will be selected within the Injection Zone based on evaluation of open-hole logs run in the borehole prior to casing installation.

Pressures and Other Stresses That May Cause Well Failure

There are no known subsurface pressures or stresses that may cause failure of WDW-4.

Hole Size

The borehole advanced for WDW-4 is projected to be 12 1/4 inches in diameter.

Well Casing Information

Figure 12 and Appendix E include information about the planned WDW-4 well casing. Tables 5 and 6 provide an overview of the casing and cementing information.

Cement Information

Table 6, Figure 12 and Appendix E include information about the WDW-4 cementing program.

Rate, Temperature and Volume of Injected Fluid

Average and Maximum Daily Flow Rate and Volume

The average injection rate for WDW-4 will be approximately 400 gpm and the maximum permitted injection rate for the well is 500 gpm.

Temperature

The temperature of the injected fluid is within average ambient temperature ranges.

Volume of Injected Fluid

The following are expected injection volumes based on a maximum injection rate of 500 gpm:

- Daily maximum injection volume: 720,000 gallons
- Annual maximum injection volume: 262,800,000 gallons
- 5-Year permit life injection volume: 1,314,000,000 gallons
- 30-Year well life injection volume: 7,884,000,000 gallons

Chemical and Physical Characteristics of Injected Fluid

The fluid to be injected into WDW-4 is the same waste stream that is currently injected into the three existing Navajo injection wells WDW-1, WDW-2 and WDW-3. This waste stream is comprised of exempt and nonexempt nonhazardous oilfield waste that is generated in the refining process. Waste waters from process units, cooling towers and boilers, streams from water purification units and desalting units, recovered and treated groundwater, and

general wash waters are blended to form the fluid injected into WDW-4. Table 3A and Appendix C present data characterizing the injection fluid.

Navajo anticipates the addition of another waste stream to the existing waste stream being injected into the three existing injection wells and the planned WDW-4. The new waste stream will originate from a reverse osmosis (RO) unit to be constructed within the refinery. Table 3B and Appendix C present data characterizing the planned new waste stream from the RO unit.

Chemical and Physical Characteristics of Formation Fluid

Formation testing will be conducted during the construction of WDW-4 to obtain site-specific data relating to the chemical, physical and radiological characteristics of the formation fluids contained within the Injection Zone.

The formation fluid contained in the Injection Zone is compatible with the well construction components and the injected fluid. Formation fluid information pertinent to the reservoir calculations is included in Appendix D.

Chemical and Physical Characteristics of the Injection Zone

The Injection Zone is Devonian age dolomite.

Chemical and Physical Characteristics of the Confining Zone

The Confining Zone is low permeability shale of the Woodford Formation and low permeability limestone of Mississippian age.

Depth, Thickness and Chemical Characteristics of Penetrated Formations Containing Ground Water

The base of the USDW, groundwater with total dissolved solids concentration with less than 10,000 milligrams per liter (mg/L), occurs at the base of the Tansill Formation. Figure 3 presents a hydrostratigraphic cross-section for the local area. Figure 4 presents a potentiometric surface map indicating the direction of groundwater movement in the freshwater aquifers.

The base of the USDW occurs at the following approximate depths in Navajo's three existing injection wells. The base of the USDW in WDW-4 is expected to be at a similar depth.

- WDW-1: approximately 493 feet KB (3,200 feet above mean sea level)
- WDW-2: approximately 473 feet KB (3,150 feet above mean sea level)
- WDW-3: approximately 420 feet KB (3,150 feet above mean sea level)

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.

The top of the WDW-4 Injection Zone is separated from the base of the USDW by several thousand feet of lower permeability carbonates, siltstones and shales.

7 (m) Contingency Plans

WDW-4 will be equipped with a high-level shutoff switch to prevent operation of the injection pump at pressures greater than the designated MASIP. The well will be equipped with a low pressure shutoff switch that will deactivate the injection pump in the event of a surface leak. In addition, the well will be equipped with a high/low pressure shutdown switch with a pressure sensor on the tubing/casing annulus. This pressure switch is intended to stop the injection pump in the event of 1) a tubing leak, or 2) a casing, packer, or wellhead leak.

If an alarm or shutdown is triggered, the following procedures will be implemented.

- Immediately cease injection operations;
- Immediately investigate the cause of the alarm or shutdown;
- Take all necessary steps to determine the presence or absence of a leak; and
- Provide verbal notification to OCD within 24 hours.

If the alarm or shutdown is not related to mechanical integrity and the cause of the alarm or shutdown is corrected, injection operations will be resumed. If the mechanical integrity of the well is in question, the well will remain out of service until the mechanical integrity of the well is restored to the satisfaction of OCD and the agency approves resumption of injection operations.

7 (n) MIT Monitoring Plans (20.6.2.5207 NMAC)

Navajo will implement a MIT monitoring program that satisfies all applicable requirements of Section 20.6.2.5207.NMAC.

- The mechanical integrity of WDW-4 will be demonstrated on an annual basis.
- Continuous monitoring devices will be used to provide a record of injection pressure, flow rate, flow volume, and annular pressure.

The results of these monitoring activities will be reported to OCD as required by regulation.

7 (o) Additional Monitoring Plans for Class I Non-Hazardous Waste Injection Wells (20.6.2.5207B NMAC)

Appendix G includes an Injected Fluids Monitoring Plan that describes the procedures to be carried out on a quarterly basis to obtain a detailed chemical and physical analysis of a representative sample of the injected fluid, including the quality assurance procedures. The plan will be updated as necessary.

The plan includes the following elements:

- The parameters for which the injected fluid will be analyzed and the rationale for the selection of these parameters;
- The test methods that will be used to test for these parameters;
- The sampling method that will be used to obtain a representative sample of the injected fluid being analyzed;
- Field sampling documentation methodologies;
- The commercial laboratory who performs the analysis; and
- Method of reporting analytical results to OCD.

7 (p) Additional Monitoring Plans for Class III Wells (20.6.2.5207C NMAC)

This section is Not Applicable; WDW-4 is not a Class III well.

7 (q) Financial Assurance

Appendix H includes a well closure plan for WDW-4. Figure 14 presents a schematic of the plugged and abandoned well. The estimated cost to plug and abandon WDW-4 is presented in the table below. This cost estimate has been prepared to reflect the estimated costs that would be incurred by Navajo to abandon the well in accordance with the procedures in Appendix H.

Description of Service	Estimated Cost
Wireline (BHP, RTS, PFOT, Perforate)	35,000
Rental Tools	5,000
Pumping Service	20,000
Cementing Service	30,000
Excavating	2,500
Mud/Brine	7,500
Frac Tanks	2,500
Vacuum Trucks	2,500
Welder	2,500
Miscellaneous	2,500
SUBTOTAL	**110,000**
Field Supervision, Project Management, Procurement	30,000
Total Estimated Cost	**$140,000**

Appendix I includes a copy of the financial assurance instrument that Navajo has established to provide the appropriate monies for plugging and abandoning WDW-4, any groundwater restoration that may be necessary, and any post-operational monitoring that may be required.

7 (r) Logging and Testing Data

Open-hole electric logs will be run from the base of conductor pipe to the total depth of the drilled borehole advanced for well installation. Conventional cores will be collected from the Injection Zone and Confining Zone. Table 4 summarizes the WDW-4 open-hole logging and coring program. Appendix E provides more specific information about the well installation program including the planned open-hole logging and testing program.

7 (s) Mechanical Integrity Data (20.6.2.5204 NMAC)

Mechanical Integrity Testing (MIT) will be conducted on WDW-4 as part of the well completion activities described in Appendix F and in accordance with applicable regulatory requirements throughout the life of the well.

7 (t) Maximum Pressure and Flow Rate

The maximum injection rate and the calculated maximum surface injection pressure at WDW-4 are as follows:

- Maximum Injection Rate: 500 gpm
- Maximum Surface Injection Pressure: 2,040 psi

7 (u) Formation Testing Program Data

The following open-hole formation testing will be performed during the drilling of WDW-4:

- Collect conventional cores from Confining Zone and Injection Zone
- Run suite of open-hole electric logs from base of conductor pipe to total drilled depth

The following cased-hole formation testing will be performed during the completion of WDW-4:

- Injectivity test

Appendices E and F provide more specific information about the planned formation testing program.

7 (v) Compatibility

The fluid to be injected into WDW-4 is the same waste stream that is currently injected into the three existing Navajo injection wells WDW-1, WDW-2 and

WDW-3. This waste stream is comprised of exempt and nonexempt nonhazardous oilfield waste that is generated in the refining process. Waste waters from process units, cooling towers and boilers, streams from water purification units and desalting units, recovered and treated groundwater, and general wash waters are blended to form the fluid injected into WDW-4. Table 3A and Appendix C present data characterizing the injection fluid.

Navajo anticipates the addition of another waste stream to the current waste stream being injected into the three existing injection wells and the planned WDW-4. The new waste stream will originate from a reverse osmosis (RO) unit to be constructed within the Artesia refinery. Table 3B and Appendix C present data characterizing the planned new waste stream from the RO unit.

The three existing injection wells are constructed of carbon steel and have shown no detrimental effects from the current waste stream or the Injection Zone formation fluids. The planned WDW-4 will be constructed of similar materials of construction.

Neither of the waste streams characterized in Tables 3A and 3B are corrosive in nature. As indicated below, the new RO reject waste stream to be added into the current waste stream already being directed to the three existing injection wells is less corrosive (lower salinity) than the current waste stream. Therefore there are no concerns about any compatibility problems between the waste stream and the materials of construction.

	Current Waste Stream	RO Reject Waste Stream
TDS (mg/L)	5,000	3,000
Chloride (mg/L)	650	250
Sulfate (mg/L)	3,000	1,500

The current waste stream has not demonstrated any incompatibilities with the injection zone formation fluid. There are no concerns about waste stream compatibility with the formation fluids in the Devonian Injection Zone.

7 (w) Area of Review Corrective Actions

No corrective action plan is required. Only two (2) of the 675 penetrations were advanced to a depth to encounter the top of the planned WDW-4 Injection Zone, and both were properly constructed and one was plugged and abandoned properly.

8.0 Modification(s)

This application does not include any proposed modifications to existing discharge processes.

9.0 Inspection/Maintenance and Reporting

Navajo performs daily visual inspections of their injection wells and the pipeline and performs required maintenance (PM) activities as scheduled to ensure safe operation of the wells.

Navajo performs routine reporting in accordance with the requirements of 20.6.2.5208.A NMAC for Class I nonhazardous waste injection wells.

10.0 Contingency Plans

Navajo has an Integrated Contingency Plan detailing responses to spills of all types, reporting spills/releases, mitigation and corrective actions, clean up and disposal as applicable. Injection well WDW-4 will be equipped with a high-pressure shutoff switch to prevent operation of the injection pump at pressures greater than the designated MASIP. The well will be equipped with a low pressure shutoff switch that will deactivate the injection pump in the event of a surface leak. In addition, the well will be equipped with a high/low pressure shutdown switch with a pressure sensor on the tubing/casing annulus. This pressure switch is intended to stop the injection pump in the event of 1) a tubing leak, or 2) a casing, packer, or wellhead leak.

If an alarm or shutdown is triggered at the wellhead, electronic signals are sent to the Control Room at the refinery notifying of the shutdown and the cause of the alarm or shutdown will be immediately investigated.

Operators will immediately cease injection operations at the wellhead and divert flow to another well, notify Maintenance and Environmental to take all necessary steps to determine the presence or absence of a leak, and Environmental will provide verbal notification to OCD within 24 hours.

If the alarm or shutdown is not related to mechanical integrity and the cause of the alarm or shutdown is corrected, injection operations will be resumed. If the mechanical integrity of the well is in question, the well will remain out of service until the mechanical integrity is restored to the satisfaction of OCD and the agency approves resumption of injection operations.

11.0 Other Information

No additional information is required to demonstrate that the discharge permit will not result in concentrations in excess of the standards of Section 20.6.2.3103 NMAC or the presence of any toxic pollutant at any place of withdrawal of water for present or reasonably foreseeable future use.

12.0 Filing Fee

A check in the amount of $100, made payable to Water Quality Management Fund, accompanies this permit application document.

13.0 Draft Public Notice

20.6.2.3108.C requires that Navajo provide notice in accordance with 20.6.2.3108.F within thirty (30) days of OCD deeming the permit application to be administratively complete. Appendix J includes a DRAFT copy of the public notice that will be published following receipt of written notification from OCD that this discharge permit renewal application has been deemed administratively complete.

Navajo understands the requirement to submit to OCD within 15 days of completion of public notice requirements stipulated Subsection C of 20.6.2.3108 NMAC proof of notice, including an affidavit of mailing(s) and the list of property owner(s), proof of publication, and an affidavit of posting, as appropriate.

14.0 Certification

The required certification language is included at the end of the completed OCD Discharge Permit Application Form in the front of this permit renewal application. The appropriate Artesia refinery authority has signed the form.

TABLES

TABLE 1
NON-FRESHWATER (OIL AND GAS) WELLS IN WDW-4 AREA OF REVIEW
NAVAJO REFINING COMPANY, LLC
ARTESIA, NEW MEXICO

Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
1	30-015-00452	17S 27E 14	2310 FSL 990 FWL CONGRESS SECTION	FEDERAL	BEDINGFIELD J E	D&A	12/1/1961	1961-05-31	30
2	30-015-00454	17S 27E 14	330 FSL 330 FWL CONGRESS SECTION	FED	JOHNSON BOB	D&A-O		1959-05-15	437
3	30-015-00456	17S 27E 15	330 FNL 990 FWL CONGRESS SECTION	FED J	JEFFERS E	D&A		1961-05-31	30
4	30-015-00457	17S 27E 15	1650 FNL 2310 FEL CONGRESS SECTION	FED D	JEFFERS E	D&A		1959-04-21	524
5	30-015-00458	17S 27E 15	330 FSL 330 FEL CONGRESS SECTION	HIGHTOWER	BREWER DRLG CO	D&A		1948-08-17	1740
6	30-015-00459	17S 27E 16	2310 FNL 1650 FEL CONGRESS SECTION	COCKBRN-GULF-STATE	COCKBURN BARNEY	D&A-OG		1956-04-05	2299
7	30-015-00460	17S 27E 17	660 FSL 660 FEL CONGRESS SECTION	HIGHTOWER	NUNN-SANDERS	D&A		1949-11-28	501
8	30-015-00462	17S 27E 19	990 FSL 1650 FEL CONGRESS SECTION	FE KEPPLE	ORCUTT E	D&A		1942-06-18	602
9	30-015-00467	17S 27E 20	660 FNL 1980 FWL CONGRESS SECTION	SPARKS	SWARTZ GUY A	D&A-O		1961-06-30	1915
10	30-015-00468	17S 27E 20	1980 FNL 660 FEL CONGRESS SECTION	HIGHTOWER	SANDERS-NUNN	D&A-O		1947-10-03	2056
11	30-015-00469	17S 27E 22	330 FNL 2310 FWL CONGRESS SECTION	BERRY	SANDERS SAM	D&A		1941-01-10	500
12	30-015-00470	17S 27E 22	2310 FNL 990 FEL CONGRESS SECTION	BERRY	CARSON & KELLY	D&A-O		1939-09-05	525
13	30-015-00471	17S 27E 23	660 FNL 990 FWL CONGRESS SECTION	BERRY	BRAINARD FRED	D&A-G		1936-11-09	2300
14	**30-015-00472**	**17S 27E 23 C SE NW**	**1980 FNL 1980 FWL CONGRESS SECTION**	**BERRY FEDERAL**	**ALAMO PERMIAN RES**	**D&A-G**		**1962-01-22**	**10427**
15	30-015-00473	17S 27E 23	2310 FSL 2310 FEL CONGRESS SECTION	BERRY	BERRY W H	D&A-G		1939-11-11	595
16	30-015-00474	17S 27E 23	330 FSL 990 FWL CONGRESS SECTION	BERRY	BERRY W H	D&A		1939-12-01	650
17	30-015-00475	17S 27E 23	330 FSL 330 FEL CONGRESS SECTION	BERRY	BERRY W H	D&A-O		1939-12-18	520
18	30-015-00519	17S 27E 25	2310 FNL 990 FWL CONGRESS SECTION	J TRAVIS	JOHNSTON R J	D&A-OG		1941-06-02	540
19	30-015-00522	17S 27E 25	2310 FSL 1650 FWL CONGRESS SECTION	BROOKS A	FEATHERSTONE OLEN F	D&A-OG		1941-11-21	548
20	30-015-00523	17S 27E 25	2310 FSL 990 FWL CONGRESS SECTION	BROOKS A	MORGAN ML ETAL	D&A-O		1942-04-03	605
21	30-015-00524	17S 27E 25	330 FSL 990 FWL CONGRESS SECTION	BRAINARD	ASTON & FAIR	D&A-OG		1947-12-02	1698
22	30-015-00579	17S 27E 26	210 FNL 210 FEL CONGRESS SECTION	HARBOLD PERMIT	JONES CL	D&A		1939-05-16	522
23	30-015-00580	17S 27E 26	990 FNL 990 FEL CONGRESS SECTION	HARBOLD-FEDERAL	HAYNES OWEN	OIL		1951-08-10	633
24	30-015-00581	17S 27E 26	330 FNL 330 FWL CONGRESS SECTION	FEDERAL 242-A	HONDO OIL & GAS CO	D&A-O		1961-10-29	640
25	30-015-00582	17S 27E 26	990 FNL 990 FWL CONGRESS SECTION	HB TRAVIS	JOHNSTON R J	TA-O		1939-07-24	561
26	30-015-00583	17S 27E 26	1675 FNL 990 FWL CONGRESS SECTION	DB ANDERSON FEDERAL	JOHNSTON R J	TA		1952-03-03	460
27	30-015-00584	17S 27E 26	2310 FNL 2310 FWL CONGRESS SECTION	CUCCA-BARRENTOS	JOHNSTON R J	D&A-O		1940-10-21	730
28	30-015-00585	17S 27E 26	2310 FNL 990 FEL CONGRESS SECTION	HARBOLD	HAYNES OWEN	D&A		1958-01-23	502
29	30-015-00586	17S 27E 26	2310 FNL 330 FEL CONGRESS SECTION	HARBOLD	HAYNES OWEN	TA		1958-06-04	270
30	30-015-00587	17S 27E 26	2310 FSL 990 FEL CONGRESS SECTION	HARBOLD	JOHNSTON R J	D&A-OG		1940-05-08	555
31	30-015-00588	17S 27E 26	1650 FSL 990 FEL CONGRESS SECTION	HARBOLD	HAYNES OWEN	TA-G		1953-07-13	491
32	30-015-00589	17S 27E 26	1946 FSL 650 FWL CONGRESS SECTION	FEDERAL 242	HONDO OIL & GAS CO	D&A-OG		1961-10-29	1114
33	30-015-00590	17S 27E 26	330 FSL 330 FWL CONGRESS SECTION	HARBOLD-FEDERAL	HAYNES OWEN	D&A-O		1951-04-27	563
34	30-015-00591	17S 27E 26	330 FSL 2310 FWL CONGRESS SECTION	HARBOLD-FEDERAL	VINTAGE DRLG CO	ABD-OW		1951-03-02	399
35	30-015-00592	17S 27E 26	330 FSL 990 FWL CONGRESS SECTION	HONDO-FEDERAL	MARBOB ENERGY CORP	ABD-OW		1951-08-19	1620
36	30-015-00593	17S 27E 26	330 FSL 1650 FWL CONGRESS SECTION	HARBOLD-FEDERAL	SMITH A J ETAL	ABD-OW		1951-11-10	423
37	30-015-00594	17S 27E 26	990 FSL 2310 FEL CONGRESS SECTION	TRIGG-FEDERAL	S D X RESOURCES INC	ABD-OW		1951-09-24	415
38	30-015-00595	17S 27E 26	330 FSL 2310 FEL CONGRESS SECTION	TRIGG-FEDERAL	S D X RESOURCES INC	ABD-OW		1951-11-01	408
39	30-015-00596	17S 27E 26	380 FSL 990 FEL CONGRESS SECTION	HARBOLD-FEDERAL X	EVANS PAT	ABD-OW		1951-01-31	423
40	30-015-00597	17S 27E 26	990 FSL 990 FWL CONGRESS SECTION	HARBOLD-FEDERAL	HAYNES OWEN	D&A		1951-03-28	423

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NAVAJO REFINING COMPANY, LLC
ARTESIA, NEW MEXICO

Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
41	30-015-00598	17S 27E 26	330 FSL 330 FEL CONGRESS SECTION	HARBOLD	DAVIS J C	ABD-OW		1941-08-28	470
42	30-015-00599	17S 27E 26	990 FSL 1035 FEL CONGRESS SECTION	HARBOLD	JOHNSTON R J	D&A		1941-11-18	514
43	30-015-00600	17S 27E 26	330 FSL 1650 FEL CONGRESS SECTION	TRIGG-FEDERAL	TRIGG JOHN H	OIL		1951-12-02	420
44	30-015-00603	17S 27E 29	1963 FNL 1960 FWL CONGRESS SECTION	SMITH	OLIVER DONALD M	D&A-O		1947-06-12	2514
45	30-015-00604	17S 27E 32	1930 FSL 1880 FWL CONGRESS SECTION	CHALK BLUFF DRAW UNIT	HUMBLE OIL & REFG CO	D&A-OG		1956-10-29	9425
46	30-015-00605	17S 27E 33	1980 FSL 660 FWL CONGRESS SECTION	EVARTS-FEDERAL	GRARIDGE CORP	ABD-OW		1960-05-29	2051
47	30-015-00606	17S 27E 34	990 FNL 330 FEL CONGRESS SECTION	HARBOLD-FEDERAL	HAYNES OWEN	D&A		1952-03-08	450
48	30-015-00607	17S 27E 34	2360 FNL 330 FEL CONGRESS SECTION	HARBOLD-FEDERAL	HAYNES OWEN	TA		1951-12-26	410
49	30-015-00608	17S 27E 34	330 FSL 1650 FEL CONGRESS SECTION	HARBOLD	PAN AMERICAN	TA		1960-03-18	5697
50	30-015-00609	17S 27E 34	330 FSL 330 FEL CONGRESS SECTION	TRIGG-FEDERAL	APACHE CORP	OIL		1960-02-11	5640
51	30-015-00610	17S 27E 35	330 FNL 2310 FWL CONGRESS SECTION	HARBOLD-FEDERAL	BIRDWELL ROBERT H	OIL		1952-04-09	409
52	30-015-00611	17S 27E 35	990 FNL 2310 FWL CONGRESS SECTION	SRLG UNIT	FAIRWAY RES OPER LLC	ABD-OW		1947-09-19	1635
53	30-015-00612	17S 27E 35	330 FNL 990 FWL CONGRESS SECTION	MALCO-FEDERAL	FREEDON ENERGY LLC	OIL		1952-06-28	1570
54	30-015-00613	17S 27E 35	1638 FNL 995 FWL CONGRESS SECTION	HARBOLD-FEDERAL	SMITH & MARRS INC	ABD-OW		1954-06-30	1555
55	30-015-00614	17S 27E 35	2310 FNL 990 FWL CONGRESS SECTION	HARBOLD	HAYNES OWEN	D&A-O		1956-04-01	414
56	30-015-00615	17S 27E 35	2369 FNL 2369 FWL CONGRESS SECTION	HARBOLD-FEDERAL	FREEDON ENERGY LLC	OIL		1941-10-16	425
57	30-015-00616	17S 27E 35	2310 FNL 2310 FWL CONGRESS SECTION	SRLG UNIT	MCQUADRANGLE LLC	ABD-OW		1947-08-01	1618
58	30-015-00617	17S 27E 35	1650 FNL 2310 FWL CONGRESS SECTION	HARBOLD-FEDERAL	SLAYTON PAUL	ABD-OW		1952-05-28	396
59	30-015-00618	17S 27E 35	1700 FNL 2310 FWL CONGRESS SECTION	SRLG UNIT	MCQUADRANGLE LLC	ABD-OW		1954-12-01	1585
60	30-015-00619	17S 27E 35	2305 FNL 1664 FEL CONGRESS SECTION	BARRIENTOS	WILLIAMS GEORGE	ABD-OW		1947-02-08	1736
61	30-015-00620	17S 27E 35	1650 FNL 990 FEL CONGRESS SECTION	SRLG UNIT	LEGACY RESERVES OPER	OIL		1947-06-07	1650
62	30-015-00621	17S 27E 35	330 FNL 990 FEL CONGRESS SECTION	HARBOLD	LEGACY RESERVES OPER	ABD-OW		1947-07-13	1700
63	30-015-00622	17S 27E 35	1650 FSL 330 FEL CONGRESS SECTION	SRLG UNIT	FAIRWAY RES OPER LLC	ABD-OW		1949-04-15	1741
64	30-015-00623	17S 27E 35	2310 FSL 990 FEL CONGRESS SECTION	SRLG UNIT	LEGACY RESERVES OPER	OIL		1947-04-18	1705
65	30-015-00624	17S 27E 35	1650 FSL 990 FEL CONGRESS SECTION	MAGRUDER A	CITIES SERV CO	ABD-OW		1941-10-21	500
66	30-015-00625	17S 27E 35 SE NW SE	1630 FSL 1645 FEL CONGRESS SECTION	MAGRUDER A	CITIES SERV OIL CO	OIL	4/21/1986	1941-09-06	456
67	30-015-00626	17S 27E 35	1650 FSL 2310 FEL CONGRESS SECTION	MAGRUDER	PATON BROTHERS	D&A	1/1/1901	1945-05-22	461
68	30-015-00627	17S 27E 35	2310 FSL 2310 FEL CONGRESS SECTION	SRLG UNIT	MCQUADRANGLE LLC	ABD-OW	5/25/2003	1947-06-09	1665
69	30-015-00628	17S 27E 35	1650 FSL 2310 FWL CONGRESS SECTION	15 SRLG UNIT	CITIES SERV CO	D&A-OG	5/27/2008	1961-09-25	5704
70	30-015-00630	17S 27E 35	2262 FSL 1650 FWL CONGRESS SECTION	SRLG UNIT	FAIRWAY RES OPER LLC	ABD-OW	1/16/2007	1948-01-19	1694
71	30-015-00631	17S 27E 35 NE NE SW	2300 FSL 2313 FWL CONGRESS SECTION	MAGRUDER A	CITIES SERV CO	ABD-OW	2/11/1977	1941-11-10	441
72	30-015-00632	17S 27E 35	1630 FSL 2310 FWL CONGRESS SECTION	SRLG UNIT	LEGACY RESERVES OPER	OIL	Active	1957-09-14	2351
73	30-015-00633	17S 27E 35	330 FSL 990 FWL CONGRESS SECTION	MAGRUDER A	BP AMERICA PRODTN CO	ABD-OW	1/12/2009	1960-04-01	5671
74	30-015-00635	17S 27E 35 SW SE SE	332 FSL 990 FEL CONGRESS SECTION	MAGRUDER A	CITIES SERV CO	ABD-OW	2/11/1977	1941-12-17	504
75	30-015-00636	17S 27E 35 SE	4290 FNL 970 FEL CONGRESS SECTION	MAGRUDER	PATON BROTHERS	OIL	5/14/1948	1942-11-10	502
76	30-015-00637	17S 27E 35	329 FSL 1893 FWL CONGRESS SECTION	RUSSELL C	TARCO ENERGY LC	OIL	Active	1960-04-20	5630
77	30-015-00638	17S 27E 35	1009 FSL 2297 FWL CONGRESS SECTION	RUSSELL C	CITIES SERV CO	ABD-OW	2/21/2009	1941-11-29	431
78	30-015-00639	17S 27E 35	410 FSL 2235 FEL CONGRESS SECTION	RUSSELL C	TARCO ENERGY LC	OIL	Active	1960-05-08	5680
79	30-015-00640	17S 27E 35	450 FSL 1650 FEL CONGRESS SECTION	RUSSELL A	PATON BROTHERS	D&A-O	NA	1949-02-09	2424
80	30-015-00641	17S 27E 35 SE	395 FSL 1622 FEL CONGRESS SECTION	RUSSELL C	TARCO ENERGY LC	OIL	3/15/2011	1942-12-14	477

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Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
81	30-015-00642	17S 27E 35	1002 FSL 1633 FEL CONGRESS SECTION	RUSSELL C	CITIES SERV CO	ABD-OW	2/15/1977	1941-10-08	461
82	30-015-00643	17S 27E 35	990 FSL 2310 FEL CONGRESS SECTION	SRLG UNIT	FAIRWAY RES OPER LLC	ABD-OW	9/17/2008	1927-10-14	1623
83	30-015-00644	17S 27E 35	330 FSL 2310 FWL CONGRESS SECTION	SRLG UNIT	FAIRWAY RES OPER LLC	ABD-OW	1/19/2007	1927-08-08	1623
84	30-015-00645	17S 27E 35	330 FSL 1650 FWL CONGRESS SECTION	SRLG UNIT	LEGACY RESERVES OPER	OIL	Active	1926-05-20	1620
85	30-015-00652	17S 27E 36	1650 FNL 330 FWL CONGRESS SECTION	SRLG UNIT	LEGACY RESERVES OPER	ABD-OW	1/25/2011	1947-08-15	1634
86	30-015-00655	17S 27E 36	990 FNL 330 FWL CONGRESS SECTION	STATE	HADLOCK FRANK B	TA-O	10/30/1950	1942-02-15	531
87	30-015-00656	17S 27E 36	660 FNL 660 FWL CONGRESS SECTION	MAGRUDER-STATE	RUTTER&WILBANKS CORP	ABD-OW	9/6/1952	1947-09-21	1655
88	30-015-00657	17S 27E 36	2310 FNL 330 FWL CONGRESS SECTION	MAGRUDER-STATE	GAS WELL SERV INC	ABD-OW	4/4/2000	1941-11-08	463
89	30-015-00686	17S 27E 26	1650 FNL 990 FWL CONGRESS SECTION	TRAVIS	JOHNSTON R J	D&A-OG	NA	1940-01-15	621
90	30-015-00719	18S 27E 2	990 FNL 1980 FWL CONGRESS SECTION	STATE CE	BP AMERICA PRODTN CO	ABD-OW	12/23/2008	1959-07-05	5765
91	30-015-00725	18S 27E 2	990 FNL 990 FWL CONGRESS SECTION	STATE A	LEGACY RESERVES OPER	TA-O	Active	1944-10-23	442
92	30-015-00727	18S 27E 2	2310 FSL 330 FWL CONGRESS SECTION	STATE B	MALCO REFINERIES INC	TA-O	NOT FOUND	1946-08-12	418
93	30-015-00729	18S 27E 2	990 FNL 650 FWL CONGRESS SECTION	STATE BA	APACHE CORP	OIL	Active	1959-09-09	5695
94	30-015-00733	18S 27E 2	1980 FNL 660 FWL CONGRESS SECTION	STATE AT	APACHE CORP	OIL	Active	1958-11-24	6131
95	30-015-00736	18S 27E 2	990 FNL 2310 FWL CONGRESS SECTION	SRLG UNIT	STEPHENS&JOHNSON	OIL	3/4/1977	1944-02-25	443
96	30-015-00738	18S 27E 2	990 FNL 2310 FEL CONGRESS SECTION	WRIGHT-STATE A	CITIES SERV CO	ABD-OW	2/17/1977	1944-03-18	440
97	30-015-00739	18S 27E 2	1650 FNL 990 FWL CONGRESS SECTION	STATE E	HUDSON WILLIAM M	ABD-OW	4/3/1952	1941-12-12	442
98	30-015-00746	18S 27E 3	2310 FNL 2310 FWL CONGRESS SECTION	HUDSON A	BP AMERICA PRODTN CO	ABD-OW	8/19/2008	1959-06-08	5705
99	30-015-00747	18S 27E 3	1980 FSL 1780 FEL CONGRESS SECTION	MALCO REFINING-FED	BP AMERICA PRODTN CO	ABD-OW	7/25/2004	1959-02-25	5881
100	30-015-00748	18S 27E 3	2310 FNL 1650 FEL CONGRESS SECTION	MALCO REFINING-FED	APACHE CORP	OIL	Active	1959-08-04	5720
101	30-015-00749	18S 27E 3	982 FNL 330 FEL CONGRESS SECTION	MALCO REFINING-FED	APACHE CORP	ABD-OW	9/13/2012	1959-10-04	5661
102	30-015-00750	18S 27E 3	2310 FNL 990 FWL CONGRESS SECTION	HUDSON B	APACHE CORP	OIL	Active	1960-05-29	5665
103	30-015-00751	18S 27E 3	972 FNL 1647 FEL CONGRESS SECTION	MALCO REFINING-FED	APACHE CORP	OIL	Active	1959-10-29	5719
104	30-015-00752	18S 27E 3	597 FNL 2309 FWL CONGRESS SECTION	MALCO REFINING-FED	BP AMERICA PRODTN CO	ABD-OW	11/18/2008	1959-11-26	5711
105	30-015-00754	18S 27E 3	1980 FSL 660 FEL CONGRESS SECTION	MALCO REFINING-FED	APACHE CORP	OIL	Active	1958-12-30	6105
106	30-015-00755	18S 27E 3	1980 FNL 660 FEL CONGRESS SECTION	MALCO REFINING-FED	APACHE CORP	OIL	9/16/2003	1959-01-29	6123
107	30-015-00759	18S 27E 3	330 FNL 330 FEL CONGRESS SECTION	MALCO-FEDERAL	AMTEX ENERGY INC	D&A	Active	1954-05-04	426
108	30-015-00760	18S 27E 3	1650 FSL 990 FWL CONGRESS SECTION	MANN-FEDERAL	APACHE CORP	OIL	Active	1959-07-12	5711
109	30-015-00765	18S 27E 4	1620 FNL 2340 FEL CONGRESS SECTION	MANN	COMPTON R D	D&A-O	NOT FOUND	1935-03-14	1420
110	30-015-00768	18S 27E 4	330 FNL 990 FEL CONGRESS SECTION	MANN	HUDSON WM A&HUDSON E	TA-O	NOT FOUND	1950-02-15	565
111	30-015-00770	18S 27E 4	1592 FSL 2302 FWL CONGRESS SECTION	CHALK BLUFF DRAW UNIT	HUMBLE OIL & REFG CO	D&A	Active	1961-01-19	5620
112	30-015-00771	18S 27E 4	2194 FNL 330 FEL CONGRESS SECTION	MALCO REFINING-FED	BP AMERICA PRODTN CO	ABD-OW	2/7/2007	1960-03-28	5637
113	30-015-00772	18S 27E 4	2190 FNL 1650 FEL CONGRESS SECTION	USA MALCO RFGGAS UN	LIME ROCK RES IIA LP	OIL	Active	1961-08-13	9815
114	30-015-00774	18S 27E 4	1650 FSL 330 FEL CONGRESS SECTION	RF WINDFOHR-FEDERAL	APACHE CORP	OIL	Active	1959-08-23	5602
115	30-015-00776	18S 27E 4	1582 FSL 1645 FEL CONGRESS SECTION	RF WINDFOHR-FEDERAL	APACHE CORP	OIL	Active	1959-10-19	5630
116	30-015-00790	18S 27E 5	2310 FNL 2310 FEL CONGRESS SECTION	CARTER-COLLIEEDERAL	LIME ROCK RES IIA LP	OIL	Active	1948-05-13	2256
117	30-015-01207	18S 27E 3	250 FNL 250 FEL CONGRESS SECTION	MANN PERMIT	COMPTON R D	OIL	NOT FOUND	1926-01-01	2034
118	30-015-01208	18S 27E 3	250 FNL 1320 FEL CONGRESS SECTION	MANN	AMTEX ENERGY INC	D&A	9/7/2007	1926-02-01	2020
119	30-015-01209	18S 27E 3	2390 FSL 2390 FEL CONGRESS SECTION	CE MANN	COMPTON R D	D&A-O	NOT FOUND	1927-04-01	542
120	30-015-01210	18S 27E 3	1650 FSL 2310 FWL CONGRESS SECTION	MALCO REFINING-FED	APACHE CORP	OIL	Active	1959-05-23	5760

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Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
121	30-015-01211	18S 27E 2	330 FNL 2310 FEL CONGRESS SECTION	SRLG UNIT	LEGACY RESERVES OPER	OIL	Active	1926-11-20	1653
122	30-015-01213	18S 27E 2	300 FNL 1650 FWL CONGRESS SECTION	SRLG UNIT	S&J OPERATING CO	ABD-OW	1/22/1993	1926-08-28	1650
123	30-015-01214	18S 27E 2	330 FNL 660 FWL CONGRESS SECTION	ROSCOE-STATE	COMPTON R D	D&A-G	NOT FOUND	1927-02-22	1650
124	30-015-01222	17S 27E 35	330 FSL 2310 FEL CONGRESS SECTION	SRLG UNIT	FAIRWAY RES OPER LLC	ABD-OW	2/21/2009	1927-02-15	1688
125	30-015-01223	17S 27E 35	2310 FSL 990 FWL CONGRESS SECTION	BARRIENTOS	WILLIAMS-PLOYHAR	D&A-O	NA	1942-01-21	459
126	30-015-01225	17S 27E 35	2310 FNL 2310 FEL CONGRESS SECTION	BARRIENTOS-FEDERAL	WILLIAMS GEORGE H	ABD-OW	NA	1941-12-07	446
127	30-015-01226	17S 27E 35	990 FNL 990 FWL CONGRESS SECTION	BROOKS B	WILLIAMS-PLOYHAR	D&A	3/19/1968	1941-12-07	600
128	30-015-01227	17S 27E 35	990 FNL 2310 FEL CONGRESS SECTION	SRLG UNIT	SPEIR ARCHIE M	D&A-OG	NA	1941-12-30	453
129	30-015-01228	17S 27E 35	2310 FNL 990 FEL CONGRESS SECTION	HARBOLD-FEDERAL	WILLIAMS GEORGE H	ABD-OW	12/11/1944	1941-11-03	472
130	30-015-01229	17S 27E 35	2310 FNL 330 FEL CONGRESS SECTION	HARBOLD	WILLIAMS-PLOYHAR	D&A-O	NOT FOUND	1942-01-16	505
131	30-015-01230	17S 27E 35	330 FNL 2310 FEL CONGRESS SECTION	BARRIENTOS	WILLIAMS GEORGE	D&A	NA	1952-07-31	430
132	30-015-01231	17S 27E 35	990 FNL 1650 FEL CONGRESS SECTION	SRLG UNIT	LEGACY RESERVES OPER	OIL	Active	1947-04-15	1642
133	30-015-01232	17S 27E 34	1650 FNL 990 FEL CONGRESS SECTION	RUSSELL B	EMPIRE GAS & FUEL CO	D&A	NA	1927-01-01	2500
134	30-015-01233	17S 27E 32	330 FSL 2310 FWL CONGRESS SECTION	BRECKKE-STATE	KEINATE-BRAINARD	D&A-G	6/15/1946	1946-02-28	2822
135	30-015-01234	17S 27E 29	2300 FSL 2200 FEL CONGRESS SECTION	RICH	BRAINARD FRED	TA-OG	NA	1925-04-01	2084
136	30-015-01235	17S 27E 27	330 FNL 990 FWL CONGRESS SECTION	BERRY	KELLY ETAL	TA	NA	1927-02-15	650
137	30-015-01236	17S 27E 27	1806 FNL 2100 FWL CONGRESS SECTION	BROOKS B	WILLIAMS GEORGE	D&A-OG	NA	1942-04-16	2442
138	30-015-01237	17S 27E 27	650 FNL 330 FEL CONGRESS SECTION	BROOKS A	WILLIAMS GEORGE	D&A-O	NA	1942-03-10	620
139	30-015-01240	17S 27E 21	1980 FNL 660 FWL CONGRESS SECTION	CLIFF L DEAN-FEDERA	LATCH LEONARD	D&A-O	4/29/1960	1947-02-23	2000
140	30-015-05596	17S 27E 35	2080 FNL 560 FEL CONGRESS SECTION	SRLG UNIT	FAIRWAY RES OPER LLC	ABD-OW	9/20/2007	1954-09-13	1621
141	30-015-05962	17S 27E 26	330 FSL 990 FEL CONGRESS SECTION	HARBOLD-FEDERAL	HAYNES OWEN	J&A	1/6/1965	1951-06-09	247
142	30-015-05964	17S 27E 32	1980 FSL 1980 FWL CONGRESS SECTION	CHALK BLUFF DRAW UNIT	HUMBLE OIL & REFG CO	J&A	NOT FOUND	1956-10-12	335
143	30-015-10026	17S 27E 17	2310 FSL 1880 FEL CONGRESS SECTION	GULF-FEDERAL	TRANSMOUNTAIN PROD	D&A-O	5/13/1965	1963-05-13	9315
144	30-015-10104	17S 27E 26	660 FSL 1980 FEL CONGRESS SECTION	TRIGG-FEDERAL	SPEIR ARCHIE M	OIL	NA	1962-12-04	1620
145	30-015-10168	17S 27E 26	660 FSL 1910 FWL CONGRESS SECTION	HARBOLD	CFM OIL LLC	OIL	Active	1962-08-11	1612
146	30-015-10301	18S 27E 3	2310 FNL 660 FWL CONGRESS SECTION	HUDSON-FEDERAL B	ATLANTIC RICHFLD CO	OIL	2/26/1959	1963-11-19	2295
147	30-015-10426	17S 27E 26	660 FSL 990 FEL CONGRESS SECTION	HARBOLD	WOODEN A O	TA-G	8/28/1996	1963-05-27	1681
148	30-015-10437	18S 27E 4	930 FNL 330 FEL CONGRESS SECTION	HONDO-FEDERAL	DEVON ENERGY CORP	ABD-OW	7/2/2004	1963-10-25	2245
149	30-015-10438	18S 27E 4	2086 FNL 440 FEL CONGRESS SECTION	HONDO-FEDERAL B	LIME ROCK RES IIA LP	OIL	Active	1963-10-08	2250
150	30-015-10466	17S 27E 34	1987 FSL 1972 FWL CONGRESS SECTION	MALCO RFG-FEDERAL P	PAN AMERICAN CORP	ABD-OW	4/15/1969	1964-07-28	3200
151	30-015-10479	18S 27E 3	1650 FNL 1650 FWL CONGRESS SECTION	CARPER-FEDERAL B	ATLANTIC RICHFLD CO	OIL	3/26/1969	1963-11-27	2374
152	30-015-10623	18S 27E 2	330 FNL 990 FWL CONGRESS SECTION	ROSCOE-STATE	ATLANTIC REFG CO	D&A	6/26/1970	1926-12-10	512
153	30-015-10873	17S 27E 20	1980 FSL 660 FWL CONGRESS SECTION	FLOOD-FEDERAL	HANSON ERNST A	D&A	6/11/1976	1966-09-30	460
154	30-015-20048	17S 27E 35	990 FNL 2110 FWL CONGRESS SECTION	HARBOLD	BIRDWELL ROBERT H	TA-O	3/21/1985	1967-05-11	418
155	30-015-20104	17S 27E 35	990 FSL 990 FEL CONGRESS SECTION	SRLG UNIT	FAIRWAY RES OPER LLC	INJ	1/18/2007	1967-11-17	1726
156	30-015-20105	17S 27E 35	990 FSL 1650 FWL CONGRESS SECTION	SRLG UNIT	S&J OPERATING CO	INJ	2/24/1988	1967-11-24	1612
157	**30-015-20159**	**17S 27E 34 C SE NW**	**1980 FNL 1980 FWL CONGRESS SECTION**	**TRIGG-FEDERAL B**	**COG OPERATING LLC**	**GAS**	**Active**	**1968-08-16**	**10610**
158	30-015-20937	17S 27E 27 NW SE	1650 FSL 2310 FEL CONGRESS SECTION	HONDO FEDERAL GAS COM	COG OPERATING LLC	GAS	Active	1973-09-05	9778
159	30-015-21047	17S 27E 26 C NW SW	1980 FSL 660 FWL CONGRESS SECTION	ARCO FEDERAL GAS	COG OPERATING LLC	GAS	Active	1973-12-31	9740
160	30-015-21119	17S 27E 27	1980 FSL 860 FWL CONGRESS SECTION	HONDO FEDERAL GAS	AMOCO PROD CO	D&A-OG	1/19/1976	1975-05-21	9627

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Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
161	30-015-21358	17S 27E 35	990 FSL 1880 FWL CONGRESS SECTION	CITGO EMPR ABO U T1	BP AMERICA PRODTN CO	G-INJ	5/3/2002	1974-12-22	5600
162	30-015-21381	17S 27E 15	1980 FNL 660 FWL CONGRESS SECTION	HANAGAN FEDERAL	MWJ PRODUCING CO	D&A	11/26/1974	1974-10-04	9439
163	30-015-21443	17S 27E 22	660 FSL 1980 FEL CONGRESS SECTION	BERRY FEDERAL	MARALO INCORPORATED	D&A-G	1/15/1975	1974-12-05	9650
164	30-015-21510	17S 27E 23 N2 SW SE	700 FSL 1980 FEL CONGRESS SECTION	BERRY	ALAMO PERMIAN RES	ABD-OW	11/30/2012	1975-04-13	2210
165	30-015-21569	17S 27E 22	1980 FNL 1980 FEL CONGRESS SECTION	BERRY	LATCH LEONARD	J&A	1/15/1977	1975-09-10	200
166	30-015-21668	17S 27E 22	1968 FNL 1980 FEL CONGRESS SECTION	BERRY	LATCH LEONARD	TA	6/20/2000	1975-10-29	2210
167	30-015-22144	17S 27E 29 SW NW NE	860 FNL 1985 FEL CONGRESS SECTION	POTTER FEDERAL COM	MURCHISON O&G INC	GAS	Active	1977-06-03	9300
168	30-015-22193	17S 27E 20	1980 FSL 1980 FEL CONGRESS SECTION	YATES FEDERAL COMM	MESA PETROLEUM CO	J&A	8/4/1977	1977-06-29	445
169	30-015-22342	18S 27E 3 E2 SW NE	1980 FNL 1650 FEL CONGRESS SECTION	FEDERAL `F` GAS COM	BP AMERICA PRODTN CO	GAS		1979-11-23	9957
170	30-015-22354	17S 27E 34	1980 FSL 660 FEL CONGRESS SECTION	TRIGG FED GAS COM	AMOCO PROD CO	D&A-G		1977-12-18	9876
171	30-015-22539	17S 27E 35	980 FNL 990 FWL CONGRESS SECTION	MALCO	HAYNES OWEN	OIL		1979-04-26	410
172	30-015-22540	17S 27E 35	990 FNL 330 FWL CONGRESS SECTION	MALCO	HAYNES OWEN	AB-LOC			
173	30-015-22541	17S 27E 35	330 FNL 330 FWL CONGRESS SECTION	MALCO	HAYNES OWEN	AB-LOC			
174	30-015-22542	17S 27E 35	360 FNL 990 FWL CONGRESS SECTION	MALCO	HAYNES OWEN	AB-LOC			
175	30-015-22691	17S 27E 28	1980 FNL 660 FWL CONGRESS SECTION	BERRY FED	YATES DRILLING CO	ABD-GW		1978-10-07	9428
176	30-015-22783	17S 27E 20	1980 FSL 1995 FEL CONGRESS SECTION	YATES FEDERAL COM	MURCHISON O&G INC	2GAS		1979-01-30	9230
177	30-015-22958	17S 27E 22	1980 FSL 660 FWL CONGRESS SECTION	MARALO FEDERAL COM	MURCHISON O&G INC	GAS		1979-07-19	9554
178	30-015-22987	17S 27E 28	2130 FNL 1650 FEL CONGRESS SECTION	WILLIS FED COM	MURCHISON O&G INC	GAS		1979-10-31	9590
179	30-015-23008	17S 27E 20	1980 FNL 1980 FEL CONGRESS SECTION	PETERSON FEDRL COM	MURCHISON O&G INC	GAS		1979-09-29	9246
180	30-015-23015	17S 27E 33 SW SE NE	2080 FNL 760 FEL CONGRESS SECTION	FEDERAL /Z/ COM	COG OPERATING LLC	GAS		1979-09-25	9910
181	30-015-23053	17S 27E 19	660 FNL 660 FEL CONGRESS SECTION	HAGEN FEDERAL	COLLIER ENERGY INC	ABD-OW		1979-10-31	1850
182	30-015-23542	18S 27E 4 E2 SW NW	1980 FNL 760 FWL CONGRESS SECTION	FEDRAL `BA` GAS COM	BP AMERICA PRODTN CO	GAS		1980-12-26	9805
183	30-015-23545	17S 27E 16	660 FSL 1980 FWL CONGRESS SECTION	STATE /16/ COM	HAMON JAKE L	D&A-G		1981-01-21	9392
184	30-015-23645	17S 27E 16	1980 FSL 1980 FWL CONGRESS SECTION	MWJ /16/STATE	HAMON JAKE L	D&A		1981-01-31	230
185	30-015-23718	17S 27E 20	1980 FNL 1995 FWL CONGRESS SECTION	LGN DRW YSO`OT`FDRL	YATES DRILLING CO	ABD-OW		1981-04-20	3111
186	30-015-23855	17S 27E 27	330 FSL 330 FEL CONGRESS SECTION	ARCO FEDERAL	MARBOB ENERGY CORP	D&A-O		1981-08-13	2025
187	30-015-23892	17S 27E 15	1980 FNL 660 FEL CONGRESS SECTION	EAGLE	H & S OIL COMPANY	D&A		1981-10-22	1625
188	30-015-23893	17S 27E 15	1980 FSL 1980 FEL CONGRESS SECTION	EAGLE	H & S OIL COMPANY	AB-LOC			
189	30-015-24172	17S 27E 21 SE SW	660 FSL 2310 FWL CONGRESS SECTION	ESTELLE `TA`FEDERAL	YATES PETROLEUM CORP	GAS		1982-08-13	9430
190	30-015-24567	17S 27E 26	660 FNL 1980 FWL CONGRESS SECTION	FEDERAL `DE` GAS COM	AMOCO PROD CO	AB-LOC			
191	30-015-24581	17S 27E 15	1980 FSL 1980 FEL CONGRESS SECTION	FIVE FORKS FEDERAL	EAGLE OIL&GAS COMPAN	D&A		1983-08-28	750
192	30-015-24703	17S 27E 35	360 FNL 990 FWL CONGRESS SECTION	HEGWER	YATES JOHN A JR	ABD-OW		1984-03-02	412
193	30-015-24727	17S 27E 35	330 FNL 330 FWL CONGRESS SECTION	HEGWER	HEGWER DRLG CO INC	AB-LOC			
194	30-015-24728	17S 27E 35	990 FNL 330 FWL CONGRESS SECTION	HEGWER	HEGWER DRLG CO INC	AB-LOC			
195	30-015-24778	17S 27E 34 SW SE	360 FSL 1650 FEL CONGRESS SECTION	HARBOLD	HAYNES OWEN	D&A		1984-04-10	450
196	30-015-24932	17S 27E 34	990 FSL 1650 FEL CONGRESS SECTION	HARBOLD	HAYNES OWEN	D&A		1984-08-01	400
197	30-015-25139	17S 27E 35	1848 FNL 2282 FWL CONGRESS SECTION	HARBOLD	FREEDON ENERGY LLC	OIL		1985-01-08	398
198	30-015-25155	17S 27E 35	990 FNL 990 FEL CONGRESS SECTION	SOUTH RED LAKE (GRAYBURG) UNIT	FAIRWAY RES OPER LLC	ABD-OW		1983-09-28	2493
199	30-015-25156	17S 27E 35 NW NE	330 FNL 1661 FEL CONGRESS SECTION	SOUTH RED LAKE GRBG	LEGACY RESERVES OPER	OIL		1983-09-28	1875
200	30-015-25157	17S 27E 35	1656 FNL 1656 FEL CONGRESS SECTION	STH RD LK(GRYRG)UNT	FAIRWAY RES OPER LLC	ABD-OW		1983-01-31	1803

TABLE 1
NON-FRESHWATER (OIL AND GAS) WELLS IN WDW-4 AREA OF REVIEW
NAVAJO REFINING COMPANY, LLC
ARTESIA, NEW MEXICO

Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
201	30-015-25209	17S 27E 35	990 FNL 2200 FWL CONGRESS SECTION	HARBOLD	REATA RESOURCES	ABD-OW		1985-03-04	416
202	30-015-25374	17S 27E 35	396 FNL 2250 FWL CONGRESS SECTION	HARBOLD	REATA RESOURCES	ABD-OW		1986-02-27	407
203	30-015-26302	17S 27E 17 SW SW	660 FSL 1190 FWL CONGRESS SECTION	FEDERAL `R`	MEWBOURNE OIL CO	GAS		1990-03-13	9120
204	30-015-27224	17S 27E 35 NW SE	1980 FSL 1980 FEL CONGRESS SECTION	CHALK BLUFF `35` FEDERAL	MEWBOURNE OIL CO	GAS		1993-07-08	9963
205	30-015-27380	17S 27E 35 SE NW	1980 FNL 1650 FWL CONGRESS SECTION	CHALK BLUFF `35` FEDERAL	MEWBOURNE OIL CO	AB-LOC			
206	30-015-28286	18S 27E 4 NW NE SW	2310 FSL 1750 FWL CONGRESS SECTION	WEST RED LAKE UNIT	LIME ROCK RES IIA LP	OIL		1995-02-10	2329
207	30-015-28711	17S 27E 29	1400 FSL 750 FEL CONGRESS SECTION	TRIGG `29` FEDERAL COM	NEARBURG PROD CO	GAS		1995-11-08	9553
208	30-015-29021	17S 27E 33 NW	1650 FNL 990 FWL CONGRESS SECTION	EXXON `33` FEDERAL COM	NEARBURG PROD CO	GAS		1996-06-30	9600
209	30-015-29024	18S 27E 4	2100 FNL 1090 FWL CONGRESS SECTION	KITE `4E` FEDERAL	LIME ROCK RES IIA LP	OIL		1996-09-03	2400
210	30-015-29030	18S 27E 4	2050 FNL 2100 FWL CONGRESS SECTION	KITE `4F` FEDERAL	LIME ROCK RES IIA LP	OIL		1996-09-09	2400
211	30-015-29050	18S 27E 4	1650 FNL 990 FEL CONGRESS SECTION	HONDO `B` FEDERAL	LIME ROCK RES IIA LP	OIL		1996-09-25	2450
212	30-015-29051	18S 27E 4	330 FNL 2210 FEL CONGRESS SECTION	HONDO FEDERAL	LIME ROCK RES IIA LP	OIL		1996-10-29	2400
213	30-015-29052	18S 27E 4	990 FNL 1750 FEL CONGRESS SECTION	HONDO FEDERAL	LIME ROCK RES IIA LP	OIL		1996-10-01	2450
214	30-015-29053	18S 27E 4	1650 FNL 2310 FEL CONGRESS SECTION	HONDO FEDERAL	LIME ROCK RES IIA LP	OIL		1996-09-15	2450
215	30-015-29065	18S 27E 4	480 FNL 890 FEL CONGRESS SECTION	HONDO FEDERAL	LIME ROCK RES IIA LP	OIL		1996-10-17	2500
216	30-015-29066	18S 27E 4	1650 FNL 1650 FWL CONGRESS SECTION	KITE `4F` FEDERAL	LIME ROCK RES IIA LP	OIL		1996-10-12	2400
217	30-015-29080	17S 27E 33	990 FSL 1650 FWL CONGRESS SECTION	EAGLE `33N` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-01-05	2499
218	30-015-29081	17S 27E 33	990 FSL 2410 FEL CONGRESS SECTION	EAGLE `33O` FEDERAL	LIME ROCK RES IIA LP	OIL		1996-12-20	2499
219	30-015-29082	17S 27E 33	1140 FSL 1090 FEL CONGRESS SECTION	EAGLE `33P` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-01-04	2500
220	30-015-29083	17S 27E 34	1650 FNL 330 FWL CONGRESS SECTION	EAGLE `34E` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-02-17	2649
221	30-015-29084	17S 27E 34	1650 FNL 1650 FWL CONGRESS SECTION	EAGLE `34F` FEDERAL	LIME ROCK RES IIA LP	OIL		1996-11-23	2600
222	30-015-29085	17S 27E 34	1650 FNL 2310 FEL CONGRESS SECTION	EAGLE `34G` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-02-10	2649
223	30-015-29087	18S 27E 4	1650 FNL 280 FWL CONGRESS SECTION	KITE `4E` FEDERAL	LIME ROCK RES IIA LP	OIL		1996-10-07	2500
224	30-015-29090	17S 27E 35 NW NW SW	2310 FSL 330 FWL CONGRESS SECTION	EAGLE `35L` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-01-19	2650
225	30-015-29091	17S 27E 34	2310 FSL 990 FEL CONGRESS SECTION	EAGLE `34I` FEDERAL	LIME ROCK RES IIA LP	OIL		1996-10-23	2600
226	30-015-29094	17S 27E 33	1450 FNL 890 FEL CONGRESS SECTION	EAGLE `33H` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-02-23	2550
227	30-015-29095	17S 27E 34	330 FNL 330 FWL CONGRESS SECTION	EAGLE `34D` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-03-30	2649
228	30-015-29096	17S 27E 34	330 FNL 1650 FWL CONGRESS SECTION	EAGLE `34C` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-03-24	2648
229	30-015-29106	17S 27E 33	330 FNL 990 FEL CONGRESS SECTION	EAGLE `33A` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-04-03	2599
230	30-015-29107	17S 27E 33	1850 FNL 2310 FEL CONGRESS SECTION	EAGLE `33G` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-04-18	2549
231	30-015-29108	17S 27E 34	330 FNL 990 FEL CONGRESS SECTION	EAGLE `34A` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-03-03	2699
232	30-015-29109	17S 27E 34	530 FNL 2510 FEL CONGRESS SECTION	EAGLE `34B` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-03-16	2699
233	30-015-29110	17S 27E 34	1650 FNL 790 FEL CONGRESS SECTION	EAGLE `34H` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-03-10	2750
234	30-015-29111	17S 27E 34	2310 FSL 2310 FEL CONGRESS SECTION	EAGLE `34J` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-01-26	2649
235	30-015-29112	17S 27E 34	2110 FSL 1750 FWL CONGRESS SECTION	EAGLE `34K` FEDERAL	LIME ROCK RES IIA LP	OIL		1996-11-10	2600
236	30-015-29113	17S 27E 34	2310 FSL 330 FWL CONGRESS SECTION	EAGLE `34L` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-02-01	2499
237	30-015-29114	17S 27E 34	1090 FSL 330 FWL CONGRESS SECTION	EAGLE `34M` FEDERAL	LIME ROCK RES IIA LP	OIL		1996-12-14	2599
238	30-015-29115	17S 27E 34	990 FSL 1650 FWL CONGRESS SECTION	EAGLE `34N` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-01-11	2599
239	30-015-29126	18S 27E 3	1450 FNL 2310 FEL CONGRESS SECTION	FALCON `3G` FEDERAL	LIME ROCK RES IIA LP	OIL		1996-11-17	2600
240	30-015-29162	18S 27E 3	230 FNL 330 FWL CONGRESS SECTION	FALCON `3D` FEDERAL	LIME ROCK RES IIA LP	OIL		1996-12-07	2600

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NON-FRESHWATER (OIL AND GAS) WELLS IN WDW-4 AREA OF REVIEW
NAVAJO REFINING COMPANY, LLC
ARTESIA, NEW MEXICO

Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
241	30-015-29163	18S 27E 3	2035 FNL 1805 FEL CONGRESS SECTION	FALCON `3G` FEDERAL	LIME ROCK RES IIA LP	OIL		1996-12-01	2650
242	30-015-29164	18S 27E 3	2360 FSL 1700 FWL CONGRESS SECTION	FALCON `3K` FEDERAL	LIME ROCK RES IIA LP	OIL		1996-11-29	2599
243	30-015-29188	18S 27E 3	430 FNL 2430 FEL CONGRESS SECTION	FALCON `3B` FEDERAL	LIME ROCK RES IIA LP	OIL		1996-12-29	2599
244	30-015-29189	18S 27E 3	330 FNL 1650 FWL CONGRESS SECTION	FALCON `3C` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-01-20	2600
245	30-015-29211	17S 27E 33	1030 FNL 2310 FEL CONGRESS SECTION	EAGLE `33B` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-04-11	2549
246	30-015-29212	18S 27E 3	890 FSL 2310 FWL CONGRESS SECTION	FALCON `3N` FEDERAL	LIME ROCK RES IIA LP	OIL		1996-11-04	2650
247	30-015-29281	17S 27E 23	660 FSL 1650 FWL CONGRESS SECTION	OXY VIKING FEDERAL	OXY USA WTP LP	GAS		1996-12-28	9650
248	30-015-29334	17S 27E 28	1650 FSL 1650 FWL CONGRESS SECTION	BERRY `28` FEDERAL COM	NEARBURG PROD CO	ABD-GW		1997-01-26	9570
249	30-015-29368	17S 27E 32	1090 FNL 990 FEL CONGRESS SECTION	CHEVRON `32` STATE COM	NEARBURG PROD CO	GAS		1997-02-28	9570
250	30-015-29421	17S 27E 32	1980 FSL 990 FEL CONGRESS SECTION	SANDY CROSSING `32` STATE COM	NEARBURG PROD CO	OIL		1997-07-31	9600
251	30-015-29542	18S 27E 3	990 FNL 1880 FEL CONGRESS SECTION	FALCON `3B` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-05-31	2800
252	30-015-29543	18S 27E 3	790 FNL 2290 FWL CONGRESS SECTION	FALCON `3C` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-06-12	2650
253	30-015-29544	18S 27E 3	840 FNL 990 FWL CONGRESS SECTION	FALCON `3D` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-06-06	2650
254	30-015-29545	18S 27E 3	1687 FNL 376 FEL CONGRESS SECTION	FALCON `3H` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-07-02	2793
255	30-015-29546	18S 27E 3	2310 FSL 2410 FEL CONGRESS SECTION	FALCON `3J` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-06-17	2699
256	30-015-29574	18S 27E 3	1850 FSL 2120 FWL CONGRESS SECTION	FALCON `3K` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-08-27	2700
257	30-015-29576	18S 27E 3 NW SW SE	930 FSL 2510 FEL CONGRESS SECTION	HAWK `3O` FEDERAL	DEVON ENERGY PROD	AB-LOC			
258	30-015-29591	17S 27E 21	2230 FSL 660 FEL CONGRESS SECTION	OXY KNIGHT FEDERAL	OXY USA WTP LP	GAS		1997-06-19	9410
259	30-015-29593	17S 27E 33	990 FNL 330 FEL CONGRESS SECTION	EAGLE `33A` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-09-10	2600
260	30-015-29594	17S 27E 33	330 FNL 1670 FEL CONGRESS SECTION	EAGLE `33B` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-09-20	2620
261	30-015-29595	17S 27E 33 SW NE	2460 FNL 1350 FEL CONGRESS SECTION	EAGLE `33G` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-11-01	2550
262	30-015-29596	17S 27E 33	2435 FNL 531 FEL CONGRESS SECTION	EAGLE `33H` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-06-26	2550
263	30-015-29597	17S 27E 33	230 FSL 2140 FWL CONGRESS SECTION	EAGLE `33N` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-07-02	2499
264	30-015-29598	17S 27E 33	330 FSL 1850 FEL CONGRESS SECTION	EAGLE `33O` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-07-08	2499
265	30-015-29599	17S 27E 33	430 FSL 330 FEL CONGRESS SECTION	EAGLE `33P` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-07-17	2500
266	30-015-29630	17S 27E 27	1650 FNL 1650 FWL CONGRESS SECTION	EAGLE `27F` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-09-09	2707
267	30-015-29631	17S 27E 34 SE NW NW	990 FNL 1065 FWL CONGRESS SECTION	EAGLE `34D` FEDERAL	DEVON ENERGY PROD	AB-LOC			
268	30-015-29632	17S 27E 34	2310 FNL 1240 FWL CONGRESS SECTION	EAGLE `34E` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-11-15	2650
269	30-015-29633	17S 27E 35	1820 FSL 960 FWL CONGRESS SECTION	EAGLE `35L FEDERAL	LIME ROCK RES IIA LP	OIL		1997-09-02	2700
270	30-015-29635	17S 27E 34 SE NW	2310 FNL 2420 FWL CONGRESS SECTION	EAGLE `34F` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-09-16	2715
271	30-015-29636	17S 27E 34	2310 FNL 1600 FEL CONGRESS SECTION	EAGLE `34G` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-12-07	2700
272	30-015-29641	17S 27E 34 NE NW SE	1690 FSL 1650 FEL CONGRESS SECTION	EAGLE `34J` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-10-17	2700
273	30-015-29642	17S 27E 34	1790 FSL 2270 FWL CONGRESS SECTION	EAGLE `34K` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-11-30	2700
274	30-015-29643	17S 27E 34 SW	1740 FSL 1065 FWL CONGRESS SECTION	EAGLE `34L` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-10-24	2650
275	30-015-29644	17S 27E 34	330 FSL 990 FWL CONGRESS SECTION	EAGLE `34M` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-08-13	2600
276	30-015-29645	17S 27E 34	330 FSL 2220 FWL CONGRESS SECTION	EAGLE `34N` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-08-19	2600
277	30-015-29650	18S 27E 5	990 FNL 2310 FWL CONGRESS SECTION	CHALK FEDERAL	LRE OPERATING LLC	OIL		2000-10-18	3450
278	30-015-29651	18S 27E 5 NW NE NW	330 FNL 1650 FWL CONGRESS SECTION	CHALK FEDERAL	LRE OPERATING LLC	OIL		2001-06-13	3393
279	30-015-29654	17S 27E 34	2310 FNL 430 FEL CONGRESS SECTION	EAGLE `34H` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-09-24	2700
280	30-015-29655	17S 27E 34	1740 FSL 280 FEL CONGRESS SECTION	EAGLE `34I` FEDERAL	LIME ROCK RES IIA LP	OIL		1997-08-26	2700

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NON-FRESHWATER (OIL AND GAS) WELLS IN WDW-4 AREA OF REVIEW
NAVAJO REFINING COMPANY, LLC
ARTESIA, NEW MEXICO

Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
281	30-015-29669	17S 27E 34	1040 FSL 180 FEL CONGRESS SECTION	EAGLE `34A` FEDERAL	DEVON ENERGY CORP	AB-LOC			
282	30-015-29670	17S 27E 34 SE SW NE	890 FNL 1500 FEL CONGRESS SECTION	EAGLE `34B` FEDERAL	DEVON ENERGY CORP	AB-LOC			
283	30-015-29671	17S 27E 34	990 FNL 2240 FWL CONGRESS SECTION	EAGLE `34C` FEDERAL	DEVON ENERGY CORP	AB-LOC			
284	30-015-29706	18S 27E 5 E2 SE NW	1980 FNL 2310 FWL CONGRESS SECTION	CHALK FEDERAL	LRE OPERATING LLC	OIL		2000-10-10	3221
285	30-015-29801	18S 27E 3	1650 FNL 330 FWL CONGRESS SECTION	RED LAKE `3` FEDERAL	APACHE CORP	ABD-OW		1997-11-05	3645
286	30-015-29802	18S 27E 3	2005 FNL 990 FWL CONGRESS SECTION	RED LAKE `3` FEDERAL	APACHE CORP	OIL		1997-10-27	3600
287	30-015-29846	17S 27E 15	1650 FSL 1980 FWL CONGRESS SECTION	OXY THOR FEDERAL	OXY USA WTP LP	GAS		1998-03-13	9500
288	30-015-29848	17S 27E 21	1650 FNL 1650 FWL CONGRESS SECTION	OXY BRAVEHEART FEDERAL	OXY U S A INC	D&A-OG		1998-01-02	9316
289	30-015-29936	17S 27E 27 NE NE	330 FNL 840 FEL CONGRESS SECTION	EAGLE `27` FEDERAL	LIME ROCK RES IIA LP	OIL		1998-10-15	2700
290	30-015-29937	17S 27E 27 NW NE	330 FNL 2310 FEL CONGRESS SECTION	EAGLE `27B` FEDERAL	LIME ROCK RES IIA LP	OIL		1998-01-22	2750
291	30-015-29938	17S 27E 27 NE NW	330 FNL 1650 FWL CONGRESS SECTION	EAGLE `27C` FEDERAL	DEVON ENERGY CORP	AB-LOC			
292	30-015-29939	17S 27E 27 NW NW	330 FNL 330 FWL CONGRESS SECTION	EAGLE `27D` FEDERAL	DEVON ENERGY CORP	AB-LOC			
293	30-015-29940	17S 27E 27 SW NW	1650 FNL 530 FWL CONGRESS SECTION	EAGLE `27E` FEDERAL	DEVON ENERGY CORP	AB-LOC			
294	30-015-29941	17S 27E 27 SW NE	1650 FNL 2310 FEL CONGRESS SECTION	EAGLE `27G` FEDERAL	DEVON ENERGY CORP	AB-LOC			
295	30-015-29942	17S 27E 27 SE NE	1450 FNL 990 FEL CONGRESS SECTION	EAGLE `27H` FEDERAL	DEVON ENERGY CORP	AB-LOC			
296	30-015-29978	18S 27E 5 SW NE	2110 FNL 1600 FEL CONGRESS SECTION	CARTER COLLIER `5` FEDERAL	LIME ROCK RES IIA LP	OIL		1998-02-25	2450
297	30-015-29983	18S 27E 5 SE NE	2310 FNL 330 FEL CONGRESS SECTION	CARTER COLLIER `5` FEDERAL	LIME ROCK RES IIA LP	OIL		1998-01-28	2450
298	30-015-29984	18S 27E 5 NE NE	990 FNL 330 FEL CONGRESS SECTION	CARTER COLLIER `5` FEDERAL	LIME ROCK RES IIA LP	OIL		1998-02-04	2500
299	30-015-29990	18S 27E 4 NW NW	990 FNL 990 FWL CONGRESS SECTION	WEST RED LAKE `4` FEDERAL	APACHE CORP	OIL		1998-06-13	2350
300	30-015-29994	18S 27E 5 SW NE	1650 FNL 2310 FEL CONGRESS SECTION	CARTER COLLIER `5` FEDERAL	LIME ROCK RES IIA LP	OIL		1998-02-18	2450
301	30-015-29995	18S 27E 5 NW NE	330 FNL 2360 FEL CONGRESS SECTION	CARTER COLLIER `5` FEDERAL	LIME ROCK RES IIA LP	OIL		1998-04-22	2455
302	30-015-29996	18S 27E 5 SE NE	1650 FNL 990 FEL CONGRESS SECTION	CARTER COLLIER `5` FEDERAL	LIME ROCK RES IIA LP	OIL		1998-02-11	2600
303	30-015-30012	17S 27E 33 SE SE NW	2310 FNL 2200 FWL CONGRESS SECTION	EVARTS `33` FEDERAL	DEVON ENERGY PROD	AB-LOC			
304	30-015-30013	17S 27E 33 SE NE NW	990 FNL 2150 FWL CONGRESS SECTION	EVARTS `33` FEDERAL	DEVON ENERGY PROD	AB-LOC			
305	30-015-30019	17S 27E 33 SE NW	1650 FNL 1650 FWL CONGRESS SECTION	EVARTS `33` FEDERAL	DEVON ENERGY CORP	AB-LOC			
306	30-015-30044	17S 27E 33 SE NW SW	1650 FSL 990 FWL CONGRESS SECTION	EVARTS `33` FEDERAL	DEVON ENERGY PROD	AB-LOC			
307	30-015-30046	17S 27E 33 NE SW	1650 FSL 2310 FWL CONGRESS SECTION	COMPTON `33` FEDERAL	LIME ROCK RES IIA LP	OIL		1998-03-25	2500
308	30-015-30047	17S 27E 33 NE SW	2310 FSL 1650 FWL CONGRESS SECTION	COMPTON `33` FEDERAL	LIME ROCK RES IIA LP	OIL		1998-04-16	2550
309	30-015-30101	17S 27E 33 SE SW NW	2310 FNL 990 FWL CONGRESS SECTION	EVARTS `33` FEDERAL	DEVON ENERGY PROD	AB-LOC			
310	30-015-30102	18S 27E 5 NW NE	990 FNL 1650 FEL CONGRESS SECTION	CARTER COLLIER `5` FEDERAL	LIME ROCK RES IIA LP	OIL		1998-03-03	2450
311	30-015-30103	18S 27E 5 NE NE	330 FNL 990 FEL CONGRESS SECTION	CARTER COLLIER `5` FEDERAL	LIME ROCK RES IIA LP	OIL		1998-03-18	2458
312	30-015-30105	17S 27E 33 NW NE NW	330 FNL 1650 FWL CONGRESS SECTION	EVARTS `33` FEDERAL	DEVON ENERGY PROD	AB-LOC			
313	30-015-30106	17S 27E 33 NW NW SW	2310 FSL 330 FWL CONGRESS SECTION	EVARTS `33` FEDERAL	DEVON ENERGY PROD	AB-LOC			
314	30-015-30107	17S 27E 33 SE NW NW	990 FNL 990 FWL CONGRESS SECTION	EVARTS `33` FEDERAL	DEVON ENERGY PROD	AB-LOC			
315	30-015-30108	17S 27E 33 NW NW NW	330 FNL 330 FWL CONGRESS SECTION	EVARTS `33` FEDERAL	DEVON ENERGY PROD	AB-LOC			
316	30-015-30124	17S 27E 33 NW SW NW	1650 FNL 330 FWL CONGRESS SECTION	EVARTS `33` FEDERAL	DEVON ENERGY PROD	AB-LOC			
317	30-015-30134	18S 27E 4 NE NW	990 FNL 2310 FWL CONGRESS SECTION	WEST RED LAKE `4` FEDERAL	APACHE CORP	OIL		1998-06-19	2320
318	30-015-30135	18S 27E 3 SE NW	2310 FNL 2110 FWL CONGRESS SECTION	VERMILLION `3` FEDERAL	APACHE CORP	OIL		1998-06-24	2500
319	30-015-30150	18S 27E 4 NW SW	2210 FSL 330 FWL CONGRESS SECTION	LAGO ROSA `4` FEDERAL	APACHE CORP	OIL		1998-06-08	2300
320	30-015-30151	18S 27E 3 SE NW	1650 FNL 1750 FWL CONGRESS SECTION	VERMILLION `3` FEDERAL	APACHE CORP	OIL		1998-07-02	2450

TABLE 1
NON-FRESHWATER (OIL AND GAS) WELLS IN WDW-4 AREA OF REVIEW
NAVAJO REFINING COMPANY, LLC
ARTESIA, NEW MEXICO

Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
321	30-015-30179	17S 27E 16 NW NE	660 FNL 1650 FEL CONGRESS SECTION	OXY CELTIC STATE	OXY U S A INC	AB-LOC			
322	30-015-30181	17S 27E 26 N2 SW NW	1650 FNL 660 FWL CONGRESS SECTION	OXY CHARLEMAGNE FEDERAL	OXY USA WTP LP	GAS		1998-06-23	9660
323	30-015-30186	18S 27E 4 NE NW	330 FNL 1650 FWL CONGRESS SECTION	WEST RED LAKE `4` FEDERAL	ARCO PERMIAN	OIL		1998-05-22	3350
324	30-015-30202	17S 27E 32 SE SW	330 FSL 2010 FWL CONGRESS SECTION	HEARD STATE	DEVON ENERGY CORP	AB-LOC			
325	30-015-30203	17S 27E 32 SE SW	990 FSL 1900 FWL CONGRESS SECTION	HEARD STATE	DEVON ENERGY CORP	AB-LOC			
326	30-015-30263	17S 27E 15 NW SE	1650 FSL 1980 FEL CONGRESS SECTION	LOGAN `ASO` FEDERAL COM	YATES PETROLEUM CORP	GAS		1998-06-22	9520
327	30-015-30386	17S 27E 23 E2 NW NE	660 FNL 1650 FEL CONGRESS SECTION	OXY WODEN FEDERAL	OXY U S A INC	D&A		1999-07-15	9630
328	30-015-30389	18S 27E 2 NE NW	380 FNL 1750 FWL CONGRESS SECTION	LOGAN `2` STATE	DEVON ENERGY CORP	AB-LOC			
329	30-015-30406	18S 27E 2 NW	990 FNL 1750 FWL CONGRESS SECTION	LOGAN `2` STATE	LIME ROCK RES IIA LP	OIL		1999-10-02	3710
330	30-015-30407	17S 27E 35 NE SE	2310 FSL 480 FEL CONGRESS SECTION	LOGAN `35` FEDERAL	DEVON ENERGY CORP	AB-LOC			
331	30-015-30408	17S 27E 35 NE NW SE	2210 FSL 1650 FEL CONGRESS SECTION	LOGAN `35` FEDERAL	LIME ROCK RES IIA LP	OIL		2000-10-03	3807
332	30-015-30409	17S 27E 35 NW SW SE	990 FSL 2100 FEL CONGRESS SECTION	LOGAN `35B` FEDERAL	LIME ROCK RES IIA LP	OIL		1998-11-07	3397
333	30-015-30410	18S 27E 3 NW NW SW	2178 FSL 330 FWL CONGRESS SECTION	MANN `3` FEDERAL	LIME ROCK RES IIA LP	OIL		2001-05-21	3630
334	30-015-30411	18S 27E 4 SE NE SE	1850 FSL 330 FEL CONGRESS SECTION	WINDFOHR `4` FEDERAL	LIME ROCK RES IIA LP	OIL		2000-11-01	3800
335	30-015-30421	17S 27E 14 NE SW	1980 FSL 2080 FWL CONGRESS SECTION	SHARMU STATE COMM	SOUTHWESTERN ENRG PR	AB-LOC			
336	30-015-30436	17S 27E 35 NW NE SE	2100 FSL 840 FEL CONGRESS SECTION	LOGAN `35` FEDERAL	LIME ROCK RES IIA LP	OIL		2000-03-07	3725
337	30-015-30437	17S 27E 35 SW NW SE	1650 FSL 2050 FEL CONGRESS SECTION	LOGAN `35` FEDERAL	LIME ROCK RES IIA LP	OIL		1999-08-24	4400
338	30-015-30438	17S 27E 35 SW NE SW	1750 FSL 1680 FWL CONGRESS SECTION	LOGAN 35 FEDERAL	LIME ROCK RES IIA LP	OIL		1998-12-04	3597
339	30-015-30439	17S 27E 35 SE SW	1090 FSL 2120 FWL CONGRESS SECTION	LOGAN `35B` FEDERAL	LIME ROCK RES IIA LP	OIL		2000-12-16	3800
340	30-015-30440	17S 27E 35 SW SE SW	650 FSL 1800 FWL CONGRESS SECTION	LOGAN `35B` FEDERAL	LIME ROCK RES IIA LP	OIL		1999-09-21	3710
341	30-015-30441	18S 27E 3 NW SW	1575 FSL 330 FWL CONGRESS SECTION	MANN `3` FEDERAL	DEVON ENERGY CORP	AB-LOC			
342	30-015-30442	18S 27E 3 NW SW SW	1024 FSL 330 FWL CONGRESS SECTION	MANN `3` FEDERAL	LIME ROCK RES IIA LP	OIL		2001-05-29	3650
343	30-015-30460	18S 27E 4 NW SE SE	1140 FSL 1105 FEL CONGRESS SECTION	WINDFOHR `4` FEDERAL	LIME ROCK RES IIA LP	2OIL		2001-04-20	3620
344	30-015-30463	18S 27E 4 SW NE	2310 FNL 2250 FEL CONGRESS SECTION	HONDO FEDERAL	LIME ROCK RES IIA LP	OIL		1998-12-26	2500
345	30-015-30464	17S 27E 30 C SE SE	660 FSL 660 FEL CONGRESS SECTION	DOSEQUIS `ASQ` FEDERAL COM	YATES PETROLEUM CORP	GAS		1999-02-19	9370
346	30-015-30466	17S 27E 35 SW SE	650 FSL 2410 FEL CONGRESS SECTION	LOGAN `35` FEDERAL	DEVON ENERGY CORP	AB-LOC			
347	30-015-30467	18S 27E 4 NE SE	2185 FSL 974 FEL CONGRESS SECTION	WINDFOHR `4` FEDERAL	LIME ROCK RES IIA LP	OIL		2000-10-22	3800
348	30-015-30468	18S 27E 4 NW SE	2199 FSL 2278 FEL CONGRESS SECTION	WINDFOHR `4` FEDERAL	LIME ROCK RES IIA LP	OIL		2000-11-10	3800
349	30-015-30474	18S 27E 4 SW NW SE	1650 FSL 2200 FEL CONGRESS SECTION	WINDFOHR `4` FEDERAL	LIME ROCK RES IIA LP	OIL		2001-04-30	3645
350	30-015-30475	17S 27E 35 NW NE SW	2210 FSL 1950 FWL CONGRESS SECTION	LOGAN `35` FEDERAL	LIME ROCK RES IIA LP	OIL		2000-12-27	3800
351	30-015-30476	17S 27E 14 NW SW	1980 FSL 990 FWL CONGRESS SECTION	DUKE `ARP` FEDERAL COM	LRE OPERATING LLC	GAS		1998-11-30	9720
352	30-015-30509	18S 27E 4 NE SW	1750 FSL 1650 FWL CONGRESS SECTION	WEST RED LAKE UNIT	DEVON ENERGY CORP	AB-LOC			
353	30-015-30532	17S 27E 22 SW NE	1650 FNL 1650 FEL CONGRESS SECTION	MARALO FEDERAL	MURCHISON O&G INC	GAS		1998-12-19	9650
354	30-015-30539	18S 27E 4 NE NE	990 FNL 990 FEL CONGRESS SECTION	HONDO FEDERAL	DEVON ENERGY CORP	AB-LOC			
355	30-015-30542	18S 27E 4 NW NW	330 FNL 660 FWL CONGRESS SECTION	WEST RED LAKE `4` FEDERAL	ARCO PERMIAN	AB-LOC			
356	30-015-30554	17S 27E 33 SW SW	890 FSL 430 FWL CONGRESS SECTION	SCARLET `33` FEDERAL	ARCO PERMIAN	AB-LOC			
357	30-015-30555	17S 27E 33 SW SW	330 FSL 990 FWL CONGRESS SECTION	SCARLET `33` FEDERAL	ARCO PERMIAN	AB-LOC			
358	30-015-30617	17S 27E 16 SW NW	1650 FNL 660 FWL CONGRESS SECTION	OXY CELTIC STATE	OXY USA WTP LP	GAS		1999-05-17	9168
359	30-015-30712	17S 27E 30 SW NE	1957 FNL 1650 FEL CONGRESS SECTION	LOGAN DRAW `30G` FEDERAL COM	DEVON ENERGY CORP	AB-LOC			
360	30-015-30720	17S 27E 16 SE NW SW	1780 FSL 720 FWL CONGRESS SECTION	OXY BIG RED STATE	OXY U S A INC	D&A-G		1999-08-19	9210

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NAVAJO REFINING COMPANY, LLC
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Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
361	30-015-30722	17S 27E 16 S2 NE SE	1700 FSL 660 FEL CONGRESS SECTION	OXY IJAM STATE	OXY USA WTP LP	GAS		2000-04-20	9480
362	30-015-30735	17S 27E 35 SW SW	990 FSL 990 FWL CONGRESS SECTION	LOGAN `35` FEDERAL	LIME ROCK RES IIA LP	OIL		2000-10-12	3700
363	30-015-30736	17S 27E 35 SW SW	330 FSL 500 FWL CONGRESS SECTION	LOGAN `35` FEDERAL	LIME ROCK RES IIA LP	OIL		1999-10-12	3700
364	30-015-30749	17S 27E 35 SE SE	1310 FSL 400 FEL CONGRESS SECTION	LOGAN `35` FEDERAL	LIME ROCK RES IIA LP	OIL		2000-12-08	3800
365	30-015-30750	17S 27E 35 SE SE	580 FSL 1030 FEL CONGRESS SECTION	LOGAN `35` FEDERAL	LIME ROCK RES IIA LP	OIL		2000-11-30	3800
366	30-015-30752	17S 27E 17 NE SE	1980 FSL 660 FEL CONGRESS SECTION	FEDERAL `R`	MEWBOURNE OIL CO	D&A		1999-09-16	9210
367	30-015-30768	17S 27E 29 SW NW	1980 FNL 660 FWL CONGRESS SECTION	POTTER FEDERAL	MURCHISON O&G INC	D&A		1999-10-05	9270
368	30-015-30771	17S 27E 21 NW NW	660 FNL 660 FWL CONGRESS SECTION	OXY EXCALIBUR FEDERAL	OXY U S A INC	D&A-G		2000-05-22	9340
369	30-015-30786	17S 27E 22 S2 NW NW	790 FNL 660 FWL CONGRESS SECTION	MARALO FEDERAL	MURCHISON O&G INC	GAS		1999-11-09	9490
370	30-015-30795	17S 27E 22 S2 NE SE	1830 FSL 660 FEL CONGRESS SECTION	MARALO FEDERAL	MURCHISON O&G INC	ABD-GW		1999-12-10	9720
371	30-015-30812	17S 27E 25 SE SW SW	330 FSL 940 FWL CONGRESS SECTION	BEECH FEDERAL	COG OPERATING LLC	OIL		1999-11-19	7244
372	30-015-30832	17S 27E 28 C SE SE	660 FSL 660 FEL CONGRESS SECTION	WILLIS FEDERAL	MURCHISON O&G INC	GAS		2000-01-13	9665
373	30-015-30882	17S 27E 26 NE SE	1980 FSL 660 FEL CONGRESS SECTION	OXY HARVESTER FEDERAL	OXY USA WTP LP	GAS		2000-03-07	9820
374	30-015-30907	17S 27E 36 E2 NW NW	660 FNL 860 FWL CONGRESS SECTION	NO BLUFF STATE COM	LIME ROCK RES A LP	GAS		2000-01-19	9917
375	30-015-30908	17S 27E 23 C NW NW	660 FNL 660 FWL CONGRESS SECTION	OXY ROSENKAVLIER FEDERAL	OXY USA WTP LP	GAS		2000-02-05	9800
376	30-015-30956	17S 27E 26 NE NW NE	530 FNL 1650 FEL CONGRESS SECTION	TRIGG FEDERAL	S D X RESOURCES INC	OIL		2000-05-01	3600
377	30-015-31038	17S 27E 30 N2 SE NE	1650 FNL 660 FEL CONGRESS SECTION	LOGAN DRAW `30` FEDERAL COM	NEARBURG PROD CO	GAS		2000-04-05	9380
378	30-015-31113	17S 27E 23 NE SW NE	1650 FNL 1650 FEL CONGRESS SECTION	BERRY FEDERAL	HANSON ENERGY	ABD-OW		2000-05-09	3075
379	30-015-31114	17S 27E 24 SW NW SW	1650 FSL 480 FWL CONGRESS SECTION	BERRY `A` FEDERAL	S D X RESOURCES INC	AB-LOC			
380	30-015-31178	17S 27E 23 NE NW SE	2310 FSL 1650 FEL CONGRESS SECTION	BERRY FEDERAL	S D X RESOURCES INC	AB-LOC			
381	30-015-31193	17S 27E 26 SW SW NE	2310 FNL 1650 FEL CONGRESS SECTION	TRIGG FEDERAL	S D X RESOURCES INC	ABD-OW		2000-08-28	3690
382	30-015-31220	17S 27E 19 NW SE SE	810 FSL 740 FEL CONGRESS SECTION	LOGAN DRAW `19` FEDERAL COM	NEARBURG PROD CO	D&A		2001-01-31	9190
383	30-015-31296	17S 27E 20 SE NW SW	1700 FSL 1140 FWL CONGRESS SECTION	LOGAN DRAW `20` FEDERAL	MURCHISON O&G INC	GAS		2000-10-28	9190
384	30-015-31388	17S 27E 26 NW NW SE	2050 FSL 2240 FEL CONGRESS SECTION	TRIGG FEDERAL	S D X RESOURCES INC	AB-LOC			
385	30-015-31531	17S 27E 15 NW SE NE	1600 FNL 1260 FEL CONGRESS SECTION	LOGAN `ASO` FEDERAL COM	LRE OPERATING LLC	GAS		2001-01-05	9550
386	30-015-31533	17S 27E 16 C NE NE	660 FNL 660 FEL CONGRESS SECTION	OXY IJAM STATE	OXY U S A INC	AB-LOC			
387	30-015-31571	17S 27E 26 SW SW SE	330 FSL 2210 FEL CONGRESS SECTION	TRIGG FEDERAL	S D X RESOURCES INC	D&A		2001-04-18	3805
388	30-015-31637	18S 27E 5 SW NE NE	990 FNL 990 FEL CONGRESS SECTION	CHALK BLUFF DRAW FEDERAL	S D X RESOURCES INC	AB-LOC			
389	30-015-31734	17S 27E 34 NE NW SE	2310 FSL 1650 FEL CONGRESS SECTION	EAGLE 34 FEDERAL	DEVON ENERGY PROD	OIL		2004-05-14	3475
390	30-015-31735	17S 27E 34 NE NE SE	2310 FSL 330 FEL CONGRESS SECTION	EAGLE `34` FEDERAL	LIME ROCK RES IIA LP	OIL		2003-02-17	3835
391	30-015-31736	17S 27E 34 SW NW SE	1650 FSL 2310 FEL CONGRESS SECTION	EAGLE `34` FEDERAL	LIME ROCK RES IIA LP	OIL		2003-01-28	3814
392	30-015-31747	17S 27E 34 SW NE SE	1650 FSL 990 FEL CONGRESS SECTION	EAGLE 34 I FEDERAL	LIME ROCK RES IIA LP	OIL		2004-07-20	3514
393	30-015-31748	17S 27E 34 NE SE SW	990 FSL 2310 FWL CONGRESS SECTION	EAGLE `34` FEDERAL	DEVON ENERGY PROD	AB-LOC			
394	30-015-31749	17S 27E 34 SW SE SW	430 FSL 1650 FWL CONGRESS SECTION	EAGLE `34` FEDERAL	DEVON ENERGY PROD	AB-LOC			
395	30-015-31761	17S 27E 35 NE NW SW	2310 FSL 990 FWL CONGRESS SECTION	EAGLE `35` FEDERAL	LIME ROCK RES IIA LP	OIL		2003-02-08	3804
396	30-015-31762	17S 27E 35 SW NW SW	1800 FSL 430 FWL CONGRESS SECTION	EAGLE `35` FEDERAL	DEVON ENERGY PROD	AB-LOC			
397	30-015-31763	17S 27E 34 NE SW SW	990 FSL 990 FWL CONGRESS SECTION	EAGLE `34` FEDERAL	DEVON ENERGY PROD	AB-LOC			
398	30-015-31764	17S 27E 34 SW SW SW	330 FSL 330 FWL CONGRESS SECTION	EAGLE `34` FEDERAL	DEVON ENERGY PROD	AB-LOC			
399	30-015-31963	18S 27E 3 SW NE NE	990 FNL 990 FEL CONGRESS SECTION	MALCO `A`	AMTEX ENERGY INC	AB-LOC			
400	30-015-31964	18S 27E 3 SE NE NE	870 FNL 360 FEL CONGRESS SECTION	MALCO `A`	AMTEX ENERGY INC	AB-LOC			

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NAVAJO REFINING COMPANY, LLC
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Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
401	30-015-31965	18S 27E 3 NE NE NE	330 FNL 420 FEL CONGRESS SECTION	MALCO A	AMTEX ENERGY INC	OIL		2003-04-15	2629
402	30-015-31967	18S 27E 2 SE NW NW	990 FNL 990 FWL CONGRESS SECTION	BPO STATE COM	MARBOB ENERGY CORP	GAS		2001-09-18	10172
403	30-015-32069	17S 27E 25 NW SW	1770 FSL 990 FWL CONGRESS SECTION	FIR FEDERAL	COG OPERATING LLC	OIL		2001-12-03	7208
404	30-015-32071	18S 27E 2 NW NW NW	330 FNL 330 FWL CONGRESS SECTION	MJ STATE	APACHE CORP	GAS		2001-11-08	3875
405	30-015-32179	18S 27E 2 NE NW NW	330 FNL 915 FWL CONGRESS SECTION	MJ STATE	APACHE CORP	OIL		2002-05-04	3923
406	30-015-32218	18S 27E 2 NW SW NW	1650 FNL 330 FWL CONGRESS SECTION	SB STATE	APACHE CORP	OIL		2002-05-13	3912
407	30-015-32231	18S 27E 2 NW SE NW	1960 FNL 1650 FWL CONGRESS SECTION	TDF STATE	APACHE CORP	OIL		2002-08-08	4022
408	30-015-32494	17S 27E 33 E2 SW SE	660 FSL 1830 FEL CONGRESS SECTION	FEDERAL `Z`	COG OPERATING LLC	GAS		2002-11-30	9790
409	30-015-32495	17S 27E 34 C SW SW	660 FSL 660 FWL CONGRESS SECTION	TRIGG B FEDERAL	COG OPERATING LLC	GAS		2003-01-01	9930
410	30-015-32551	17S 27E 25 NE SW SW	990 FSL 990 FWL CONGRESS SECTION	ENRON FEDERAL	LRE OPERATING LLC	OIL		2009-03-04	3223
411	30-015-32614	17S 27E 27 S2 NW NE	1260 FNL 1980 FEL CONGRESS SECTION	HONDO FEDERAL GAS COM	RICKS EXPL INC	D&A		2003-05-17	9670
412	30-015-32662	17S 27E 25 SW SW SW	330 FSL 330 FWL CONGRESS SECTION	ENRON FEDERAL	LRE OPERATING LLC	OIL		2003-04-07	3220
413	30-015-32836	17S 27E 35 SW NW SW	1800 FSL 430 FWL CONGRESS SECTION	EAGLE 35 FEDERAL	LIME ROCK RES IIA LP	OIL		2004-07-31	3542
414	30-015-32837	17S 27E 35 SW SE NW	2310 FNL 1750 FWL CONGRESS SECTION	EAGLE 35F FEDERAL	LIME ROCK RES IIA LP	OIL		2003-08-05	3505
415	30-015-32838	17S 27E 35 NE SE NW	1750 FNL 2160 FWL CONGRESS SECTION	EAGLE 35 FEDERAL	LIME ROCK RES IIA LP	OIL		2004-02-10	3520
416	30-015-32839	17S 27E 34 NE SW SW	990 FSL 990 FWL CONGRESS SECTION	EAGLE 34 M FEDERAL	LIME ROCK RES IIA LP	OIL		2004-06-12	3520
417	30-015-32840	17S 27E 34 NE SE SW	990 FSL 2310 FWL CONGRESS SECTION	EAGLE 34 FEDERAL	LIME ROCK RES IIA LP	OIL		2003-07-13	3500
418	30-015-32841	17S 27E 34 SW SW SW	330 FSL 330 FWL CONGRESS SECTION	EAGLE 34 FEDERAL	LIME ROCK RES IIA LP	OIL		2004-01-29	3518
419	30-015-32842	17S 27E 34 SW SE SW	430 FSL 1650 FWL CONGRESS SECTION	EAGLE 34 FEDERAL	DEVON ENERGY CORP	OIL		2004-05-04	3531
420	30-015-32861	17S 27E 35 SW SE NE	2300 FNL 990 FEL CONGRESS SECTION	MIDNIGHT MATADOR	LEGACY RESERVES OPER	OIL		2003-08-18	2443
421	30-015-32871	17S 27E 34 NE SE SE	990 FSL 330 FEL CONGRESS SECTION	EAGLE 34 FEDERAL	LIME ROCK RES IIA LP	OIL		2003-07-24	3476
422	30-015-32927	17S 27E 25 SW SE NW	2310 FNL 1650 FWL CONGRESS SECTION	DOGWOOD FEDERAL	COG OPERATING LLC	OIL		2003-10-27	7331
423	30-015-32978	17S 27E 35 NE SE NE	1750 FNL 430 FEL CONGRESS SECTION	EAGLE 35 H FEDERAL	LIME ROCK RES IIA LP	OIL		2004-02-19	3503
424	30-015-32986	17S 27E 34 NE SW SE	990 FSL 1655 FEL CONGRESS SECTION	OD FEDERAL	APACHE CORP	OIL		2003-10-22	3800
425	30-015-32995	17S 27E 34 SW SW SE	330 FSL 2310 FEL CONGRESS SECTION	OD FEDERAL	APACHE CORP	OIL		2003-10-20	3814
426	30-015-33010	17S 27E 35 SW SE NE	2560 FNL 760 FEL CONGRESS SECTION	EAGLE 35 H FEDERAL	LIME ROCK RES IIA LP	OIL		2003-09-22	3500
427	30-015-33035	17S 27E 35 SW SW NW	2310 FNL 215 FWL CONGRESS SECTION	EAGLE 35E FEDERAL	LIME ROCK RES IIA LP	OIL		2003-09-11	3500
428	30-015-33111	18S 27E 2	530 FNL 2310 FWL CONGRESS SECTION	LOGAN 2C STATE	LIME ROCK RES IIA LP	OIL		2004-05-11	3666
429	30-015-33182	17S 27E 34 SW SW NE	2260 FNL 2270 FEL CONGRESS SECTION	EAGLE 34G FEDERAL	LIME ROCK RES IIA LP	OIL		2004-01-20	3512
430	30-015-33191	17S 27E 34 SW SE NE	2310 FNL 990 FEL CONGRESS SECTION	EAGLE 34H FEDERAL	LIME ROCK RES IIA LP	OIL		2004-03-01	3520
431	30-015-33192	17S 27E 34 NE NE SW	2310 FSL 2410 FWL CONGRESS SECTION	EAGLE 34K FEDERAL	LIME ROCK RES IIA LP	OIL		2004-04-22	3494
432	30-015-33193	18S 27E 3 NE NW NE	330 FNL 1650 FEL CONGRESS SECTION	FALCON 3B FEDERAL	LIME ROCK RES IIA LP	OIL		2004-06-28	3506
433	30-015-33194	17S 27E 34 SW NE SW	1650 FSL 1780 FWL CONGRESS SECTION	EAGLE 34K FEDERAL	LIME ROCK RES IIA LP	OIL		2004-05-21	3503
434	30-015-33195	17S 27E 34 SW NE NE	960 FNL 815 FEL CONGRESS SECTION	EAGLE 34A FEDERAL	LIME ROCK RES IIA LP	OIL		2004-07-01	3510
435	30-015-33216	18S 27E 3 E2 NE NE	660 FNL 630 FEL CONGRESS SECTION	FALCON 3A FEDERAL	LIME ROCK RES IIA LP	OIL		2004-03-11	3530
436	30-015-33227	17S 27E 35 SW SE NW	2260 FNL 1590 FWL CONGRESS SECTION	HARBOLD FEDERAL	FREEDON ENERGY LLC	OIL		2003-12-20	450
437	30-015-33235	17S 27E 35 SW NE NW	990 FNL 1525 FWL CONGRESS SECTION	EAGLE 35C FEDERAL	LIME ROCK RES IIA LP	OIL		2004-03-31	3524
438	30-015-33236	17S 27E 34 NE SE NW	1550 FNL 2110 FWL CONGRESS SECTION	EAGLE 34F FEDERAL	LIME ROCK RES IIA LP	OIL		2004-06-02	3516
439	30-015-33237	17S 27E 34 SW	2310 FSL 1170 FWL CONGRESS SECTION	EAGLE 34L FEDERAL	LIME ROCK RES IIA LP	OIL		2004-04-12	3535
440	30-015-33242	17S 27E 35 NE SW NW	1800 FNL 1100 FWL CONGRESS SECTION	EAGLE 35E FEDERAL	LIME ROCK RES IIA LP	OIL		2004-08-11	3550

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Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
441	30-015-33261	17S 27E 34 NE SW NE	1650 FNL 1650 FEL CONGRESS SECTION	EAGLE 34G FEDERAL	LIME ROCK RES IIA LP	2OIL		2004-06-17	3510
442	30-015-33262	17S 27E 34 SW NW NW	990 FNL 430 FWL CONGRESS SECTION	EAGLE 34D FEDERAL	LIME ROCK RES IIA LP	OIL		2005-04-13	3500
443	30-015-33263	17S 27E 34 SW SW NW	2195 FNL 505 FWL CONGRESS SECTION	EAGLE 34E FEDERAL	LIME ROCK RES IIA LP	OIL		2004-05-24	3531
444	30-015-33264	17S 27E 34 NE NW NW	480 FNL 990 FWL CONGRESS SECTION	EAGLE 34D FEDERAL	DEVON ENERGY PROD	AB-LOC			
445	30-015-33265	17S 27E 34 NE SE NE	1800 FNL 360 FEL CONGRESS SECTION	EAGLE 34H FEDERAL	LIME ROCK RES IIA LP	OIL		2004-06-23	3514
446	30-015-33266	17S 27E 35 NE NE NW	480 FNL 2310 FWL CONGRESS SECTION	EAGLE 35C FEDERAL	LIME ROCK RES IIA LP	OIL		2004-07-22	3550
447	30-015-33267	17S 27E 35 NE NW NW	430 FNL 940 FWL CONGRESS SECTION	EAGLE 35D FEDERAL	LIME ROCK RES IIA LP	OIL		2004-07-13	3536
448	30-015-33271	17S 27E 35 SW NW NW	990 FNL 500 FWL CONGRESS SECTION	EAGLE 35 D FEDERAL	LIME ROCK RES IIA LP	OIL		2004-03-22	3497
449	30-015-33272	17S 27E 34 SW NE NW	990 FNL 1650 FWL CONGRESS SECTION	EAGLE 34C FEDERAL	LIME ROCK RES IIA LP	OIL		2005-02-16	3515
450	30-015-33273	17S 27E 34 NE NW NE	330 FNL 1650 FEL CONGRESS SECTION	EAGLE 34B FEDERAL	DEVON ENERGY PROD	AB-LOC			
451	30-015-33274	17S 27E 34 SW NW NE	990 FNL 2310 FEL CONGRESS SECTION	EAGLE 34B FEDERAL	LIME ROCK RES IIA LP	OIL		2005-02-28	3515
452	30-015-33275	17S 27E 34 NE NE NW	460 FNL 2235 FWL CONGRESS SECTION	EAGLE 34C FEDERAL	LIME ROCK RES IIA LP	OIL		2005-04-05	3500
453	30-015-33351	17S 27E 35 SE SW NE	2155 FNL 1650 FEL CONGRESS SECTION	MIDNIGHT MATADOR FEDERAL A	MCQUADRANGLE LLC	AB-LOC			
454	30-015-33352	18S 27E 3 SW NE NE	990 FNL 990 FEL CONGRESS SECTION	FALCON 3A FEDERAL	LIME ROCK RES IIA LP	OIL		2004-07-09	3495
455	30-015-33353	17S 27E 34 SW NW SW	1650 FSL 330 FWL CONGRESS SECTION	EAGLE 34L FEDERAL	LIME ROCK RES IIA LP	OIL		2004-06-06	3524
456	30-015-33354	18S 27E 3 NE NE NW	330 FNL 2310 FWL CONGRESS SECTION	FALCON 3C FEDERAL	LIME ROCK RES IIA LP	OIL		2005-03-09	3500
457	30-015-33355	18S 27E 3 SW NE NW	990 FNL 1650 FWL CONGRESS SECTION	FALCON 3C FEDERAL	LIME ROCK RES IIA LP	OIL		2005-04-25	3505
458	30-015-33427	17S 27E 35 SW NE NE	1150 FNL 960 FEL CONGRESS SECTION	EAGLE 35A FEDERAL	LIME ROCK RES IIA LP	OIL		2004-08-03	3550
459	30-015-33463	17S 27E 34 NE SW NW	1680 FNL 1150 FWL CONGRESS SECTION	EAGLE 34E FEDERAL	LIME ROCK RES IIA LP	OIL		2005-02-07	3550
460	30-015-33535	17S 27E 34 SW SE NW	2310 FNL 1575 FWL CONGRESS SECTION	EAGLE 34F FEDERAL	LIME ROCK RES IIA LP	OIL		2004-08-11	3540
461	30-015-33624	17S 27E 34 NE NE NE	425 FNL 330 FEL CONGRESS SECTION	EAGLE 34A FEDERAL	LIME ROCK RES IIA LP	OIL		2005-06-15	3516
462	30-015-33745	18S 27E 3 NW SE NW	1350 FNL 1730 FWL CONGRESS SECTION	OXY BOERNE FEDERAL	OXY USA WTP LP	GAS		2005-02-08	9920
463	30-015-33764	17S 27E 35 NE SW NE	1800 FNL 1650 FEL CONGRESS SECTION	OPL EAGLE 35 FEDERAL	OCCIDENTAL PERMIAN	OIL		2005-03-15	3600
464	30-015-33765	17S 27E 35 SW SW NE	2210 FNL 2310 FEL CONGRESS SECTION	OPL EAGLE 35 FEDERAL	OCCIDENTAL PERMIAN	OIL		2005-03-04	3600
465	30-015-33792	17S 27E 36 SW SW NW	2264 FNL 366 FWL CONGRESS SECTION	NO BLUFF STATE COM	LRE OPERATING LLC	OIL		2005-01-11	3890
466	30-015-33793	17S 27E 36 NW SW NW	1765 FNL 330 FWL CONGRESS SECTION	NO BLUFF STATE COM	LRE OPERATING LLC	OIL		2005-01-25	3650
467	30-015-33829	17S 27E 33 SW SE SE	330 FSL 890 FEL CONGRESS SECTION	EAGLE 33P FEDERAL	LIME ROCK RES IIA LP	OIL		2005-05-04	3500
468	30-015-33830	17S 27E 33 NE NE SE	2310 FSL 330 FEL CONGRESS SECTION	EAGLE 33 I FEDERAL	DEVON ENERGY PROD	AB-LOC			
469	30-015-33831	17S 27E 33 SW SW SE	330 FSL 2210 FEL CONGRESS SECTION	EAGLE 33 O FEDERAL	DEVON ENERGY PROD	AB-LOC			
470	30-015-33832	17S 27E 33 NE SW SE	990 FSL 1750 FEL CONGRESS SECTION	EAGLE 33O FEDERAL	LIME ROCK RES IIA LP	OIL		2005-08-08	3490
471	30-015-33833	18S 27E 3 SW NW NE	990 FNL 2310 FEL CONGRESS SECTION	FALCON 3B FEDERAL	LIME ROCK RES IIA LP	OIL		2005-06-27	3525
472	30-015-33834	18S 27E 3 SW NW NW	890 FNL 280 FWL CONGRESS SECTION	FALCON 3D FEDERAL	DEVON ENERGY PROD	AB-LOC			
473	30-015-33835	17S 27E 33 SW NW SE	1651 FSL 2311 FEL CONGRESS SECTION	EAGLE 33 J FEDERAL	DEVON ENERGY PROD	OIL		2005-06-27	3525
474	30-015-33980	17S 27E 23 S2 NE SE	1830 FSL 660 FEL CONGRESS SECTION	OXY VIKING FEDERAL	OXY USA WTP LP	AB-LOC			
475	30-015-34007	17S 27E 26 SW SE SW	515 FSL 1630 FWL CONGRESS SECTION	EAGLE 26 N FEDERAL	LIME ROCK RES IIA LP	OIL		2005-06-06	3525
476	30-015-34008	17S 27E 33 SW SE NE	2310 FNL 990 FEL CONGRESS SECTION	EAGLE 33 H FEDERAL	LIME ROCK RES IIA LP	OIL		2005-05-16	3618
477	30-015-34014	17S 27E 26 SW	230 FSL 230 FWL CONGRESS SECTION	EAGLE 26 M FEDERAL	LIME ROCK RES IIA LP	OIL		2006-01-09	3504
478	30-015-34023	17S 27E 35 SW NW NE	990 FNL 2160 FEL CONGRESS SECTION	OPL EAGLE 35 FEDERAL	OCCIDENTAL PERMIAN	OIL		2005-03-27	3600
479	30-015-34050	17S 27E 36 SE NW NW	935 FNL 990 FWL CONGRESS SECTION	NO BLUFF STATE COM	SOUTHWESTERN ENRG PR	OIL		2005-04-28	3709
480	30-015-34082	17S 27E 26 NW SE SE	755 FSL 890 FEL CONGRESS SECTION	EAGLE 26 P FEDERAL	LIME ROCK RES IIA LP	OIL		2005-07-05	3510

TABLE 1
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NAVAJO REFINING COMPANY, LLC
ARTESIA, NEW MEXICO

Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
481	30-015-34103	17S 27E 33 NE SE SE	1090 FSL 330 FEL CONGRESS SECTION	EAGLE 33P FEDERAL	LIME ROCK RES IIA LP	OIL		2005-05-26	3508
482	30-015-34134	17S 27E 36	1125 FNL 330 FWL CONGRESS SECTION	NO BLUFF STATE COM	LRE OPERATING LLC	OIL		2005-09-20	3595
483	30-015-34136	17S 27E 36 NW NW NW	600 FNL 330 FWL CONGRESS SECTION	NO BLUFF STATE COM	LIME ROCK RES A LP	AB-LOC			
484	30-015-34189	17S 27E 33 SW SW NE	2310 FNL 2310 FEL CONGRESS SECTION	EAGLE 33 G FEDERAL	DEVON ENERGY PROD	AB-LOC			
485	30-015-34190	18S 27E 3 SW NW NW	890 FNL 280 FWL CONGRESS SECTION	FALCON 3 D FEDERAL	LIME ROCK RES IIA LP	OIL		2005-07-18	3477
486	30-015-34191	17S 27E 33 SW NE SE	1650 FSL 1110 FEL CONGRESS SECTION	EAGLE 33-I FEDERAL	DEVON ENERGY PROD	AB-LOC			
487	30-015-34201	17S 27E 33 NE NE NE	330 FNL 330 FEL CONGRESS SECTION	EAGLE 33 A FEDERAL	DEVON ENERGY PROD	AB-LOC			
488	30-015-34259	17S 27E 33 SW NE NE	880 FNL 1210 FEL CONGRESS SECTION	EAGLE 33 A FEDERAL	DEVON ENERGY PROD	AB-LOC			
489	30-015-34316	17S 27E 32 NE SW NE	1750 FNL 1650 FEL CONGRESS SECTION	RED LAKE 32 STATE G	NEARBURG PROD CO	OIL		2006-02-28	3511
490	30-015-34338	18S 27E 5 NE NE SE	2310 FSL 405 FEL CONGRESS SECTION	KITE 51 FEDERAL	DEVON ENERGY PROD	AB-LOC			
491	30-015-34368	17S 27E 32 NE SE SE	990 FSL 330 FEL CONGRESS SECTION	RED LAKE 32 STATE P	NEARBURG PROD CO	AB-LOC			
492	30-015-34369	17S 27E 32 NE SW SE	990 FSL 1650 FEL CONGRESS SECTION	RED LAKE 32 STATE O	NEARBURG PROD CO	AB-LOC			
493	30-015-34370	17S 27E 32 NE NE SE	2310 FSL 330 FEL CONGRESS SECTION	RED LAKE 32 STATE I	NEARBURG PROD CO	AB-LOC			
494	30-015-34371	17S 27E 32 NE SE NE	1650 FNL 330 FEL CONGRESS SECTION	RED LAKE 32 STATE H	NEARBURG PROD CO	AB-LOC			
495	30-015-34385	17S 27E 35 NW SW NE	1896 FNL 2000 FEL CONGRESS SECTION	MIDNIGHT MATADOR A FEDERAL	LEGACY RESERVES OPER	OIL		2006-01-23	2475
496	30-015-34421	17S 27E 33 NE SW NW	1650 FNL 900 FWL CONGRESS SECTION	RED LAKE 33 FEDERAL E	NEARBURG PROD CO	AB-LOC			
497	30-015-34462	17S 27E 34 NW SW SE	990 FSL 2310 FEL CONGRESS SECTION	OD FEDERAL	APACHE CORP	OIL		2006-01-20	3518
498	30-015-34511	17S 27E 35 NW	1950 FNL 2375 FWL CONGRESS SECTION	MIDNIGHT MATADOR FEDERAL	LEGACY RESERVES OPER	OIL		2006-01-30	2478
499	30-015-34517	17S 27E 33 SE NW NW	990 FNL 990 FWL CONGRESS SECTION	RED LAKE 33 FEDERAL D	NEARBURG PROD CO	ABD-OW		2006-03-09	3700
500	30-015-34518	17S 27E 33 S2 SW NW	2310 FNL 660 FWL CONGRESS SECTION	RED LAKE 33 E FEDERAL	NEARBURG PROD CO	AB-LOC			
501	30-015-34547	17S 27E 35 SE NE NW	1150 FNL 2310 FWL CONGRESS SECTION	MIDNIGHT MATADOR	LEGACY RESERVES OPER	OIL		2006-10-30	2504
502	30-015-34907	17S 27E 35 E2 NW NW	660 FNL 1310 FWL CONGRESS SECTION	OXY ADMIRAL FEDERAL	OXY USA WTP LP	GAS		2006-06-26	9780
503	30-015-35240	17S 27E 35 NW SE NW	1470 FNL 1740 FWL CONGRESS SECTION	MIDNIGHT MATADOR	LEGACY RESERVES OPER	OIL		2006-12-01	2515
504	30-015-35264	17S 27E 35 SE SE NE	2100 FNL 385 FEL CONGRESS SECTION	MIDNIGHT MATADOR	LEGACY RESERVES OPER	OIL		2006-12-13	2515
505	30-015-35289	17S 27E 35 NW SE NE	1470 FNL 850 FEL CONGRESS SECTION	MIDNIGHT MATADOR	LEGACY RESERVES OPER	OIL		2007-06-19	2520
506	30-015-35619	17S 27E 35 SE SW NE	2310 FNL 1700 FEL CONGRESS SECTION	MIDNIGHT MATADOR A	LEGACY RESERVES OPER	OIL		2007-06-19	2505
507	30-015-35620	17S 27E 35 NW NW NE	330 FNL 2290 FEL CONGRESS SECTION	MIDNIGHT MATADOR A	LEGACY RESERVES OPER	OIL		2007-07-02	2510
508	30-015-35697	17S 27E 35 NW SW NE	1500 FNL 2290 FEL CONGRESS SECTION	MIDNIGHT MATADOR A	LEGACY RESERVES OPER	OIL		2007-07-11	2500
509	30-015-35713	17S 27E 35 NW NE NW	330 FNL 1500 FWL CONGRESS SECTION	MIDNIGHT MATADOR	LEGACY RESERVES OPER	OIL		2007-08-06	2530
510	30-015-35772	18S 27E 3 NW SW	1575 FSL 330 FWL CONGRESS SECTION	MANN 3 FEDERAL	DEVON ENERGY CORP	OIL		2007-10-03	4025
511	30-015-35773	18S 27E 5 NE NE SE	2310 FSL 405 FEL CONGRESS SECTION	KITE 5 I FEDERAL	DEVON ENERGY PROD	AB-LOC			
512	30-015-35808	18S 27E 3	2110 FNL 2310 FEL CONGRESS SECTION	FALCON 3 G FEDERAL	LIME ROCK RES IIA LP	OIL		2007-10-20	4125
513	30-015-36051	17S 27E 33 SW SW SE	330 FSL 2210 FEL CONGRESS SECTION	EAGLE 33 O FEDERAL	DEVON ENERGY PROD	AB-LOC			
514	30-015-36067	17S 27E 32 SW NW SE	1650 FSL 2310 FEL CONGRESS SECTION	SOONERS STATE	CHASE G A JR DBA GC	OIL		2008-06-05	7600
515	30-015-36073	17S 27E 35	999 FSL 2297 FWL CONGRESS SECTION	RUSSELL `C`	TARCO ENERGY LC	OIL		2008-06-01	520
516	30-015-36081	17S 27E 35 NE SE	1520 FSL 1280 FEL CONGRESS SECTION	LOGAN 35 FEDERAL	LIME ROCK RES IIA LP	OIL		2008-04-15	3585
517	30-015-36213	17S 27E 35 NE SW SE	1052 FSL 1643 FEL CONGRESS SECTION	RUSSELL `C`	TARCO ENERGY LC	SERVCE		2006-01-16	530
518	30-015-36314	18S 27E 3 NE SW	1895 FSL 1410 FWL CONGRESS SECTION	FALCON 3 K FEDERAL	DEVON ENERGY CORP	OIL		2008-07-10	3665
519	30-015-36450	17S 27E 32	1310 FNL 660 FWL CONGRESS SECTION	CHEVRON 32 STATE COM	NEARBURG PROD CO	AB-LOC			
520	30-015-36875	17S 27E 26 C NE SW	1980 FSL 1980 FWL CONGRESS SECTION	OXY COMMODORE FEDERAL	OXY USA WTP LP	AB-LOC			

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NON-FRESHWATER (OIL AND GAS) WELLS IN WDW-4 AREA OF REVIEW
NAVAJO REFINING COMPANY, LLC
ARTESIA, NEW MEXICO

Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
521	30-015-37195								
522	30-015-37372	17S 27E 36	600 FNL 330 FWL CONGRESS SECTION	NO BLUFF 36 STATE COM	LRE OPERATING LLC	OIL		2010-01-18	4637
523	30-015-37672	17S 27E 36	330 FNL 890 FWL CONGRESS SECTION	NO BLUFF 36 STATE COM	LRE OPERATING LLC	OIL		2010-05-07	4658
524	30-015-37738	17S 27E 35	1687 FSL 330 FEL CONGRESS SECTION	MAGRUDER	TARCO ENERGY LC	AB-LOC			
525	30-015-37739	17S 27E 35	2308 FSL 330 FEL CONGRESS SECTION	MAGRUDER	TARCO ENERGY LC	AB-LOC			
526	30-015-37741	17S 27E 35	965 FSL 970 FEL CONGRESS SECTION	MAGRUDER	TARCO ENERGY LC	AB-LOC			
527	30-015-37742	17S 27E 35	1653 FSL 990 FEL CONGRESS SECTION	MAGRUDER	TARCO ENERGY LC	OIL		2011-08-20	558
528	30-015-37743	17S 27E 35	2308 FSL 1034 FEL CONGRESS SECTION	MAGRUDER	TARCO ENERGY LC	AB-LOC			
529	30-015-37744	17S 27E 35	1610 FSL 1645 FEL CONGRESS SECTION	MAGRUDER	TARCO ENERGY LC	OIL		2010-11-14	540
530	30-015-37745	17S 27E 35	2319 FSL 1652 FEL CONGRESS SECTION	MAGRUDER	TARCO ENERGY LC	AB-LOC			
531	30-015-37746	17S 27E 35	1624 FSL 2306 FEL CONGRESS SECTION	MAGRUDER	TARCO ENERGY LC	OIL		2011-07-21	540
532	30-015-37747	17S 27E 35	2275 FSL 2244 FEL CONGRESS SECTION	MAGRUDER	TARCO ENERGY LC	AB-LOC			
533	30-015-37762	17S 27E 35	445 FSL 1622 FEL CONGRESS SECTION	RUSSELL C	TARVER JOE L	OIL		2005-11-15	510
534	30-015-37783	17S 27E 35	990 FSL 2225 FEL CONGRESS SECTION	RUSSELL `C`	TARCO ENERGY LC	OIL		2012-03-23	530
535	30-015-39066	18S 27E 2	2420 FNL 185 FWL CONGRESS SECTION	EMPIRE ABO UNIT	APACHE CORP	AB-LOC			
536	30-015-39360	17S 27E 26	330 FSL 530 FEL CONGRESS SECTION	EAGLE `26` P FEDERAL	LIME ROCK RES IIA LP	OIL		2011-09-16	4540
537	30-015-39451	18S 27E 3	250 FNL 1300 FWL CONGRESS SECTION	FALCON 3 D FEDERAL	LIME ROCK RES IIA LP	OIL		2011-10-11	4538
538	30-015-39452	17S 27E 26	990 FSL 730 FEL CONGRESS SECTION	EAGLE 26 P FEDERAL	LIME ROCK RES IIA LP	OIL		2011-10-20	4607
539	30-015-39459	17S 27E 33	290 FSL 2210 FEL CONGRESS SECTION	EAGLE 33 O FEDERAL	LIME ROCK RES IIA LP	OIL		2011-09-30	4430
540	30-015-39462	17S 27E 25 NW SW	2235 FSL 330 FWL CONGRESS SECTION	FIR FEDERAL	COG OPERATING LLC	OIL		2011-12-11	4750
541	30-015-39464	17S 27E 25 NE SW	2460 FSL 1650 FWL CONGRESS SECTION	SPRUCE FEDERAL	COG OPERATING LLC	OIL		2011-12-04	4730
542	30-015-39465	17S 27E 25 NW SW	2430 FSL 900 FWL CONGRESS SECTION	FIR FEDERAL	COG OPERATING LLC	OIL		2011-11-10	4738
543	30-015-39466	17S 27E 25 NW SW	1710 FSL 330 FWL CONGRESS SECTION	FIR FEDERAL	COG OPERATING LLC	OIL		2011-11-26	4735
544	30-015-39564	17S 27E 26	330 FSL 2310 FWL CONGRESS SECTION	EAGLE 26 N FEDERAL	LIME ROCK RES IIA LP	OIL		2011-11-15	4538
545	30-015-39759	17S 27E 25	622 FNL 1520 FWL CONGRESS SECTION	REDBUD FEDERAL	COG OPERATING LLC	AB-LOC			
546	30-015-39763	17S 27E 25 SE NW	1650 FNL 1410 FWL CONGRESS SECTION	DOGWOOD FEDERAL	COG OPERATING LLC	OIL		2012-04-06	4766
547	30-015-39767	17S 27E 34	900 FSL 900 FEL CONGRESS SECTION	EAGLE 34 P FEDERAL	LIME ROCK RES IIA LP	OIL		2012-01-14	3679
548	30-015-39948	18S 27E 3	2310 FSL 2390 FWL CONGRESS SECTION	FALCON 3 K FEDERAL	LIME ROCK RES IIA LP	OIL		2012-03-27	5101
549	30-015-40108	18S 27E 3	1950 FSL 1775 FEL CONGRESS SECTION	FALCON 3 J FEDERAL	LIME ROCK RES IIA LP	OIL		2012-04-09	4915
550	30-015-40197	17S 27E 25 NE SW	1328 FSL 1501 FWL CONGRESS SECTION	SPRUCE FEDERAL	COG OPERATING LLC	OIL		2012-08-24	4727
551	30-015-40198	17S 27E 25	485 FSL 330 FWL CONGRESS SECTION	BEECH FEDERAL	COG OPERATING LLC	AB-LOC			
552	30-015-42573	17S 27E 35 SW	2130 FSL 1950 FWL CONGRESS SECTION	LOGAN 35 K FEDERAL	LIME ROCK RES IIA LP	PERMIT			
553	30-015-40209	17S 27E 25 SW SW	110 FSL 240 FWL CONGRESS SECTION	BEECH 25 FEDERAL	COG OPERATING LLC	AB-LOC			
554	30-015-40446	17S 27E 33	2210 FSL 330 FEL CONGRESS SECTION	EAGLE `33` I FEDERAL	LIME ROCK RES IIA LP	OIL		2012-09-02	4400
555	30-015-40554	18S 27E 5	990 FNL 2310 FEL CONGRESS SECTION	CONDOR 5 FEDERAL	COG OPERATING LLC	PERMIT			
556	30-015-40618	18S 27E 2	330 FNL 2300 FWL CONGRESS SECTION	BRAD STATE	TARCO ENERGY LC	OIL		2012-08-27	525
557	30-015-40619	18S 27E 2	330 FNL 1650 FWL CONGRESS SECTION	BRAD STATE	TARCO ENERGY LC	OIL		2012-08-20	530
558	30-015-40620	18S 27E 2	968 FNL 2300 FWL CONGRESS SECTION	BRAD STATE	TARCO ENERGY LC	OIL		2012-10-10	530
559	30-015-40621	18S 27E 2	968 FNL 1650 FWL CONGRESS SECTION	BRAD STATE	TARCO ENERGY LC	OIL		2012-09-26	550
560	30-015-40677	18S 27E 2	380 FNL 1650 FEL CONGRESS SECTION	BLAKE STATE	TARCO ENERGY LC	PERMIT			

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ARTESIA, NEW MEXICO

Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
561	30-015-40678	18S 27E 2	330 FNL 2300 FEL CONGRESS SECTION	BLAKE STATE	TARCO ENERGY LC	PERMIT			
562	30-015-40679	18S 27E 2	968 FNL 2300 FEL CONGRESS SECTION	BLAKE STATE	TARCO ENERGY LC	OIL		2012-12-03	530
563	30-015-40686	18S 27E 3	575 FNL 2300 FEL CONGRESS SECTION	EAGLE 3 FEDERAL	COG OPERATING LLC	PERMIT			
564	30-015-40687	18S 27E 3	271 FNL 1172 FEL CONGRESS SECTION	EAGLE 3 FEDERAL	COG OPERATING LLC	PERMIT			
565	30-015-40688	18S 27E 4	2147 FSL 1537 FEL CONGRESS SECTION	HAWK 4 FEDERAL	COG OPERATING LLC	PERMIT			
566	30-015-40783	18S 27E 2	990 FNL 1500 FWL CONGRESS SECTION	LOGAN `2` C STATE	LIME ROCK RES IIA LP	OIL		2012-10-12	4776
567	30-015-40804	17S 27E 25	2130 FNL 330 FWL CONGRESS SECTION	MATTHEWS `25` FEDERAL	LIME ROCK RES IIA LP	OIL		2012-11-08	4717
568	30-015-40806	17S 27E 35	990 FSL 370 FWL CONGRESS SECTION	LOGAN `35` M FEDERAL	LIME ROCK RES IIA LP	OIL		2013-01-08	3900
569	30-015-40807	17S 27E 35	330 FSL 2310 FWL CONGRESS SECTION	LOGAN B `35` N FEDERAL	LIME ROCK RES IIA LP	OIL		2013-01-17	4000
570	30-015-40808	17S 27E 35	970 FSL 990 FEL CONGRESS SECTION	LOGAN `35` P FEDERAL	LIME ROCK RES IIA LP	OIL		2012-11-26	4000
571	30-015-40809	17S 27E 35	2310 FNL 960 FWL CONGRESS SECTION	EAGLE `35` E FEDERAL	LIME ROCK RES IIA LP	OIL		2012-11-16	4764
572	30-015-40810	17S 27E 35	455 FNL 990 FEL CONGRESS SECTION	EAGLE `35` A FEDERAL	LIME ROCK RES IIA LP	OIL		2012-12-07	4758
573	30-015-40811	17S 27E 35	990 FNL 865 FWL CONGRESS SECTION	EAGLE `35` D FEDERAL	LIME ROCK RES IIA LP	OIL		2012-12-16	4700
574	30-015-40812	17S 27E 34	2260 FNL 400 FEL CONGRESS SECTION	EAGLE `34` H FEDERAL	LIME ROCK RES IIA LP	OIL		2012-12-28	4860
575	30-015-41119	18S 27E 2	430 FNL 2300 FWL CONGRESS SECTION	LOGAN `2` C STATE	LIME ROCK RES IIA LP	OIL		2013-03-28	4851
576	30-015-41213	17S 27E 34	915 FSL 1695 FWL CONGRESS SECTION	EAGLE `34` N FEDERAL	LIME ROCK RES IIA LP	OIL		2013-04-05	4600
577	30-015-41214	17S 27E 33 SE SW	330 FSL 1750 FWL CONGRESS SECTION	EAGLE `33` N FEDERAL	LIME ROCK RES IIA LP	OIL		2013-04-21	4604
578	30-015-41215	17S 27E 34	1650 FSL 990 FWL CONGRESS SECTION	EAGLE `34` L FEDERAL	LIME ROCK RES IIA LP	OIL		2013-04-13	4650
579	30-015-41216	17S 27E 34	990 FNL 990 FWL CONGRESS SECTION	EAGLE `34` D FEDERAL	LIME ROCK RES IIA LP	OIL		2013-12-04	4705
580	30-015-41217	17S 27E 34	2310 FNL 990 FWL CONGRESS SECTION	EAGLE `34` E FEDERAL	LIME ROCK RES IIA LP	OIL		2013-04-15	4658
581	30-015-41218	17S 27E 34	990 FNL 2275 FWL CONGRESS SECTION	EAGLE `34` C FEDERAL	LIME ROCK RES IIA LP	OIL		2013-04-25	4700
582	30-015-41226	17S 27E 33 SW NE	2310 FNL 2310 FEL CONGRESS SECTION	EAGLE 33 G FEDERAL	LIME ROCK RES IIA LP	OIL		2013-04-29	4600
583	30-015-41255	18S 27E 3	805 FNL 2155 FWL CONGRESS SECTION	FALCON `3` C FEDERAL	LIME ROCK RES IIA LP	OIL		2013-05-07	4650
584	30-015-41260	17S 27E 23 SW	1670 FSL 860 FEL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	OIL		2013-12-09	4500
585	30-015-41261	17S 27E 23 SE	1150 FSL 1150 FEL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	OIL		2013-12-19	4520
586	30-015-41264	17S 27E 33	1650 FSL 2310 FEL CONGRESS SECTION	EAGLE `33` J FEDERAL	LIME ROCK RES IIA LP	PERMIT			
587	30-015-41285	17S 27E 34	2280 FSL 1110 FEL CONGRESS SECTION	EAGLE `34` I FEDERAL	LIME ROCK RES IIA LP	OIL		2013-11-26	4816
588	30-015-41287	17S 27E 34	2355 FNL 2455 FWL CONGRESS SECTION	EAGLE `34` F FEDERAL	LIME ROCK RES IIA LP	OIL		2013-10-09	4774
589	30-015-41288	17S 27E 33	470 FSL 360 FEL CONGRESS SECTION	EAGLE `33` P FEDERAL	LIME ROCK RES IIA LP	OIL		2013-06-01	4670
590	30-015-41339	17S 27E 23 SW	2230 FSL 360 FWL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	OIL		2013-11-06	4505
591	30-015-41340	17S 27E 23 SW	2240 FSL 1680 FWL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	OIL		2013-07-22	4534
592	30-015-41341	17S 27E 23 SE	2210 FSL 2180 FEL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	OIL		2013-07-30	4507
593	30-015-41342	17S 27E 23 SW	950 FSL 330 FWL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	OIL		2013-11-28	4525
594	30-015-41370	17S 27E 35	2355 FSL 475 FEL CONGRESS SECTION	LOGAN `35` I FEDERAL	LIME ROCK RES IIA LP	AT-TD		2014-04-05	3936
595	30-015-41425	17S 27E 23 SW	380 FSL 2240 FWL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	OIL		2013-12-27	4525
596	30-015-41432	17S 27E 34	2345 FNL 1750 FEL CONGRESS SECTION	EAGLE `34` G FEDERAL	LIME ROCK RES IIA LP	OIL		2014-02-12	4750
597	30-015-41433	17S 27E 34 SW	1820 FSL 2290 FWL CONGRESS SECTION	EAGLE `34` K FEDERAL	LIME ROCK RES IIA LP	OIL		2014-02-20	4708
598	30-015-41434	17S 27E 35	1650 FSL 2460 FWL CONGRESS SECTION	LOGAN `35` K FEDERAL	LIME ROCK RES IIA LP	OIL		2013-07-22	3918
599	30-015-41435	17S 27E 35 SE	720 FSL 1770 FEL CONGRESS SECTION	LOGAN 35 O FEDERAL	LIME ROCK RES IIA LP	AT-TD		2014-04-13	3600
600	30-015-41440	17S 27E 35	870 FNL 2310 FWL CONGRESS SECTION	EAGLE `35` C FEDERAL	LIME ROCK RES IIA LP	OIL		2013-07-29	4753

TABLE 1
NON-FRESHWATER (OIL AND GAS) WELLS IN WDW-4 AREA OF REVIEW
NAVAJO REFINING COMPANY, LLC
ARTESIA, NEW MEXICO

Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
601	30-015-41441	17S 27E 35	1860 FSL 990 FWL CONGRESS SECTION	EAGLE `35` L FEDERAL	LIME ROCK RES IIA LP	OIL		2014-02-04	4917
602	30-015-41446	17S 27E 34	2280 FSL 2445 FEL CONGRESS SECTION	EAGLE `34` J FEDERAL	LIME ROCK RES IIA LP	OIL		2014-01-28	4768
603	30-015-41466	18S 27E 3	2065 FNL 2205 FEL CONGRESS SECTION	FALCON `3` G FEDERAL	LIME ROCK RES IIA LP	PERMIT			
604	30-015-41468	17S 27E 23 SE	1045 FSL 2160 FEL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	OIL		2014-01-04	4520
605	30-015-41510	18S 27E 4	2310 FSL 1650 FWL CONGRESS SECTION	HONDO `4` K FEDERAL	LIME ROCK RES IIA LP	OIL		2013-09-21	4760
606	30-015-41697	17S 27E 35	1820 FNL 970 FEL CONGRESS SECTION	EAGLE `35 H` FEDERAL	LIME ROCK RES IIA LP	OIL		2013-11-09	4861
607	30-015-41698	17S 27E 25 NW NW	985 FNL 330 FWL CONGRESS SECTION	MATTHEWS `25` FEDERAL	LIME ROCK RES IIA LP	PERMIT			
608	30-015-41699	17S 27E 25 NW NW	370 FNL 985 FWL CONGRESS SECTION	MATTHEWS `25` FEDERAL	LIME ROCK RES IIA LP	PERMIT			
609	30-015-41721	17S 27E 25 SW NW	2180 FNL 1115 FWL CONGRESS SECTION	MATTHEWS `25` FEDERAL	LIME ROCK RES IIA LP	AT-TD		2014-04-21	4967
610	30-015-41751	17S 27E 35 NW	2475 FNL 2260 FWL CONGRESS SECTION	EAGLE `35 F` FEDERAL	LIME ROCK RES IIA LP	OIL		2013-11-17	4872
611	30-015-41852	17S 27E 23 SW	432 FSL 2100 FWL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
612	30-015-41853	17S 27E 23 SW	240 FSL 210 FWL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
613	30-015-41854	17S 27E 23	2555 FSL 890 FWL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
614	30-015-41870	17S 27E 23	1755 FSL 900 FWL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
615	30-015-41871	17S 27E 23	1435 FSL 2261 FWL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
616	30-015-41872	17S 27E 23	1720 FSL 1650 FEL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
617	30-015-41873	17S 27E 23	2480 FSL 451 FEL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
618	30-015-41874	17S 27E 23	1017 FSL 2040 FEL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
619	30-015-41875	17S 27E 23	1202 FSL 903 FEL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
620	30-015-41876	17S 27E 23	2080 FSL 360 FWL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
621	30-015-41877	17S 27E 23	1670 FSL 1680 FWL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
622	30-015-41878	17S 27E 23	2200 FSL 2240 FWL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
623	30-015-41879	17S 27E 23	1670 FSL 2130 FEL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
624	30-015-41880	17S 27E 23 SE	2210 FSL 1680 FEL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
625	30-015-41881	17S 27E 23	2409 FSL 876 FEL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
626	30-015-41882	17S 27E 23	1670 FSL 710 FEL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
627	30-015-41883	17S 27E 23 SW	380 FSL 1640 FWL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
628	30-015-41884	17S 27E 23 SE	25 FSL 2327 FEL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
629	30-015-41885	17S 27E 23	978 FSL 1920 FEL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
630	30-015-41960	18S 27E 2 NW	1160 FNL 330 FWL CONGRESS SECTION	MJ STATE	APACHE CORP	OIL		2014-03-06	4012
631	30-015-41961	18S 27E 2 NW	1200 FNL 1140 FWL CONGRESS SECTION	MJ STATE	APACHE CORP	OIL		2014-03-10	4001
632	30-015-41997	17S 27E 23	360 FSL 770 FWL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
633	30-015-41998	17S 27E 23	714 FSL 1277 FWL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
634	30-015-41999	17S 27E 23 SW	850 FSL 860 FWL CONGRESS SECTION	YESO VIKING FEDERAL	OXY USA WTP LP	PERMIT			
635	30-015-42002	18S 27E 2 NW	1900 FNL 990 FWL CONGRESS SECTION	SB STATE	APACHE CORP	OIL		2014-03-14	4115
636	30-015-42038	18S 27E 4 SE	920 FSL 330 FEL CONGRESS SECTION	WINDFOHR `4` FEDERAL	LIME ROCK RES IIA LP	PERMIT			
637	30-015-42052	18S 27E 4 SE	2310 FSL 330 FEL CONGRESS SECTION	WINDFOHR `4` I FEDERAL	LIME ROCK RES IIA LP	PERMIT			
638	30-015-42121	18S 27E 2	658 FNL 1984 FWL CONGRESS SECTION	BRAD STATE	TARCO ENERGY LC	PERMIT			
639	30-015-42247	17S 27E 35 SE	2110 FSL 2225 FEL CONGRESS SECTION	LOGAN `35` J FEDERAL	LIME ROCK RES IIA LP	PERMIT			
640	30-015-42263	17S 27E 33 SW	990 FSL 2310 FWL CONGRESS SECTION	EAGLE `33` N FEDERAL	LIME ROCK RES IIA LP	AT-TD		2014-04-27	4760

TABLE 1
NON-FRESHWATER (OIL AND GAS) WELLS IN WDW-4 AREA OF REVIEW
NAVAJO REFINING COMPANY, LLC
ARTESIA, NEW MEXICO

Map ID	API	Twp-Rng-Sec	Footage	Lease Name	Current Operator	Status and Type	Plug Date	Drill Date	Depth (ft)
641	30-015-42301	17S 27E 26 SE	1720 FSL 920 FEL CONGRESS SECTION	EAGLE `26` I FEDERAL	LIME ROCK RES IIA LP	PERMIT			
642	30-015-42302	17S 27E 35 NW	1670 FNL 330 FWL CONGRESS SECTION	EAGLE `35` E FEDERAL	LIME ROCK RES IIA LP	AT-TD		2014-06-21	4750
643	30-015-42363	17S 27E 25 SW SW	110 FSL 240 FWL CONGRESS SECTION	BEECH 25 FEDERAL	COG OPERATING LLC	OIL		2014-05-08	6819
644	30-015-42373	17S 27E 26 SW SW	330 FSL 820 FWL CONGRESS SECTION	EAGLE `26` M FEDERAL	LIME ROCK RES IIA LP	PERMIT			
645	30-015-42454	17S 27E 35 NW	1760 FNL 1660 FWL CONGRESS SECTION	EAGLE `35` F FEDERAL	LIME ROCK RES IIA LP	PERMIT			
646	30-015-42522	17S 27E 34 SW	2210 FSL 330 FWL CONGRESS SECTION	EAGLE `34` L FEDERAL	LIME ROCK RES IIA LP	PERMIT			
647	30-015-42523	17S 27E 34 SW	400 FSL 2165 FWL CONGRESS SECTION	EAGLE `34` NORTH FEDERAL	LIME ROCK RES IIA LP	PERMIT			
648	30-015-42550	18S 27E 4 SE	2190 FSL 1650 FEL CONGRESS SECTION	WINDFOHR `4` FEDERAL	LIME ROCK RES IIA LP	PERMIT			
649	30-015-42037	18S 27E 4 SE	430 FSL 2140 FEL CONGRESS SECTION	WINDFOHR `4` FEDERAL	LIME ROCK RES IIA LP	PERMIT			
650	30-015-00463	17S 27E 19	2310 FNL 1650 FEL CONGRESS SECTION	GULF-KEPPLE	ALAMO PERMIAN RES	ABD-OW			1788
651	30-015-00464	17S 27E 19	1980 FSL 2210 FEL CONGRESS SECTION	GULF-KEPPLE	ALAMO PERMIAN RES	ABD-OW			1833
652	30-015-00465	17S 27E 19	330 FSL 2310 FWL CONGRESS SECTION	KEPPLE	BASSETT D M DRLG CO	D&A-O			1848
653	30-015-21595	17S 27E 31 NW SE	1980 FSL 1980 FEL CONGRESS SECTION	EXXON /31/ FEDERAL	FASKEN DAVID	D&A-G			9470
654	30-015-29707	18S 27E 5 NW SE NW	1650 FNL 1650 FWL CONGRESS SECTION	CHALK FEDERAL	LRE OPERATING LLC	OIL			3200
655	30-015-40555	18S 27E 5	2445 FNL 2458 FEL CONGRESS SECTION	CONDOR 5 FEDERAL	COG OPERATING LLC	PERMIT			
656	30-015-00781	18S 27E 5	2310 FSL 2310 FEL CONGRESS SECTION	YATES-COLLIER-FEDER	PETROLEUM CORP OF TX	ABD-OW			2004
657	30-015-31631	18S 27E 5 SE NW SE	1750 FSL 1650 FEL CONGRESS SECTION	MALIBU FEDERAL	LRE OPERATING LLC	OIL			3210
658	30-015-29067	18S 27E 5 NW NE SE	2310 FSL 890 FEL CONGRESS SECTION	KITE `5I` FEDERAL	LIME ROCK RES IIA LP	OIL			2350
659	30-015-29023	18S 27E 5	1825 FSL 325 FEL CONGRESS SECTION	KITE `5I` FEDERAL	LIME ROCK RES IIA LP	OIL			2350
660	30-015-28445	18S 27E 4	990 FSL 330 FWL CONGRESS SECTION	WEST RED LAKE UNIT	LIME ROCK RES IIA LP	OIL			2225
661	30-015-30234	18S 27E 4 NW SW	1550 FSL 1115 FWL CONGRESS SECTION	LAGO ROSA `4` FEDERAL	BP AMERICA PRODTN CO	ABD-OW			3800
662	30-015-28925	18S 27E 4	850 FSL 2310 FWL CONGRESS SECTION	WEST RED LAKE UNIT	LIME ROCK RES IIA LP	OIL			2400
663	30-015-00769	18S 27E 4	430 FSL 2310 FWL CONGRESS SECTION	CHALK BLUFF DRAW UNIT 1	APACHE CORP	OIL			5635
664	30-015-30415	18S 27E 4 NW SW SE	934 FSL 2291 FEL CONGRESS SECTION	WINDFOHR `4` FEDERAL	LIME ROCK RES IIA LP	OIL			3620
665	30-015-34916	18S 27E 4 N2 SW SE	760 FSL 1980 FEL CONGRESS SECTION	OXY WILD BURRO FEDERAL	CHI OPERATING INC	GAS			9845
666	30-015-30419	18S 27E 4 SE SW SE	560 FSL 1650 FEL CONGRESS SECTION	WINDFOHR `4` FEDERAL	LIME ROCK RES IIA LP	2OIL			3800
667	30-015-00775	18S 27E 4	330 FSL 1638 FEL CONGRESS SECTION	RF WINDFOHR-FEDERAL	BP AMERICA PRODTN CO	ABD-OW			5666
668	30-015-30420	18S 27E 4 N2 SE SE	810 FSL 660 FEL CONGRESS SECTION	WINDFOHR `4` FEDERAL	LIME ROCK RES IIA LP	OIL			3630
669	30-015-00773	18S 27E 4	660 FSL 660 FEL CONGRESS SECTION	RF WINDFOHR-FEDERAL	ARCO OIL & GAS CORP	ABD-OW			5800
670	30-015-40689	18S 27E 4	227 FSL 907 FEL CONGRESS SECTION	HAWK 4 FEDERAL	COG OPERATING LLC	PERMIT			
671	30-015-00753	18S 27E 3	660 FSL 660 FWL CONGRESS SECTION	MANN-FEDERAL	APACHE CORP	OIL			6938
672	30-015-35936	18S 27E 3 SW SW	452 FSL 867 FWL CONGRESS SECTION	MANN 3 FEDERAL	LIME ROCK RES IIA LP	OIL			3718
673	30-015-29575	18S 27E 3	680 FSL 1350 FWL CONGRESS SECTION	FALCON `3N` FEDERAL	LIME ROCK RES IIA LP	OIL			2749
674	30-015-00756	18S 27E 3	660 FSL 1980 FWL CONGRESS SECTION	MALCO REFINING-FED	APACHE CORP	OIL			5834
675	30-015-00466	17S 27E 19	1650 FSL 2310 FEL CONGRESS SECTION	FE KEPPLE	ORCUTT E	TA-O			1375

TABLE 2
FRESHWATER WELLS IN WDW-4 AREA OF REVIEW
NAVAJO REFINING COMPANY, L.L.C
WASTE DISPOSAL WELL NO. 4
ARTESIA, NEW MEXICO

WR File Nbr	Use	Owner	County	Source	q64	q16	q4	Sec	Tws	Rng	X	Y
RA 01716	COM	RIVERSIDE MUTUAL DOMESTIC ASSO	ED	Artesian		4	3	16	17S	27E	566854	3632521
RA 03694	DOM	C. M. BERRY	ED	Shallow			4	17	17S	27E	565854	3632721
RA 03791	DOM	C. L. BOWEN	ED		2	1	4	17	17S	27E	565747	3633021
RA 03816	DOM	R. D. COLLIER	CH	Artesian			4	17	17S	27E	565854	3632721
RA 04114	DOM	J. HIRAM MOORE	LE	Artesian	4	4	3	16	17S	27E	566953	3632420
RA 04153	DOM	J. HIRAM MOORE	CH	Artesian	4	4	3	16	17S	27E	566953	3632420
RA 04320	DOM	C.V. BROWN	ED	Artesian			3	17	17S	27E	565053	3632719
RA 06531	DOM	CHARLES C. POWELL	ED		4	1	4	17	17S	27E	565747	3632821
RA 06560	DOM	TONY HALL	CH	Shallow	2	1	2	20	17S	27E	565757	3632217
RA 07231	MUL	FERN WILSON	ED		3	3	3	16	17S	27E	566353	3632422
RA 07844	EXP	RIVERSIDE WATER USERS ASSOC.	ED	Shallow	3	4	3	16	17S	27E	566753	3632420
RA 07844 EXPL	EXP	RIVERSIDE WATER USERS ASSOC.	ED	Artesian		4	3	16	17S	27E	566854	3632521
RA 11691	MON	INTEGRATED WATER SERVIES	ED		2	1	4	17	17S	27E	565800	3633029
RA 04554	DOM	NA	ED	Artesian			1	23	17S	27E	569859	3631947
RA 03661	DOM	NA	ED	Shallow	3	2	3	32	17S	27E	565186	3628038

TABLE 3A
INJECTION FLUID CHARACTERATION
NAVAJO REFINING, L.L.C.
ARTESIA, NEW MEXICO

Mar-14		
MISC		
ANALYTE	**RESULT**	**UNIT**
Bicarbonate (As CaCO3)	270	mg/L CaCO3
Bromide	1.6	mg/L
Carbonate (As CaCO3)	< 2.0	mg/L CaCO3
Chloride	410	mg/L
Fluoride	5.5	mg/L
Ignitability	>200	°F
Nitrogen, Nitrate (As N)	< 1.0	mg/L
Nitrogen, Nitrite (As N)	< 1.0	mg/L
pH	7.45	pH Units
Phosphorus, Orthophosphate (As P)	< 5.0	mg/L
Reactive Cyanide	< 1.00	mg/Kg
Reactive Sulfide	5.1	mg/Kg
Specific Conductance	7000	µmhos/cm
Specific Gravity	1.006	
Sulfate	3900	mg/L
Total Alkalinity (as CaCO3)	270	mg/L CaCO3
Total Dissolved Solids	6180	mg/L

Jun-14		
ANALYTE	**RESULT**	**UNIT**
Bicarbonate (As CaCO3)	290	mg/L CaCO3
Bromide	0.72	mg/L
Carbonate (As CaCO3)	< 2.0	mg/L CaCO3
Chloride	290	mg/L
Cyanide, Reactive	< 1.00	mg/L
Fluoride	28	mg/L
Ignitability	>200	°F
Nitrogen, Nitrate (As N)	< 0.50	mg/L
Nitrogen, Nitrite (As N)	1.5	mg/L
pH	7.91	pH units
Phosphorus, Orthophosphate (As P)	< 2.5	mg/L
Reactive Sulfide	< 1.0	mg/L
Specific Conductance	6000	µmhos/cm
Specific Gravity	1.003	
Sulfate	2600	mg/L
Total Alkalinity (as CaCO3)	290	mg/L CaCO3
Total Dissolved Solids	4440	mg/L

Sep-14		
ANALYTE	**RESULT**	**UNIT**
Bicarbonate (As CaCO3)	120	mg/L CaCO3
Bromide	< 0.50	mg/L
Carbonate (As CaCO3)	< 2.0	mg/L CaCO3
Chloride	350	mg/L
Cyanide, Reactive	< 1.00	mg/L
Fluoride	7.0	mg/L
Ignitability	>200	°F
Nitrogen, Nitrate (As N)	< 0.50	mg/L
Nitrogen, Nitrite (As N)	< 0.50	mg/L
pH	6.61	pH Units
Phosphorus, Orthophosphate (As P)	< 10	mg/L
Reactive Sulfide	< 1.0	mg/L
Specific Conductance	5400	µmhos/cm
Specific Gravity	1.001	
Sulfate	2500	mg/L
Total Alkalinity (as CaCO3)	120	mg/L CaCO3
Total Dissolved Solids	4700	mg/L

TOTAL METALS

Aluminum	2.3	mg/L
Antimony	< 0.050	mg/L
Arsenic	< 0.020	mg/L
Barium	0.049	mg/L
Beryllium	< 0.0030	mg/L
Cadmium	< 0.0020	mg/L
Calcium	93	mg/L
Chromium	< 0.0060	mg/L
Cobalt	< 0.0060	mg/L
Copper	0.0092	mg/L
Iron	3.3	mg/L
Lead	< 0.0050	mg/L
Magnesium	30	mg/L
Manganese	0.12	mg/L
Mercury	< 0.00020	mg/L
Nickel	0.016	mg/L
Potassium	37	mg/L
Selenium	0.13	mg/L
Silver	< 0.0050	mg/L
Sodium	1400	mg/L
Thallium	< 0.050	mg/L
Vanadium	< 0.050	mg/L
Zinc	0.15	mg/L

Aluminum	1.2	mg/L
Antimony	< 0.050	mg/L
Arsenic	0.027	mg/L
Barium	< 0.020	mg/L
Beryllium	< 0.0030	mg/L
Cadmium	< 0.0020	mg/L
Calcium	27	mg/L
Chromium	< 0.0060	mg/L
Cobalt	< 0.0060	mg/L
Copper	< 0.0060	mg/L
Iron	0.21	mg/L
Lead	< 0.0050	mg/L
Magnesium	9.2	mg/L
Manganese	0.032	mg/L
Mercury	< 0.00020	mg/L
Nickel	< 0.010	mg/L
Potassium	69	mg/L
Selenium	0.069	mg/L
Silver	< 0.0050	mg/L
Sodium	1200	mg/L
Thallium	< 0.050	mg/L
Vanadium	< 0.050	mg/L
Zinc	< 0.020	mg/L

Aluminum	0.18	mg/L
Antimony	< 0.050	mg/L
Arsenic	0.061	mg/L
Barium	0.022	mg/L
Beryllium	< 0.0030	mg/L
Cadmium	< 0.0020	mg/L
Calcium	80	mg/L
Chromium	< 0.0060	mg/L
Cobalt	< 0.0060	mg/L
Copper	< 0.0060	mg/L
Iron	0.50	mg/L
Lead	< 0.0050	mg/L
Magnesium	28	mg/L
Manganese	0.21	mg/L
Mercury	< 0.00020	mg/L
Nickel	0.012	mg/L
Potassium	58	mg/L
Selenium	< 0.050	mg/L
Silica	9.8	mg/L
Silver	< 0.0050	mg/L
Thallium	< 0.050	mg/L
Titanium	< 0.0050	mg/L

TCLP METALS

Mar-14		
Arsenic	<0.10	mg/L
Barium	<0.010	mg/L
Cadmium	<0.010	mg/L
Chromium	<0.010	mg/L
Lead	<0.010	mg/L
Mercury	<0.020	mg/L
Selenium	<0.010	mg/L
Silver	<0.010	mg/L

Jun-14		
Arsenic	< 5.0	mg/L
Barium	< 100	mg/L
Cadmium	< 1.0	mg/L
Chromium	< 5.0	mg/L
Lead	< 5.0	mg/L
Mercury	< 0.020	mg/L
Selenium	< 1.0	mg/L
Silver	< 5.0	mg/L

Sep-14		
Arsenic	< 5.0	mg/L
Barium	< 100	mg/L
Cadmium	< 1.0	mg/L
Chromium	< 5.0	mg/L
Lead	< 5.0	mg/L
Mercury	< 0.020	mg/L
Selenium	< 1.0	mg/L
Silver	< 5.0	mg/L

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TABLE 3A
INJECTION FLUID CHARACTERATION
NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

MARCH 2014

SEMI-VOLATILES AND VOLATILES

1,1,1,2-Tetrachloroethane	< 0.50
1,1,1-Trichloroethane	< 0.50
1,1,2,2-Tetrachloroethane	< 0.50
1,1,2-Trichloroethane	< 0.50
1,1-Biphenyl	< 1.0
1,1-Dichloroethane	< 0.50
1,1-Dichloroethene	< 0.50
1,1-Dichloropropene	< 0.50
1,2,3-Trichlorobenzene	< 0.50
1,2,3-Trichloropropane	< 0.50
1,2,4,5-Tetrachlorobenzene	< 10
1,2,4-Trichlorobenzene	< 0.50
1,2,4-Trimethylbenzene	< 0.50
1,2-Dibromo-3-chloropropane	< 0.50
1,2-Dibromoethane (EDB)	< 0.50
1,2-Dichlorobenzene	< 0.50
1,2-Dichloroethane (EDC)	< 0.50
1,2-Dichloropropane	< 0.50
1,3,5-Trimethylbenzene	< 0.50
1,3-Dichlorobenzene	< 0.50
1,3-Dichloropropane	< 0.50
1,4-Dichlorobenzene	< 0.50
1,4-Dioxane	< 20
1-Methylnaphthalene	< 10
2,2-Dichloropropane	< 0.50
2,3,4,6-Tetrachlorophenol	< 10
2,4,5-Trichlorophenol	< 10
2,4,6-Trichlorophenol	< 10
2,4-Dichlorophenol	< 10
2,4-Dimethylphenol	< 10
2,4-Dinitrophenol	< 10
2,4-Dinitrotoluene	< 10
2-Chloroethyl vinyl ether	< 1.0
2-Chloronaphthalene	< 10
2-Chlorophenol	< 10
2-Chlorotoluene	< 0.50
2-Hexanone	< 0.50
2-Methylnaphthalene	< 10
2-Methylphenol	< 10
2-Nitroaniline	< 10
2-Nitrophenol	< 10
3,3´-Dichlorobenzidine	< 10
3-Nitroaniline	< 10
4,6-Dinitro-2-methylphenol	< 10
4-Bromophenyl phenyl ether	< 10
4-Chloro-3-methylphenol	< 5.0
4-Chloroaniline	< 10
4-Chlorophenyl phenyl ether	< 10
4-Chlorotoluene	< 0.50
4-Isopropyltoluene	< 0.50
4-Nitroaniline	< 10
4-Nitrophenol	< 10
Acenaphthene	< 10
Acenaphthylene	< 10
Acetone	42
Acetonitrile	< 10
Acetophenone	< 10
Acrolein	< 10
Acrylonitrile	< 10
Allyl chloride	< 0.50
Anthracene	< 10
Benz(a)anthracene	< 1.0
Benzene	0.63
Benzo(a)pyrene	< 1.0
Benzo(b)fluoranthene	< 1.0
Benzo(g,h,i)perylene	< 1.0
Benzo(k)fluoranthene	< 1.0
Bis(2-chloroethoxy)methane	< 10
Bis(2-chloroethyl)ether	< 10
Bis(2-chloroisopropyl)ether	< 10
Bis(2-ethylhexyl)phthalate	< 5.0
Bromobenzene	< 0.50
Bromochloromethane	< 0.50
Bromodichloromethane	< 0.50
Bromoform	< 0.50
Bromomethane	< 0.50
Butyl benzyl phthalate	< 10
Caprolactam	< 0.10
Carbazole	< 10
Carbon disulfide	5.6
Carbon Tetrachloride	< 0.50
Chlorobenzene	< 0.50
Chloroethane	< 0.50
Chloroform	0.64
Chloromethane	< 0.50
Chloroprene	< 0.50
Chrysene	< 0.10
cis-1,2-DCE	< 0.50
cis-1,3-Dichloropropene	< 0.50
Cyclohexane	1.6
Dibenz(a,h)anthracene	< 1.0
Dibenzofuran	< 10
Dibromochloromethane	< 0.50
Dibromomethane	< 0.50
Dichlorodifluoromethane	< 0.50
Diethyl ether	< 0.50
Diethyl phthalate	< 10
Diisopropyl ether	< 0.50
Dimethyl phthalate	< 10
Di-n-butyl phthalate	< 10
Di-n-octyl phthalate	< 10
Epichlorohydrin	< 5.0
Ethyl acetate	< 0.50
Ethyl methacrylate	< 0.50
Ethyl tert-butyl ether	< 0.50
Ethylbenzene	< 0.50
Fluoranthene	< 10
Fluorene	< 10
Freon-113	< 0.50
Hexachlorobenzene	< 1.0
Hexachlorobutadiene	< 10
Hexachlorocyclopentadiene	< 10
Hexachloroethane	< 10
Indeno(1,2,3-cd)pyrene	< 1.0
Iodomethane	< 0.50
Isobutanol	< 20
Isophorone	< 10
Isopropyl acetate	< 0.50
Isopropylbenzene	< 0.50
Methacrylonitrile	< 0.50
Methyl acetate	< 0.50
Methyl ethyl ketone	5.6
Methyl isobutyl ketone	< 2.5
Methyl methacrylate	< 0.50
Methyl methacrylate	< 0.50
Methyl tert-butyl ether (MTBE	< 10
Methylcyclohexane	1.2
Methylene Chloride	< 2.5
mp-Xylenes	< 1.0
n-Amyl acetate	< 0.50
Naphthalene	< 10
n-Butylbenzene	< 0.50
n-Hexane	< 0.50
Nitrobenzene	< 5.0
N-Nitroso-di-n-butylamine	< 1.0
N-Nitrosodi-n-propylamine	< 10
N-Nitrosodiphenylamine	< 2.0
n-Propylbenzene	< 0.50
o-Toluidine	< 1.0
o-Xylene	< 0.50
Pentachloroethane	< 5.0
Pentachlorophenol	< 10
Phenanthrene	< 10
Phenol	< 5.0
p-isopropyltoluene	< 0.50
Propionitrile	< 0.50
Pyrene	< 10
Pyridine	< 1.0
sec-Butylbenzene	< 0.50
Styrene	< 0.50
tert-Amyl methyl ether	< 0.50
tert-Butyl alcohol	< 20
tert-Butylbenzene	< 0.50
Tetrachloroethene (PCE)	< 0.50
Tetrahydrofuran	< 0.50
Toluene	< 0.50
trans-1,2-DCE	< 0.50
trans-1,3-Dichloropropene	< 0.50
trans-1,4-Dichloro-2-butene	< 0.50
Trichloroethene (TCE)	< 0.50
Trichlorofluoromethane	< 0.50
Vinyl acetate	< 0.50
Vinyl chloride	< 0.50

All parameters reported in µg/L

TABLE 3A
JUNE 2014 INJECTION FLUID CHARACTERATION
NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

JUNE 2014

SEMI-VOLATILES AND VOLATILES

1,1,1,2-Tetrachloroethane	< 0.50
1,1,1,2-Tetrachloroethane	< 0.50
1,1,1-Trichloroethane	< 0.50
1,1,2,2-Tetrachloroethane	< 0.50
1,1,2-Trichloroethane	< 0.50
1,1-Biphenyl	< 0.10
1,1-Dichloroethane	< 0.50
1,1-Dichloroethene	< 0.50
1,1-Dichloropropene	< 0.50
1,2,3-Trichlorobenzene	< 0.50
1,2,3-Trichloropropane	< 0.50
1,2,4,5-Tetrachlorobenzene	< 10
1,2,4-Trichlorobenzene	< 0.50
1,2,4-Trimethylbenzene	< 0.50
1,2-Dibromo-3-chloropropane	< 0.50
1,2-Dibromoethane (EDB)	< 0.50
1,2-Dichlorobenzene	< 0.50
1,2-Dichloroethane (EDC)	< 0.50
1,2-Dichloropropane	< 0.50
1,3-Dichlorobenzene	< 0.50
1,3-Dichloropropane	< 0.50
1,4-Dichlorobenzene	< 0.50
1,4-Dioxane	< 20
1-Methylnaphthalene	< 10
2,2-Dichloropropane	< 0.50
2,3,4,6-Tetrachlorophenol	< 10
2,4,5-Trichlorophenol	< 10
2,4,6-Trichlorophenol	< 10
2,4-Dichlorophenol	< 10
2,4-Dimethylphenol	< 10
2,4-Dinitrophenol	< 10
2,4-Dinitrotoluene	< 10
2-Chloroethyl vinyl ether	< 2.5
2-Chloronaphthalene	< 10
2-Chlorophenol	< 10
2-Chlorotoluene	< 0.50
2-Hexanone	< 0.50
2-Methylnaphthalene	< 10

3,3´-Dichlorobenzidine	< 10
3-Nitroaniline	< 10
4,6-Dinitro-2-methylphenol	< 10
4-Bromophenyl phenyl ether	< 10
4-Chloro-3-methylphenol	< 5.0
4-Chloroaniline	< 10
4-Chlorophenyl phenyl ether	< 10
2-Methylphenol	< 10
2-Nitroaniline	< 10
2-Nitrophenol	< 10
4-Chlorotoluene	< 0.50
4-Nitroaniline	< 10
4-Nitrophenol	< 10
Acenaphthene	< 10
Acenaphthylene	< 10
Acetone	15
Acetonitrile	< 2.5
Acetophenone	< 10
Acrolein	< 2.5
Acrylonitrile	< 10
Allyl chloride	< 0.50
Anthracene	< 10
Atrazine	< 0.10
Benz(a)anthracene	< 0.10
Benzaldehyde	< 0.10
Benzene	0.64
Benzo(a)pyrene	< 0.10
Benzo(b)fluoranthene	< 0.10
Benzo(g,h,i)perylene	< 10
Benzo(k)fluoranthene	< 0.10
Bis(2-chloroethoxy)methane	< 10
Bis(2-chloroethyl)ether	< 10
Bis(2-chloroisopropyl)ether	< 10
Bis(2-ethylhexyl)phthalate	< 5.0
Bromobenzene	< 0.50
Bromochloromethane	< 0.50
Bromodichloromethane	< 0.50
Bromoform	< 0.50

Bromomethane	< 0.50
Butyl benzyl phthalate	< 10
Caprolactam	< 0.10
Carbazole	< 10
Carbon disulfide	< 0.50
Carbon Tetrachloride	< 0.50
Chlorobenzene	< 0.50
Chloroethane	< 0.50
Chloroform	< 0.50
Chloromethane	< 0.50
Chloroprene	< 0.50
Chrysene	< 0.10
cis-1,2-DCE	< 0.50
cis-1,3-Dichloropropene	< 0.50
Cyclohexane	< 2.5
Cyclohexane	< 0.50
Dibenz(a,h)anthracene	< 0.10
Dibenzofuran	< 10
Dibromochloromethane	< 0.50
Dibromomethane	< 0.50
Dichlorodifluoromethane	< 0.50
Diethyl ether	< 0.50
Diethyl phthalate	< 10
Diisopropyl ether	< 0.50
Dimethyl phthalate	< 10
Di-n-butyl phthalate	< 10
Di-n-octyl phthalate	< 10
Epichlorohydrin	< 5.0
Ethyl acetate	< 0.50
Ethyl methacrylate	< 2.5
Ethyl tert-butyl ether	< 0.50
Ethylbenzene	< 0.50
Fluoranthene	< 10
Fluorene	< 10
Freon-113	< 0.50
Hexachlorobenzene	< 1.0
Hexachlorobutadiene	< 10
Hexachlorocyclopentadiene	< 10

Hexachloroethane	< 10
Indeno(1,2,3-cd)pyrene	< 0.10
Iodomethane	< 0.50
Isobutanol	< 50
Isophorone	< 10
Isopropyl acetate	< 0.50
Isopropylbenzene	< 0.50
Methacrylonitrile	< 2.5
Methyl acetate	< 0.50
Methyl ethyl ketone	< 2.5
Methyl isobutyl ketone	< 2.5
Methyl methacrylate	< 2.5
Methyl tert-butyl ether (MTBE)	< 10
Methylcyclohexane	< 1.0
Methylene Chloride	< 2.5
mp-Xylenes	< 1.0
n-Amyl acetate	< 0.50
Naphthalene	< 10
n-Butylbenzene	< 0.50
n-Hexane	< 0.50
Nitrobenzene	< 5.0
N-Nitroso-di-n-butylamine	< 0.10
N-Nitrosodi-n-propylamine	< 10
N-Nitrosodiphenylamine	< 2.0
n-Propylbenzene	< 0.50
o-Toluidine	< 0.10
o-Xylene	< 0.50
Pentachloroethane	< 5.0
Pentachlorophenol	< 10
Phenanthrene	< 10
Phenol	< 5.0
p-isopropyltoluene	< 0.50
Propionitrile	< 2.5
Pyrene	< 10
Pyridine	< 0.10
sec-Butylbenzene	< 0.50
Styrene	< 0.50
tert-Amyl methyl ether	< 0.50

tert-Butyl alcohol	< 10
tert-Butylbenzene	< 0.50
Tetrachloroethene (PCE)	< 0.50
Tetrahydrofuran	< 0.50
Toluene	< 0.50
trans-1,2-DCE	< 0.50
trans-1,3-Dichloropropene	< 0.50
trans-1,4-Dichloro-2-butene	< 0.50
Trichloroethene (TCE)	< 0.50
Trichlorofluoromethane	< 0.50
Vinyl acetate	< 0.50
Vinyl acetate	< 0.50
Vinyl chloride	< 0.50

All parameters measured in µg/l

TABLE 3A
SEPTEMBER 2014 INJECTION FLUID CHARACTERATION
NAVAJO REFINING, L.L.C.
ARTESIA, NEW MEXICO

SEPTEMBER 2014

SEMI-VOLATILES AND VOLATILES

1,1,1,2-Tetrachloroethane	< 0.50
1,1,1-Trichloroethane	< 0.50
1,1,2,2-Tetrachloroethane	< 0.50
1,1,2-Trichloroethane	< 0.50
1,1-Biphenyl	< 5.0
1,1-Dichloroethane	< 0.50
1,1-Dichloropropene	< 0.50
1,2,3-Trichlorobenzene	< 0.50
1,2,3-Trichloropropane	< 0.50
1,2,4,5-Tetrachlorobenzene	< 10
1,2,4-Trichlorobenzene	< 0.50
1,2,4-Trimethylbenzene	< 0.50
1,2-Dibromo-3-chloropropane	< 0.50
1,2-Dibromoethane (EDB)	< 0.50
1,2-Dichlorobenzene	< 0.50
1,2-Dichloroethane (EDC)	< 0.50
1,2-Dichloropropane	< 0.50
1,3,5-Trimethylbenzene	< 0.50
1,3-Dichlorobenzene	< 0.50
1,3-Dichloropropane	< 0.50
1,4-Dichlorobenzene	< 0.50
1,4-Dioxane	< 20
1-Methylnaphthalene	< 10
2,2-Dichloropropane	< 0.50
2,3,4,6-Tetrachlorophenol	< 10
2,4,5-Trichlorophenol	< 10
2,4,6-Trichlorophenol	< 10
2,4-Dichlorophenol	< 10
2,4-Dimethylphenol	< 10
2,4-Dinitrophenol	< 10
2,4-Dinitrotoluene	< 10
2,6-Dinitrotoluene	< 10
2-Chloroethyl vinyl ether	< 0.50
2-Chloronaphthalene	< 10
2-Chlorophenol	< 10
2-Chlorotoluene	< 0.50
2-Hexanone	< 0.50
2-Methylnaphthalene	< 10
2-Methylphenol	< 10

2-Nitroaniline	< 10
2-Nitrophenol	< 10
3,3´-Dichlorobenzidine	< 10
3-Nitroaniline	< 10
4,6-Dinitro-2-methylphenol	< 10
4-Bromophenyl phenyl ether	< 10
4-Chloro-3-methylphenol	< 5.0
4-Chloroaniline	< 10
4-Chlorophenyl phenyl ether	< 10
4-Chlorotoluene	< 0.50
4-Isopropyltoluene	< 0.50
4-Methyl-2-pentanone	< 0.50
4-Nitroaniline	< 10
4-Nitrophenol	< 10
Acenaphthene	< 10
Acenaphthylene	< 10
Acetone	18
Acetonitrile	73
Acetophenone	< 10
Acrolein	< 0.50
Acrylonitrile	< 10
Allyl chloride	< 0.50
Anthracene	< 10
Atrazine	< 5.0
Benz(a)anthracene	< 0.10
Benzaldehyde	< 5.0
Benzene	< 0.50
Benzo(a)pyrene	< 0.10
Benzo(b)fluoranthene	< 0.10
Benzo(g,h,i)perylene	< 10
Benzo(k)fluoranthene	< 0.10
Bis(2-chloroethoxy)methane	< 10
Bis(2-chloroethyl)ether	< 10
Bis(2-chloroisopropyl)ether	< 10
Bis(2-ethylhexyl)phthalate	< 5.0
Bromobenzene	< 0.50
Bromochloromethane	< 0.50
Bromodichloromethane	< 0.50
Bromoform	< 0.50

Bromomethane	< 0.50
Butyl benzyl phthalate	< 10
Caprolactam	< 5.0
Carbazole	< 10
Carbon disulfide	0.56
Carbon Tetrachloride	< 0.50
Chlorobenzene	< 0.50
Chloroethane	< 0.50
Chloroform	< 0.50
Chloromethane	< 0.50
Chloroprene	< 0.50
Chrysene	< 0.10
cis-1,2-DCE	< 0.50
cis-1,3-Dichloropropene	< 0.50
Cyclohexane	< 0.50
Dibenz(a,h)anthracene	< 0.10
Dibenzofuran	< 10
Dibromochloromethane	< 0.50
Dibromomethane	< 0.50
Dichlorodifluoromethane	< 0.50
Diethyl ether	< 0.50
Diethyl phthalate	< 10
Diisopropyl ether	< 0.50
Dimethyl phthalate	< 10
Di-n-butyl phthalate	< 10
Di-n-octyl phthalate	< 10
Epichlorohydrin	< 5.0
Ethyl acetate	< 0.50
Ethyl methacrylate	< 0.50
Ethyl tert-butyl ether	< 0.50
Ethylbenzene	< 0.50
Fluoranthene	< 10
Fluorene	< 10
Freon-113	< 0.50
Hexachlorobenzene	< 1.0
Hexachlorobutadiene	< 10
Hexachlorocyclopentadiene	< 10
Hexachloroethane	< 10
Indeno(1,2,3-cd)pyrene	< 5.0

Iodomethane	< 0.50
Isobutanol	< 50
Isophorone	< 10
Isopropyl acetate	< 0.50
Isopropylbenzene	< 0.50
Methacrylonitrile	< 0.50
Methyl acetate	< 0.50
Methyl ethyl ketone	< 2.5
Methyl isobutyl ketone	< 2.5
Methyl methacrylate	< 0.50
Methyl tert-butyl ether (MTBE)	< 10
Methylcyclohexane	< 1.0
Methylene Chloride	< 2.5
mp-Xylenes	< 1.0
n-Amyl acetate	< 0.50
Naphthalene	< 10
n-Butylbenzene	< 0.50
n-Hexane	< 0.50
Nitrobenzene	< 10
N-Nitroso-di-n-butylamine	< 5.0
N-Nitrosodi-n-propylamine	< 10
N-Nitrosodiphenylamine	< 2.0
n-Propylbenzene	< 0.50
o-Toluidine	< 5.0
o-Xylene	< 0.50
Pentachloroethane	< 5.0
Pentachlorophenol	< 10
Phenanthrene	< 10
Phenol	< 5.0
p-isopropyltoluene	< 0.50
Propionitrile	0.97
Pyrene	< 10
Pyridine	< 5.0
sec-Butylbenzene	< 0.50
Styrene	< 0.50
tert-Amyl methyl ether	< 0.50
tert-Butyl alcohol	23
tert-Butylbenzene	< 0.50
Tetrachloroethene (PCE)	< 0.50

Tetrahydrofuran	< 0.50
Toluene	< 0.50
trans-1,2-DCE	< 0.50
trans-1,3-Dichloropropene	< 0.50
trans-1,4-Dichloro-2-butene	< 0.50
Trichloroethene (TCE)	< 0.50
Trichlorofluoromethane	< 0.50
Vinyl acetate	< 0.50
Vinyl chloride	< 0.50
Xylenes, Total	< 1.0

All parameters measured in µg/L

TABLE 3B
INJECTION FLUID CHARACTERIZATION DATA
RO REJECT
NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO
JUNE 2014

Miscellaneous	
Total Cyanide (mg/L)	<0.010
Chloride (mg/L)	36.0
Fluoride (mg/L)	2.3
Sulfate (mg/L)	1,200
Nitrite (mg/L)	<0.10
Nitrate (mg/L)	1.2
pH (S.U.)	7.92
TDS (mg/L)	2,460
Radionuclides	
Radium-226 (pCi/L)	0.667
Radium-226+/- (pCi/L)	0.599
Radium-228 (pCi/L)	-0.136
Radium-228 +/- (pCi/L)	0.352
PCBs	
Aroclor 1016 (ug/L)	<1.0
Aroclor 1221 (ug/L)	<1.0
Aroclor 1232 (ug/L)	<1.0
Aroclor 1242 (ug/L)	<1.0
Aroclor 1248 (ug/L)	<1.0
Aroclor 1254 (ug/L)	<1.0
Aroclor 1260 (ug/L)	<1.0
TPH Ranges	
TPH-DRO (mg/L)	<1.0
TPH-ORO (mg/L)	<5.0
TPH-GRO (mg/L)	<0.050

Metals (Total)	
Arsenic	0.0036
Barium	0.054
Cadmium	<0.001
Calcium	470
Chromium	<0.001
Iron	<0.010
Lead	<0.001
Manganese	<0.001
Nickel	<0.001
Potassium	1.2
Selenium	<0.010
Sodium	39.0
Vanadium	0.0075

Semivolatiles	
1,1-Biphenyl	<0.50
1-Methylnaphthalene	<0.50
2-Methylnaphthalene	<0.50
Benz(a)pyrene	<0.50
Naphthalene	<0.50
Phenol	<0.50
Phenol	<0.50

Metals (Dissolved)	
Aluminum	<0.010
Arsenic	0.0012
Barium	0.045
Boron	<0.10
Cadmium	<0.001
Calcium	460
Chromium	0.0016
Cobalt	<0.001
Iron	<0.10
Lead	<0.001
Manganese	0.0013
Mercury	<0.0002
Molybdenum	0.0084
Nickel	0.0013
Potassium	1.4
Selenium	0.0076
Silver	<0.001
Sodium	39.0
Uranium	0.0034
Vanadium	0.0077
Zinc	0.21

Volatiles	
1,1,1-Trichloroethane	<0.50
1,1,1,2-Tetrachloroethane	<0.50
1,1,2,2-Tetrachloroethane	<0.50
1,1,2-Trichloroethane	<0.50
1,2-Dibromomethane	<0.50
1,1-Dichloroethane	<0.50
1,1-Dichloroethene	<0.50
1,2-Dichloroethane	<0.50
1,2-Dichloropropane	<0.50
1,2,4-Trimethylbenzene	<0.50
1,3,5-Trimethylbenzene	<0.50
2-Butanone	<5.0
2-Hexanone	<2.5
Acetone	<2.5
Benzene	<0.50
Bromodichloromethane	<0.50
Bromoform	<0.50
Bromomethane	<0.50
Carbon disulfide	<0.50
Carbon tetrachloride	<0.50
Chlorobenzene	<0.50
Chloroethane	<0.50
Chloroform	<0.50
Chloromethane	<0.50
cis-1,2-DCE	<0.50

Volatiles	
cis-1,3-Dichloropropene	<0.50
Dibromochloromethane	<0.50
Isopropylbenzene	<0.50
Methylene chloride	<0.50
Methyl isobutyl ketone	<2.5
MTBE	<0.50
Naphthalene	<0.50
n-Butylbenzene	<0.50
n-Propylbenzene	<0.50
p-isopropyltoluene	<0.50
sec-Butylbenzene	<0.50
Styrene	<0.50
Tetrachloroethene	<0.50
Toluene	<0.50
trans-1,2-DCE	<0.50
trans-1,3-Dichloropropene	<0.50
Trichloroethene	<0.50
Vinyl chloride	<0.50
mp-Xylenes	<0.50
o-Xylenes	<0.50

mg/L	Milligrams per liter.
pCi/L	Picocurries per liter.
ug/L	Micrograms per liter.
S.U.	Standard Units.
<	Less than.

All concentrations reported in milligrams per liter (mg/L).

TABLE 4

OPEN-HOLE LOGGING AND CORING PROGRAM

NAVAJO REFINING COMPANY, L.L.C.
WASTE DISPOSAL WELL NO. 4
ARTESIA, NEW MEXICO

Interval	Open Hole Log Description
Surface Borehole (80' – 1,500')	Induction Resistivity/Spontaneous Potential/Formation Density/ Compensated Neutron/Caliper/Gamma Ray
	Four Arm Caliper
Protection Borehole (1,500' – 10,800')	Laterolog Resistivity/Formation Density/ Compensated Neutron/Caliper/Gamma Ray
	Four Arm Caliper

Interval	Coring Description
Confining Zone (9,700' – 10,200')	4" Diameter x 30' Long Conventional Core
Injection Interval (10,200' – 10,700')	4" Diameter x 60' Long Conventional Core

TABLE 5

WELL TUBULAR INFORMATION
NAVAJO REFINING COMPANY, L.L.C.
WASTE DISPOSAL WELL NO. 4
ARTESIA, NEW MEXICO

Ref	Section	Outside Diameter (in)	Depth Interval (feet BGL)	Material	Collapse Resistance (psi)	Internal Yield (psi)	Tensile Strength (lbs)	Body Yield (lbs)	Max. External Press (psi)	Max. Internal Press (psi)	Maximum Tensile Load (lbs)	Safety Factor Collapse	Safety Factor Burst	Safety Factor Tension
	Conductor	20	0 - 80	129.33 ppf; 0.625" wall, Welded	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	Surface Casing	13⅜	0 - 1500	54.5 ppf, K-55, ST&C	1,130	2,730	547,000	853,000	624	1,000	81,750	1.81	2.73	6.69
2	Protection	9⅝	0 - 10,800	47 ppf, N-80, LT&C	4,760	6,870	905,000	1,086,000	4,243	1,500	479,400	1.12	4.58	1.89
3	Injection Tubing	7	0 - 10,100	26 ppf, K-55, LT&C	4,320	4,980	401,000	415,000	1,982	2,144	244,400	2.18	2.32	1.64

References:

1. Maximum external pressure after cementing 16.4 ppg cement with fresh water inside. Assumed gradient equal to 8.0 ppg (16.4-8.4). Maximum internal pressure during pressure test at 1000 psi excluding external pressure.

2. Maximum external pressure after cementing 16.4 ppg cement with fresh water inside. Assumed gradient equal to 8.0 ppg. Maximum internal pressure during pressure test at 1500 psi excluding external pressure.

3. Maximum external pressure pressure during APT assumes 10 ppg water in 7" x 9⅝" annulus with 1200 psi surface test pressure and 8.4 ppg fluid inside tubing. Maximum internal pressure = Hydrostatic pressure inside 7" tubing (9 ppg*0.052*9400') + Maximum Permitted Surface Injection Pressure (1900) - Minimum Expected Annulus Pressure (8.5*0.052*9400).

TABLE 6

WELL CASING AND CEMENTING PROGRAM
NAVAJO REFINING COMPANY
WASTE DISPOSAL WELL NO. 4
ARTESIA, NEW MEXICO

Cemented Casing Description	Cemented Interval Top (ft BGL)	Cemented Interval Bottom (ft BGL)	Borehole Type	Hole Size (in)	Casing OD (in)	Cement Volumes Subtotal (ft^3)	Cement Volumes Excess Factor	Cement Volumes Excess (ft^3)	Cement Volumes Total (ft^3)	Estimated Cement Requirements Slurry Type	Estimated Cement Requirements Volume (ft^3)	Estimated Cement Requirements Description
Surface Casing	0	80	Conductor Pipe	18.750	13.375	75.3	0%	0.0	75.3			
(0 - 1,500')	80	1,300	Open Hole	17.500	13.375	847.5	20%	169.5	1016.9	Lead	1092	Lightweight Class A
13⅜", 54.5#,	1,300	1,500	Open Hole	17.500	13.375	138.9	20%	27.8	166.7			
K-55, ST&C	1,455	1,500	Shoe-Track	12.615		39.1	0%	0.0	39.1	Tail	206	Class A
Protection Casing: Stage II	0	1,500	Surface Casing	12.615	9.625	544.0	0%	0.0	544.0			
(0 - 5,800')	1,500	5,400	Open Hole	12.250	9.625	1221.4	20%	244.3	1465.7	Lead	2010	Lightweight Class H
9⅝", 47#, N-80, LT&C	5,400	5,800	Open Hole	12.250	9.625	125.3	20%	25.1	150.3	Tail	150	Class H
Protection Casing: Stage I	5,800	10,000	Open Hole	12.250	9.625	1315.4	20%	263.1	1578.5	Lead	1578	Lightweight Class H
(5,800 - 10,800')	10,000	10,800	Open Hole	12.250	9.625	250.6	20%	50.1	300.7			
9⅝", 47#, N-80, LT&C	10,755	10,800	Shoe-Track	9.681		23.0	0%	0.0	23.0	Tail	324	Class H

TABLE 7

CASED HOLE LOGGING PROGRAM
NAVAJO REFINING COMPANY, L.L.C.
WASTE DISPOSAL WELL NO. 4
ARTESIA, NEW MEXICO

Interval	Log Description
13⅜" Surface Casing (Surface – 1500')	Cement Bond /Variable Density/Gamma Ray Log
9⅝" Protection Casing (Surface – 10,800')	Cement Bond /Variable Density/Gamma Ray Log, Casing Inspection Log
7" Injection Tubing & 9⅝" Protection Casing (Surface – 10,800')	Temperature Survey, Bottomhole Pressure, Pressure Falloff Test, Radioactive Tracer Survey

FIGURES

PROPOSED WDW-4

Logan Draw Oil Field

Logan Draw

EMPIRE OIL FIELD

PIPELINE

PECOS RIVER

Spring Lake

Gaging Station

Footbridge

Sobstation

Pumping Sta

Oil Tanks

Oil Wells

Gravel Pit

Gas Well

BM

N

NEW MEXICO

QUADRANGLE LOCATION

SUBSURFACE

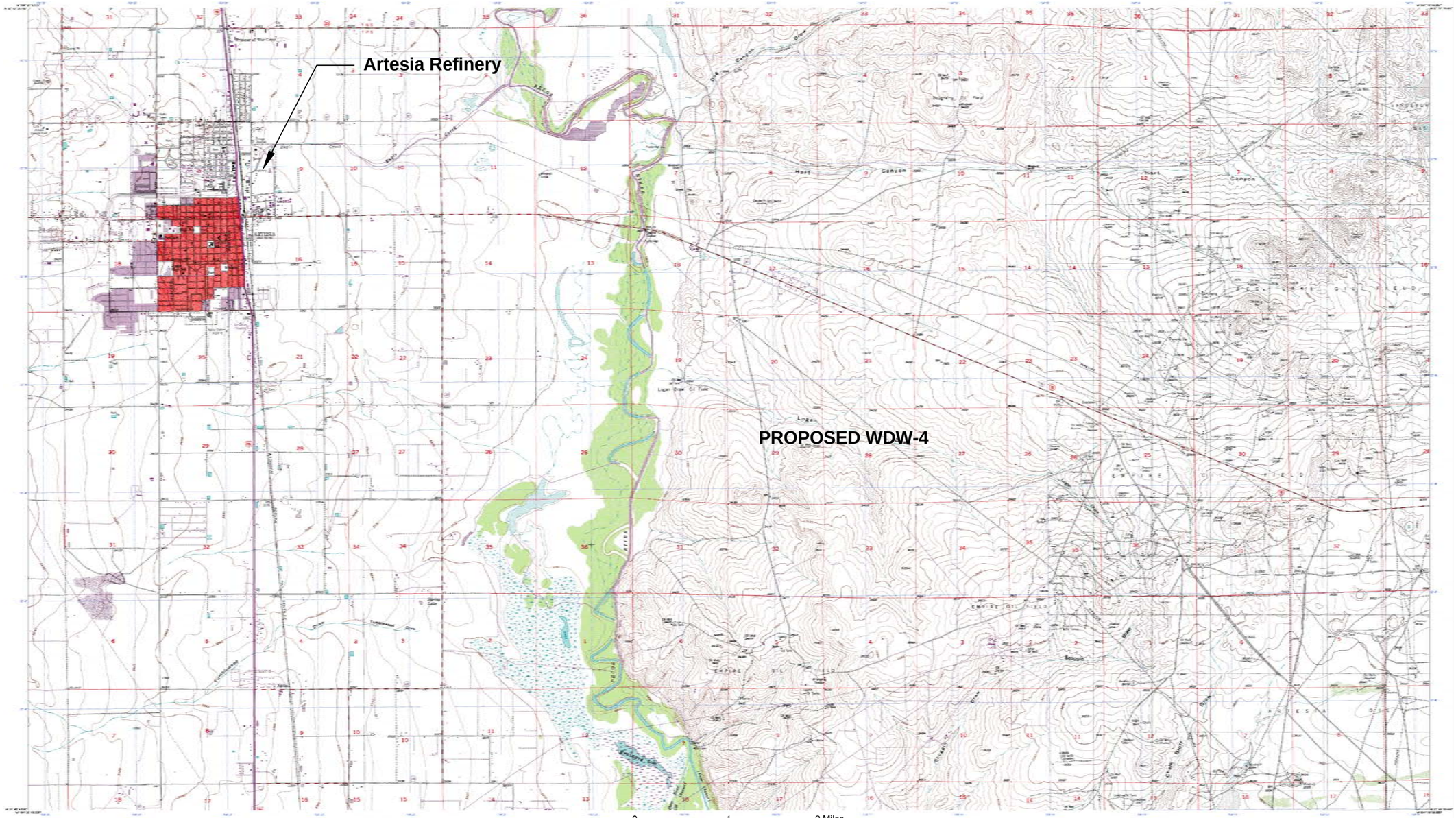
HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

FIGURE 2

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

SITE MAP

DATE: 09/02/14	CHECKED BY:	JOB NO: 185818-6944
DRAWN BY: WDD	APPROVED BY:	DWG. NO:



N

QUADRANGLE LOCATION

Maps compiled from USGS Quads: Artesia, NM; Artesia NE, NM; Diamond Mound, NM; Espuela, NM; Spring Lake, NM; Red Lake, NM;

SUBSURFACE

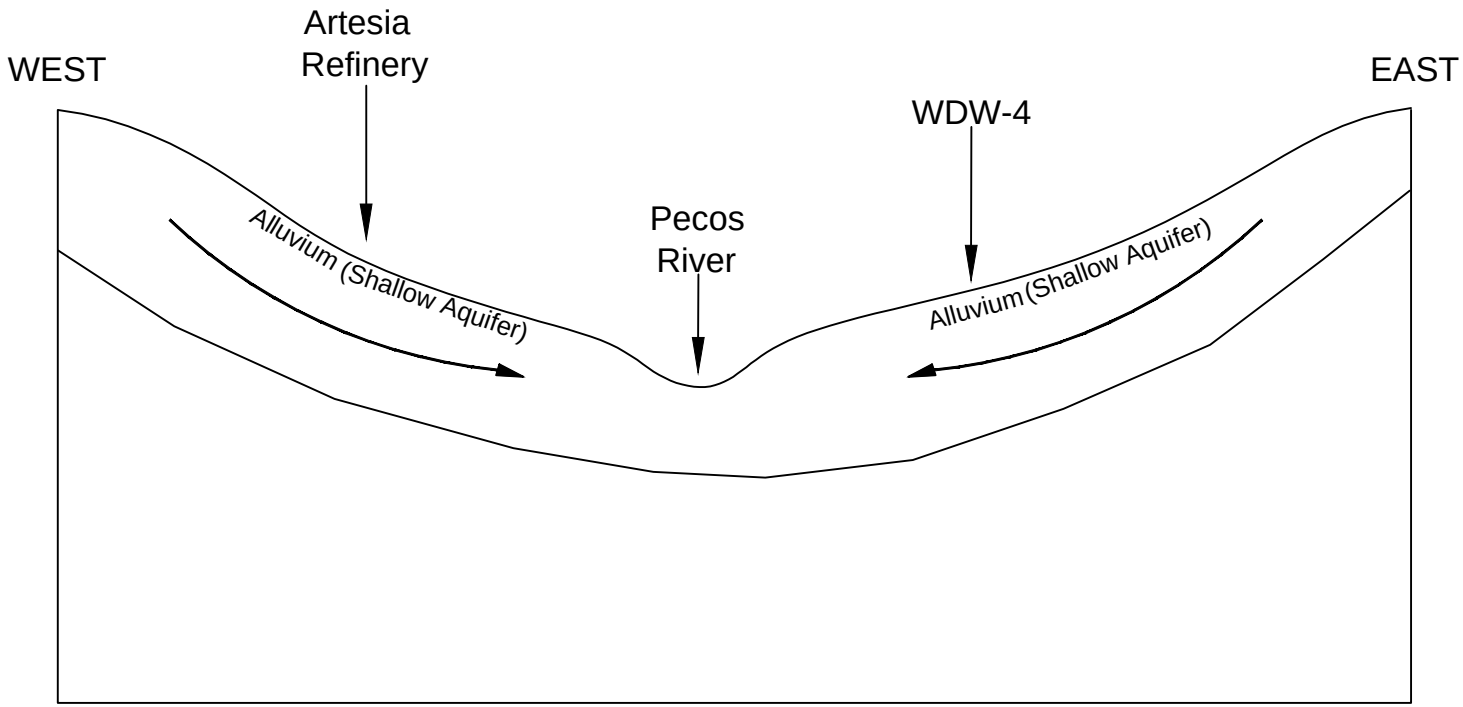
HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

FIGURE 1

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

SITE LOCATION MAP

DATE: 08/21/14	CHECKED BY:	JOB NO: 185818-6944
DRAWN BY: WDD	APPROVED BY:	DWG. NO:



NOT TO SCALE

EXPLANATION

Direction of Groundwater Movement

SUBSURFACE

HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

FIGURE 3

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

GENERALIZED HYDROGEOLOGIC CROSS-SECTION

DATE: 08/21/14	CHECKED BY:	JOB NO: 185818-6944
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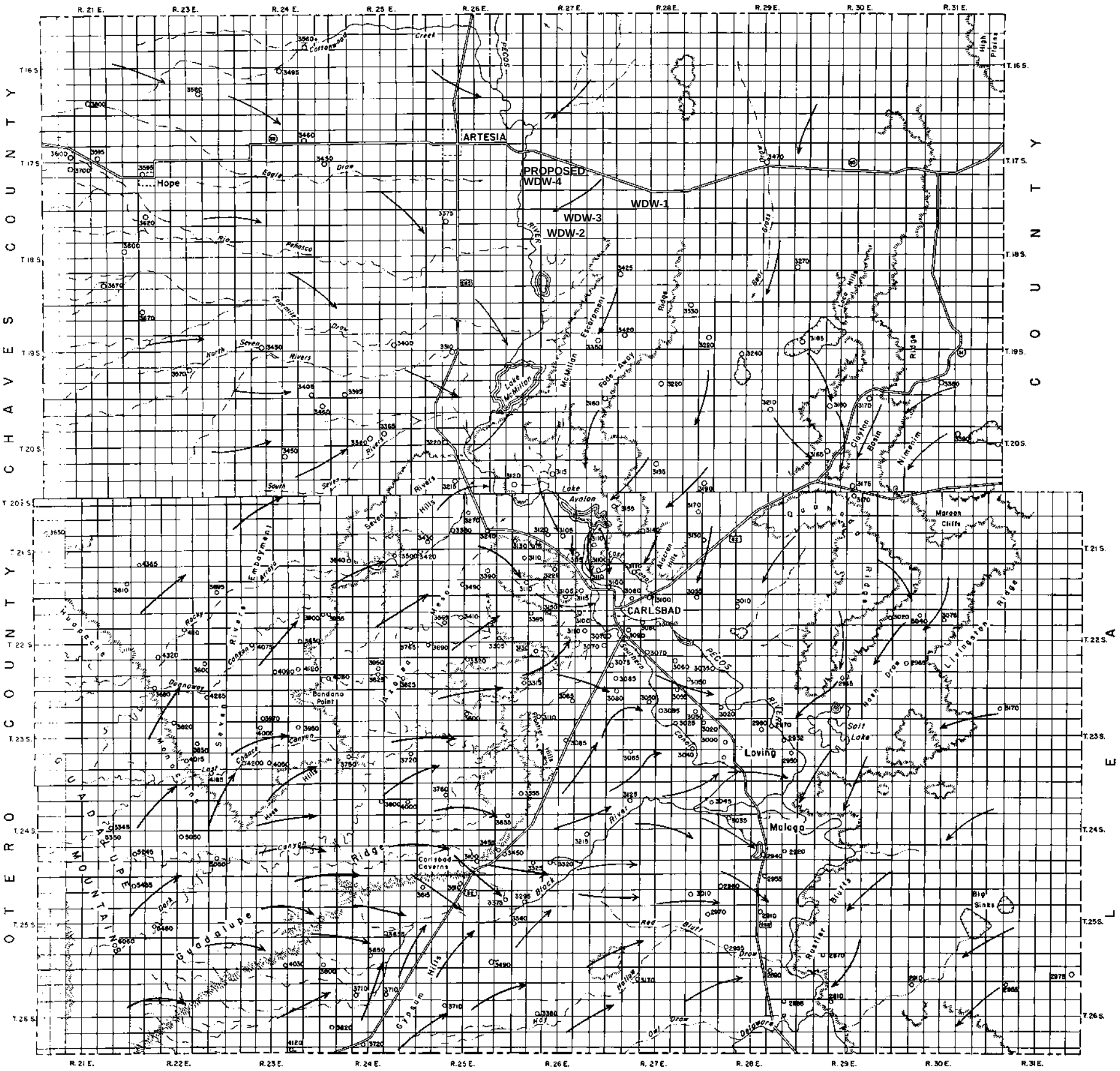
NEW MEXICO BUREAU OF MINES AND MINERAL RESOURCES

GROUND-WATER REPORT 3 PLATE 3

C H A V E S C O U N T Y



GENERAL DIRECTION OF MOVEMENT OF GROUND WATER

IN EDDY COUNTY, NEW MEXICO

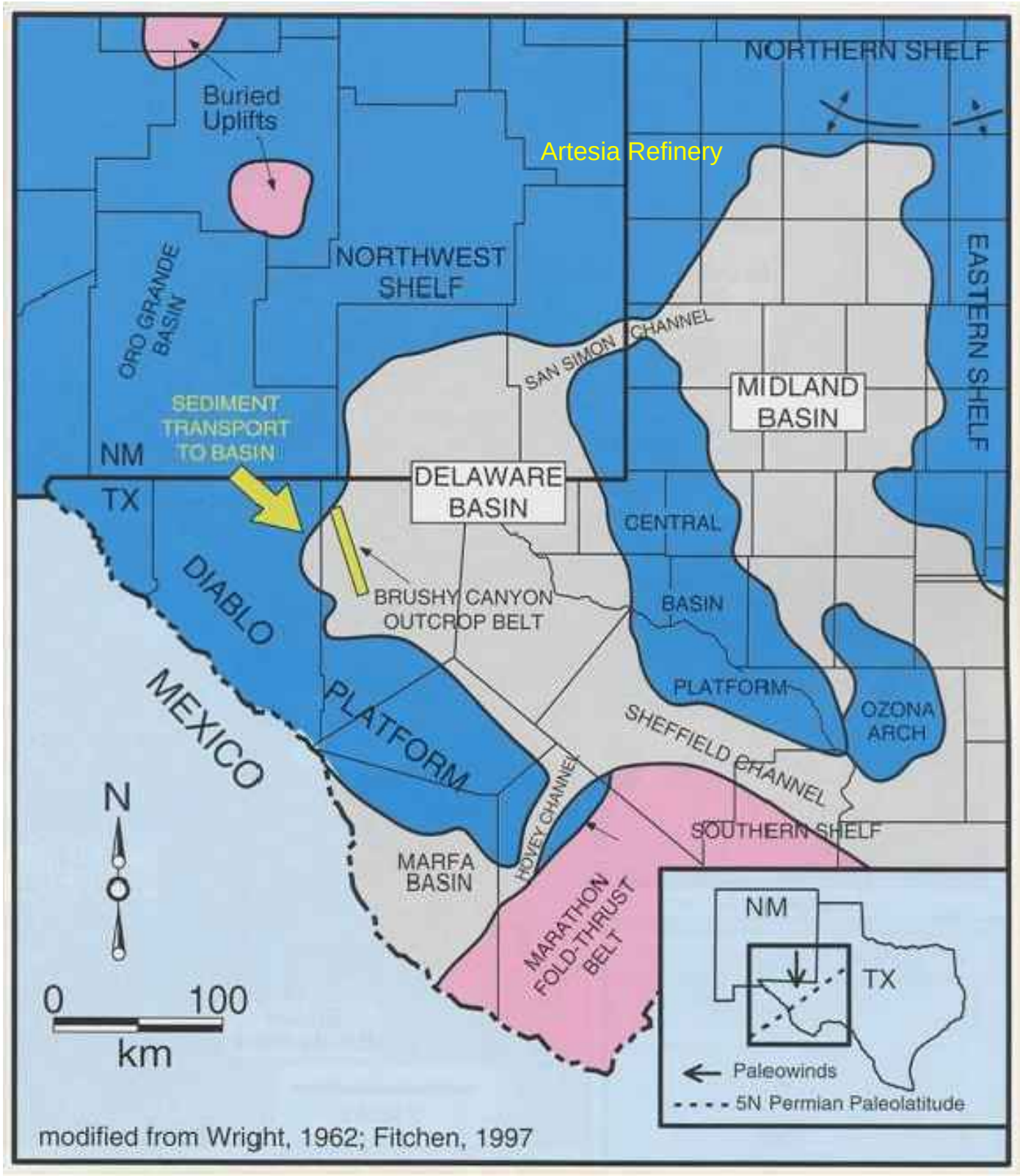
SCALE

5 0 5 10 MILES

EXPLANATION

- Well
- Spring
- Direction of ground water movements
- 3360 Altitudes (feet above sea level) of ground water levels

FIGURE 4



SUBSURFACE

HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

FIGURE 5

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

PERMIAN BASIN MAP

DATE: 07/22/13	CHECKED BY:	JOB NO: 60D6944
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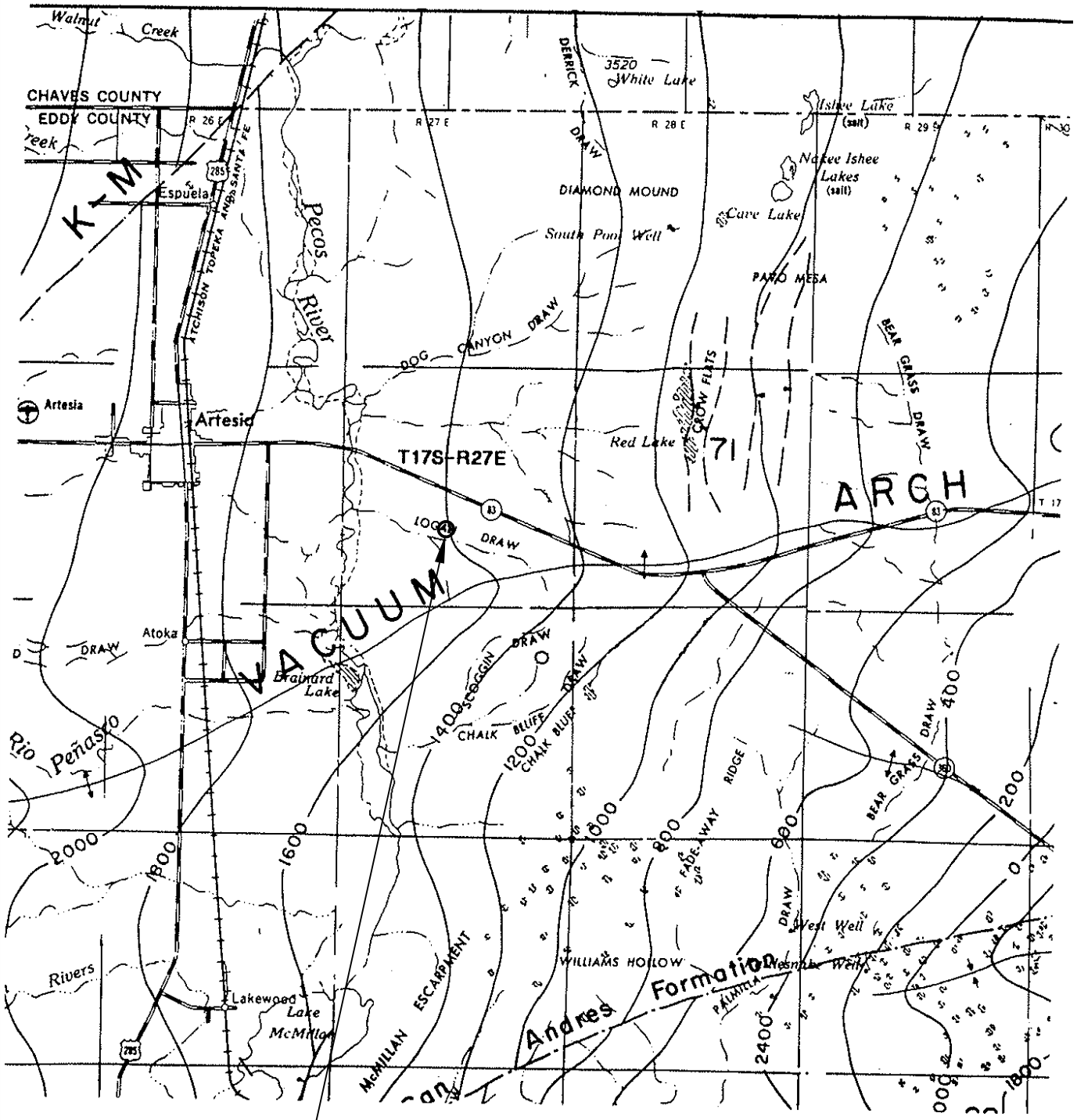
NORTHWEST SHELF, CENTRAL BASIN PLATFORM

Age		Strata		Oil Plays
Triassic		Chinle		
		Santa Rosa		
Permian	Ochoan	Dewey Lake		
		Rustler		
		Salado		
	Guadalupian	Artesia Group	Tansill	Artesia Platform Sandstone
			Yates	
			Seven Rivers	
			Queen	
			Grayburg	Upper San Andres and Grayburg Platform - Artesia Vacuum Trend
		San Andres		Upper San Andres and Grayburg Platform - Central Basin Platform Trend
	Leonardian	Glorieta		Leonardian Restricted Platform Carbonate
		Yeso	Paddock	
			Blinebry	
			Tubb	
			Drinkard	
	Wolfcampian	Abo		Abo Platform Carbonate
		Hueco ("Wolfcamp")		Wolfcamp Platform Carbonate
Pennsylvanian	Virgilian	Bough		Northwest Shelf Upper Pennsylvanian Carbonate
		Cisco		
	Missourian	Canyon		
	Des Moinesian	Strawn		Northwest Shelf Strawn Patch Reef
	Atokan	Atoka		
	Morrowan	Morrow		
Miss.		undivided		
Dev.	Upper	Woodford		
	Middle			
	Lower	Thirtyone		Devonian Thirtyone Deepwater Chert
Sil.	Upper	Wristen		Wristen Buildups and Platform Carbonate
	Middle			
	Lower	Fusselman		Fusselman Shallow Platform Carbonate
Ord.	Upper	Montoya		
	Middle	Simpson		Simpson Cratonic Sandstone
	Lower	Ellenburger		Ellenburger Karst-Modified Restricted Ramp Carbonate
		Bliss		
Cambrian				
Precambrian		igneous, metamorphics volcanics		

FIGURE 6

STRATIGRAPHIC COLUMN



SUBSURFACE

HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

FIGURE 7

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

REGIONAL GEOLOGIC FEATURES

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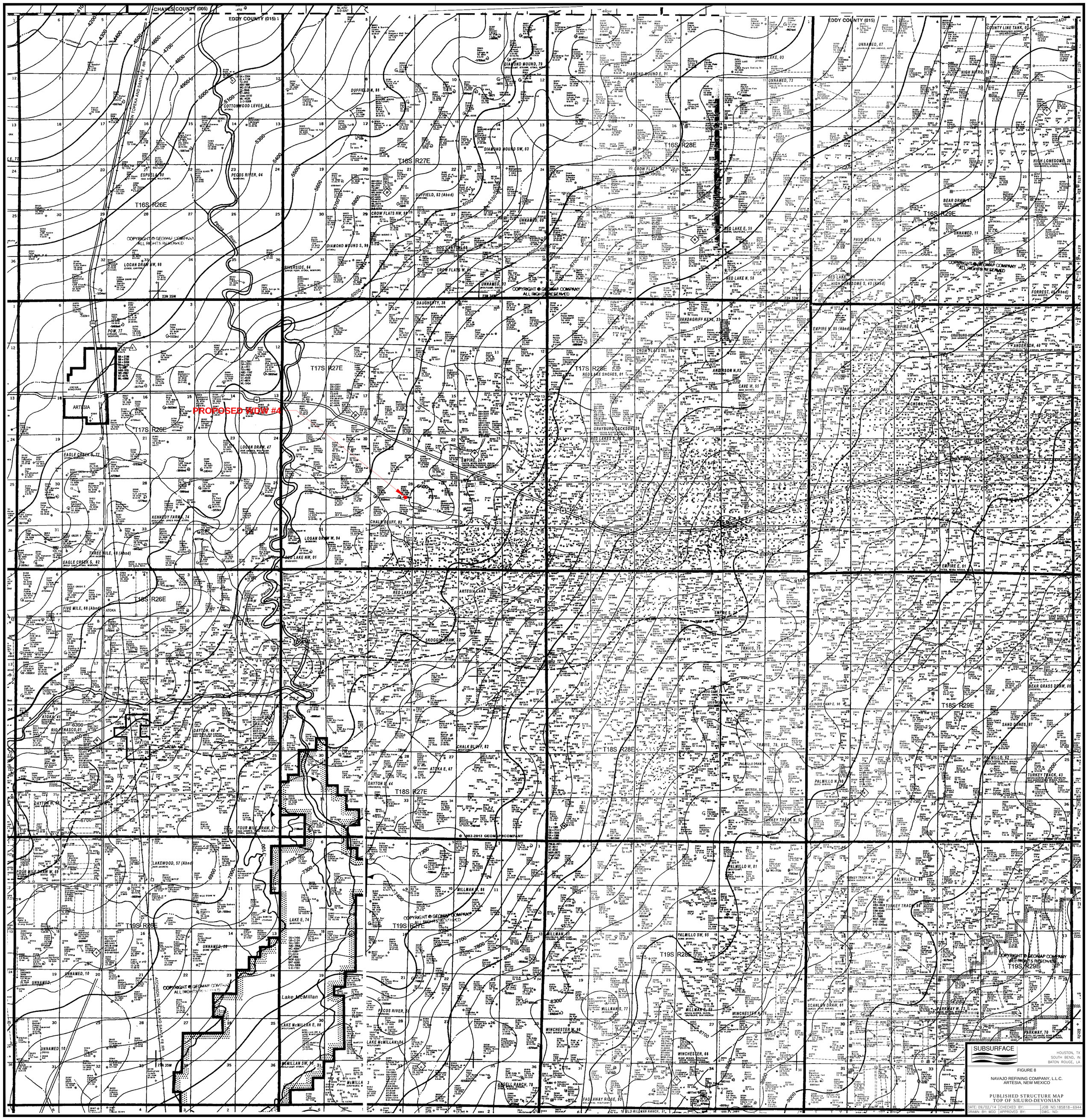
CHAVES COUNTY (005)
EDDY COUNTY (015)
T16S R27E
T16S R28E
T16S R26E
T16S R29E
T17S R27E
T17S R28E
T17S R26E
T17S R29E
T18S R26E
T18S R27E
T18S R28E
T18S R29E
T19S R26E
T19S R27E
T19S R28E
T19S R29E
PROPOSED WDW #4
COPYRIGHT © GEOMAP COMPANY ALL RIGHTS RESERVED
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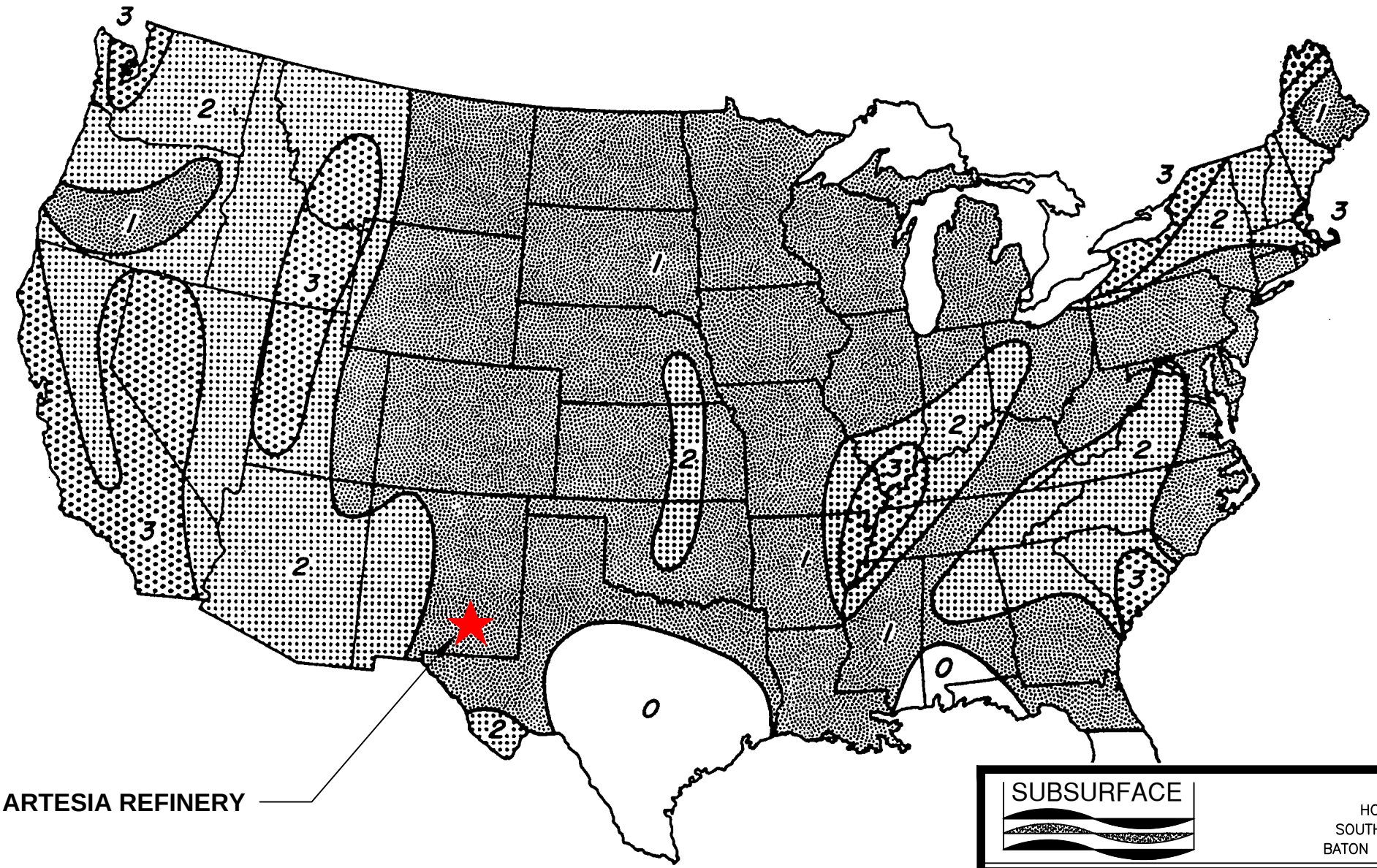
SUBSURFACE
HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA
FIGURE 8
NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO
PUBLISHED STRUCTURE MAP
TOP OF SILURO-DEVONIAN
DATE: 09/02/14
CHECKED BY:
JOB NO:185818-6944
DRAWN BY: WDD
APPROVED BY:
DWG. NO:



LEGEND

Zone 0 - no damage.
Zone 1 - minor damage; corresponds to intensities V and VI of the M.M.* Scale.
Zone 2 - moderate damage; corresponds to intensity VII of the M.M.* Scale.
Zone 3 - major damage; corresponds to intensity VIII and higher of the M.M.* Scale.
(* - M.M. Refers to the Modified Mercalli Intensity Scale.)

SUBSURFACE

HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

FIGURE 9

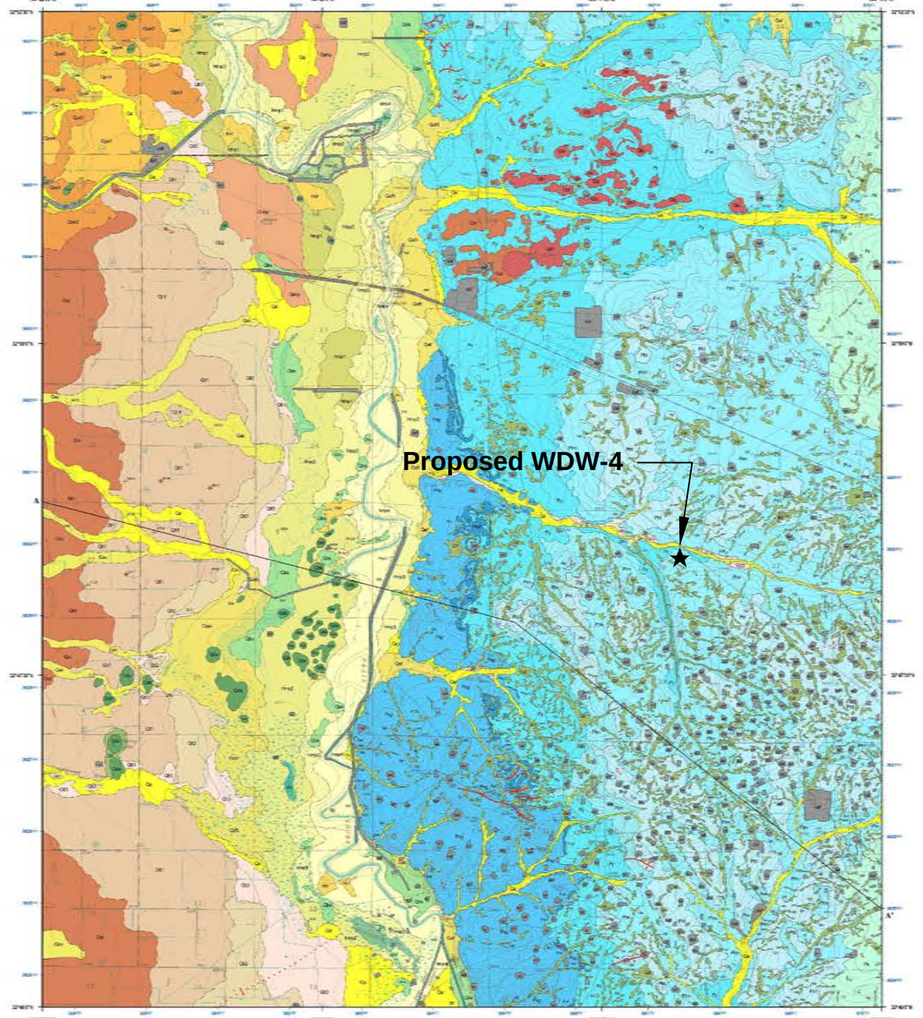
NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

SEISMIC RISK MAP

DATE: 07/22/13	CHECKED BY:	JOB NO: 60D6944
DRAWN BY: WDD	APPROVED BY:	DWG. NO:

NEW MEXICO BUREAU OF GEOLOGY AND MINERAL RESOURCES A DIVISION OF NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY

NMBGMR Open-file Geologic Map 214
Last Modified June 2011



1:24,000

QUADRANGLE LOCATION

New Mexico Bureau of Geology and Mineral Resources
New Mexico Tech
801 Leroy Place
Socorro, New Mexico
87801-4796

(575) 835-5490

This and other STATEMAP quadrangles are available for free download in both PDF and ArcGIS formats at:

http://geoinfo.nmt.edu

Geologic map of the Spring Lake quadrangle, Eddy County, New Mexico.

May 2011

by

David J. McCraw, Lewis A. Land, and Shannon Williams

New Mexico Bureau of Geology and Mineral Resources, 801 Leroy Place, Socorro, NM 87801

New Mexico Bureau of Geology and Mineral Resources
Open-file Geologic Map 214

EXPLANATION OF MAP SYMBOLS

COMMENTS TO MAP USERS

A geologic map displays information on the distribution, nature, orientation, and age relationships of rock and deposits and the occurrence of structural features. Geologic and fault contacts are irregular surfaces that form boundaries between different types or ages of units. Data depicted on this geologic quadrangle map may be based on any of the following: reconnaissance field geologic mapping, compilation of published and unpublished work, and photogeologic interpretation. Locations of contacts are not surveyed, but are plotted by interpretation of the position of a given contact onto a topographic base map. Therefore, the accuracy of contact locations depends on the scale of mapping and the interpretation of the geologist(s). Any enlargement of this map could cause misunderstanding in the detail of mapping and may result in erroneous interpretations. Site-specific conditions should be verified by detailed surface mapping or subsurface exploration. Topographic and cultural changes associated with recent development may not be shown.

Cross sections are constructed based upon the interpretations of the author made from geologic mapping and available geophysical and subsurface (drillhole) data. Cross-sections should be used as an aid to understanding the general geological framework of the map area, and not for the sole source of information for use in locating or designing wells, buildings, roads, or other man-made structures.

The map has not been reviewed according to New Mexico Bureau of Geology and Mineral Resources standards. The contents of the report and map should not be considered final and authoritative until reviewed and published by the New Mexico Bureau of Geology and Mineral Resources. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the State of New Mexico, or the U.S. Government.

DESCRIPTION OF MAP UNITS

CENOZOIC

QUATERNARY and NEOGENE

Alluvium, lacustrine, and anthropogenic deposits

Disturbed land and/or artificial fill (Historic) — Disrupted fill and areas affected by human disturbances, mapped where deposits or exposures are locally extensive. Especially notable are the numerous constructed oil and gas well pads. Also includes the U.S. Bureau of Reclamation's Kaiser Channel of the Pecos River, as well as other straightened reaches.

Quaternary tributary alluvium and valley-fill alluvium, undifferentiated (Historic to uppermost Pleistocene) — Brown (7.5YR4/2) to pinkish gray (7.5YR6/2) (tributaries) to light reddish brown (5YR6/4) to reddish brown (2.5YR4/4) (Pecos floodplain valley-fill); unconsolidated, moderately sorted, pebbly sand, silt, and clay. Varies considerably in thickness from <1 to 3 m in tributaries and up to 20–22 m in the floodplain.

Quaternary alluvial channel swale and/or depression fill deposits of the Eagle Creek piedmont alluvial complex (upper Pleistocene to Holocene) — Light brown (7.5YR6/4) to pinkish gray (7.5YR6/2), unconsolidated, poorly sorted, fine-grained sand, silt, and clay with smooth carbonate growth and pebble-accompanying thin (<1–1.5 m) channels, swales, and coalescing depressions draining the Eagle Creek piedmont complex. (*Qpe*)

Quaternary alluvial channel swale and/or depression fill deposits originating from either Eagle Creek or Rio Peñasco piedmont complexes extending across Pecos Valley terraces (upper Pleistocene to Holocene) — Light brown (7.5YR6/4) to pinkish gray (7.5YR6/2), unconsolidated, poorly sorted, fine-grained sand, silt, and clay, occasional carbonate pebbles, occupying thin (<1–1.5 m) channels, swales, and coalescing depressions.

Alluvial-fan deposits, undivided (Historic to uppermost Pleistocene) — Predominantly carbonate gravels to pebbles, often in stringers, in a brown (7.5YR4/2) to pinkish gray (7.5YR6/2), unconsolidated, poorly sorted, and coarse- to fine-grained sand to silty sand. Two large fans built by both historic flower channels of Eagle Creek (*Qafd*), and by Tumbleweed Draw (*Qafd*), debouch from those western tributaries onto the western floodplain margin, interfingering with and/or spreading out onto Pecos floodplain deposits. Thicknesses decrease from tributary mouths from ~6 m to ~1 m at their distal margins. Fans debouching onto the floodplain from eastern tributaries are very considerably in thickness from ~1 m for small fans and up to ~8 m at the apices of fans built by large tributaries (e.g., Hart Canyon, *Qafh*, and Logan Draw, *Qafl*). Many of these fans have been truncated and their deposits removed by the eastward migrating Pecos River from meander belts Hms2 to Ims4 (e.g., Dog Canyon, *Qafd*).

Quaternary playa deposits (upper Pleistocene to Holocene) — Pinkish white (7.5YR8/2), unconsolidated, well-sorted, fine-grained sand, silt, and clay. Thickness unknown (≥ 1m).

Pecos River alluvial valley floor

(Historical map unit labels are given a lower case "h" to differentiate them from Holocene map units.)

Pecos River meanderbelt alluvial deposits (Historic to lower Holocene) — At the onset of the Holocene, the Pecos River switched from a braided regime to a meandering one, and proceeded to build four distinguishable meanderbelts on top of the basal, upper Pleistocene Pecos River braided alluvial valley-fill (*Qapg*). Consisting of channel, channel fill, point bar, and natural levee deposits, undivided, these meanderbelts are differentiated based upon cross-cutting relationships observed in the field, as well as aerial photographic work, into an historic unit (*Qmeph*) and three older Holocene units (*Qmep, h, l*). These older Holocene units reveal a pattern of progressive meanderbelt shifting from west to east across the floodplain:

Historic meanderbelt deposits (Historic to upper Holocene) — Occasional pebbles of dolomite, limestone, sandstone, chert, and quartzite in a very pale brown (10YR7/4) to reddish brown (2.5YR4/4), unconsolidated, moderately to well-sorted, coarse- to fine-grained sand, in the former modern channel and adjacent bar areas, grading to silty sand and sandy clay with distance from this channel. Several meshes of the Pecos River on the quad have been channelized by the U.S. Bureau of Reclamation during the mid 20th Century. The northernmost section of the Kaiser Channel extends into the northernmost part of the quad. Meanderbelt thicknesses commonly range from 1 to 5 m.

Younger meanderbelt deposits (upper Holocene) — Very pale brown (10YR7/4) to reddish brown (2.5YR4/4), unconsolidated, moderately sorted, occasionally pebbly (dolomite, limestone, sandstone, chert, and quartzite), coarse- to fine-grained sand, silty sand, and sandy clay. Unit primarily lies immediately west of *Qmep*, in the center of the floodplain. Thickness 2-5 m.

Older Holocene meander belt deposits (upper to middle Holocene) — Very pale brown (10YR7/4) to reddish brown (2.5YR4/4), unconsolidated, moderately sorted, occasionally pebbly (dolomite, limestone, sandstone, chert, and quartzite), coarse- to fine-grained sand, silty sand, and sandy clay. Unit lies immediately west of *Qmep*. Thickness 3-5 m.

Old Holocene meander belt deposits (lower to middle Holocene) — Very pale brown (10YR7/4) to reddish brown (2.5YR4/4), unconsolidated, moderately sorted, occasionally pebbly (dolomite, limestone, sandstone, chert, and quartzite), coarse- to fine-grained sand, silty sand, and sandy clay. Thickness 3-5 m.

Holocene cretaceous splay deposits (middle to upper Holocene) — Very pale brown (10YR7/4) to reddish brown (2.5YR4/4), unconsolidated, gradict sand and silty sand, closest to the channel bank bounded by the cretaceous to sandy clay at the distal margins. Thickness <1 to 2 m.

Floodplain alluvial backswamp deposits (Historic to upper Pleistocene) — Light reddish-brown (5YR6/4) to very dark gray (7.5YR3/1), unconsolidated, well-sorted, silty sand, sandy clay, and clay in low-lying, poorly drained areas. These areas commonly received only fine-grained, slack-water flood deposition, prior to channelization. Thickness range from 3-15 (?) m.

Pecos River braided alluvial deposits (upper Pleistocene to lower Holocene) — Gravels and pebbles of dolomite, limestone, sandstone, chert, and quartzite in a reddish brown (2.5YR4/4) to light reddish-brown (5YR6/4), unconsolidated, poorly to moderately sorted, coarse- to fine-grained sand, silty sand, sandy clay, and clay. Braided channels and bars locally the surface of *Qaby* elsewhere, but on the Spring Lake quad, on largely featureless. Mostly buried by Holocene meanderbelt. Thicknesses vary (buried upon Lyford, 1973) from about 5 to 30 m.

Pecos Valley alluvial terrace complex

Alluvial terraces of the Pecos River and its tributaries were first described in the classic study of Fiedler and Nye (1933). They recognized 3 terraces flanking the floodplain (from lowest to highest) the Lakewood, the Orchard Park, and the Blackdom. All three terraces are present on the Spring Lake quad.

Lakewood terrace alluvial deposits (upper to middle Pleistocene) The Lakewood terrace, with an elevation of 6 to 9 m above the floodplain, flanks the most Pecos floodplain and extends up many of its tributaries. Following McCraw, et al. (2007) and McCraw and Land (2008), three distinct, low-lying (upper to uppermost middle(?) Pleistocene) "Lakewood terraces" are recognized. The highest and oldest of which (*Qlk*) would be Fiedler and Nye's original. Surface treads elevations above the floodplain for these three are: +3-2 m, 2-6 m, and 6-9 m, respectively. They are comprised of occasional gravels and pebbles, lenses (10YR5/3) to dark reddowish brown (10YR3/4), unconsolidated, moderately sorted, coarse- to fine- grained sand, silty sand, silt and sandy clay. Pedogenic carbonate accretions from stage I to stage I+ (occasionally III) from (*Qlk* to *Qlj*). Mostly non-gypsiferous.

Youngest Lakewood terrace alluvial deposits (upper Pleistocene) — Thickness <1 to 1 m.

Young Lakewood terrace alluvial deposits (upper Pleistocene) Thickness 1.5 to 3 m.

Older Lakewood terrace alluvial deposits (upper to middle Pleistocene) — Thickness ~2 to 9 m.

Orchard Park terrace alluvial deposits (upper Pliocene (?) to upper Pleistocene) — According to Fiedler and Nye (1933), the Orchard Park terrace rises 1.5-3 m above the Lakewood terrace and 10.5-20 m above the Pecos floodplain. It is comprised of gravels and pebbles of dolomite, limestone, sandstone, chert, and quartzite in a very pale brown (10YR7/4) to reddish brown (5YR4/4), unconsolidated, moderately sorted, coarse- to fine- grained sand, silty sand, silt, and sandy clay. Pedogenic carbonate is a strong stage III. Thickness ranges from 3 to 15 m.

Blackdom terrace alluvial deposits (middle to lower Pleistocene) — The Blackdom terrace occurs in isolated remnants primarily along the Permian Yates formation (*Py*), 25-42 m above and east of the Pecos floodplain. It is comprised of poorly sorted pebbles of dolomite, limestone, sandstone, chert, and quartzite in a very pale brown (10YR7/4) to reddish brown (5YR4/4), unconsolidated, moderately sorted, coarse- to fine-grained sand, silty sand, silt, and sandy clay. Pedogenic carbonate is III-III+. Thickness ~15 m.

Eagle Creek alluvial piedmont complex

Eagle Creek alluvial piedmont deposits (Upper to middle Pleistocene) — Eagle Creek (or Eagle Draw further west) heads on the easternmost flank of the southern Sacramento Mountains in San Andres Formation (*Psa*) rocks and flows east to the Pecos River. Where it leaves the Permian highlands, it has built a large piedmont alluvial complex, which coalesces with the Rio Felix to the north and the Rio Peñasco to the south. This piedmont complex grades to and into the Pecos Valley alluvial terraces. Oldest, highest remnant surfaces may be as old as Pliocene, which possibly grades to a river system which forms Gatuña formation deposits today. It is comprised of gravels that are almost exclusively limestone derived from *Psa*, supported in a matrix of light brown (7.5YR6/3), unconsolidated, moderately sorted, coarse- to fine- grained sand, silty sand, silt (largely calcareous), and sandy clay. On the Spring Lake quad, only the two youngest piedmont deposits (*Qpe_y* are mapped. Topographic expression between these deposits are often to subtle to practically non-existent. Distinction is often based upon a stronger developed pedogenic carbonate (*Qpe_* = stage III – II+; *Qpe_y* = stage III- (*Qpe_* grades to (*Qlj*).

Younger Quaternary alluvial piedmont deposit (upper Pleistocene) Thickness 1 to 3 m.

Younger Quaternary alluvial piedmont deposit (upper to uppermost middle Pleistocene) — Thickness 2 to 6 m.

Quaternary depression fill and sinkhole deposits

Quaternary depression fill, undifferentiated (Holocene to middle Pleistocene) — Unconsolidated, well-sorted, fine-grained silty sands to clayey complexes of alluvial, eolian(?), colluvial, and commixed lacustrine deposits within closed depressions. Colors variable. Depressions are created by either gradual subsidence or sudden collapse followed by gradual subsidence of underlying, gypsiferous carbonate bedrock. These complexes are often significantly modified by erosion, erosion and deposition, playa deposition, deflation, and mass wasting. Depression fills have been active since the middle Pleistocene and are usually <3 m thick, but can reach thicknesses in excess of 10 m.

Quaternary sinkhole deposits, primarily caused by collapse (Historic to middle Pleistocene) — Complexes of unconsolidated, well- to poorly-sorted, coarse- to fine-grained sands to clay, alluvial, colluvial, eolian, and occasional lacustrine deposits within closed depressions. Colors variable. Thickness <4 to 8 m.

PALEOZOIC

Permian Artesia Group

Salado formation, mixed gypsiferous facies (Guadalupian) — Irregular masses of gypsum, dolomite, and salt in outcrops with chaotic bedding orientations. Exposed in eastern part of quadrangle. Thickness unknown.

Tansill formation, dolomitic facies (Guadalupian) — Light gray dolomite forming the basal part of the section, grading upward into interbedded mixed facies. Thickness ~4 to 5 m.

View looking north-northwest of northernmost exposure of *Psd* as it plunges beneath the alluvium. The roadside hummock on the north side of U. S. Highway 82 sits on alluvial fan (*Qafl*) east of the modern Pecos River meanderbelt (*Ims4*). Photo by D. McCraw.

Tansill formation, mixed silty gypsiferous facies (Guadalupian) — Interbedded mixed gray silty dolomite, siltstone, and gypsum, and yellowish sandstone with subhorizontal and orange-red chert grains. Thickness 2 to 50 m.

Yates formation, mixed gypsiferous facies (Guadalupian) — Very light gray, massive to vesicular gypsum interbedded with pale dolomite, green to white and orange to red siltstone and minor sandstone. Folded into domes and basins on a meter- to several-decimeter scale. Forms caverns. Outcrop exposures poor. Thickness increases westward from 2 to 50 m.

Seven Rivers formation, dolomitic facies (Guadalupian) — Light gray to yellowish to pink, thinly to thickly bedded, vesicular to massive dolomite interbedded with pink dolomitic siltstone, yellowish sandstone and thin beds of nodular gypsum. Thickness 1 to 3 m.

Seven Rivers formation, gypsiferous facies (Guadalupian) — White/gray, occasionally yellow to red massive gypsum interbedded with thin- to medium-bedded, light gray dolomite and red gypsiferous siltstone, often containing gypsum nodules, and yellowish sandstone, which often exhibit soft sediment deformation. Commonly fractured, occasionally forming caverns, with many low amplitude folds varying in scale from meters to kilometers. Thickness unknown.

Queen and Grayburg formations, undifferentiated (Guadalupian) — Cross section only.

Lower Permian Formations

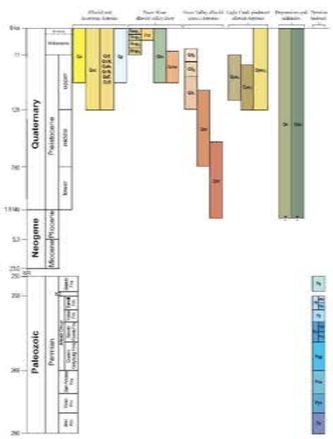
San Andres formation — Cross section only.

Glorieta sandstone tongue Cross section only.

Yeso formation, undifferentiated — Cross section only.

Abo formation, undifferentiated — Cross section only.

CORRELATION OF MAP UNITS



View looking north of eastern edge of a small warped synclinal basin developed in Yates formation (*Py*). The outermost oldest exposed bed of gypsum on the far right curving from the rock in the distance resurfaces roughly 20 m away to the left out of the photo. Younger interbedded redbeds and gypsum making up the majority of the photo also resurface to the left within this bed. Photo by D. McCraw.

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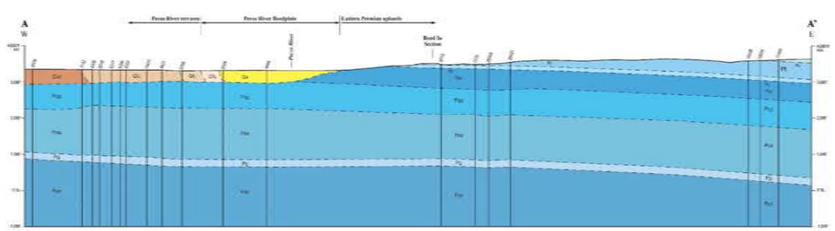
GEOLOGIC CROSS SECTION



SUBSURFACE

HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

FIGURE 10

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

SURFACE GEOLOGIC MAP

DATE: 08/21/14	CHECKED BY:	JOB NO: 185818-6944
DRAWN BY: WDD	APPROVED BY:	DWG. NO:

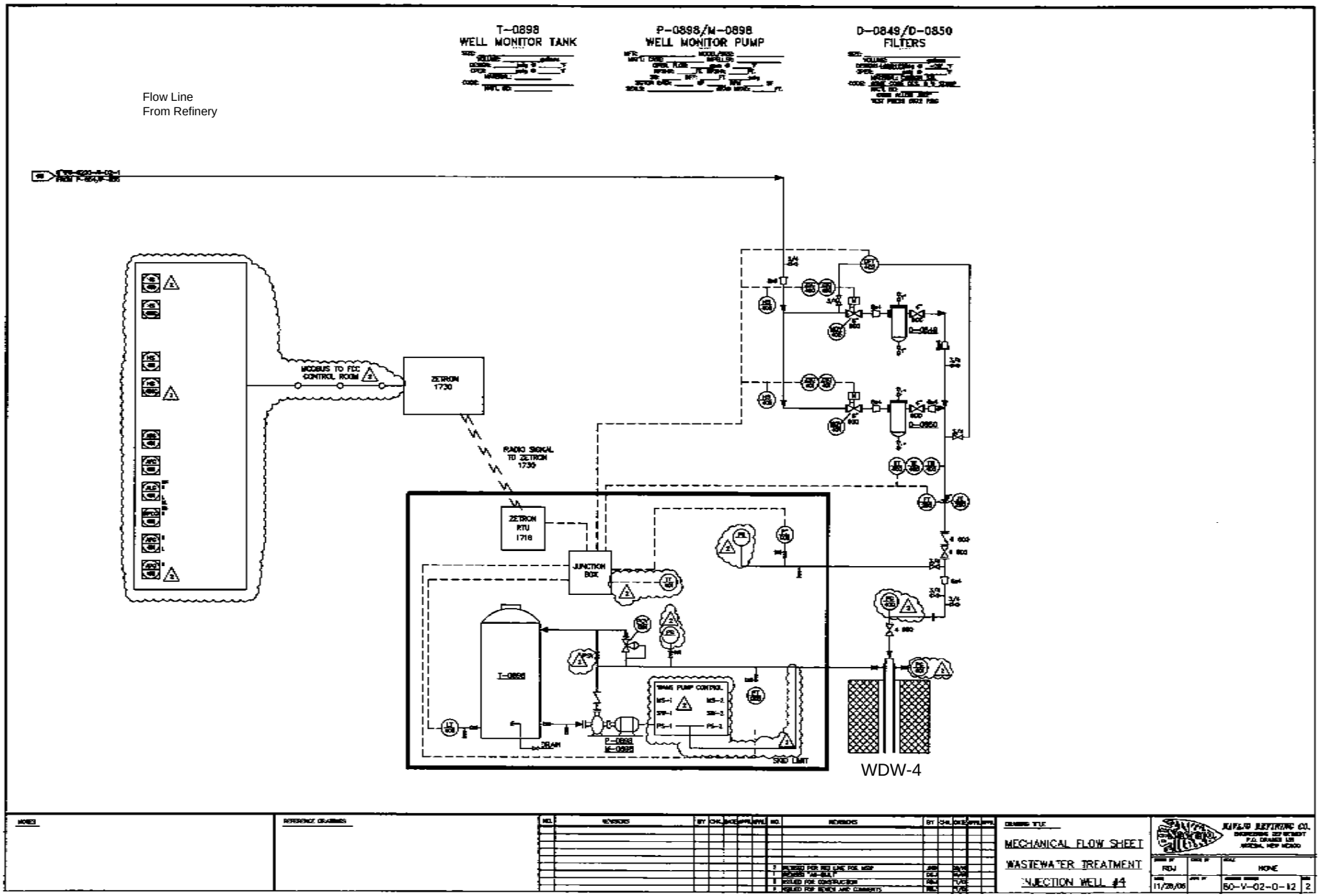
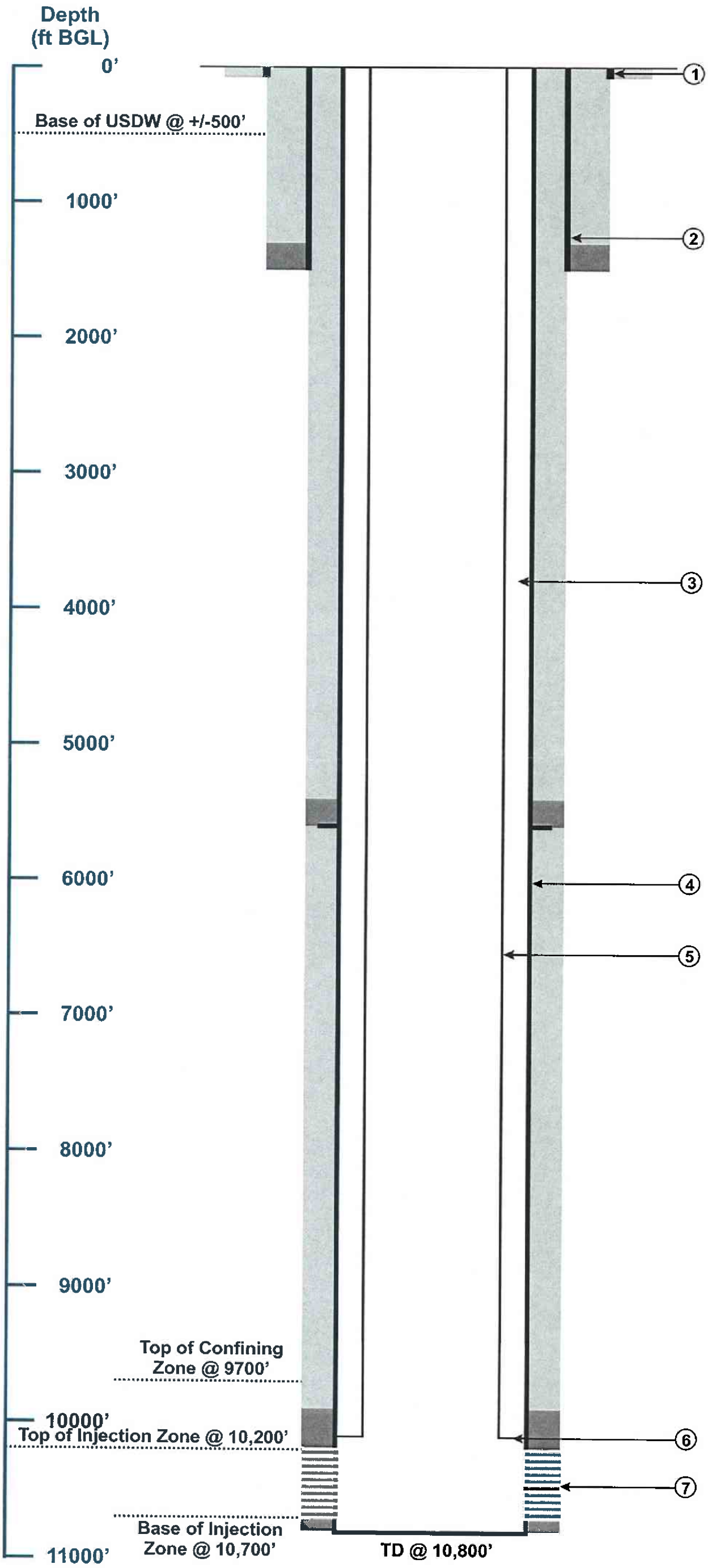


FIGURE 11
PRE-INJECTION SURFACE FACILITIES
NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO



Below Ground Details
(feet below Ground Level)

1. Conductor Pipe - 20", 129.33 lb/ft (0.625" wall), API 5LX-56, plain-end, beveled conductor set in 24" augered hole at 80' and cemented to the surface with 3 yd^3 of redi-mix.

2. Surface Casing - 13⅜", 54.5 lb/ft, K-55, ST&C, set at 1,500' in a 17½" hole and cemented to the surface with 1,092 ft^3 of lightweight Class A lead cement followed by 206 ft^3 of Class A tail cement.

3. Annulus Fluid - injection tubing and protection casing annulus filled with 250 bbl of brine water containing a corrosion inhibitor, a bactericide and an oxygen scavenger.

4. Protection Casing - 9⅝", 47 lb/ft, N-80, LT&C set in a 12¼" hole at 10,800' with a DV Tool at 5,800' and cemented to the surface in two stages as follows:
   Stage I (5,800' - 10,800'): 1,579 ft^3 of lightweight Class A cement followed by 324 ft^3 of Class A cement.
   Stage II (Surface - 5,800'): 2,010 ft^3 of lightweight Class H cement followed by 150 ft^3 of Class H cement.

5. Injection Tubing - 7", 26 lb/ft, K-55, LT&C set in packer at approximately 10,100'.

6. Injection Packer - 7" x 9⅝" set at approximately 10,100'.

7. Perforations - Devonian Injection Interval perforated 2 spf in selected intervals between 10,200' and 10,700'.

ft BGL = feet below ground level

NOTE: Final below ground well depths, configuration, specifications and volumes will be presented in the post-installation Well Construction Report.

SUBSURFACE
Houston, TX
South Bend, IN
Baton Rouge, LA

FIGURE 12
Navajo Refining Company, L.L.C.
WDW-4 Class I Injection Well
Artesia, New Mexico
PROPOSED BELOW GROUND WELL SCHEMATIC

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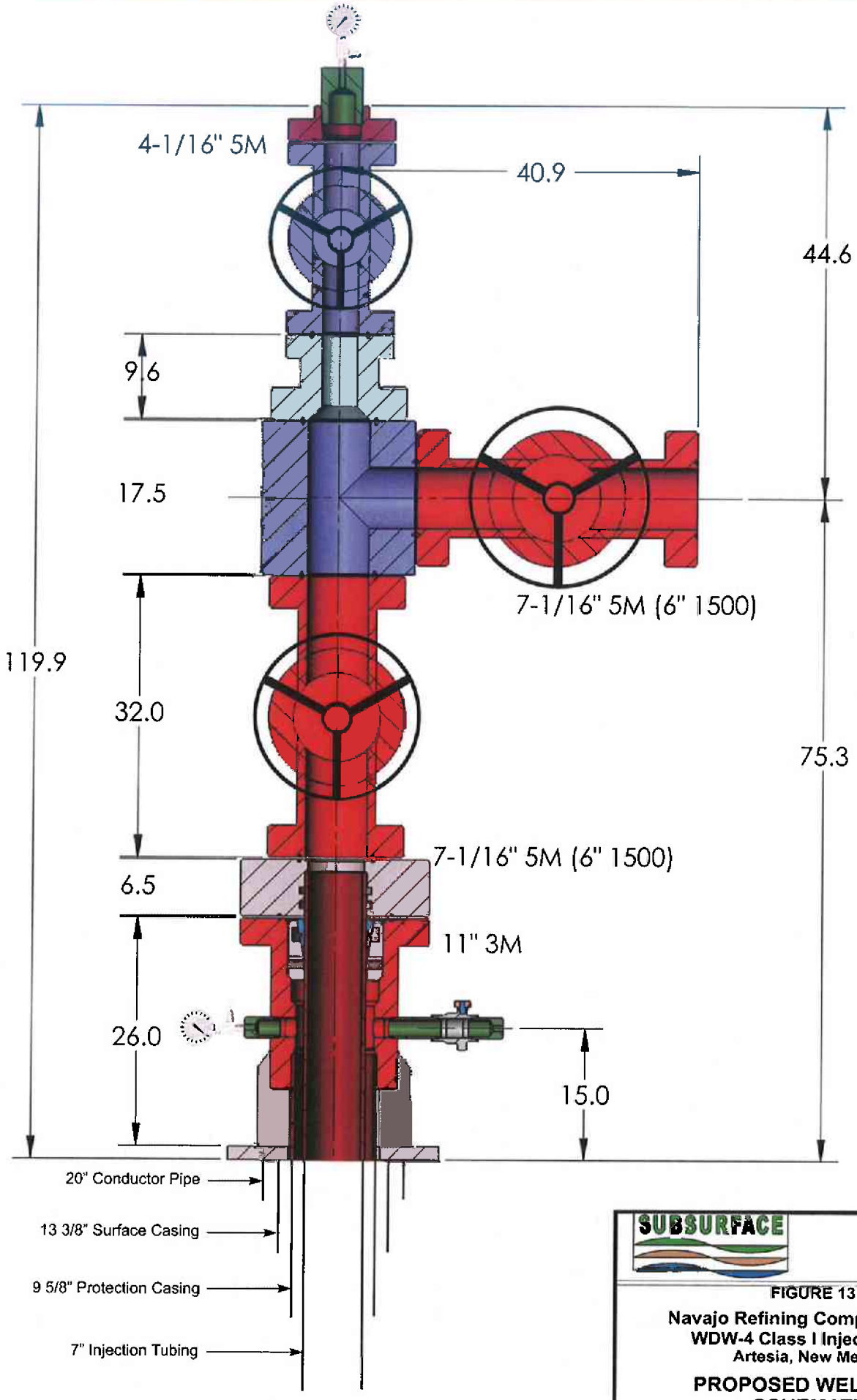

NOTE: Final wellhead configuration, specifications and dimensions will be presented in the post-installation Well Construction Report.

SUBSURFACE

Houston, TX
South Bend, IN
Baton Rouge, LA

FIGURE 13

Navajo Refining Company, L.L.C.
WDW-4 Class I Injection Well
Artesia, New Mexico

PROPOSED WELLHEAD SCHEMATIC

DATE 09/02/14	CHECKED BY	JOB NO. 185818-6944	
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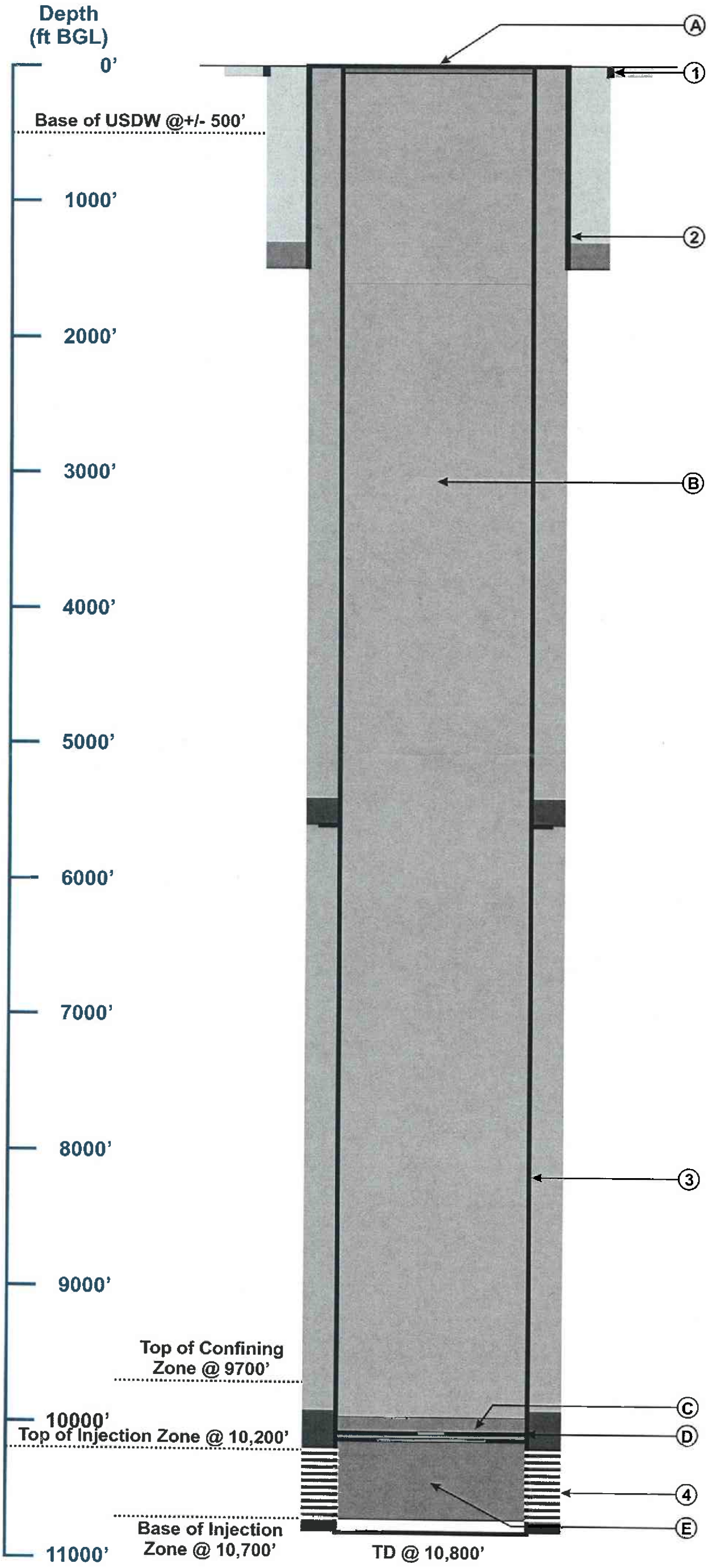

Below Ground Details
(feet below Ground Level)

1. Conductor Pipe - 20", 129.33 lb/ft (0.625" wall), API 5LX-56, plain-end, beveled conductor set in 24" augered hole at 80' and cemented to the surface with 3 yd^3 of redi-mix.

2. Surface Casing - 13⅜", 54.5 lb/ft, K-55, ST&C, set at 1,500' in a 17½" hole and cemented to the surface with 1,092 ft^3 of lightweight Class A lead cement followed by 206 ft^3 of Class A tail cement.

3. Protection Casing - 9⅝", 47 lb/ft, N-80, LT&C set in a 12¼" hole at 10,800' with a DV Tool at 5,800' and cemented to the surface in two stages as follows:
   Stage I (5,800' - 10,800'): 1,579 ft^3 of lightweight Class A cement followed by 324 ft^3 of Class A cement.
   Stage II (Surface - 5,800'): 2,010 ft^3 of lightweight Class H cement followed by 150 ft^3 of Class H cement.

4. Perforations - Devonian Injection Interval perforated 2 spf in selected intervals between 10,200' and 10,700'.

NOTE: 7" injection tubing and 7" x 9 5/8" packer removed prior to abandonment.

Plugging and Abandonment

A. Inscribed Steel Plate Cover - All casings cut-off 3' below the surface and a ½" steel plate inscribed with operator name, well API no. and P&A Date welded over the 13⅜" surface casing.

B. Cement Plug - Class A cement (1.18 ft^3/sack) spotted in balanced plugs from 9,950' to 3'.

C. Cement Plug Above Retainer - 100-foot Class A (1.18 ft^3/sack) cement plug spotted above cement retainer 9,950' to 10,050'.

D. Cement Retainer - set in 9⅝" casing at 10,050'.

E. Cement Plug Below Retainer - 250 sacks of Class A (1.18 ft^3/sack) cement pumped below cement retainer from 10,050' to 10,200' and across perforations from 10,200' to 10,700'.

ft BGL = feet below ground level

NOTE: Final below ground well depths, configuration, specifications and volumes will be presented in the post-installation Well Construction Report.

SUBSURFACE
Houston, TX
South Bend, IN
Baton Rouge, LA

FIGURE 14
Navajo Refining Company, L.L.C.
WDW-4 Class I Injection Well
Artesia, New Mexico
PLUGGED AND ABANDONED WELL SCHEMATIC

DATE 09/02/14	CHECKED BY	JOB NO 185818-6944	
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PROPOSED WDW-4

Logan Draw Oil Field

Logan Draw

EMPIRE OIL FIELD

PIPELINE

PECOS RIVER

Spring Lake

Gaging Station

Footbridge

Sobstation

Pumping Sta

Oil Tanks

Oil Wells

Gravel Pit

Gas Well

BM

N

NEW MEXICO

QUADRANGLE LOCATION

SUBSURFACE

HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

FIGURE 2

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

SITE MAP

DATE: 09/02/14	CHECKED BY:	JOB NO: 185818-6944
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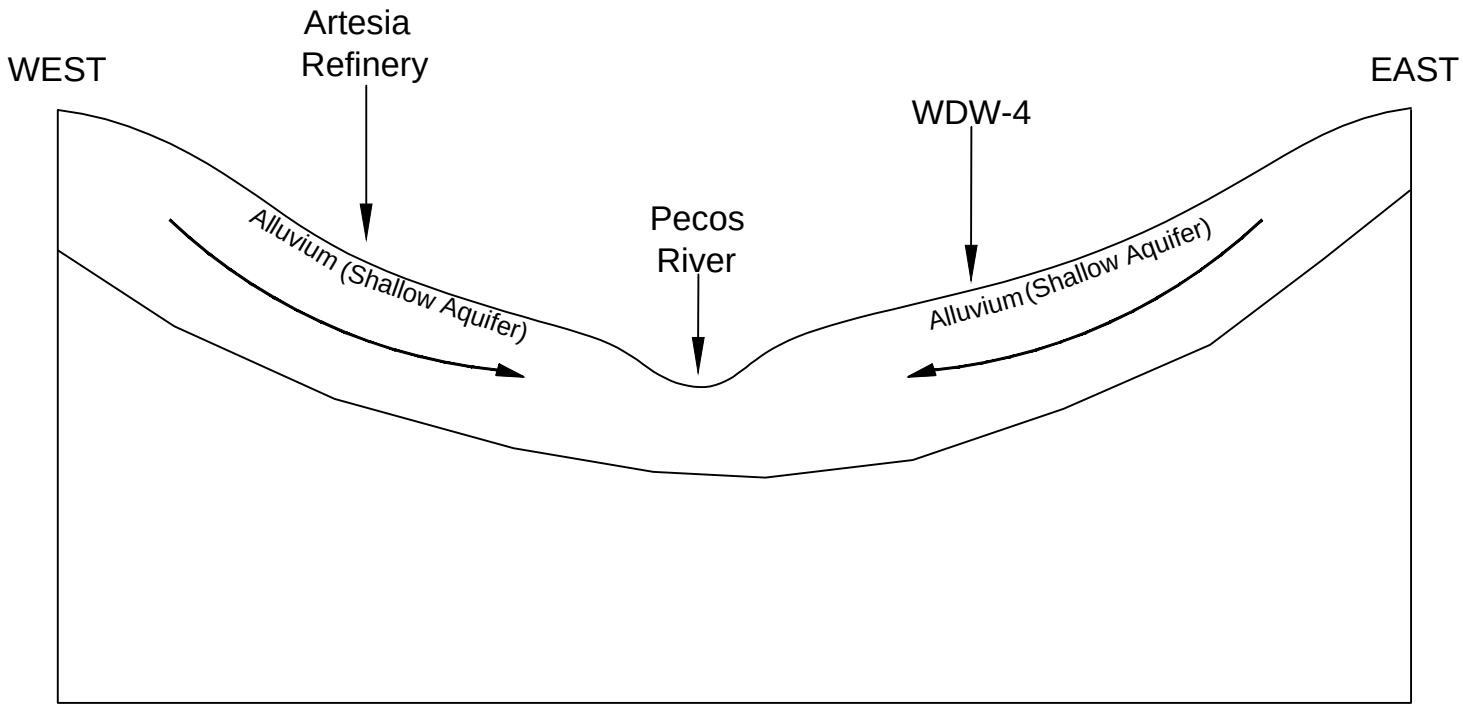

NOT TO SCALE

EXPLANATION

Direction of Groundwater Movement

SUBSURFACE

HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

FIGURE 3

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

GENERALIZED HYDROGEOLOGIC CROSS-SECTION

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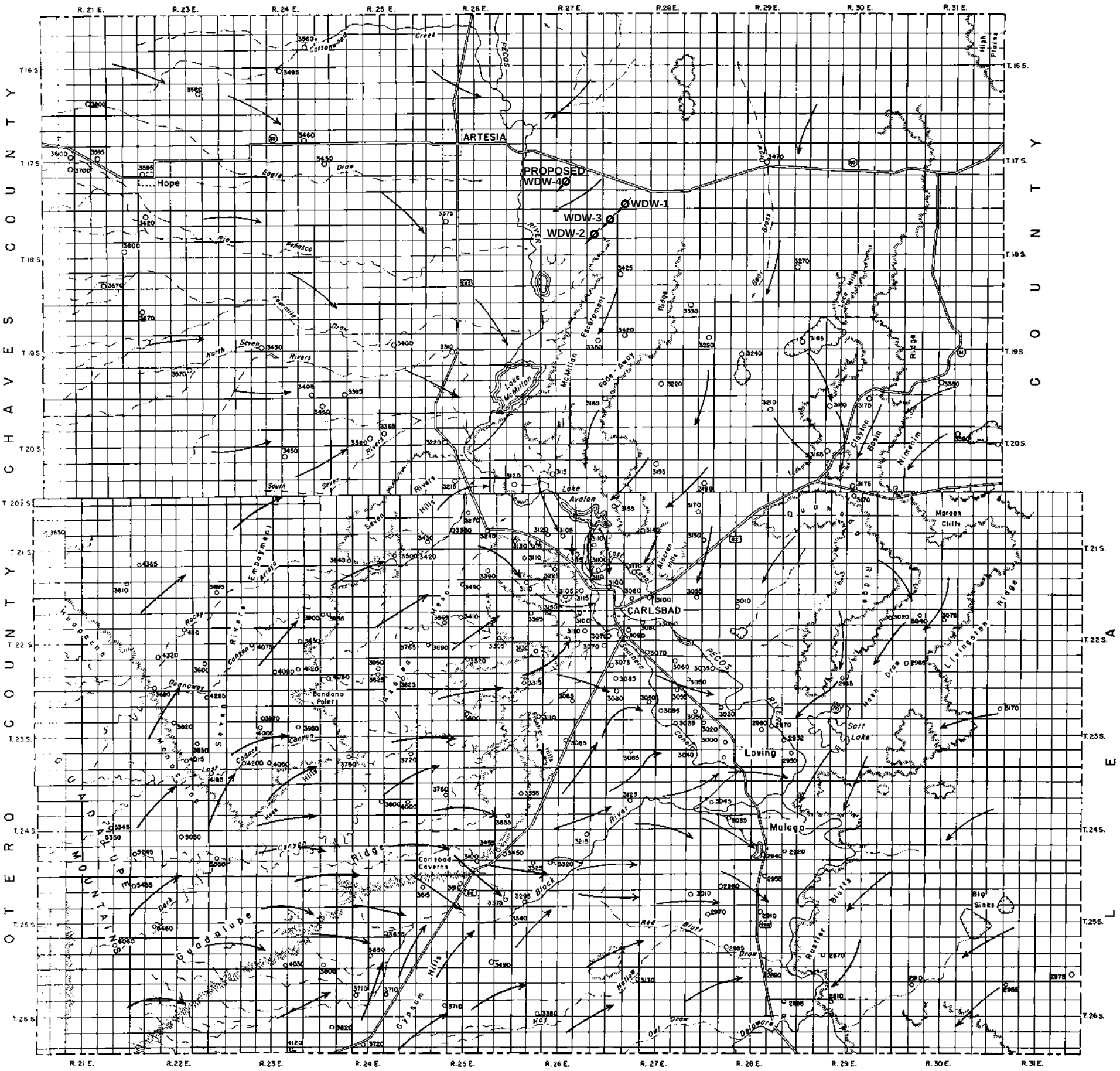
NEW MEXICO BUREAU OF MINES AND MINERAL RESOURCES

GROUND-WATER REPORT 3 PLATE 3

C H A V E S C O U N T Y



GENERAL DIRECTION OF MOVEMENT OF GROUND WATER IN EDDY COUNTY, NEW MEXICO

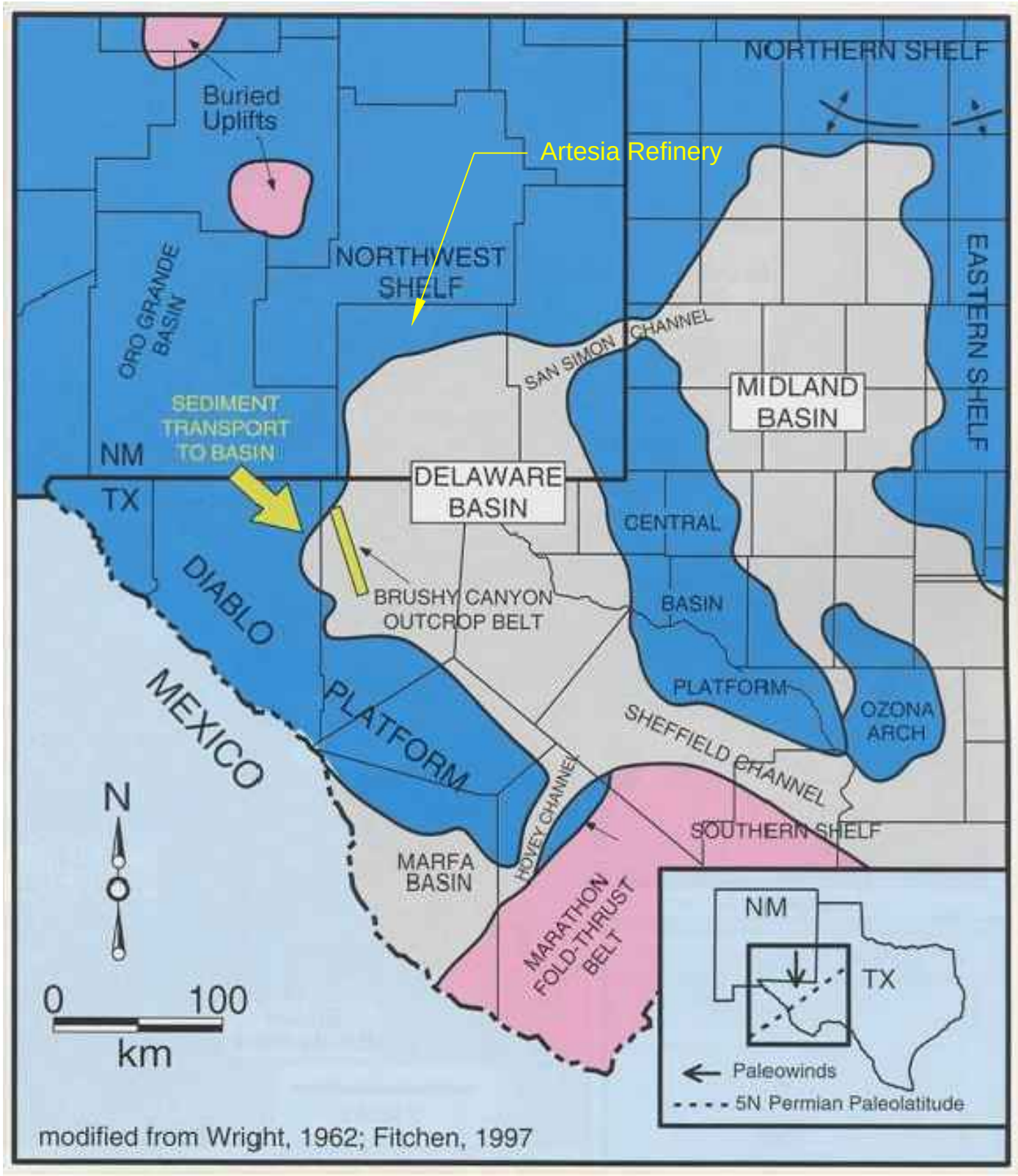
SCALE

5 0 5 10 MILES

EXPLANATION

- Well
- Spring
- Direction of ground water movements
- 3360 Altitudes (feet above sea level) of ground water levels

FIGURE 4



SUBSURFACE

HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

FIGURE 5

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

PERMIAN BASIN MAP

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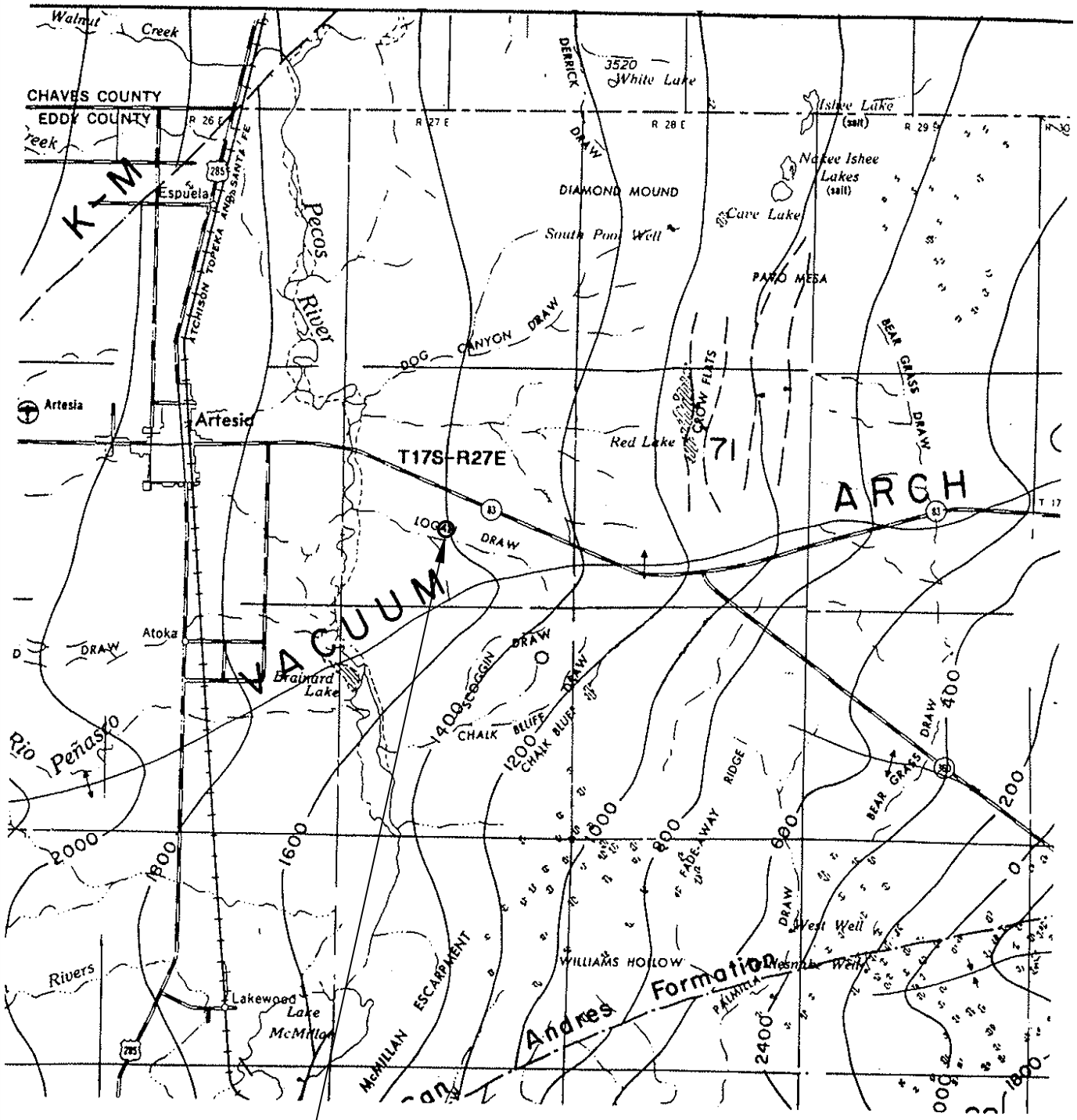
DRAWN BY: WDD	APPROVED BY:	DWG. NO:

NORTHWEST SHELF, CENTRAL BASIN PLATFORM

Age		Strata		Oil Plays
Triassic		Chinle		
		Santa Rosa		
Permian	Ochoan	Dewey Lake		
		Rustler		
		Salado		
	Guadalupian	Artesia Group	Tansill	Artesia Platform Sandstone
			Yates	
			Seven Rivers	
			Queen	
			Grayburg	Upper San Andres and Grayburg Platform - Artesia Vacuum Trend
		San Andres		Upper San Andres and Grayburg Platform - Central Basin Platform Trend
	Leonardian	Glorieta		Leonardian Restricted Platform Carbonate
		Yeso	Paddock	
			Blinebry	
			Tubb	
			Drinkard	
	Wolfcampian	Abo		Abo Platform Carbonate
		Hueco ("Wolfcamp")		Wolfcamp Platform Carbonate
Pennsylvanian	Virgilian	Bough		Northwest Shelf Upper Pennsylvanian Carbonate
		Cisco		
	Missourian	Canyon		
	Des Moinesian	Strawn		Northwest Shelf Strawn Patch Reef
	Atokan	Atoka		
	Morrowan	Morrow		
Miss.		undivided		
Dev.	Upper	Woodford		
	Middle			
	Lower	Thirtyone		Devonian Thirtyone Deepwater Chert
Sil.	Upper	Wristen		Wristen Buildups and Platform Carbonate
	Middle			
	Lower	Fusselman		Fusselman Shallow Platform Carbonate
Ord.	Upper	Montoya		
	Middle	Simpson		Simpson Cratonic Sandstone
	Lower	Ellenburger		Ellenburger Karst-Modified Restricted Ramp Carbonate
		Bliss		
Cambrian				
Precambrian		igneous, metamorphics volcanics		

FIGURE 6

STRATIGRAPHIC COLUMN



SUBSURFACE

HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

FIGURE 7

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

REGIONAL GEOLOGIC FEATURES

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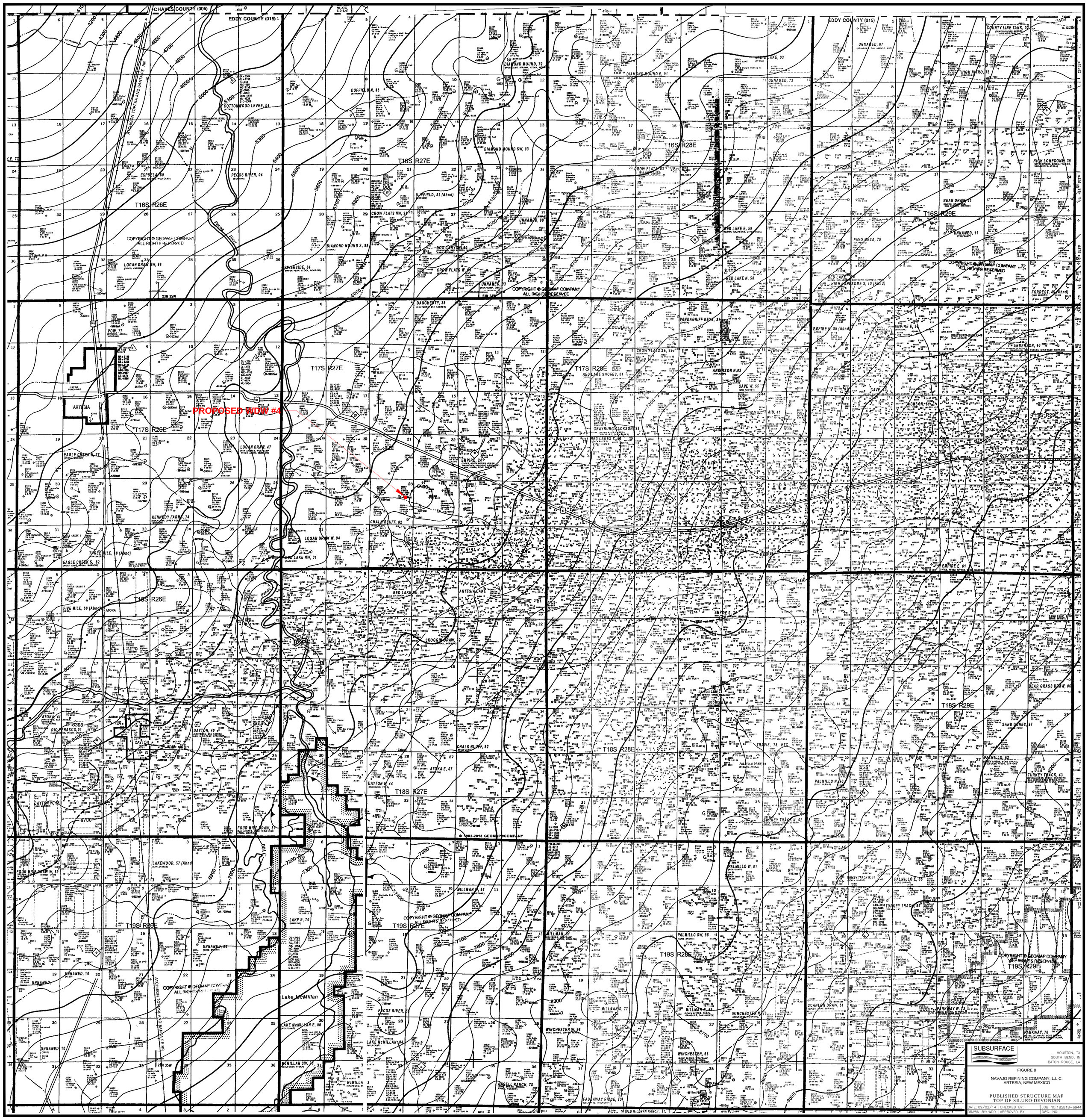
CHAVES COUNTY (005)
EDDY COUNTY (015)
T16S R27E
T16S R28E
T16S R26E
T16S R29E
T17S R27E
T17S R28E
T17S R26E
T17S R29E
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T18S R27E
T18S R28E
T18S R29E
T19S R26E
T19S R27E
T19S R28E
T19S R29E
PROPOSED WDW #4
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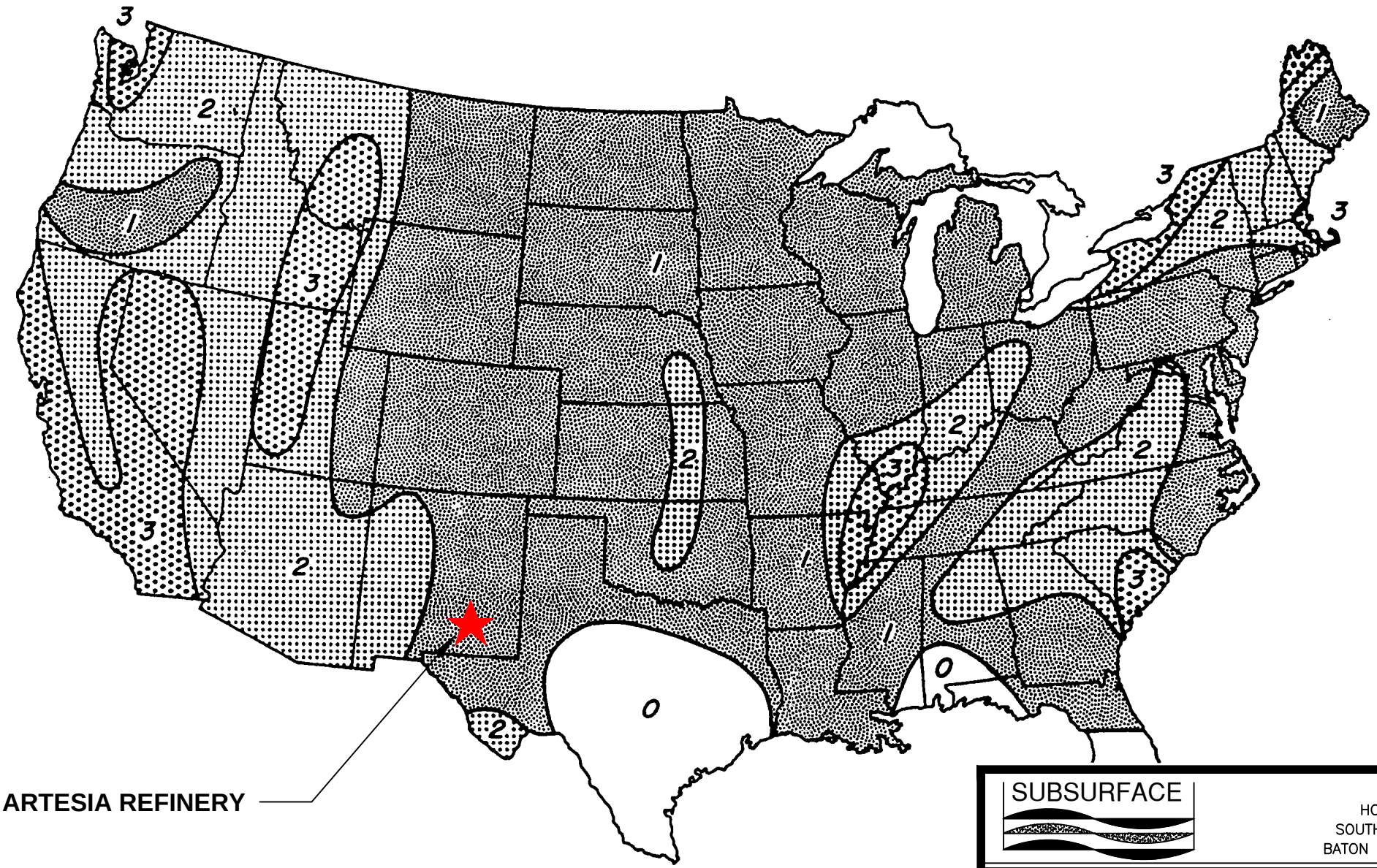
SUBSURFACE
HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA
FIGURE 8
NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO
PUBLISHED STRUCTURE MAP
TOP OF SILURO-DEVONIAN
DATE: 09/02/14
CHECKED BY:
JOB NO:185818-6944
DRAWN BY: WDD
APPROVED BY:
DWG. NO:



LEGEND

Zone 0 - no damage.
Zone 1 - minor damage; corresponds to intensities V and VI of the M.M.* Scale.
Zone 2 - moderate damage; corresponds to intensity VII of the M.M.* Scale.
Zone 3 - major damage; corresponds to intensity VIII and higher of the M.M.* Scale.
(* - M.M. Refers to the Modified Mercalli Intensity Scale.)

SUBSURFACE

HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

FIGURE 9

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

SEISMIC RISK MAP

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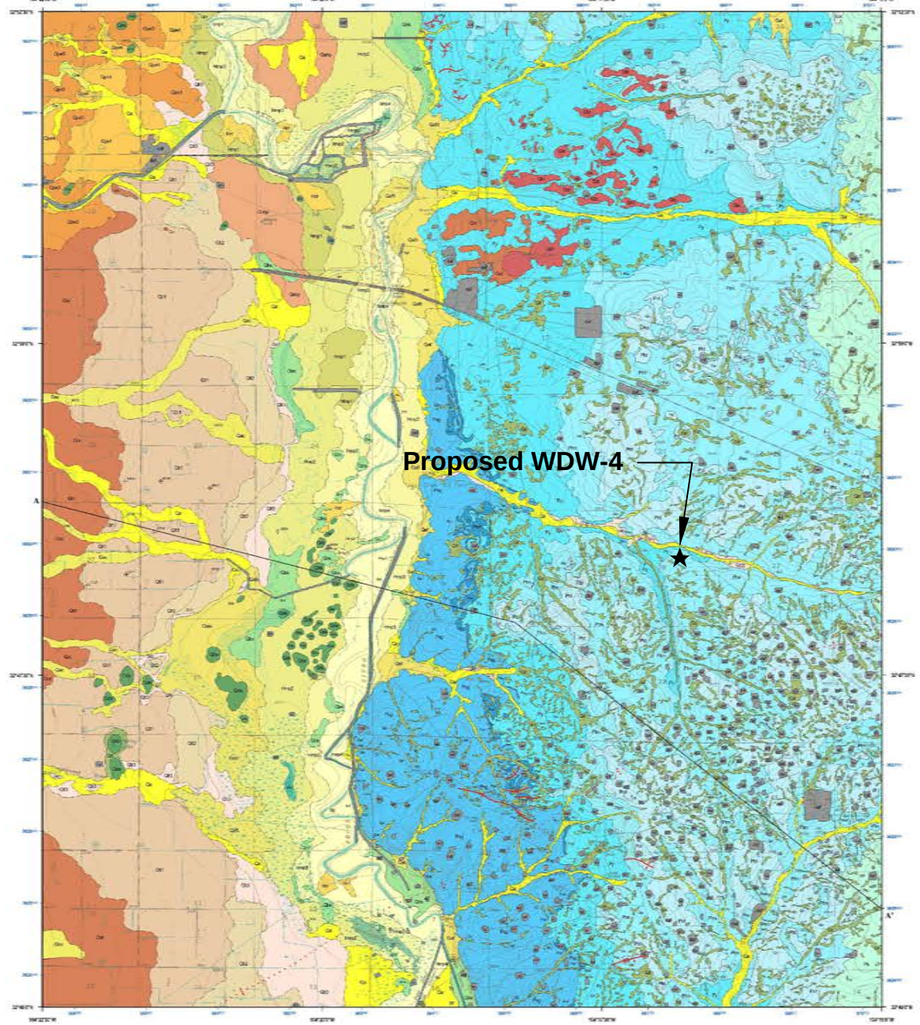

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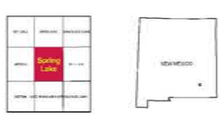
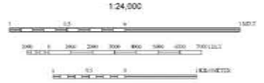


QUADRANGLE LOCATION



Mapping of the quadrangle was funded by a matching funds grant from the STATEMAP program of the National Cooperative Geologic Mapping Act, administered by the U. S. Geological Survey, and by the New Mexico Bureau of Geology and Mineral Resources. Dr. Peter A. Scholle, Director and State Geologist; Dr. J. Michael Timmons, Geologic Mapping Program Manager).

New Mexico Bureau of Geology and Mineral Resources
Open-file Geologic Map 214

New Mexico Bureau of Geology and Mineral Resources
New Mexico Tech
801 Leroy Place
Socorro, New Mexico
87801-4796

(575) 835-5490

This and other STATEMAP quadrangles are available for free download in both PDF and ArcGIS formats at:

http://geoinfo.nmt.edu

Geologic map of the Spring Lake quadrangle, Eddy County, New Mexico.

May 2011

by

David J. McCraw, Lewis A. Land, and Shannon Williams

New Mexico Bureau of Geology and Mineral Resources, 801 Leroy Place, Socorro, NM 87801

EXPLANATION OF MAP SYMBOLS

- A—A' Location of geologic cross section.
- Geologic contact. Solid where exposed or known, dashed where approximately known, dotted where concealed or inferred.
- Trace of synclinal axial plane associated with recumbent collapse.
- Trace of anticline axial plane associated with recumbent collapse.
- Arroyo – Western Arch. Subsurface anticlinal arch mapping Permian and older strata.
- Inclined bedding showing degrees of dip.
- Oil & gas exploration well used in cross section construction.

COMMENTS TO MAP USERS

A geologic map displays information on the distribution, nature, orientation, and age relationships of rock and deposits and the occurrence of structural features. Geologic and fault contacts are irregular surfaces that form boundaries between different types or ages of units. Data depicted on this geologic quadrangle map may be based on any of the following: reconnaissance field geologic mapping, compilation of published and unpublished work, and photogeologic interpretation. Locations of contacts are not surveyed, but are plotted by interpretation of the position of a given contact into a topographic base map. Therefore, the accuracy of contact locations depends on the scale of mapping and the interpretation of the geologist(s). Any enlargement of this map could cause misunderstanding in the detail of mapping and may result in erroneous interpretations. Site-specific conditions should be verified by detailed surface mapping or subsurface exploration. Topographic and cultural changes associated with recent development may not be shown.

Cross sections are constructed based upon the interpretations of the author made from geologic mapping and available geophysical and subsurface (drillhole) data. Cross-sections should be used as an aid to understanding the general geological framework of the map area, and not for the sole source of information for use in locating or designing wells, buildings, roads, or other man-made structures.

The map has not been reviewed according to New Mexico Bureau of Geology and Mineral Resources standards. The contents of the report and map should not be considered final and authoritative until reviewed and published by the New Mexico Bureau of Geology and Mineral Resources. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the State of New Mexico, or the U.S. Government.

DESCRIPTION OF MAP UNITS

CENOZOIC

QUATERNARY and NEOGENE

Alluvium, lacustrine, and anthropogenic deposits

Disturbed land and/or artificial fill (Historic) — Dumped fill and areas affected by human disturbances, mapped where deposits or disturbances are locally extensive. Especially notable are the numerous constructed oil and gas well pads. Also includes the U.S. Bureau of Reclamation's Kaiser Channel of the Pecos River, as well as other straightened reaches.

Quaternary tributary alluvium and valley-fill alluvium, undifferentiated (Historic to uppermost Pleistocene) — Brown (7.5YR4/2) to pinkish gray (7.5YR6/2) (tributaries) to light reddish-brown (5YR6/4) to reddish brown (2.5YR4/4) (Pecos floodplain valley-fill); unconsolidated, moderately sorted, pebbly sand, silt, and clay. Varies considerably in thickness from <1 to 3 m in tributaries and up to 20–22 m in the floodplain.

Quaternary alluvial channel swale and/or depression fill deposits of the Eagle Creek piedmont alluvial complex (upper Pleistocene to Holocene) — Light brown (7.5YR6/4) to pinkish gray (7.5YR6/2), unconsolidated, poorly sorted, fine-grained sand, silt, and clay with smooth carbonate gravels and pebbles occupying thin (<1–1.5 m) channels, swales, and coalescing depressions draining the Eagle Creek piedmont complex. (Qpe)

Quaternary alluvial channel swale and/or depression fill deposits originating from either Eagle Creek or Rio Peñasco piedmont complexes extending across Pecos Valley terraces (upper Pleistocene to Holocene) — Light brown (7.5YR6/4) to pinkish gray (7.5YR6/2), unconsolidated, poorly sorted, fine-grained sand, silt, and clay, occasional carbonate pebbles, occupying thin (<1–1.5 m) channels, swales, and coalescing depressions.

Alluvial-fan deposits, multi-lobed (Historic to uppermost Pleistocene) — Predominantly carbonate gravels to pebbles, often in stringers, in a brown (7.5YR4/2) to pinkish gray (7.5YR6/2), unconsolidated, poorly sorted, and coarse- to fine-grained sand to silty sand. Two large fans built by both historic flower channels of Eagle Creek (Qafd1), and by Tumbleweed Draw (Qafd), debouch from dense western tributaries onto the western floodplain margin, interfingering with and/or spreading out onto Pecos floodplain deposits. Thicknesses decrease from tributary mouths from ~6 m to ~1 m at their distal margins. Fans debouching onto the floodplain from eastern tributaries are very considerably in thickness from <1 m for small fans and up to ~8 m at the apices of fans built by large tributaries (e.g., Hart Canyon, (Qafd), and Logan Draw, (Qafd). Many of these fans have been truncated and their deposits removed by the eastward migrating Pecos River from meander belts Hms2 to Ims4 (e.g., Dog Canyon, (Qafd)

Quaternary playa deposits (upper Pleistocene to Holocene) — Pinkish white (7.5YR8/2), unconsolidated, well-sorted, fine-grained sand, silt, and clay. Thickness unknown (≥ 1m)

Pecos River alluvial valley floor

(Distinct map unit labels are given a lower case "a" to differentiate them from Holocene map units.)

Pecos River meanderbelt alluvial deposits (Historic to lower Holocene) — At the onset of the Holocene, the Pecos River switched from a braided regime to a meandering one, and proceeded to build four distinguishable meanderbelts on top of the basic, upper Pleistocene Pecos River braided alluvial valley-fill (Qvlpv). Consisting of channel, channel fill, point bar, and natural levee deposits, undivided, these meanderbelts are differentiated based upon cross-cutting relationships observed in the field, as well as aerial photographic work, into an historic axial (Imap,) and three older Holocene units (Omp,). These older Holocene units reveal a pattern of progressive meanderbelt shifting from west to east across the floodplain:

Historic meanderbelt deposits (Historic to upper Holocene) — Occasional pebbles of dolomite, limestone, sandstone, chert, and quartzite in a very pale brown (10YR7/4) to reddish brown (2.5YR4/4), unconsolidated, moderately to well-sorted, coarse- to fine-grained sand, in the former modern channel and adjacent bar areas, grading to silty sand and sandy clay with distance from this channel. Several reaches of the Pecos River on the quad have been channelized by the U.S. Bureau of Reclamation during the mid 20th Century. The northernmost section of the Kaiser Channel extends into the northernmost part of the quad. Meanderbelt thicknesses commonly range from 1 to 5 m.

Young meanderbelt deposits (upper Holocene) — Very pale brown (10YR7/4) to reddish brown (2.5YR4/4), unconsolidated, moderately sorted, occasionally pebbly (dolomite, limestone, sandstone, chert, and quartzite), coarse- to fine-grained sand, silty sand, and sandy clay. Unit primarily lies immediately west of Imp2, in the center of the floodplain. Thickness 2-5 m.

Older Holocene meander belt deposits (upper to middle Holocene) — Very pale brown (10YR7/4) to reddish brown (2.5YR4/4), unconsolidated, moderately sorted, occasionally pebbly (dolomite, limestone, sandstone, chert, and quartzite), coarse- to fine-grained sand, silty sand, and sandy clay. Unit lies immediately west of Imp1. Thickness 3-5 m.

Old Holocene meander belt deposits (lower to middle Holocene) — Very pale brown (10YR7/4) to reddish brown (2.5YR4/4), unconsolidated, moderately sorted, occasionally pebbly (dolomite, limestone, sandstone, chert, and quartzite), coarse- to fine-grained sand, silty sand, and sandy clay. Thickness 3-5 m.

Holocene crevasse splay deposits (middle to upper Holocene) — Very pale brown (10YR7/4) to reddish brown (2.5YR4/4), unconsolidated, graded sand and silty sand, closest to the channel bank breached by the crevasse to sandy clay at the distal margins. Thickness <1 to 2 m.

Floodplain alluvial backswamp deposits (Historic to upper Pleistocene) — Light reddish-brown (5YR6/4) to very dark gray (7.5YR3/1), unconsolidated, well-sorted, silty sand, sandy clay, and clay in low-lying, poorly drained areas. These areas commonly received only fine-grained, slack-water flood deposition, prior to channelization. Thicknesses range from 3-15 (?) m.

Pecos River braided alluvial deposits (upper Pleistocene to lower Holocene) — Gravels and pebbles of dolomite, limestone, sandstone, chert, and quartzite in a reddish-brown (2.5YR4/4)to light reddish-brown (5YR6/4), unconsolidated, poorly to moderately sorted, coarse- to fine-grained sand, silty sand, sandy clay, and clay. Braided channels and bars typify the surface of *Qvlpv* elsewhere, but on the Spring Lake quad, as largely featureless. Mostly buried by Holocene meanderbelt. Thicknesses vary (buried upon Lyford, 1973) from about 5 to 30 m.

Pecos Valley alluvial terrace complex

Alluvial terraces of the Pecos River and its tributaries were first described in the classic study of Fiedler and Nye (1933). They recognized 3 terraces flanking the floodplain (from lowest to highest) the Lakewood, the Orchard Park, and the Blackdom. All three terraces are present on the Spring Lake quad.

Lakewood terrace alluvial deposits (upper to middle Pleistocene) The Lakewood terrace, with an elevation of 6 to 9 m above the floodplain, flanks the most Pecos floodplain and extends up many of its tributaries. Following McCraw, et al. (2007) and McCraw and Land (2008), three distinct, low-lying (upper to uppermost middle(?) Pleistocene) "Lakewood terraces" are recognized. The highest and oldest of which (Qlk) would be Fiedler and Nye's original. Surface treads elevations above the floodplain for these three are: +3-2 m, 2-6 m, and 6-9 m, respectively. They are comprised of occasional gravels and pebbles, lenses (OYRS3/3) to dark yellowish brown (10YR3/4), unconsolidated, moderately sorted, coarse- to fine- grained sand, silty sand, silt and sandy clay. Pedogenic carbonate accretions from stage I to stage I+ (occasionally III) from (Qlk to Qlj). Mostly non-gypsiferous.

- Qlj — **Youngest Lakewood terrace alluvial deposits (upper Pleistocene)** — Thickness <1 to 1 m.
- Qlk — **Young Lakewood terrace alluvial deposits (upper Pleistocene)** Thickness 1.5 to 3 m.
- Qlk1 — **Older Lakewood terrace alluvial deposits (upper to middle Pleistocene)** — Thickness ~2 to 9 m.
- Qal — **Orchard Park terrace alluvial deposits (upper Pliocene (?) to upper Pleistocene)** — According to Fiedler and Nye (1933), the Orchard Park terrace rises 3.5-3 m above the Lakewood terrace and 10.5-20 m above the Pecos floodplain. It is comprised of gravels and pebbles of dolomite, limestone, sandstone, chert, and quartzite in a very pale brown (10YR7/4) to reddish brown (5YR4/4), unconsolidated, moderately sorted, coarse- to fine- grained sand, silty sand, silt, and sandy clay. Pedogenic carbonate is a strong stage III. Thickness ranges from 3 to 15 m.
- Qbd — **Blackdom terrace alluvial deposits (middle to lower Pleistocene)** — The Blackdom terrace occurs in isolated remnants primarily along the Permian Yates formation (Py). 25-42 m above and max 2 the Pecos floodplain. It is comprised of poorly sorted pebbles of dolomite, limestone, sandstone, chert, and quartzite in a very pale brown (10YR7/4) to reddish brown (5YR4/4), unconsolidated, moderately sorted coarse- to fine- grained sand, silty sand, silt, and sandy clay. Pedogenic carbonate is III-III+. Thickness ~15 m.

Eagle Creek alluvial piedmont complex

Eagle Creek alluvial piedmont deposits (Upper to middle Pleistocene) — Eagle Creek (or Eagle Draw further west) heads on the easternmost flank of the southern Sacramento Mountains in San Andres Formation (Psa) rocks and flows east to the Pecos River. Where it leaves the Permian highlands, it has built a large piedmont alluvial complex, which coalesces with the Rio Felix to the north and the Rio Peñasco to the south. This piedmont complex grades to and into the Pecos Valley alluvial terraces. Oldest, highest remnant surfaces may be as old as Pliocene, which possibly grades to a river system which forms Gatuña formation deposits today. It is comprised of gravels that are almost exclusively limestone derived from *Psa*, supported in a matrix of light brown (7.5YR6/3), unconsolidated, moderately sorted, coarse- to fine- grained sand, silty sand, silt (largely calcareous), and sandy clay. On the Spring Lake quad, only the two youngest piedmont deposits (Qpe,) are mapped. Topographic expression between these deposits are often to subtle to practically non-existent. Distinction is often based upon a stronger developed pedogenic carbonate (Qpe, = stage III – II+; Qpe, = stage III- (Qpe, grades to (Qlj,

- Qpe(y) — **Youngest Quaternary alluvial piedmont deposit (upper Pleistocene)** Thickness 1 to 3 m.
- Qpe(o) — **Younger Quaternary alluvial piedmont deposit (upper to uppermost middle Pleistocene)** — Thickness 2 to 6 m.

Quaternary depression fill and sinkhole deposits

- Qal — **Quaternary depression fill, undifferentiated (Holocene to middle Pleistocene)** — Unconsolidated, well-sorted, fine-grained silty sands to clayey exsudates of alluvial, eolian(?), and commonal lacustrine deposits within closed depressions. Colors variable. Depressions are created by either gradual subsidence or sudden collapse followed by gradual subsidence of underlying, gypsiferous carbonate bedrock. These complexes are often significantly modified by eolian erosion and deposition, playa deposition, deflation, and mass wasting. Depression fills have been active since the middle Pleistocene and are usually <3 m thick, but can reach thicknesses in excess of 10 m.
- Qsm — **Quaternary sinkhole deposits, primarily caused by collapse (Historic to middle Pleistocene)** — Complexes of unconsolidated, well- to poorly-sorted, coarse- to fine-grained sands to clay, alluvial, colluvial, eolian, and occasional lacustrine deposits within closed depressions. Colors variable. Thickness <4 to 8 m.

PALEOZOIC

Permian Artesia Group

- Ps — **Salado formation, mixed gypsiferous facies (Guadalupian)** — Irregular masses of gypsum, dolomite, and salt in outcrops with chaotic bedding orientations. Exposed in eastern part of quadrangle. Thickness unknown.
- Pty — **Tansill formation, dolomitic facies (Guadalupian)** — Light gray dolomite forming the basal part of the section, grading upward into interbedded mixed facies. Thickness ~4 to 5 m.

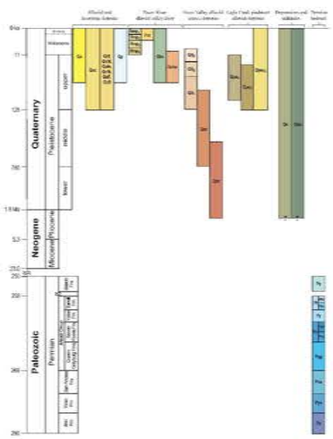
View looking north-northwest of northernmost exposure of *Psd* as it plunges beneath the alluvium. The roadside hummock on the north side of U. S. Highway 82 sits on alluvial fan (Qlaf) east of the modern Pecos River meanderbelt (Imp2). Photo by D. McCraw.

- Psd — **Tansill formation, mixed silty gypsiferous facies (Guadalupian)** — Interbedded mixed gray silty dolomite, siltstone and gypsum, and yellowish sandstone with subhorizontal and energy-reel chert grains. Thickness 2 to 50 m.
- Py — **Yates formation, mixed gypsiferous facies (Guadalupian)** — Very light gray, massive to vesicular gypsum interbedded with pale dolomite, green to white and orange to red siltstone and minor sandstone. Folded into domes and basins on a meter to several-hectometer scale. Forms caverns. Outcrop exposures poor. Thickness increases westward from 2 to 50 m.
- Psr — **Seven Rivers formation, dolomitic facies (Guadalupian)** — Light gray to yellowish to pink, thinly to thickly bedded, vesicular to massive dolomite interbedded with pink dolomitic siltstone, yellowish sandstone and thin beds of milky gypsum. Thickness 8 to 9 m.
- Psg — **Seven Rivers formation, gypsiferous facies (Guadalupian)** — White/gray, occasionally yellow to red massive gypsum interbedded with thin- to medium-bedded, light gray dolomite and red gypsiferous siltstone, often containing gypsum nodules, and yellowish sandstone, which often exhibit soft sediment deformation. Commonly fractured, occasionally forming caverns, with many low amplitude folds varying in scale from meters to kilometers. Thickness unknown.
- Qsg — **Queen and Grayburg formations, undifferentiated** (Guadalupian) — Cross section only.

Lower Permian Formations

- Psa — **San Andres formation** — Cross section only.
- Gl — **Glorieta sandstone tongue** Cross section only.
- Pyu — **Yeso formation, undifferentiated** — Cross section only.
- Pa — **Abo formation, undifferentiated** — Cross section only.

CORRELATION OF MAP UNITS



View looking north of eastern edge of a small warped synclinal basin developed in Yates formation (Py). The outermost oldest exposed bed of gypsum on the far right curving from the rock in the distance resurfaces roughly 20 m away to the left out of the photo. Younger interbedded redbeds and gypsum making up the majority of the photo also resurface to the left within this bed. Photo by D. McCraw.

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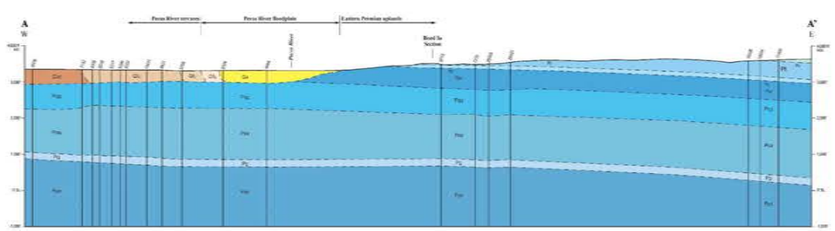
GEOLOGIC CROSS SECTION



SUBSURFACE

HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

FIGURE 10

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

SURFACE GEOLOGIC MAP

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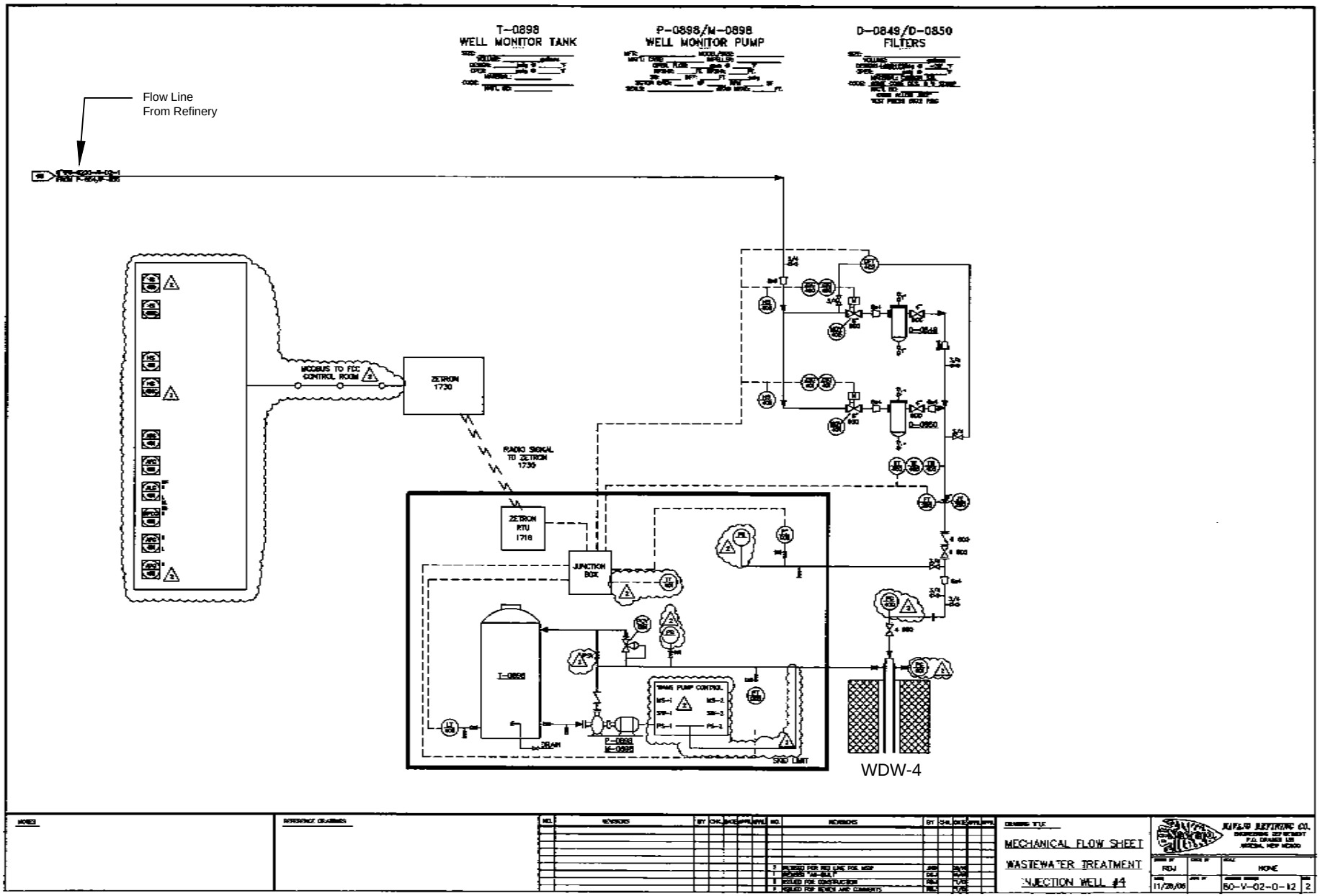
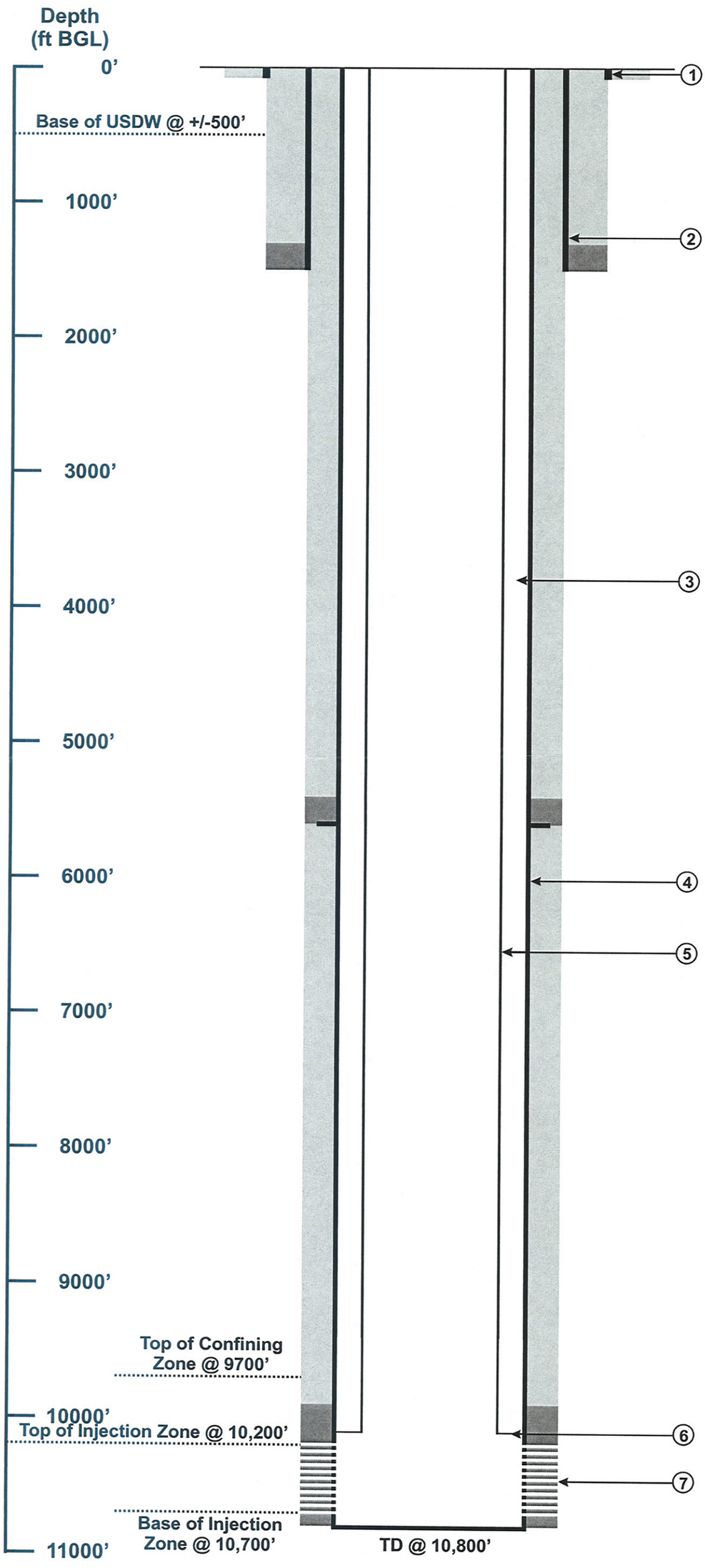


FIGURE 11
PRE-INJECTION SURFACE FACILITIES
NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO



Below Ground Details
(feet below Ground Level)

1. Conductor Pipe - 20", 129.33 lb/ft (0.625" wall), API 5LX-56, plain-end, beveled conductor set in 24" augered hole at 80' and cemented to the surface with 3 yd^3 of redi-mix.
2. Surface Casing - 13⅜", 54.5 lb/ft, K-55, ST&C, set at 1,500' in a 17½" hole and cemented to the surface with 1,092 ft^3 of lightweight Class A lead cement followed by 206 ft^3 of Class A tail cement.
3. Annulus Fluid - injection tubing and protection casing annulus filled with 250 bbl of brine water containing a corrosion inhibitor, a bactericide and an oxygen scavenger.
4. Protection Casing - 9⅝", 47 lb/ft, N-80, LT&C set in a 12¼" hole at 10,800' with a DV Tool at 5,800' and cemented to the surface in two stages as follows:
   Stage I (5,800' - 10,800'): 1,579 ft^3 of lightweight Class A cement followed by 324 ft^3 of Class A cement.
   Stage II (Surface - 5,800'): 2,010 ft^3 of lightweight Class H cement followed by 150 ft^3 of Class H cement.
5. Injection Tubing - 7", 26 lb/ft, K-55, LT&C set in packer at approximately 10,100'.
6. Injection Packer - 7" x 9⅝" set at approximately 10,100'.
7. Perforations - Devonian Injection Interval perforated 2 spf in selected intervals between 10,200' and 10,700'.

ft BGL = feet below ground level

NOTE: Final below ground well depths, configuration, specifications and volumes will be presented in the post-installation Well Construction Report.

SUBSURFACE
Houston, TX
South Bend, IN
Baton Rouge, LA

FIGURE 12
Navajo Refining Company, L.L.C.
WDW-4 Class I Injection Well
Artesia, New Mexico
PROPOSED BELOW GROUND WELL SCHEMATIC

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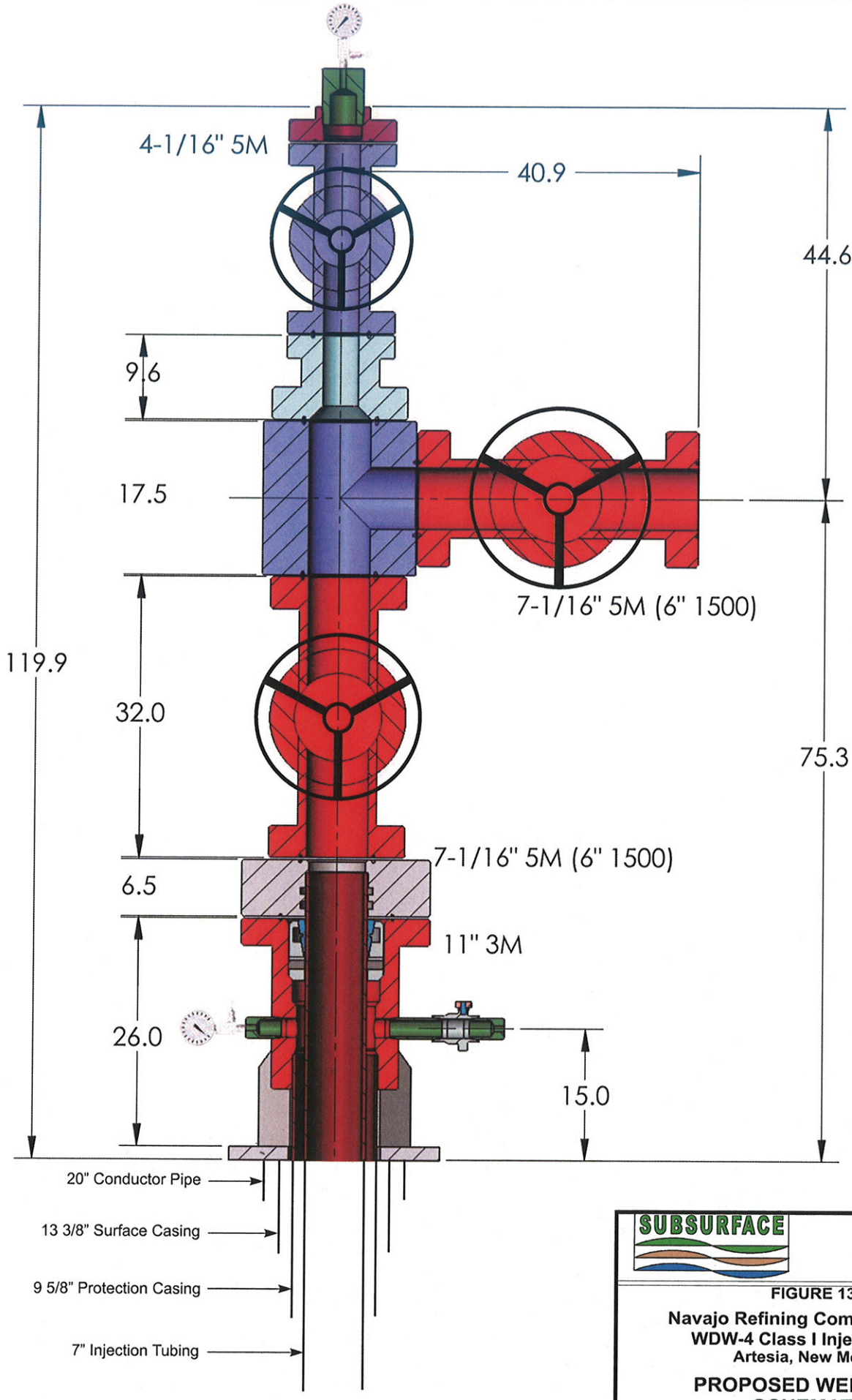


NOTE: Final wellhead configuration, specifications and dimensions will be presented in the post-installation Well Construction Report.

SUBSURFACE

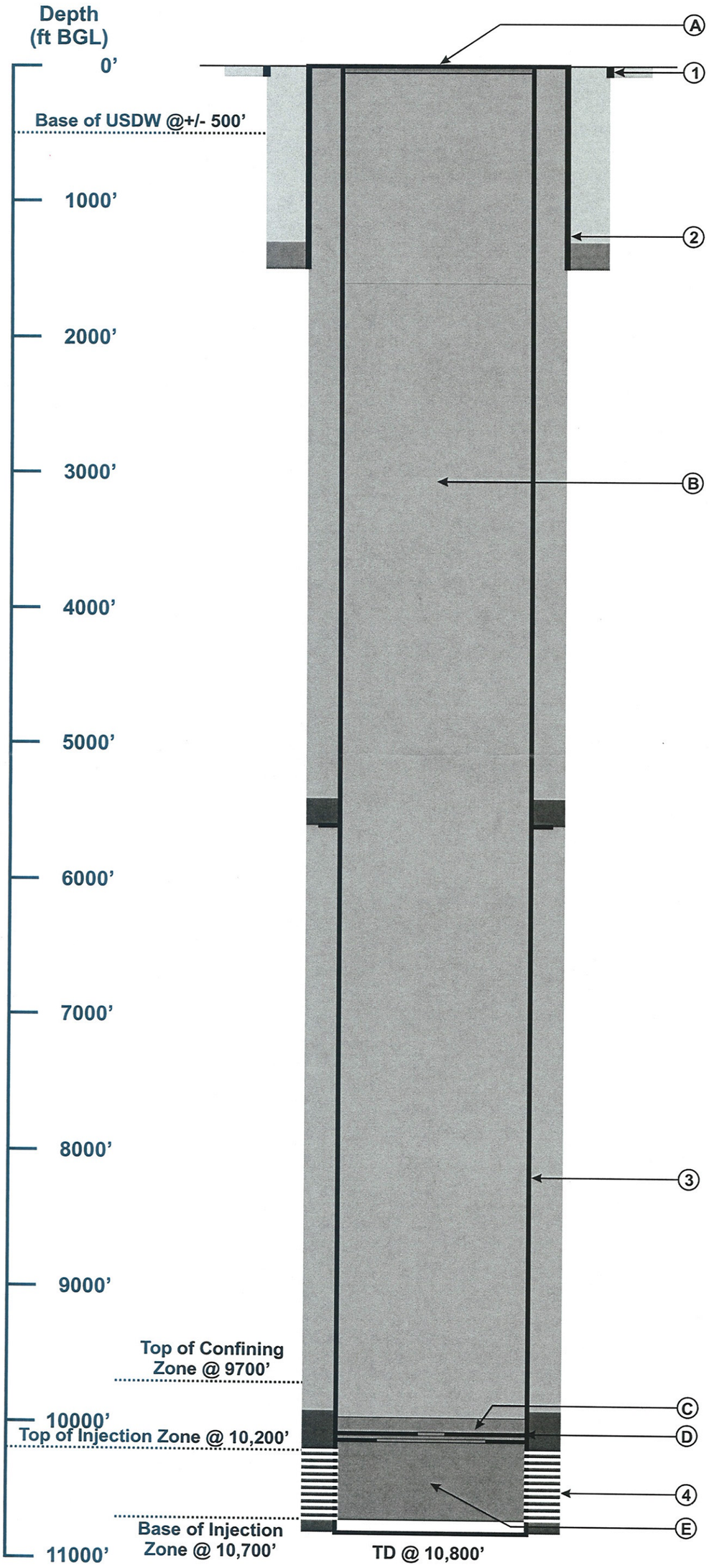
Houston, TX
South Bend, IN
Baton Rouge, LA

FIGURE 13

Navajo Refining Company, L.L.C.
WDW-4 Class I Injection Well
Artesia, New Mexico

PROPOSED WELLHEAD SCHEMATIC

DATE 09/02/14	CHECKED BY		JOB NO. 185818-6944
DRAWN BY WDD	APPROVED BY		DWG NO.



Below Ground Details
(feet below Ground Level)

1. Conductor Pipe - 20", 129.33 lb/ft (0.625" wall), API 5LX-56, plain-end, beveled conductor set in 24" augered hole at 80' and cemented to the surface with 3 yd^3 of redi-mix.

2. Surface Casing - 13⅜", 54.5 lb/ft, K-55, ST&C, set at 1,500' in a 17½" hole and cemented to the surface with 1,092 ft^3 of lightweight Class A lead cement followed by 206 ft^3 of Class A tail cement.

3. Protection Casing - 9⅝", 47 lb/ft, N-80, LT&C set in a 12¼" hole at 10,800' with a DV Tool at 5,800' and cemented to the surface in two stages as follows:
   Stage I (5,800' - 10,800'): 1,579 ft^3 of lightweight Class A cement followed by 324 ft^3 of Class A cement.
   Stage II (Surface - 5,800'): 2,010 ft^3 of lightweight Class H cement followed by 150 ft^3 of Class H cement.

4. Perforations - Devonian Injection Interval perforated 2 spf in selected intervals between 10,200' and 10,700'.

NOTE: 7" injection tubing and 7" x 9 5/8" packer removed prior to abandonment.

Plugging and Abandonment

A. Inscribed Steel Plate Cover - All casings cut-off 3' below the surface and a ½" steel plate inscribed with operator name, well API no. and P&A Date welded over the 13⅜" surface casing.

B. Cement Plug - Class A cement (1.18 ft^3/sack) spotted in balanced plugs from 9,950' to 3'.

C. Cement Plug Above Retainer - 100-foot Class A (1.18 ft^3/sack) cement plug spotted above cement retainer 9,950' to 10,050'.

D. Cement Retainer - set in 9⅝" casing at 10,050'.

E. Cement Plug Below Retainer - 250 sacks of Class A (1.18 ft^3/sack) cement pumped below cement retainer from 10,050' to 10,200' and across perforations from 10,200' to 10,700'.

ft BGL = feet below ground level

NOTE: Final below ground well depths, configuration, specifications and volumes will be presented in the post-installation Well Construction Report.

SUBSURFACE
Houston, TX
South Bend, IN
Baton Rouge, LA

FIGURE 14
Navajo Refining Company, L.L.C.
WDW-4 Class I Injection Well
Artesia, New Mexico
PLUGGED AND ABANDONED
WELL SCHEMATIC

DATE 09/02/14	CHECKED BY	JOB NO. 185818-6944	
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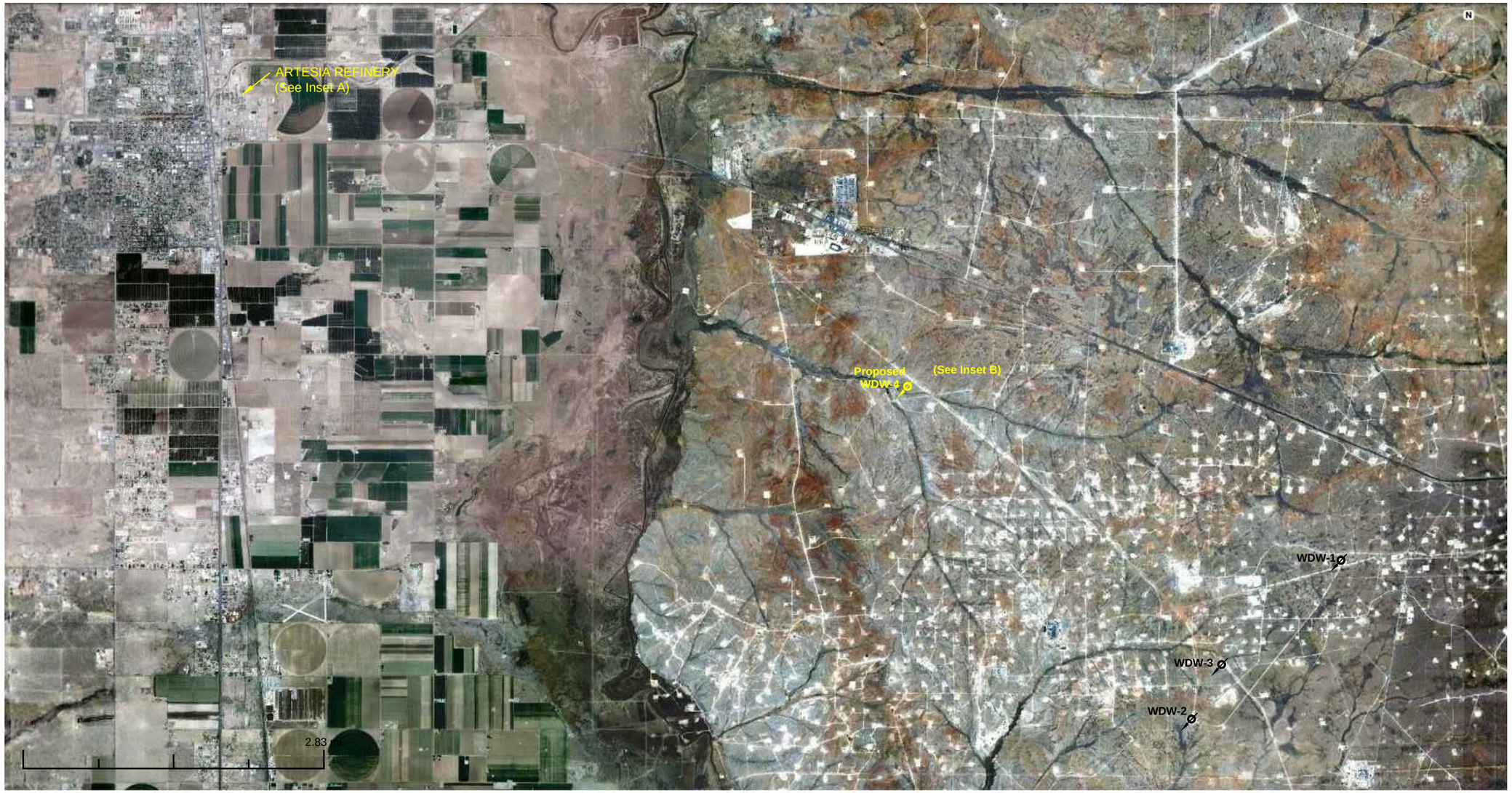
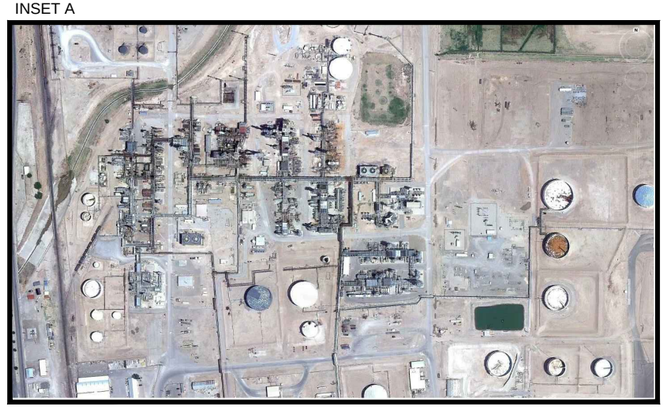


INSET A



INSET B

SUBSURFACE

HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

DRAWING 1

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

FACILITY MAP

DATE: 09/02/14	CHECKED BY:	JOB NO:185818-6944
DRAWN BY: WDD	APPROVED BY:	DWG. NO:

17S 27E

N

LEGEND

- PERMITTED WELL
- DRY HOLE
- PLUGGED AND ABANDONED WELL
- GAS WELL
- OIL WELL
- OIL & GAS WELL
- ABANDONED GAS WELL
- ABANDONED OIL WELL
- ABANDONED OIL & GAS WELL
- INJECTION WELL
- PLUGGED & ABANDONED INJECTION WELL
- SALTWATER DISPOSAL WELL
- PLUGGED SALTWATER DISPOSAL WELL
- 2.5-MILE RADIUS AREA OF REVIEW

SCALE (IN FEET)
0 1000 2000

Well Number — API Number (30-015-11256) — Map ID Number (see Table 1) — Total Depth of Well

SUBSURFACE
Houston, TX
South Bend, IN
Baton Rouge, LA

DRAWING 2

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

AREA OF REVIEW MAP

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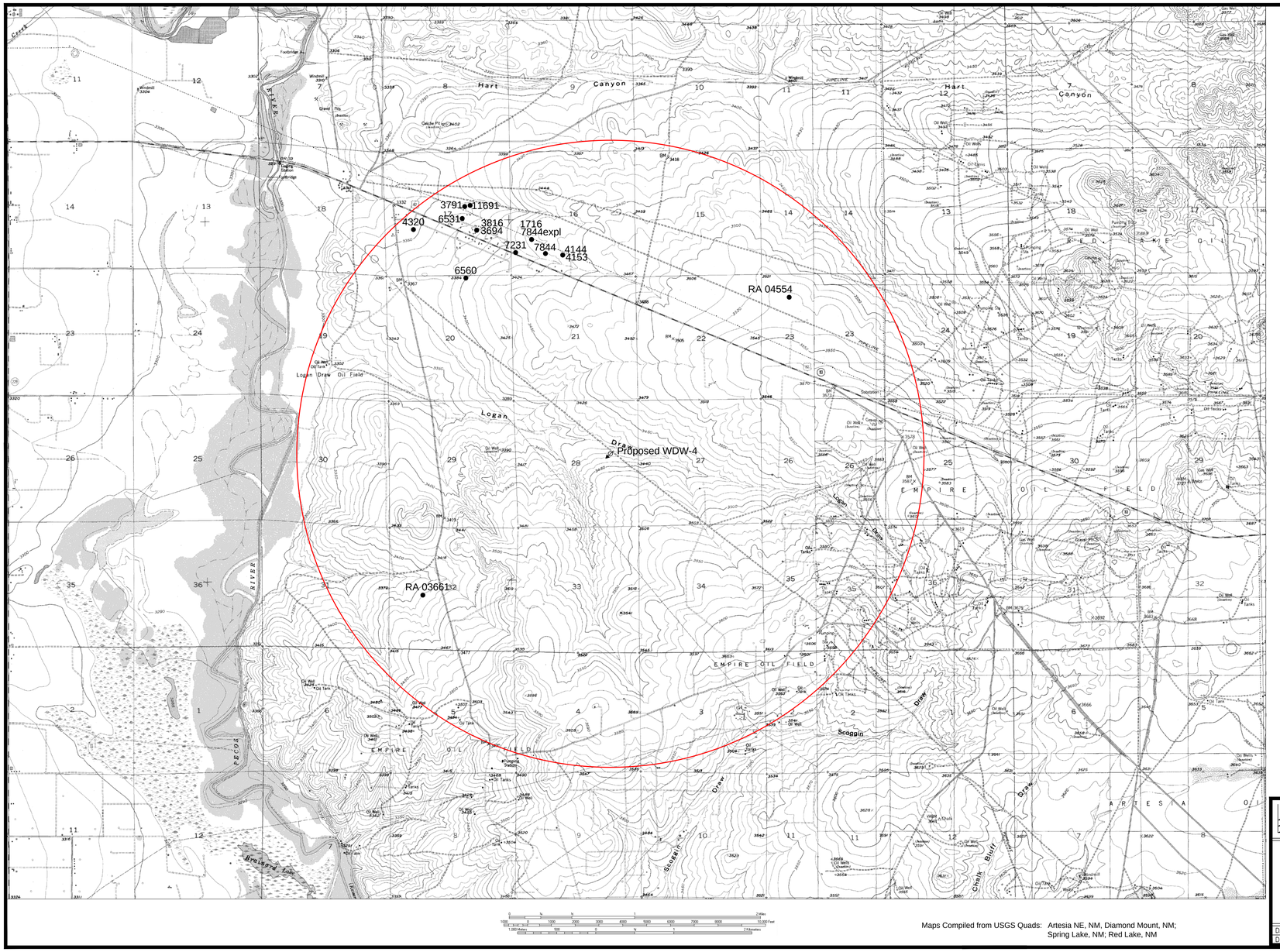
	JOB NO: 185818-6944
	DWG NO:



LEGEND:

7844 (Refer to Table 2)

2.5-Mile Radius Area of Review

ROAD CLASSIFICATION

Heavy-duty — Light-duty

Medium-duty — Unimproved dirt

U. S. Route — State Route

NEW MEXICO

QUADRANGLE LOCATION

UTM GRID AND 1955 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

Maps Compiled from USGS Quads: Artesia NE, NM, Diamond Mount, NM; Spring Lake, NM; Red Lake, NM

SUBSURFACE

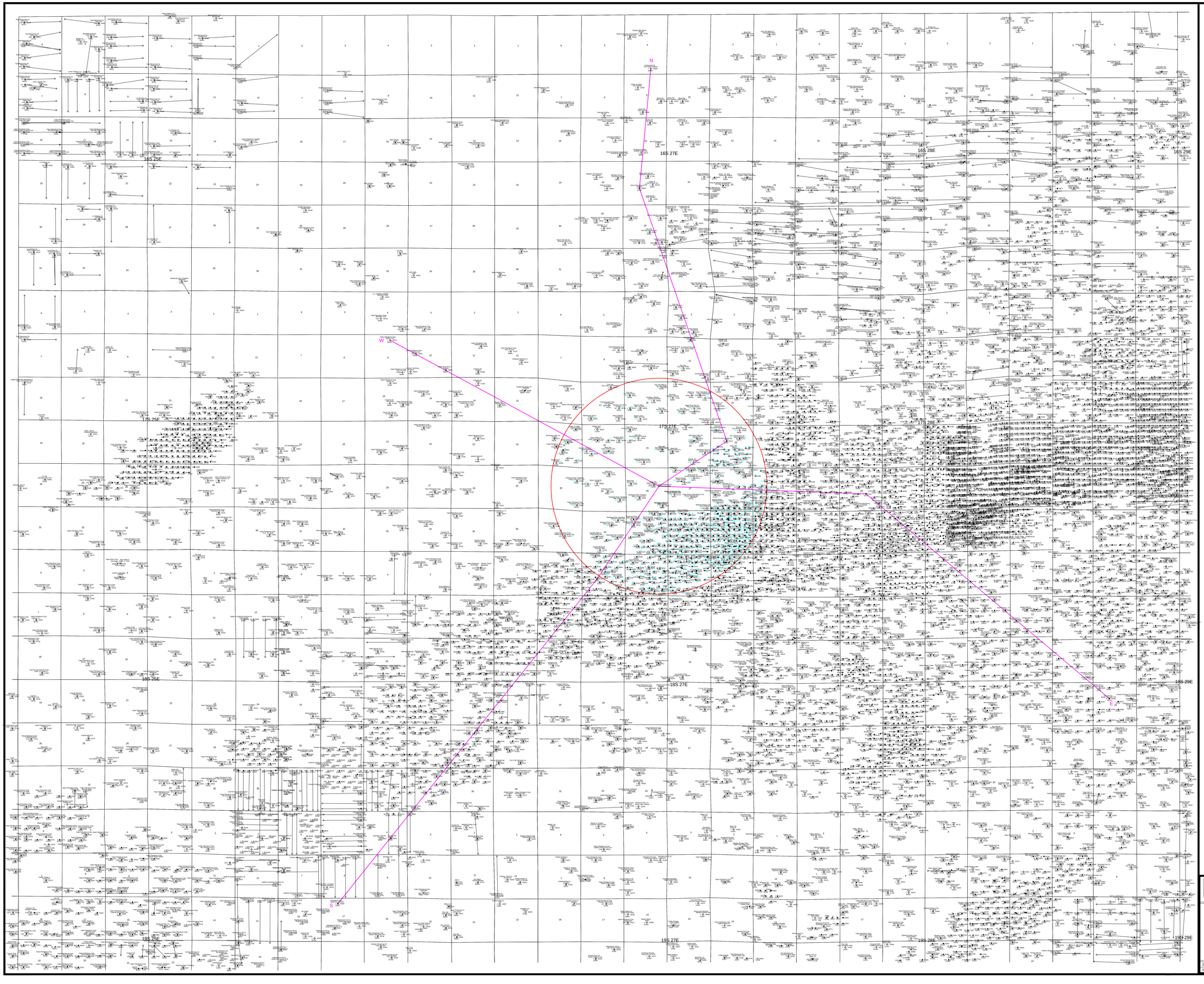
HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

DRAWING 3

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

FRESHWATER WELLS IN AREA OF REVIEW

DATE: 09/08/14	CHECKED BY:	JOB NO:185818-6944
DRAWN BY: WDD	APPROVED BY:	DWG. NO:



LEGEND

- PERMITTED WELL
- DRY HOLE
- PLUGGED AND ABANDONED WELL
- GAS WELL
- OIL WELL
- OIL & GAS WELL
- ABANDONED GAS WELL
- ABANDONED OIL WELL
- ABANDONED OIL & GAS WELL
- INJECTION WELL
- PLUGGED & ABANDONED INJECTION WELL
- SALTWATER DISPOSAL WELL
- PLUGGED SALTWATER DISPOSAL WELL
- 2.5-MILE RADIUS AREA OF REVIEW
- GEOLOGIC CROSS-SECTION LINE

Well Number — API Number — 30 - 31296 — 00190 — Map ID Number (see Table 1) — Total Depth of Well

SCALE (IN FEET)
0 1500 3000

SUBSURFACE
Houston, TX
South Bend, IN
Baton Rouge, LA

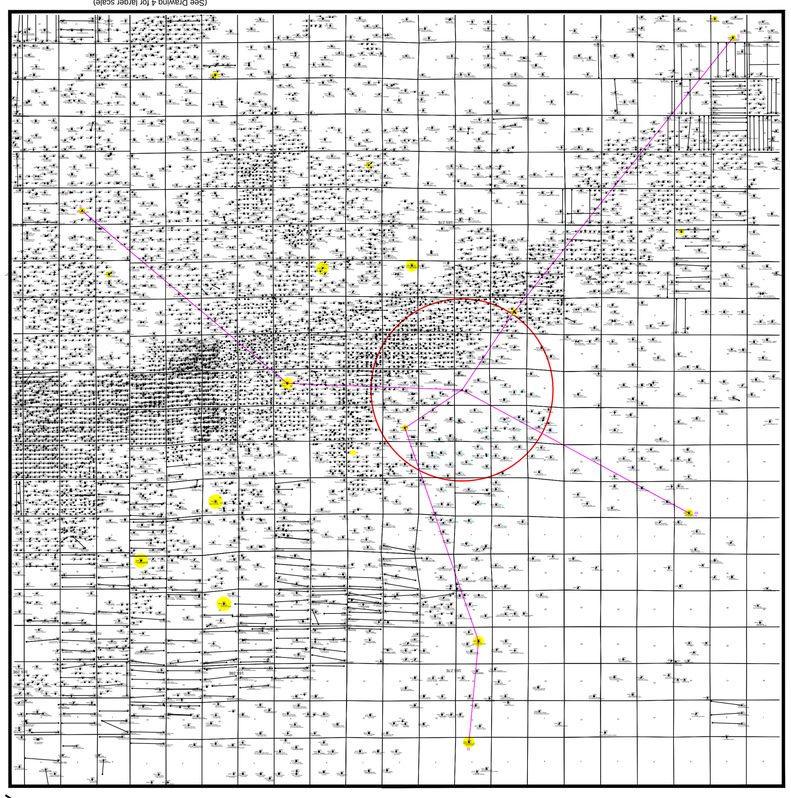
DRAWING 4

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

GEOLOGIC CROSS-SECTION INDEX MAP

DATE: 09/08/14	CHECKED BY:	JOB NO: 185818-6944
DRAWN BY: WDD	APPROVED BY:	DWG NO:

WEST
EAST
PRE-ONGARD WELL OPERATOR
PRE-ONGARD WELL NO. 001
SEC. 9 T17S R26E
TD: 9,018' KB: 3,364'
PLUGGED WATER WELL
API NUMBER 30-015-20913
NAVAJO REFINING COMPANY, L.L.C.
PROPOSED WDW NO. 4
SEC. 28 T17S R27E
COG OPERATING INC.
STATE B GAS COM NO. 1
SEC. 29 T17S R28E
TD: 12,431' KB: 3,715'
ACTIVE GAS WELL
API NUMBER 30-015-01611
OXY USA INC.
SOUTH LOCO HILLS UNIT NO. 10
SEC. 20 T18S R29E
TD: 9,304' KB: 3,570'
PLUGGED OIL WELL
API NUMBER 30-015-03449
37,524'
25,184'
38,872'
Elevation (ft msl)
GROUND LEVEL
GRAYBURG
SAN ANDRES
GLORIETA
TUBB
YESO
ABO
WOLFCAMP
CISCO
CANYON
STRAWN
CHESTER
MISSISSIPPIAN
WOODFORD
DEVONIAN
MONTOYA
SIMPSON
ELLENBURGER
CONFINING ZONE
INJECTION ZONE
PTD: 10,800'
(See Drawing 4 for larger scale)
VERTICAL SCALE
0
200
HORIZONTAL SCALE
0
3000
SUBSURFACE
HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA
DRAWING 5
NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO
WEST - EAST DIP
GEOLOGIC CROSS-SECTION A-A'
DATE: 09/08/14
DRAWN BY: WDD
CHECKED BY:
APPROVED BY:
JOB NO: 60D6945
DWG. NO:



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

DRAWING 6

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

NORTH - SOUTH
GEOLOGIC CROSS-SECTION B-B'

DATE: 09/08/14	CHECKED BY:	JOB NO: 185818-6944
DRAWN BY: WDD	APPROVED BY:	DWG. NO:

VERTICAL SCALE
0
200

HORIZONTAL SCALE (Feet)
0
3000

NORTH

PRE-ONGARD WELL OPERATOR
PRE-ONGARD WELL NO. 001
SEC. 11 T16S R27E
TD: 10,767' KB: 3,668'
PLUGGED OIL WELL
API NUMBER 30-015-00561

SNOW OIL & GAS INC.
DUFFIELD NO. 1
SEC. 21 T16S R27E
TD: 10,185' KB: 3,572'
ACTIVE GAS WELL
API NUMBER 30-015-00565

ALAMO PERMIAN RESOURCES
BERRY FEDERAL NO. 29
SEC. 23 T17S R27E
TD: 10,427' KB: 3,545'
PLUGGED GAS WELL
API NUMBER 30-015-00472

NAVAJO REFINING COMPANY, L.L.C.
PROPOSED WDW NO. 4
SEC. 28 T17S R27E

LRE OPERATING LLC
CHALK BLUFF FED NO. 1
SEC. 5 T18S R27E
TD: 10,397' KB: 3,512'
ACTIVE SALTWATER DISPOSAL WELL
API NUMBER 30-015-00789

PRE-ONGARD WELL OPERATOR
PRE-ONGARD WELL NO. 1
SEC. 17 T19S R26E
TD: 10,200' KB: 3,396'
PLUGGED OIL WELL
API NUMBER 30-015-10338

SOUTH

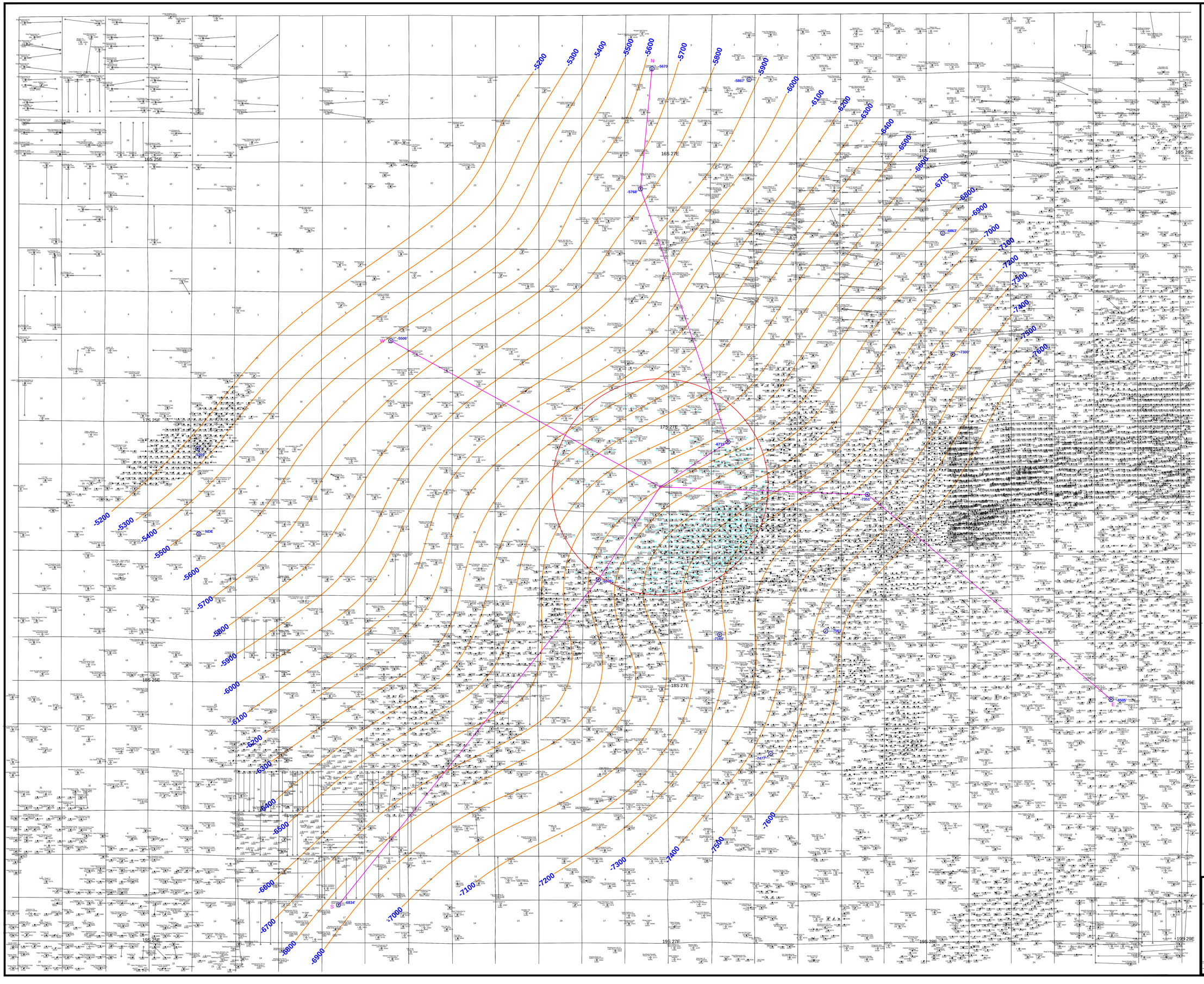
18,803'
32,668'
9,798'
13,599'
50,899'
(NTS)

Elevation (ft msl)

-7,800' -7,700' -7,600' -7,500' -7,400' -7,300' -7,200' -7,100' -7,000' -6,900' -6,800' -6,700' -6,600' -6,500' -6,400' -6,300' -6,200' -6,100' -6,000' -5,900' -5,800' -5,700' -5,600' -5,500' -5,400' -5,300' -5,200' -5,100' -5,000' -4,900' -4,800' -4,700' -4,600' -4,500' -4,400' -4,300' -4,200' -4,100' -4,000' -3,900' -3,800' -3,700' -3,600' -3,500' -3,400' -3,300' -3,200' -3,100' -3,000' -2,900' -2,800' -2,700' -2,600' -2,500' -2,400' -2,300' -2,200' -2,100' -2,000' -1,900' -1,800' -1,700' -1,600' -1,500' -1,400' -1,300' -1,200' -1,100' -1,000' -900' -800' -700' -600' -500' -400' -300' -200' -100' 0' 100' 200' 300' 400' 500' 600' 700' 800' 900' 1,000' 1,100' 1,200' 1,300' 1,400' 1,500' 1,600' 1,700' 1,800' 1,900' 2,000' 2,100' 2,200' 2,300' 2,400' 2,500' 2,600' 2,700' 2,800' 2,900' 3,000' 3,100' 3,200' 3,300' 3,400' 3,500' 3,600' 3,700' 3,800'

PTD: 10,800'

INJECTION ZONE
CONFINING ZONE
MISSISSIPPIAN
WOODFORD
DEVONIAN
SIMPSON
MONTOYA
ELLENBURG
CHESTER
STRAWN
CANYON
CISCO
WOLFCAMP
ABO
YESO
TUBB
GLORIETA
SAN ANDRES
GRAYBURG
GROUND LEVEL



LEGEND

- PERMITTED WELL
- DRY HOLE
- PLUGGED AND ABANDONED WELL
- GAS WELL
- OIL WELL
- OIL & GAS WELL
- ABANDONED GAS WELL
- ABANDONED OIL WELL
- ABANDONED OIL & GAS WELL
- INJECTION WELL
- PLUGGED & ABANDONED INJECTION WELL
- SALTWATER DISPOSAL WELL
- PLUGGED SALTWATER DISPOSAL WELL
- 2.5-MILE RADIUS AREA OF REVIEW
- GEOLOGIC CROSS-SECTION LINE
- -5600 STRUCTURE CONTOUR OF TOP OF INJECTION ZONE

Well Number
API Number
Map ID Number (see Table 1)
Top of Injection Zone Elevation (ft msl)
Total Depth of Well

SCALE IN FEET
0 1000 2000

CI = 100'

SUBSURFACE

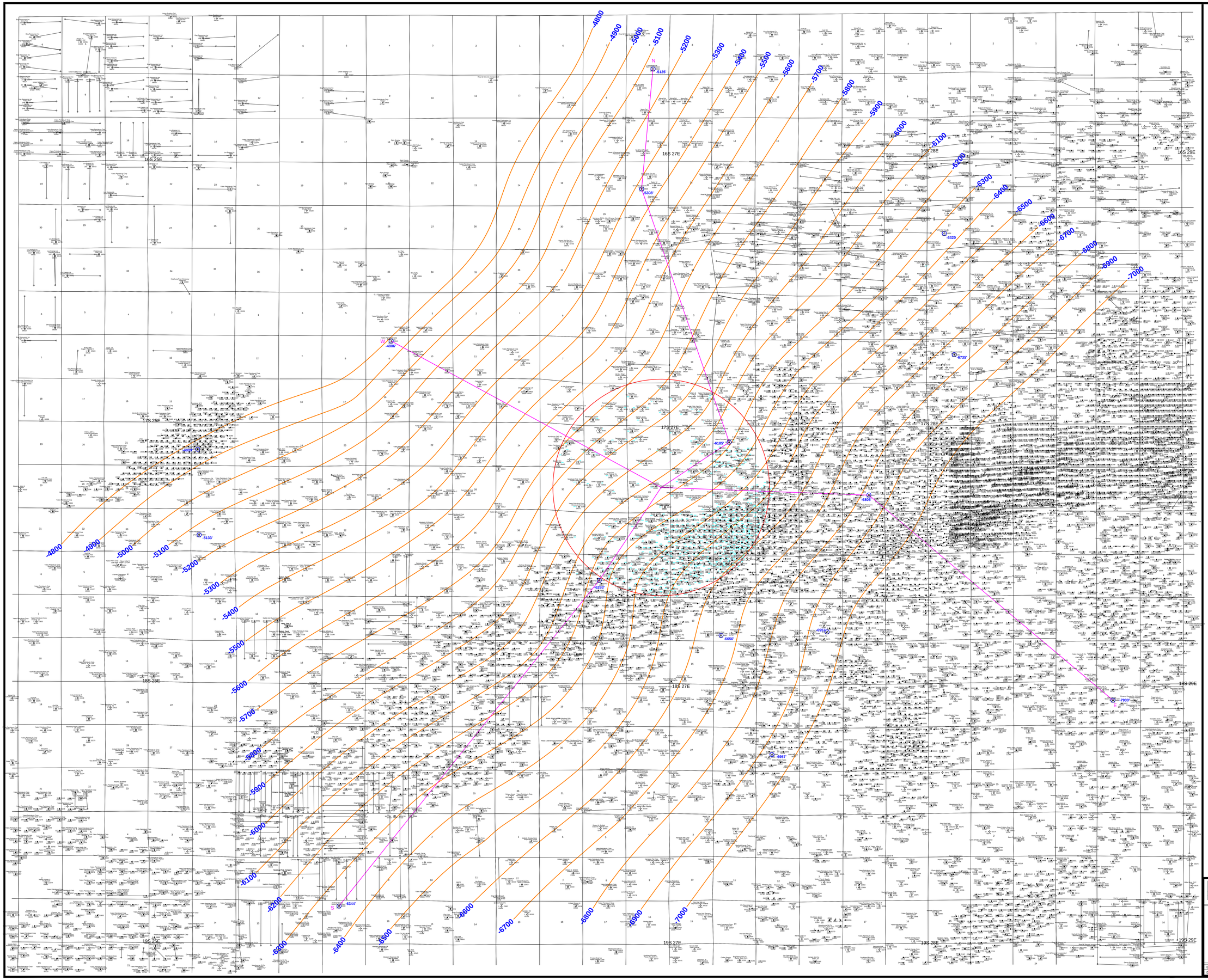
Houston, TX
South Bend, IN
Baton Rouge, LA

DRAWING 7

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

STRUCTURE CONTOUR MAP TOP OF INJECTION ZONE

DATE: 07/22/13	CHECKED BY:	JOB NO: 60D6944
DRAWN BY: WDD	APPROVED BY:	DWG NO:



LEGEND

- PERMITTED WELL
- DRY HOLE
- PLUGGED AND ABANDONED WELL
- GAS WELL
- OIL WELL
- OIL & GAS WELL
- ABANDONED GAS WELL
- ABANDONED OIL WELL
- ABANDONED OIL & GAS WELL
- INJECTION WELL
- PLUGGED & ABANDONED INJECTION WELL
- SALTWATER DISPOSAL WELL
- PLUGGED SALTWATER DISPOSAL WELL
- 2.5-MILE RADIUS AREA OF REVIEW
- GEOLOGIC CROSS-SECTION LINE
- -5900 STRUCTURE CONTOUR OF TOP OF CONFINING ZONE

Well Number — API Number
Map ID Number (see Table 1)
-6,185' Top of Confining Zone Elevation (ft msl)
Total Depth of Well

SCALE (IN FEET)
0 1600 3200

CI = 100'

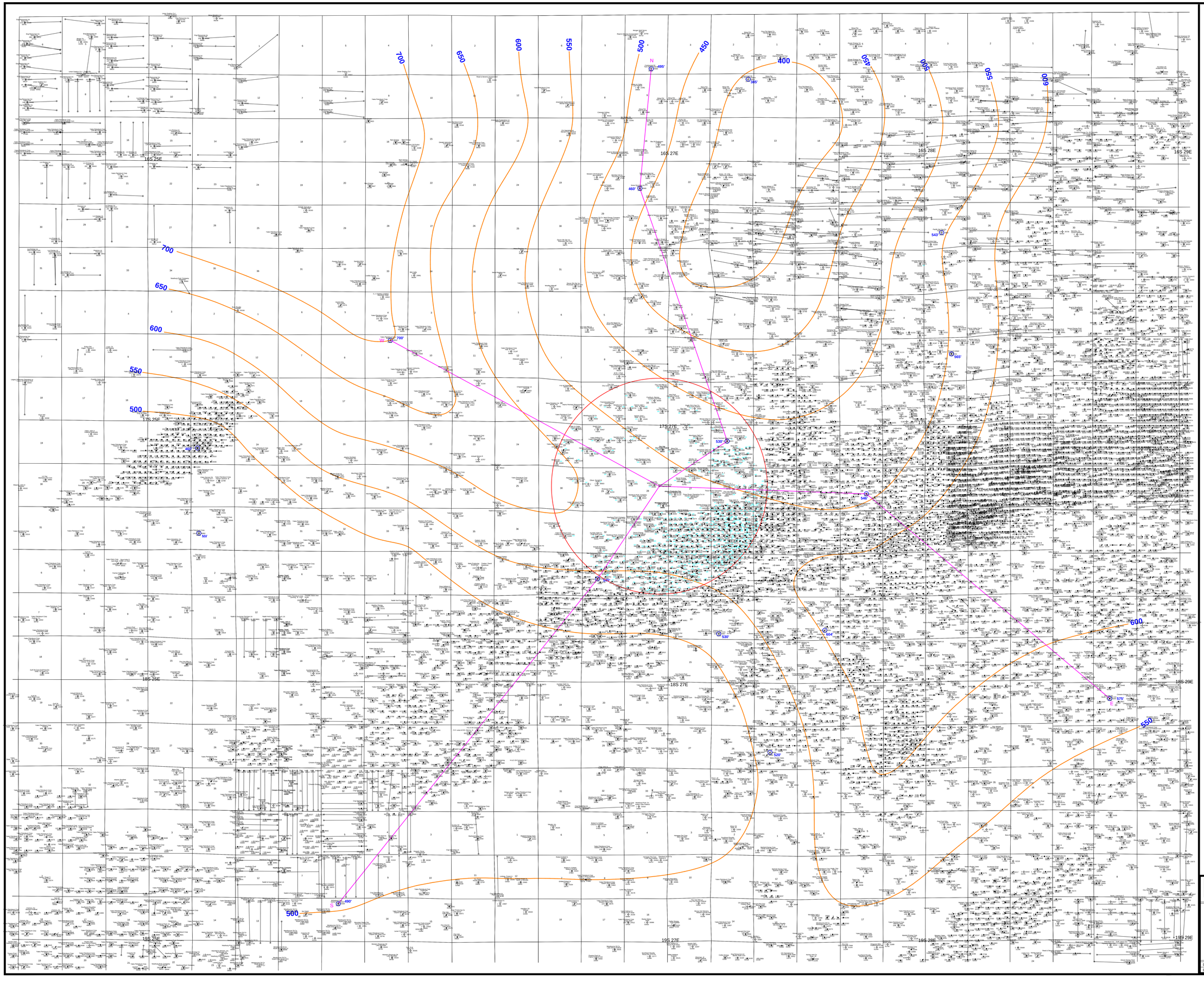
SUBSURFACE
Houston, TX
South Bend, IN
Baton Rouge, LA

DRAWING 8

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

STRUCTURE CONTOUR MAP TOP OF CONFINING ZONE

DATE: 09/08/14	CHECKED BY:	JOB NO:	185818-6944
DRAWN BY: WDD	APPROVED BY:	DWG NO:	



LEGEND

- PERMITTED WELL
- DRY HOLE
- PLUGGED AND ABANDONED WELL
- GAS WELL
- OIL WELL
- OIL & GAS WELL
- ABANDONED GAS WELL
- ABANDONED OIL WELL
- ABANDONED OIL & GAS WELL
- INJECTION WELL
- PLUGGED & ABANDONED INJECTION WELL
- SALTWATER DISPOSAL WELL
- PLUGGED SALTWATER DISPOSAL WELL
- 2.5-MILE RADIUS AREA OF REVIEW
- GEOLOGIC CROSS-SECTION LINE
- 500 — ISOPACH CONTOUR OF THE CONFINING ZONE

Well Number — API Number — Map ID Number (see Table 1) — Confining Zone Thickness (feet) — Total Depth of Well

SCALE (IN FEET): 0, 1500, 3000

CI = 50'

SUBSURFACE

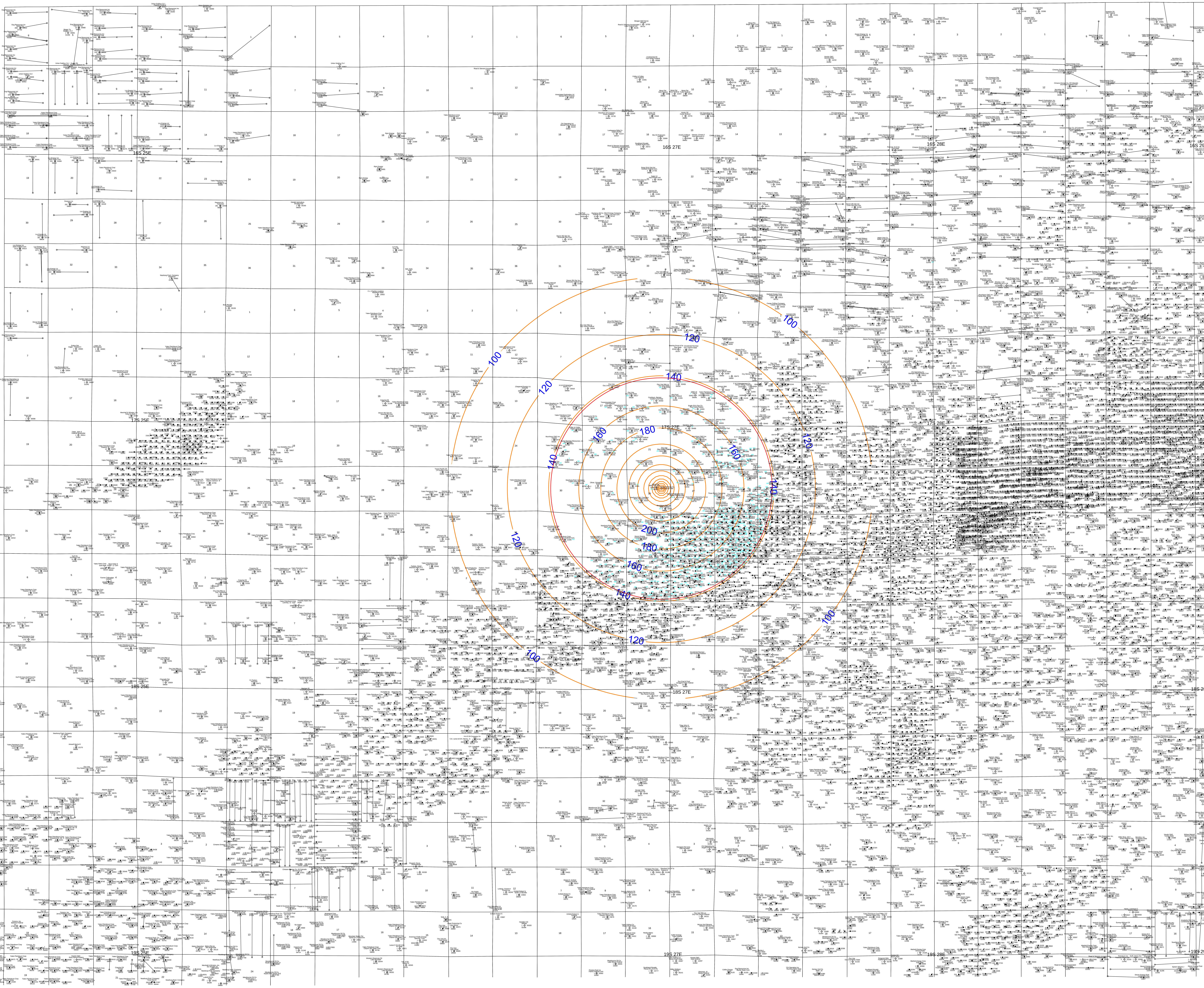
Houston, TX
South Bend, IN
Baton Rouge, LA

DRAWING 9

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

ISOPACH MAP OF CONFINING ZONE MAP

DATE: 09/09/14	CHECKED BY:	JOB NO: 185818-6944
DRAWN BY: WDD	APPROVED BY:	DWG NO:



LEGEND

- PERMITTED WELL
- DRY HOLE
- PLUGGED AND ABANDONED WELL
- GAS WELL
- OIL WELL
- OIL & GAS WELL
- ABANDONED GAS WELL
- ABANDONED OIL WELL
- ABANDONED OIL & GAS WELL
- INJECTION WELL
- PLUGGED & ABANDONED INJECTION WELL
- SALTWATER DISPOSAL WELL
- PLUGGED SALTWATER DISPOSAL WELL
- 2.5-MILE RADIUS AREA OF REVIEW
- 120 PRESSURE INCREASE CONTOURS (PSI)

NOTE: CRITICAL PRESSURE OF 452 PSI NOT REACHED

Well Number
API Number
14 Map ID Number (see Table 1)
29 00472
10427
Total Depth of Well

SCALE (IN FEET)
0 1500 3000

SUBSURFACE

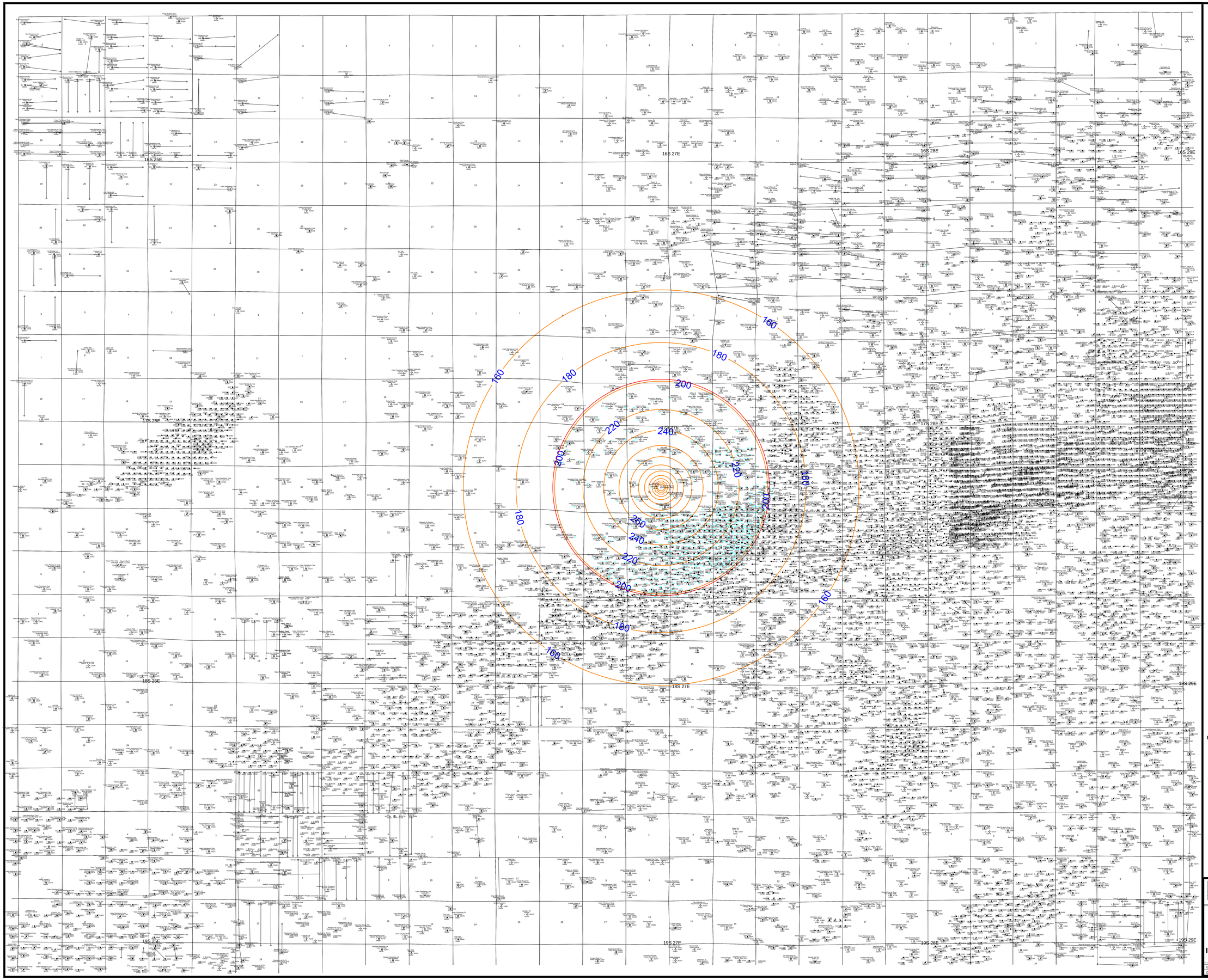
Houston, TX
South Bend, IN
Baton Rouge, LA

DRAWING 10

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

PROJECTED CONE OF INFLUENCE IN INJECTION ZONE, INITIAL 5-YEAR PERMIT PERIOD

DATE: 09/08/14	CHECKED BY:	JOB NO: 185818-6944
DRAWN BY: WDD	APPROVED BY:	DWG NO:



LEGEND

- PERMITTED WELL
- DRY HOLE
- PLUGGED AND ABANDONED WELL
- GAS WELL
- OIL WELL
- OIL & GAS WELL
- ABANDONED GAS WELL
- ABANDONED OIL WELL
- ABANDONED OIL & GAS WELL
- INJECTION WELL
- PLUGGED & ABANDONED INJECTION WELL
- SALTWATER DISPOSAL WELL
- PLUGGED SALTWATER DISPOSAL WELL
- 2.5-MILE RADIUS AREA OF REVIEW
- 200 PRESSURE INCREASE CONTOURS (PSI)

NOTE: CRITICAL PRESSURE OF 452 PSI NOT REACHED

Well Number — API Number: 14 - 20 - 10472 — Map ID Number (see Table 1)

Total Depth of Well: 10427

SCALE (IN FEET): 0 1500 3000

SUBSURFACE

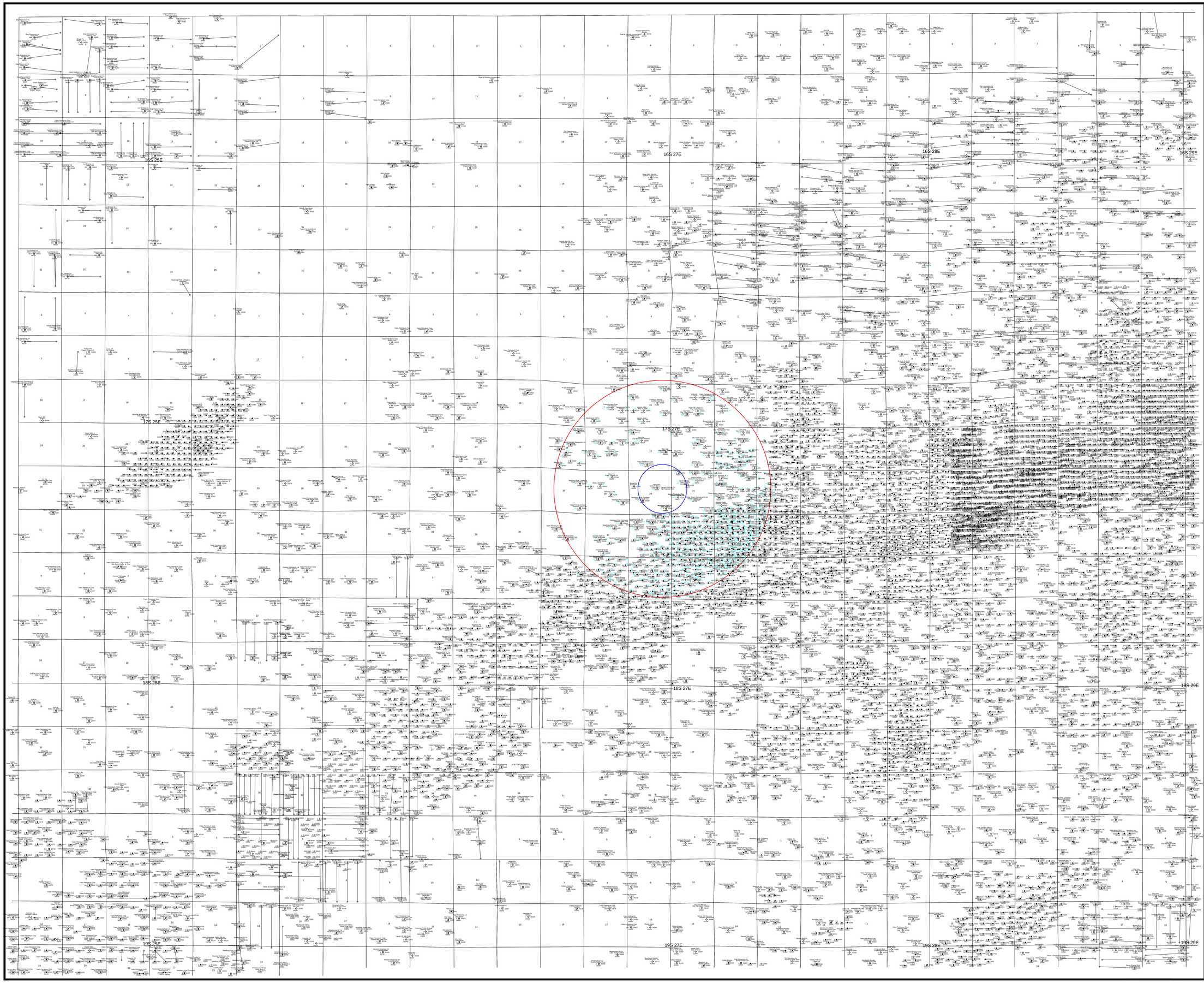
Houston, TX
South Bend, IN
Baton Rouge, LA

DRAWING 11

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

PROJECTED CONE OF INFLUENCE IN INJECTION ZONE, EXPECTED 30-YEAR LIFE OF WELL

DATE: 09/09/14	CHECKED BY:	JOB NO: 185618-6944
DRAWN BY: WDD	APPROVED BY:	DWG NO:



LEGEND

- PERMITTED WELL
- DRY HOLE
- PLUGGED AND ABANDONED WELL
- GAS WELL
- OIL WELL
- OIL & GAS WELL
- ABANDONED GAS WELL
- ABANDONED OIL WELL
- ABANDONED OIL & GAS WELL
- INJECTION WELL
- PLUGGED & ABANDONED INJECTION WELL
- SALTWATER DISPOSAL WELL
- PLUGGED SALTWATER DISPOSAL WELL
- 2.5-MILE RADIUS AREA OF REVIEW
- 2,972 FEET RADIUS PROJECTED PLUME FRONT INITIAL 5-YEAR PERMIT PERIOD

Well Number — API Number: 30-015-10472 — Map ID Number (see Table 1) — Total Depth of Well: 10427

SCALE (IN FEET): 0 2500 5000

SUBSURFACE

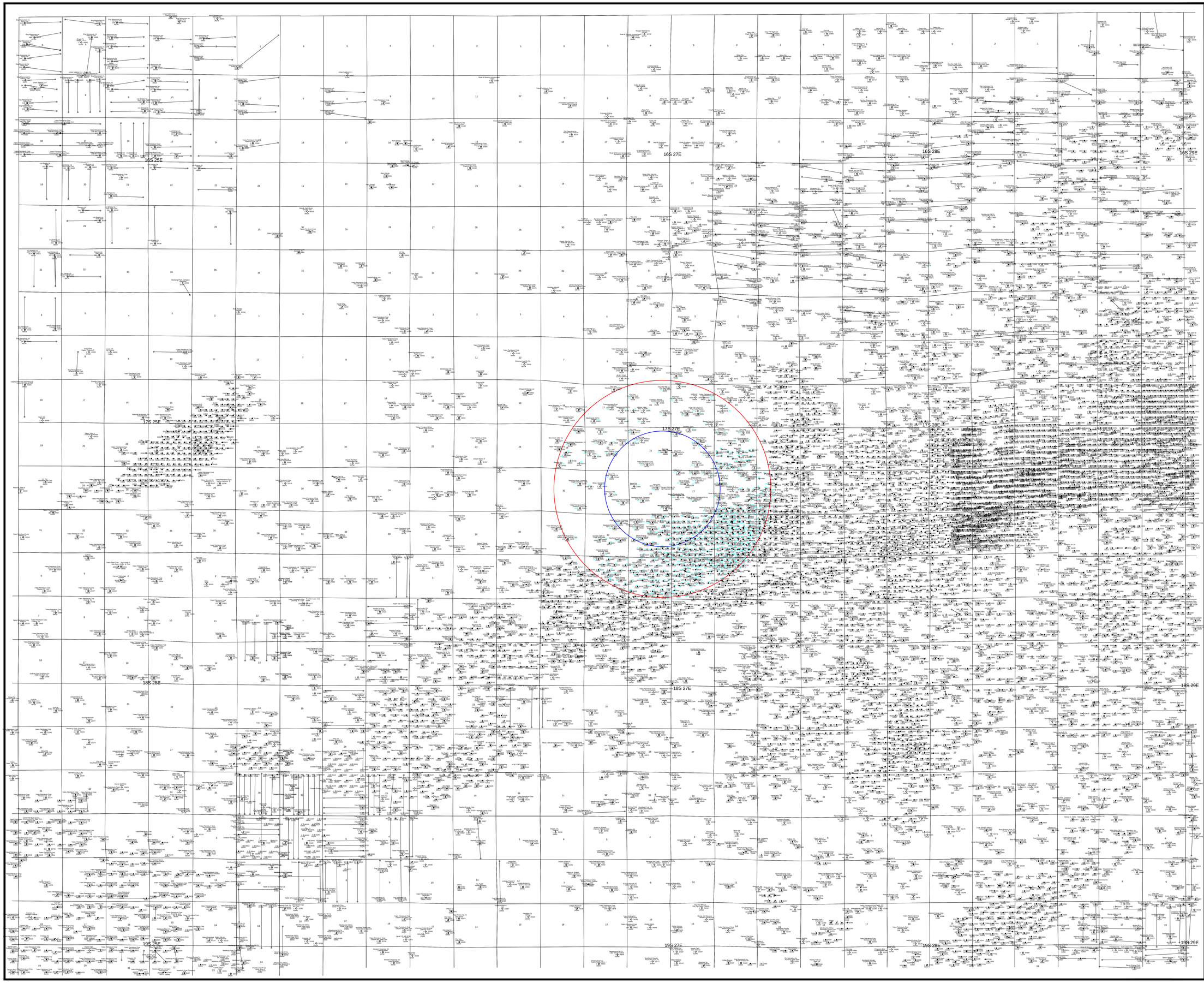
Houston, TX
South Bend, IN
Baton Rouge, LA

DRAWING 12

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

PROJECTED PLUME FRONT IN INJECTION ZONE, INITIAL 5-YEAR PERMIT PERIOD

DATE: 09/08/14	CHECKED BY:	JOB NO. 185818-6944
DRAWN BY: WDD	APPROVED BY:	DWG NO.



LEGEND

- PERMITTED WELL
- DRY HOLE
- PLUGGED AND ABANDONED WELL
- GAS WELL
- OIL WELL
- OIL & GAS WELL
- ABANDONED GAS WELL
- ABANDONED OIL WELL
- ABANDONED OIL & GAS WELL
- INJECTION WELL
- PLUGGED & ABANDONED INJECTION WELL
- SALTWATER DISPOSAL WELL
- PLUGGED SALTWATER DISPOSAL WELL
- 2.5-MILE RADIUS AREA OF REVIEW
- 7,028 FEET RADIUS PROJECTED PLUME FRONT EXPECTED 30-YEAR LIFE OF WELL

Well Number — API Number — Map ID Number (see Table 1)

29 — 00472 — M

10427

Total Depth of Well

SCALE IN FEET

0 2500 5000

SUBSURFACE

Houston, TX
South Bend, IN
Baton Rouge, LA

DRAWING 13

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

PROJECTED PLUME FRONT IN INJECTION ZONE, EXPECTED 30-YEAR LIFE OF WELL

DATE: 09/08/14	CHECKED BY:	JOB NO. 185818-6944
DRAWN BY: WDD	APPROVED BY:	DWG NO.

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

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

Form C-101
Revised July 18, 2013

☐ AMENDED REPORT

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

1. Operator Name and Address	2. OGRID Number
Navajo Refining Company, L.L.C. 501 E. Main Artesia NM 88210	15694
	3. API Number

4. Property Code	5. Property Name	6. Well No.
	Waste Disposal Well	WDW-4

7. Surface Location

UL - Lot	Section	Township	Range	Lot Idn	Feet from	N/S Line	Feet From	E/W Line	County
—	28	17S	27E	—	2,310	FNL	1,100	FEL	Eddy

8. Proposed Bottom Hole Location

UL - Lot	Section	Township	Range	Lot Idn	Feet from	N/S Line	Feet From	E/W Line	County
—	28	17S	27E	—	2,310	FNL	1,100	FEL	Eddy

9. Pool Information

Pool Name	Pool Code
Devonian (Undifferentiated)	

Additional Well Information

11. Work Type	12. Well Type	13. Cable/Rotary	14. Lease Type	15. Ground Level Elevation
N	I	R	S	3,450'±
16. Multiple	**17. Proposed Depth**	**18. Formation**	**19. Contractor**	**20. Spud Date**
N	10,800'	Devonian	TDB	TDB

Depth to Ground water	Distance from nearest fresh water well	Distance to nearest surface water
500'±	Unknown	3 miles ±

☒ We will be using a closed-loop system in lieu of lined pits

21. Proposed Casing and Cement Program

Type	Hole Size	Casing Size	Casing Weight/ft	Setting Depth	Sacks of Cement	Estimated TOC
Conductor	24"	20"	129.33	80'	3 cu yd	Surface
Surface	17 ½"	13 3/8"	54.5	1,500'	1,298 cu ft	Surface
Protection	12 ¼"	9 5/8"	47	10,800	4,063 cu ft	Surface

Casing/Cement Program: Additional Comments

See attached Construction Procedure and Proposed Well Schematic

22. Proposed Blowout Prevention Program

Type	Working Pressure	Test Pressure	Manufacturer
TDB	TDB	TDB	TDB

23. I hereby certify that the information given above is true and complete to the best of my knowledge and belief. I further certify that I have complied with 19.15.14.9 (A) NMAC ☐ and/or 19.15.14.9 (B) NMAC ☐, if applicable.	OIL CONSERVATION DIVISION	
Signature: Robert C Boans	Approved By:	
Printed name: Robert E. Boans	Title:	
Title: Operations Manager	Approved Date:	Expiration Date:
E-mail Address: robert.boans@hollyfrontier.com		
Date: 11-21-2014 Phone: 505-746-5248	Conditions of Approval Attached	

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

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 August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number	2 Pool Code	3 Pool Name
		Devonian (undifferentiated)

4 Property Code	5 Property Name	6 Well Number
	Waste Disposal Well	WDW-4

7 OGRID No.	8 Operator Name	9 Elevation
15694	Navajo Refining Company, L.L.C.	3,430'

10 Surface Location

U L or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
	28	17S	27E		2,310'	FNL	1,100'	FEL	Eddy

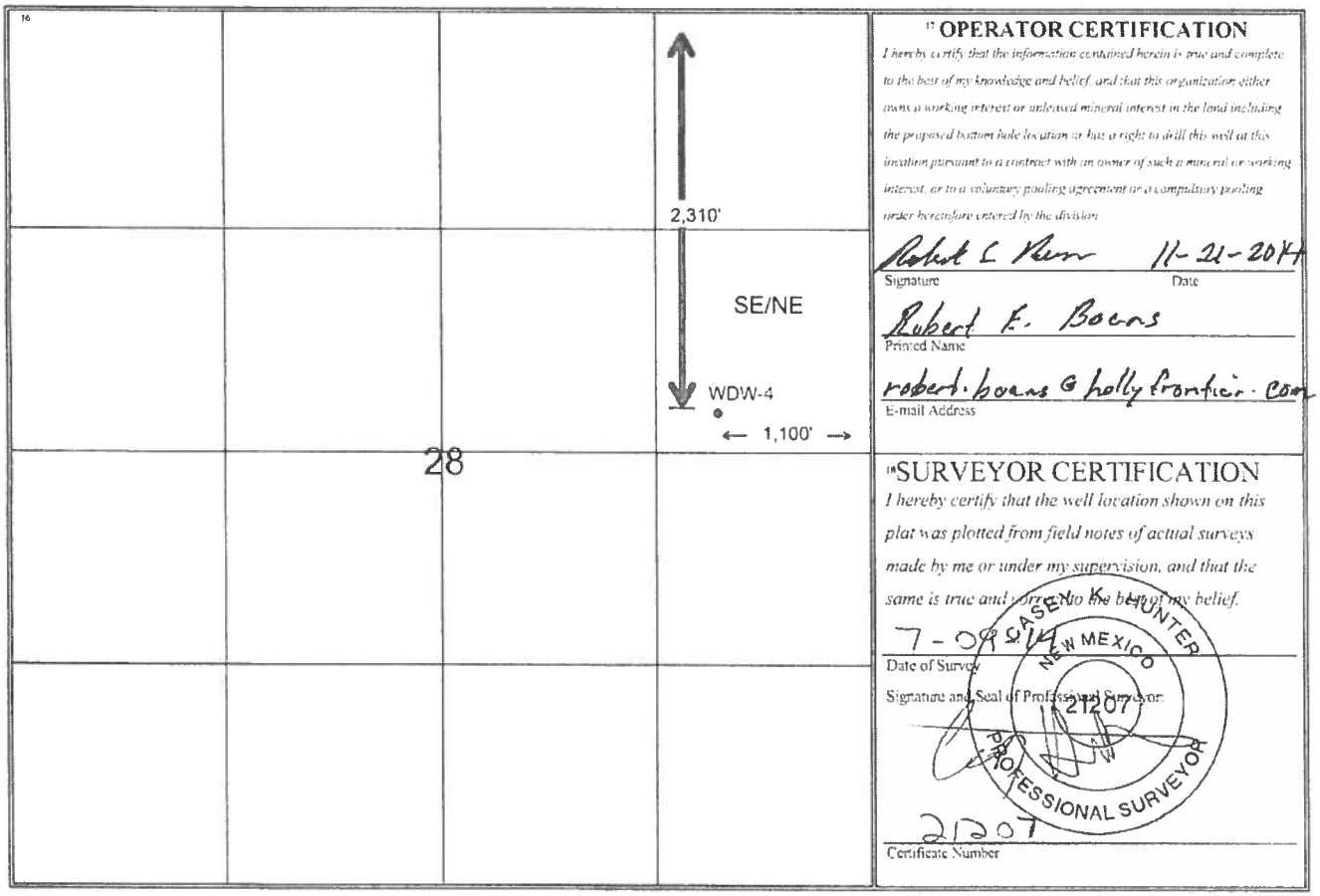
11 Bottom Hole Location If Different From Surface

U L 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.
2.500	N		

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, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Robert C Rees 11-21-2014
Signature Date

Robert E. Boens
Printed Name

robert.boens@hollyfrontier.com
E-mail Address

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.

7-08-14
Date of Survey

Signature and Seal of Professional Surveyor:

GARY L. JONES — NEW MEXICO — 7977 — PROFESSIONAL SURVEYOR

21207
Certificate Number

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

FORM C-108
Revised June 10, 2003

APPLICATION FOR AUTHORIZATION TO INJECT

I. PURPOSE: _____Secondary Recovery _____Pressure Maintenance ___X___Disposal _____Storage
Application qualifies for administrative approval? _____Yes _____No

II. OPERATOR: Navajo Refining Company, L.L.C.

ADDRESS: 501 E. Main, Artesia, New Mexico 88210

CONTACT PARTY: Mike Holder PHONE: (214) 954-6536

III. WELL DATA: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project? _____Yes ___X___No
If yes, give the Division order number authorizing the project: _____

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

Please refer to Section 7(a) Area of Review of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

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.

Please refer to Section 7(a) Area of Review of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

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.).

Please refer to Section 7 of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

*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.

Please refer to Section 7(e) Geology of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

IX. Describe the proposed stimulation program, if any.

Please refer to Section 7(i) Stimulation Program of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

*X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted).

Please refer to Section 7r Logging and Testing of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

*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.

A diligent search of public records did not located any groundwater quality data in the area of the location where WDW-4 will be installed.

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.

Navajo Refining Company, L.L.C. has examined available geologic and engineering data and has found 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.

Please refer to Section 13 Draft Public Notice of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

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: Robert E. Boans TITLE: Operation Manager

SIGNATURE: Robert E Boans DATE: 11-21-2014

E-MAIL ADDRESS: _____

* 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

Side 2

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.

Please refer to Sections 3.0 Location and 4.0 Landowner(s) Geology of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(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.

Please refer to Section 7(l) Construction Procedures of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(3) A description of the tubing to be used including its size, lining material, and setting depth.

Please refer to Section 7(l) Construction Procedures of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Please refer to Section 7(l) Construction Procedures of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

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.

Please refer to Section 7(e) Geology of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(2) The injection interval and whether it is perforated or open-hole.

Please refer to Section 7(e) Geology of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(3) State if the well was drilled for injection or, if not, the original purpose of the well.

WDW-4 is being drilled specifically for injection of liquid wastes originating at the Navajo Artesia Refinery as described in Section 7(f) Proposed Operating Parameters of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(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.

Please refer to Section 7(l) Construction Procedures of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

(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.

Oil and gas production in the area where WDW-4 will be installed occurs in the Queen, Grayburg and San Andres Formation at depths of approximately 2,500 feet and the Morrow Formation at a depth of approximately 9,500 feet. The planned Devonian age Injection Interval in the Navajo WDW-4 injection wells is expected to be encountered below 10,000 feet, approximately 10,200 to 10,700 feet. There are no deeper oil or gas zones in the area.

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.

Please refer to Section 13 Draft Public Notice of the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

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.

Side 1

INJECTION WELL DATA SHEET

OPERATOR: Navajo Refining Company, L.L.C.

WELL NAME & NUMBER: Waste Disposal Well No. 4 (WDW-4)

WELL LOCATION: 2,310' FNL and 1,100' FEL of Section 28, Township 17 South Range 27 East

FOOTAGE LOCATION | UNIT LETTER | SECTION | TOWNSHIP | RANGE

Refer to Figure 12 in the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

WELLBORE SCHEMATIC

WELL CONSTRUCTION DATA

Surface Casing

Hole Size: _____ Casing Size: _____

Cemented with: _____ sx. *or* _____ ft^3

Top of Cement: _____ Method Determined: _____

Intermediate Casing

Hole Size: _____ Casing Size: _____

Cemented with: _____ sx. *or* _____ ft^3

Top of Cement: _____ Method Determined: _____

Production Casing

Hole Size: _____ Casing Size: _____

Cemented with: _____ sx. *or* _____ ft^3

Top of Cement: _____ Method Determined: _____

Total Depth: _____

Injection Interval

_____ feet to _____

(Perforated or Open Hole; indicate which)

Side 2

INJECTION WELL DATA SHEET

Refer to Figure 12 in the document entitled Permit Application, Class I Nonhazardous Waste Injection Well WDW No. 4, Navajo Refining Company, L.L.C., dated November 2014. A copy of this permit application was submitted to the District II office at the same time as the original document was submitted to the main office in Santa Fe.

Tubing Size: _____ Lining Material: _____

Type of Packer: _____

Packer Setting Depth: _____

Other Type of Tubing/Casing Seal (if applicable): _____

Additional Data

1. Is this a new well drilled for injection? X Yes _____ No

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

   _____

2. Name of the Injection Formation: Devonian (undifferentiated)

3. Name of Field or Pool (if applicable): Not applicable

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

   _____

5. Give the name and depths of any oil or gas zones underlying or overlying the proposed injection zone in this area: Queen, Grayburg and San Andres (approximately 2,500 feet) and Morrow (approximately 9,500 feet)

ACKNOWLEDGEMENT OF RECEIPT
OF CHECK/CASH

I hereby acknowledge receipt of Check No. 1424458 dated 11/7/14

or cash received on 11/17/14 in the amount of $ 100.00

from PARSONS BRINCKERHOFF

for PEMIT APPLICATION/INJECTION WELL WDW-4

Submitted by: CARL CHAVEZ Date: 11/17/14

Submitted to ASD by: LUPE SHERMAN Date: 11/17/14

Received in ASD by: _____ Date: _____

Filing Fee _____ New Facility: _____ Renewal: _____

Modification _____ Other ✓ PERMIT FEE

Organization Code 521.07 Applicable FY 15

To be deposited in the Water Quality Management Fund.

Full Payment _____ or Annual Increment _____

SUBSURFACE

November 7, 2014

Mr. Carl J. Chavez
State of New Mexico
Energy, Minerals and Natural Resources Department
Oil Conservation Division
Environmental Bureau
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

RE: Permit Application, Injection Well WDW-4
Navajo Refining Company, L.L.C., Artesia, New Mexico
Subsurface Project No. 185818-6944

Dear Mr. Chavez:

On behalf of Navajo Refining Company, L.L.C., (Navajo), Subsurface Technology, Inc. is pleased to provide an original and one copy of a permit application for a planned new nonhazardous injection well. A copy of the application is also being forwarded to the District II office in Artesia.

Please contact Mr. Mike Holder with Navajo at Michael.Holder@hollyfrontier.com or (575) 308-1115, if you have any questions.

Sincerely,

Jerry W. Taylor, PG
Sr. Geologist

Enclosure
c: State of New Mexico, Oil Conservation Division
Mr. Mike Holder, HollyFrontier

Subsurface Technology, Inc.
A Parsons Brinckerhoff Company
8212 Kelwood Ave., Baton Rouge, LA 70806
(225) 753-2561 / Fax (225) 925-2530 / e-mail: pfbr@subsurfacegroup.com

NEW MEXICO ENVIRONMENT DEPARTMENT - ALBUQUERQUE FIELD OFFICE DAILY CHECK RECEIPT LOG

DATE RECEIVED	WALK-IN	MAIL	NAME ON CHECK	DATE OF CHECK	CHECK/MONEY ORDER#	PROGRAM ACCOUNT CODE	AMOUNT OF CHECK	DATE DEPOSITED	DEPOSITED BY:
11/17/14		✓	PARSONS BRINCKERHOFF	11/7/14	1424458	0740	$100.00		
TOTAL							$100.00		

REVENUE TRANSMITTAL SHEET

Description	Fund	Dept.	Share Acct	Sub Acct	Amount
Liquid Waste	34000	Z3200	496402		
Water Recreation Facilities	40000	Z8501	496402		
Food Permit Fees	99100	Z2600	496402		
OTHER	34100	232900		2329029000	

SUBSURFACE

November 7, 2014

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

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Navajo Refining Company, L.L.C., Artesia, New Mexico
Subsurface Project No. 185818-6944

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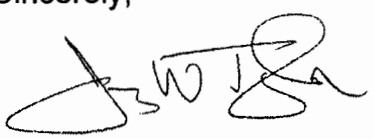
Please contact Mr. Mike Holder with Navajo at Michael.Holder@hollyfrontier.com or (575) 308-1115, if you have any questions.

Sincerely,



Jerry W. Taylor, PG
Sr. Geologist

Enclosure
c: State of New Mexico, Oil Conservation Division
Mr. Mike Holder, HollyFrontier

Subsurface Technology, Inc.
A Parsons Brinckerhoff Company
8212 Kelwood Ave., Baton Rouge, LA 70806
(225) 753-2561 / Fax (225) 925-2530 / e-mail: pfbr@subsurfacegroup.com

140 11614 282 P2 5717

1424458 *FOR INQUIRIES CONTACT ACCOUNTSPAYABLE@PBWORLD.COM OR (717) 859-7400*

V 187325

DATE	INVOICE NUMBER	DESCRIPTION	AMOUNT
03-NOV-14	03-NOV-2014		$100.00
			$100.00

THIS CHECK HAS A COLORED BACKGROUND AND CONTAINS MULTIPLE SECURITY FEATURES - SEE BACK FOR DETAILS

50-937
213

PARSONS BRINCKERHOFF

PARSONS BRINCKERHOFF GROUP ADMINISTRATION, INC.
4139 OREGON PIKE
EPHRATA, PA 17522-9550

No. 1424458

JPMorgan Chase Bank, N.A.
SYRACUSE, NEW YORK

DATE
07-NOV-14

AMOUNT USD
$100.00

PAY EXACTLY: One Hundred And NO/100 Dollars

void after 120 days

TWO SIGNATURES REQUIRED OVER TEN THOUSAND DOLLARS

PAY TO THE ORDER OF

WATER QUALITY MANAGEMENT FUND
NM ENVIRONMENTAL BUREAU
1220 SOUTH ST FRANCIS DRIVE
SANTA FE, NM 87505

HEAT SENSITIVE RUB AREA TO VERIFY

Patrick Sheridan
AUTHORIZED SIGNATURE

AUTHORIZED SIGNATURE

[redacted]