

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  
Department  
Oil Conservation Division  
1220 South St. Francis Dr.  
Santa Fe, NM 87505

Form C-144  
July 21, 2008

**For temporary pits, closed-loop systems, and below-grade tanks**, submit to the appropriate NMOCD District Office.  
**For permanent pits and exceptions** submit to the Santa Fe Environmental Bureau office and provide a copy to the appropriate NMOCD District Office.

**Pit, Closed-Loop System, Below-Grade Tank, or  
Proposed Alternative Method Permit or Closure Plan Application**

- Type of action: ☒ Permit of a pit, closed-loop system, below-grade tank, or proposed alternative method  
☐ Closure of a pit, closed-loop system, below-grade tank, or proposed alternative method  
☐ Modification to an existing permit  
☐ Closure plan only submitted for an existing permitted or non-permitted pit, closed-loop system, below-grade tank, or proposed alternative method

**Instructions: Please submit one application (Form C-144) per individual pit, closed-loop system, below-grade tank or alternative request**

Please be advised that approval of this request does not relieve the operator of liability should operations result in pollution of surface water, ground water or the environment. Nor does approval relieve the operator of its responsibility to comply with any other applicable governmental authority's rules, regulations or ordinances.

1.

Operator: Williams Production Co, LLC OGRID #: 120782  
Address: PO Box 640/721 So. Main, Aztec, NM 87410  
Facility or well name: Rosa Unit #015B  
API Number: 30-039-29505 OCD Permit Number: \_\_\_\_\_  
U/L or Qtr/Qtr J Section 29 Township 31N Range 05W County: Rio Arriba  
Center of Proposed Design: Latitude 36.87000 Longitude -107.38194 NAD: ☒ 1927 ☐ 1983  
Surface Owner: ☒ Federal ☐ State ☐ Private ☐ Tribal Trust or Indian Allotment

2.

☐ **Pit:** Subsection F or G of 19.15.17.11 NMAC

Temporary: ☐ Drilling ☐ Workover

☐ Permanent ☐ Emergency ☐ Cavitation ☐ P&A

☐ Lined ☐ Unlined Liner type: Thickness \_\_\_\_\_ mil ☐ LLDPE ☐ HDPE ☐ PVC ☐ Other \_\_\_\_\_

☐ String-Reinforced

Liner Seams: ☐ Welded ☐ Factory ☐ Other \_\_\_\_\_ Volume: \_\_\_\_\_ bbl Dimensions: L \_\_\_\_\_ x W \_\_\_\_\_ x D \_\_\_\_\_

3.

☐ **Closed-loop System:** Subsection H of 19.15.17.11 NMAC

Type of Operation: ☐ P&A ☐ Drilling a new well ☐ Workover or Drilling (Applies to activities which require prior approval of a permit or notice of intent)

☐ Drying Pad ☐ Above Ground Steel Tanks ☐ Haul-off Bins ☐ Other \_\_\_\_\_

☐ Lined ☐ Unlined Liner type: Thickness \_\_\_\_\_ mil ☐ LLDPE ☐ HDPE ☐ PVC ☐ Other \_\_\_\_\_

Liner Seams: ☐ Welded ☐ Factory ☐ Other \_\_\_\_\_

4.

☒ **Below-grade tank:** Subsection I of 19.15.17.11 NMAC

Volume: 120 bbl Type of fluid: Produced Water

Tank Construction material: Single-wall Steel

☐ Secondary containment with leak detection ☒ Visible sidewalls, liner, 6-inch lift and automatic overflow shut-off

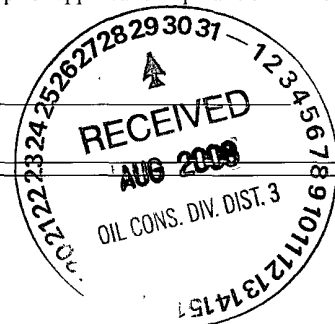
☐ Visible sidewalls and liner ☐ Visible sidewalls only ☐ Other \_\_\_\_\_

Liner type: Thickness 40 mil ☐ HDPE ☐ PVC ☒ Other LLDPE (See Specs attached)

5.

☐ **Alternative Method:**

Submittal of an exception request is required. Exceptions must be submitted to the Santa Fe Environmental Bureau office for consideration of approval.



6.

**Fencing:** Subsection D of 19.15.17.11 NMAC (*Applies to permanent pits, temporary pits, and below-grade tanks*)

- ☐ Chain link, six feet in height, two strands of barbed wire at top (*Required if located within 1000 feet of a permanent residence, school, hospital, institution or church*)
- ☐ Four foot height, four strands of barbed wire evenly spaced between one and four feet
- ☒ Alternate. Please specify \_\_\_\_\_ Per BLM APD Specifications \_\_\_\_\_

7.

**Netting:** Subsection E of 19.15.17.11 NMAC (*Applies to permanent pits and permanent open top tanks*)

- ☒ Screen ☐ Netting ☐ Other \_\_\_\_\_
- ☐ Monthly inspections (If netting or screening is not physically feasible)

8.

**Signs:** Subsection C of 19.15.17.11 NMAC

- ☐ 12"x 24", 2" lettering, providing Operator's name, site location, and emergency telephone numbers
- ☒ Signed in compliance with 19.15.3.103 NMAC

9.

**Administrative Approvals and Exceptions:**

Justifications and/or demonstrations of equivalency are required. Please refer to 19.15.17 NMAC for guidance.

**Please check a box if one or more of the following is requested, if not leave blank:**

- ☐ Administrative approval(s): Requests must be submitted to the appropriate division district or the Santa Fe Environmental Bureau office for consideration of approval.
- ☐ Exception(s): Requests must be submitted to the Santa Fe Environmental Bureau office for consideration of approval.

10.

**Siting Criteria (regarding permitting):** 19.15.17.10 NMAC

**Instructions:** The applicant must demonstrate compliance for each siting criteria below in the application. Recommendations of acceptable source material are provided below. Requests regarding changes to certain siting criteria may require administrative approval from the appropriate district office or may be considered an exception which must be submitted to the Santa Fe Environmental Bureau office for consideration of approval. Applicant must attach justification for request. Please refer to 19.15.17.10 NMAC for guidance. Siting criteria does not apply to drying pads or above-grade tanks associated with a closed-loop system.

|                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Ground water is less than 50 feet below the bottom of the temporary pit, permanent pit, or below-grade tank.<br>- NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells                                                                                                                                                                                       | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                |
| Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark).<br>- Topographic map; Visual inspection (certification) of the proposed site                                                                                                                                   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                |
| Within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application.<br>(Applies to temporary, emergency, or cavitation pits and below-grade tanks)<br>- Visual inspection (certification) of the proposed site; Aerial photo; Satellite image                                                                                          | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><input type="checkbox"/> NA |
| Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application.<br>(Applies to permanent pits)<br>- Visual inspection (certification) of the proposed site; Aerial photo; Satellite image                                                                                                                                         | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><input type="checkbox"/> NA |
| Within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes, or within 1000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application.<br>- NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                |
| Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended.<br>- Written confirmation or verification from the municipality; Written approval obtained from the municipality                                                                                            | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                |
| Within 500 feet of a wetland.<br>- US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site                                                                                                                                                                                                                                              | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                |
| Within the area overlying a subsurface mine.<br>- Written confirmation or verification or map from the NM EMNRD-Mining and Mineral Division                                                                                                                                                                                                                                                              | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                |
| Within an unstable area.<br>- Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; Topographic map                                                                                                                                                                                                                                  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                |
| Within a 100-year floodplain.<br>- FEMA map                                                                                                                                                                                                                                                                                                                                                              | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                |

11.

**Temporary Pits, Emergency Pits, and Below-grade Tanks Permit Application Attachment Checklist:** Subsection B of 19.15.17.9 NMAC**Instructions:** Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

- ☒ Hydrogeologic Report (Below-grade Tanks) - based upon the requirements of Paragraph (4) of Subsection B of 19.15.17.9 NMAC  
☐ Hydrogeologic Data (Temporary and Emergency Pits) - based upon the requirements of Paragraph (2) of Subsection B of 19.15.17.9 NMAC  
☒ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC  
☒ Design Plan - based upon the appropriate requirements of 19.15.17.11 NMAC  
☒ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC  
☒ Closure Plan (Please complete Boxes 14 through 18, if applicable) - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC  
☐ Previously Approved Design (attach copy of design) API Number: \_\_\_\_\_ or Permit Number: \_\_\_\_\_

12.

**Closed-loop Systems Permit Application Attachment Checklist:** Subsection B of 19.15.17.9 NMAC**Instructions:** Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

- ☐ Geologic and Hydrogeologic Data (only for on-site closure) - based upon the requirements of Paragraph (3) of Subsection B of 19.15.17.9  
☐ Siting Criteria Compliance Demonstrations (only for on-site closure) - based upon the appropriate requirements of 19.15.17.10 NMAC  
☐ Design Plan - based upon the appropriate requirements of 19.15.17.11 NMAC  
☐ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC  
☐ Closure Plan (Please complete Boxes 14 through 18, if applicable) - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC  
☐ Previously Approved Design (attach copy of design) API Number: \_\_\_\_\_  
☐ Previously Approved Operating and Maintenance Plan API Number: \_\_\_\_\_ (Applies only to closed-loop system that use above ground steel tanks or haul-off bins and propose to implement waste removal for closure)

13.

**Permanent Pits Permit Application Checklist:** Subsection B of 19.15.17.9 NMAC**Instructions:** Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

- ☐ Hydrogeologic Report - based upon the requirements of Paragraph (1) of Subsection B of 19.15.17.9 NMAC  
☐ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC  
☐ Climatological Factors Assessment  
☐ Certified Engineering Design Plans - based upon the appropriate requirements of 19.15.17.11 NMAC  
☐ Dike Protection and Structural Integrity Design - based upon the appropriate requirements of 19.15.17.11 NMAC  
☐ Leak Detection Design - based upon the appropriate requirements of 19.15.17.11 NMAC  
☐ Liner Specifications and Compatibility Assessment - based upon the appropriate requirements of 19.15.17.11 NMAC  
☐ Quality Control/Quality Assurance Construction and Installation Plan  
☐ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC  
☐ Freeboard and Overtopping Prevention Plan - based upon the appropriate requirements of 19.15.17.11 NMAC  
☐ Nuisance or Hazardous Odors, including H<sub>2</sub>S, Prevention Plan  
☐ Emergency Response Plan  
☐ Oil Field Waste Stream Characterization  
☐ Monitoring and Inspection Plan  
☐ Erosion Control Plan  
☐ Closure Plan - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

14.

**Proposed Closure:** 19.15.17.13 NMAC**Instructions:** Please complete the applicable boxes, Boxes 14 through 18, in regards to the proposed closure plan.

- Type: ☐ Drilling ☐ Workover ☐ Emergency ☐ Cavitation ☐ P&A ☐ Permanent Pit ☒ Below-grade Tank ☐ Closed-loop System  
☐ Alternative  
 Proposed Closure Method: ☒ Waste Excavation and Removal  
☐ Waste Removal (Closed-loop systems only)  
☐ On-site Closure Method (Only for temporary pits and closed-loop systems)  
☐ In-place Burial ☐ On-site Trench Burial  
☐ Alternative Closure Method (Exceptions must be submitted to the Santa Fe Environmental Bureau for consideration)

15.

**Waste Excavation and Removal Closure Plan Checklist:** (19.15.17.13 NMAC) **Instructions:** Each of the following items must be attached to the closure plan. Please indicate, by a check mark in the box, that the documents are attached.

- ☒ Protocols and Procedures - based upon the appropriate requirements of 19.15.17.13 NMAC  
☒ Confirmation Sampling Plan (if applicable) - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC  
☒ Disposal Facility Name and Permit Number (for liquids, drilling fluids and drill cuttings)  
☒ Soil Backfill and Cover Design Specifications - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC  
☒ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC  
☒ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

16.

**Waste Removal Closure For Closed-loop Systems That Utilize Above Ground Steel Tanks or Haul-off Bins Only:** (19.15.17.13.D NMAC)

**Instructions:** Please identify the facility or facilities for the disposal of liquids, drilling fluids and drill cuttings. Use attachment if more than two facilities are required.

Disposal Facility Name: \_\_\_\_\_ Disposal Facility Permit Number: \_\_\_\_\_

Disposal Facility Name: \_\_\_\_\_ Disposal Facility Permit Number: \_\_\_\_\_

Will any of the proposed closed-loop system operations and associated activities occur on or in areas that *will not* be used for future service and operations?

☐ Yes (If yes, please provide the information below) ☐ No

*Required for impacted areas which will not be used for future service and operations:*

☐ Soil Backfill and Cover Design Specifications - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC

☐ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC

☐ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

17.

**Siting Criteria (regarding on-site closure methods only):** 19.15.17.10 NMAC

**Instructions:** Each siting criteria requires a demonstration of compliance in the closure plan. Recommendations of acceptable source material are provided below. Requests regarding changes to certain siting criteria may require administrative approval from the appropriate district office or may be considered an exception which must be submitted to the Santa Fe Environmental Bureau office for consideration of approval. Justifications and/or demonstrations of equivalency are required. Please refer to 19.15.17.10 NMAC for guidance.

Ground water is less than 50 feet below the bottom of the buried waste.

- NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells

☐ Yes ☐ No

☐ NA

Ground water is between 50 and 100 feet below the bottom of the buried waste

- NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells

☐ Yes ☐ No

☐ NA

Ground water is more than 100 feet below the bottom of the buried waste.

- NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells

☐ Yes ☐ No

☐ NA

Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark).

- Topographic map; Visual inspection (certification) of the proposed site

☐ Yes ☐ No

Within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application.

- Visual inspection (certification) of the proposed site; Aerial photo; Satellite image

☐ Yes ☐ No

Within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes, or within 1000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application.

- NM Office of the State Engineer - iWATERS database; Visual inspection (certification) of the proposed site

☐ Yes ☐ No

Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended.

- Written confirmation or verification from the municipality; Written approval obtained from the municipality

☐ Yes ☐ No

Within 500 feet of a wetland.

- US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site

☐ Yes ☐ No

Within the area overlying a subsurface mine.

- Written confirmation or verification or map from the NM EMNRD-Mining and Mineral Division

☐ Yes ☐ No

Within an unstable area.

- Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; Topographic map

☐ Yes ☐ No

Within a 100-year floodplain.

- FEMA map

☐ Yes ☐ No

18.

**On-Site Closure Plan Checklist:** (19.15.17.13 NMAC) **Instructions:** Each of the following items must be attached to the closure plan. Please indicate, by a check mark in the box, that the documents are attached.

☐ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC

☐ Proof of Surface Owner Notice - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC

☐ Construction/Design Plan of Burial Trench (if applicable) based upon the appropriate requirements of 19.15.17.11 NMAC

☐ Construction/Design Plan of Temporary Pit (for in-place burial of a drying pad) - based upon the appropriate requirements of 19.15.17.11 NMAC

☐ Protocols and Procedures - based upon the appropriate requirements of 19.15.17.13 NMAC

☐ Confirmation Sampling Plan (if applicable) - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC

☐ Waste Material Sampling Plan - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC

☐ Disposal Facility Name and Permit Number (for liquids, drilling fluids and drill cuttings or in case on-site closure standards cannot be achieved)

☐ Soil Cover Design - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC

☐ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC

☐ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

19.

**Operator Application Certification:**

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

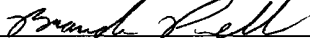
Name (Print): Michael K. Lane Title: Sr. Environmental Specialist

Signature:  Date: 8/29/08

e-mail address: myke.lane@williams.com Telephone: 505-634-4219

20.

**OCD Approval:** ☐ Permit Application (including closure plan) ☒ Closure Plan (only) ☐ OCD Conditions (see attachment)

OCD Representative Signature:  Approval Date: 10-7-08

Title: Enviro Spec OCD Permit Number: \_\_\_\_\_

21.

**Closure Report (required within 60 days of closure completion):** Subsection K of 19.15.17.13 NMAC

*Instructions: Operators are required to obtain an approved closure plan prior to implementing any closure activities and submitting the closure report. The closure report is required to be submitted to the division within 60 days of the completion of the closure activities. Please do not complete this section of the form until an approved closure plan has been obtained and the closure activities have been completed.*

☐ Closure Completion Date: \_\_\_\_\_

22.

**Closure Method:**

☐ Waste Excavation and Removal ☐ On-Site Closure Method ☐ Alternative Closure Method ☐ Waste Removal (Closed-loop systems only)  
☐ If different from approved plan, please explain.

23.

**Closure Report Regarding Waste Removal Closure For Closed-loop Systems That Utilize Above Ground Steel Tanks or Haul-off Bins Only:**

*Instructions: Please identify the facility or facilities for where the liquids, drilling fluids and drill cuttings were disposed. Use attachment if more than two facilities were utilized.*

Disposal Facility Name: \_\_\_\_\_ Disposal Facility Permit Number: \_\_\_\_\_

Disposal Facility Name: \_\_\_\_\_ Disposal Facility Permit Number: \_\_\_\_\_

Were the closed-loop system operations and associated activities performed on or in areas that *will not* be used for future service and operations?

☐ Yes (If yes, please demonstrate compliance to the items below) ☐ No

*Required for impacted areas which will not be used for future service and operations:*

- ☐ Site Reclamation (Photo Documentation)  
☐ Soil Backfilling and Cover Installation  
☐ Re-vegetation Application Rates and Seeding Technique

24.

**Closure Report Attachment Checklist:** *Instructions: Each of the following items must be attached to the closure report. Please indicate, by a check mark in the box, that the documents are attached.*

- ☐ Proof of Closure Notice (surface owner and division)  
☐ Proof of Deed Notice (required for on-site closure)  
☐ Plot Plan (for on-site closures and temporary pits)  
☐ Confirmation Sampling Analytical Results (if applicable)  
☐ Waste Material Sampling Analytical Results (required for on-site closure)  
☐ Disposal Facility Name and Permit Number  
☐ Soil Backfilling and Cover Installation  
☐ Re-vegetation Application Rates and Seeding Technique  
☐ Site Reclamation (Photo Documentation)

On-site Closure Location: Latitude \_\_\_\_\_ Longitude \_\_\_\_\_ NAD: ☐ 1927 ☐ 1983

25.

**Operator Closure Certification:**

I hereby certify that the information and attachments submitted with this closure report is true, accurate and complete to the best of my knowledge and belief. I also certify that the closure complies with all applicable closure requirements and conditions specified in the approved closure plan.

Name (Print): \_\_\_\_\_ Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

e-mail address: \_\_\_\_\_ Telephone: \_\_\_\_\_

**Hydrogeological Report  
Williams Production Company, LLC  
Rosa Unit #15B**

**Regional Hydrological Context**

**Referenced Well Location:**

The referenced well and pit is located on Bureau of Land Management land within Farmington Field Office (FFO) management jurisdiction in Rio Arriba County, New Mexico. This site is positioned in the northeastern portion of the San Juan Basin, an asymmetrical syncline that extends from northwestern New Mexico into southwestern Colorado (Carson National Forest DEIS, 2007). Elevation of the referenced well is approximately 6451 feet MSL.

**General Regional Groundwater Description:**

As a portion of the San Juan Basin, the FFO region is underlain by sandstone aquifers of the Colorado Plateau. The primary aquifer of potential concern at this location is the Unita-Animas Aquifer, composed primarily of Lower Tertiary rocks in the San Juan Basin. The aquifer consists of the San Jose Formation; the underlying Animas formation and its lateral equivalent, the Nacimiento formation; and the Ojo Alamo Sandstone. The thickness of the Unita-Animas aquifer generally increases toward the central part of the basin. In the northeastern part of the San Juan Basin, the maximum thickness of the aquifer is approximately 3500 feet (USGS, 2001). This aquifer contains fresh to moderately saline water.

Groundwater generally flows toward the San Juan River and its tributaries, where it becomes alluvial groundwater or is discharged to stream flow. Additional information regarding the Hydrogeologic setting can be found in the provided references.

**Site Specific Information:**

**Surface Hydrology:**

The pit is located on a northeastern slope draining to Laguna Seca Draw, approximately .3 miles to the east.

**1<sup>st</sup> Water Bearing Formation:**

San Jose, Tertiary

**Formation Thickness:**

Approximately 1,900 ft.

**Underlying Formation:**

Nacimiento, Tertiary

**Depth to Groundwater:**

Depth to groundwater is estimated at greater than 100 feet bgs. Within a one-mile radius of this location, there were no iWATERS wells with recorded water depth information. However, cathodic data associated with Rosa Unit 15A (approximately 1300 feet from pit) shows a depth to moisture at 200 feet. Further cathodic wells, Rosas 15 (approximately 1575 feet from pit) and 200 (approximately 1500 feet from pit) show depth to moisture at 60 feet (see Siting Criteria Map I for details).

**References:**

Allen, Erin. Undated. Colorado Plateau Aquifers.

<http://academic.emporio.edu/schulmem/hydro/TERM%20PROJECTS/2007/Allen/Aquifer.html>.

New Mexico Energy, Minerals and Natural Resources Department, Division of Mining and Minerals. Database. 2008. Internet accessed August 2008.

New Mexico Office of the State Engineer. August 2008. iWaters database. Internet accessed August 2008.

New Mexico WQCC. 2005. State of New Mexico Water Quality Act and the Water Control Commission Regulations.

United States Department of Agriculture, Forest Service. 2007. Draft Environmental Impact Statement for Surface Management of Gas Leasing and Development. Jicarilla Ranger District, Carson National Forest, Rio Arriba County, New Mexico.

United States Department of the Interior. Bureau of Land Management. 2003. Final Farmington Resource Management Plan and Final Environmental Impact Statement. Farmington Field Office, Farmington, New Mexico.

United States Geological Survey. 2001. Groundwater Atlas of the United States: Arizona, Colorado, New Mexico and Utah. USGS Publication HA 730-C; <http://capp.water.usgs.gov>.

*New Mexico Office of the State Engineer*  
**POD Reports and Downloads**

---

Township:  Range:  Sections:

NAD27 X:  Y:  Zone:   Search Radius:

County:   Basin:   Number:  Suffix:

Owner Name: (First)  (Last)  ☐ Non-Domestic ☐ Domestic ☒ All

POD / Surface Data Report Avg Depth to Water Report Water Column Report

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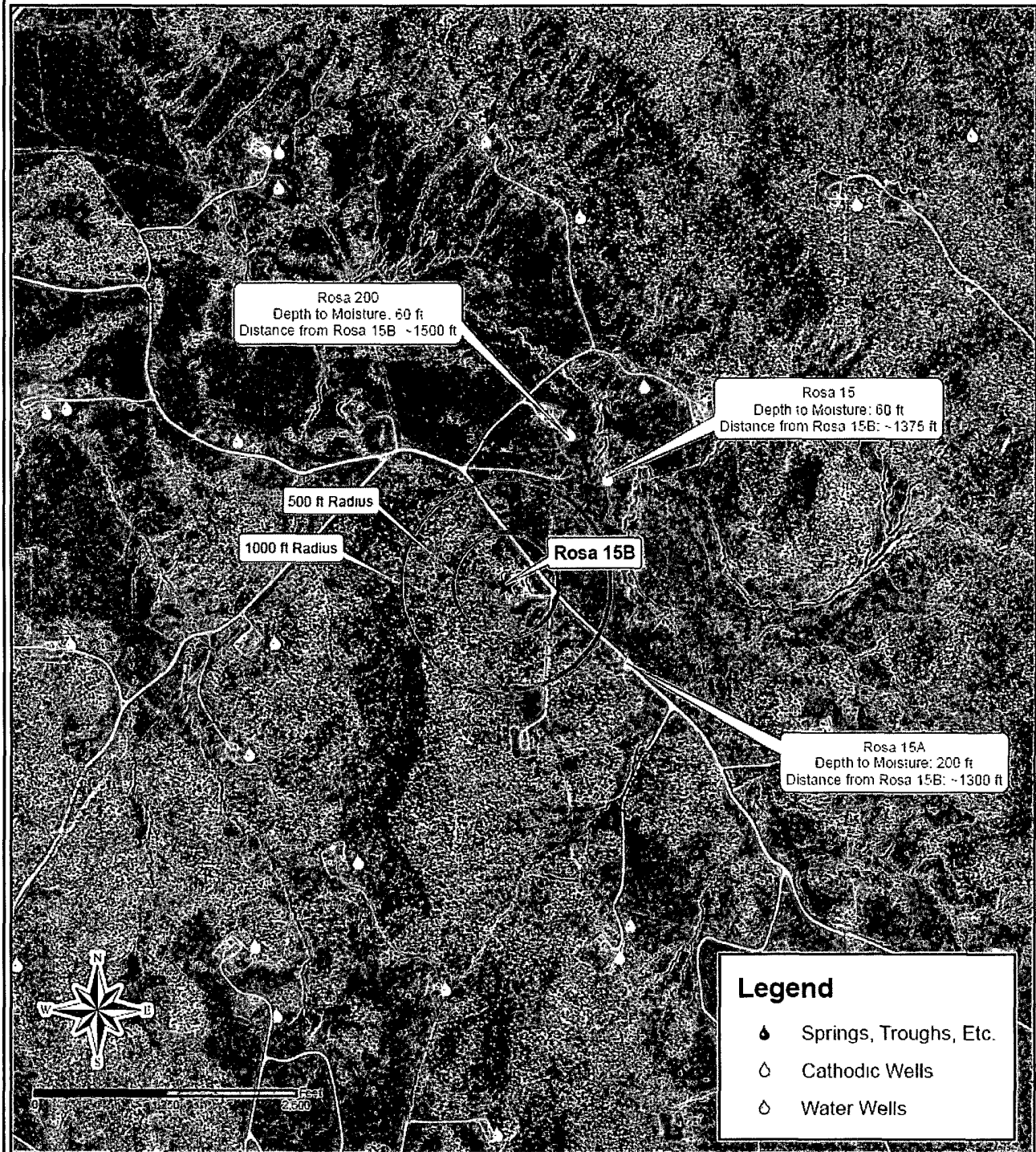
WATER COLUMN REPORT 08/26/2008

(quarters are 1=NW 2=NE 3=SW 4=SE)  
(quarters are biggest to smallest)

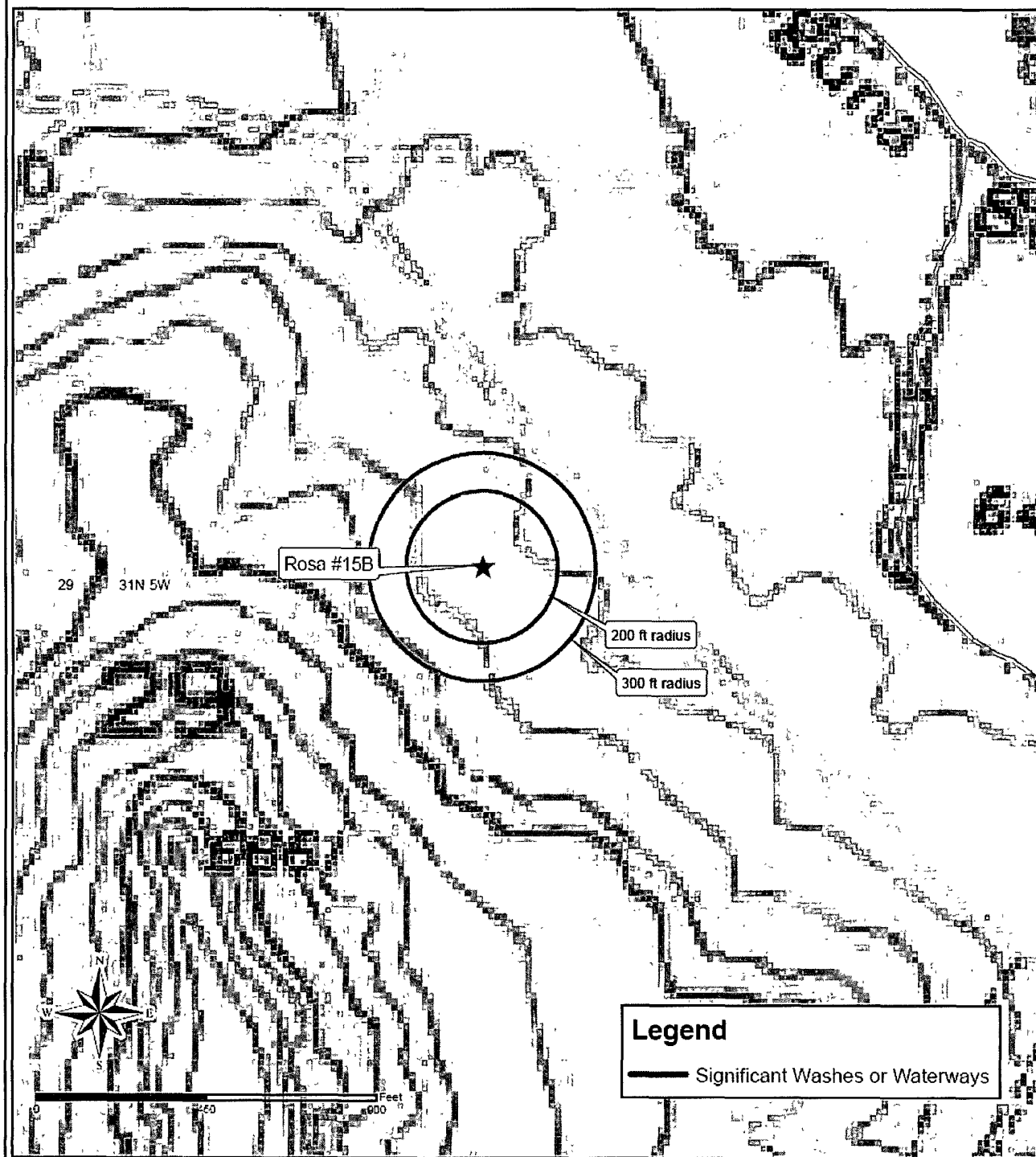
| POD Number | Tws | Rng | Sec | q | q | q | Zone | X | Y | Depth<br>Well | Depth<br>Water | Water (in feet)<br>Column |
|------------|-----|-----|-----|---|---|---|------|---|---|---------------|----------------|---------------------------|
|------------|-----|-----|-----|---|---|---|------|---|---|---------------|----------------|---------------------------|

No Records found, try again

Siting Criteria Map I  
Existing Known Water Wells, Cathodic Wells, & Springs  
Williams Exploration and Production Company  
Rosa #15B  
T31N, R5W, Section 29, NMPM  
Rio Arriba Countv. New Mexico



Siting Criteria Map II  
Topographic Features  
Williams Exploration and Production Company  
Rosa #15B  
T31N, R5W, Section 29, NMPM  
Rio Arriba County, New Mexico

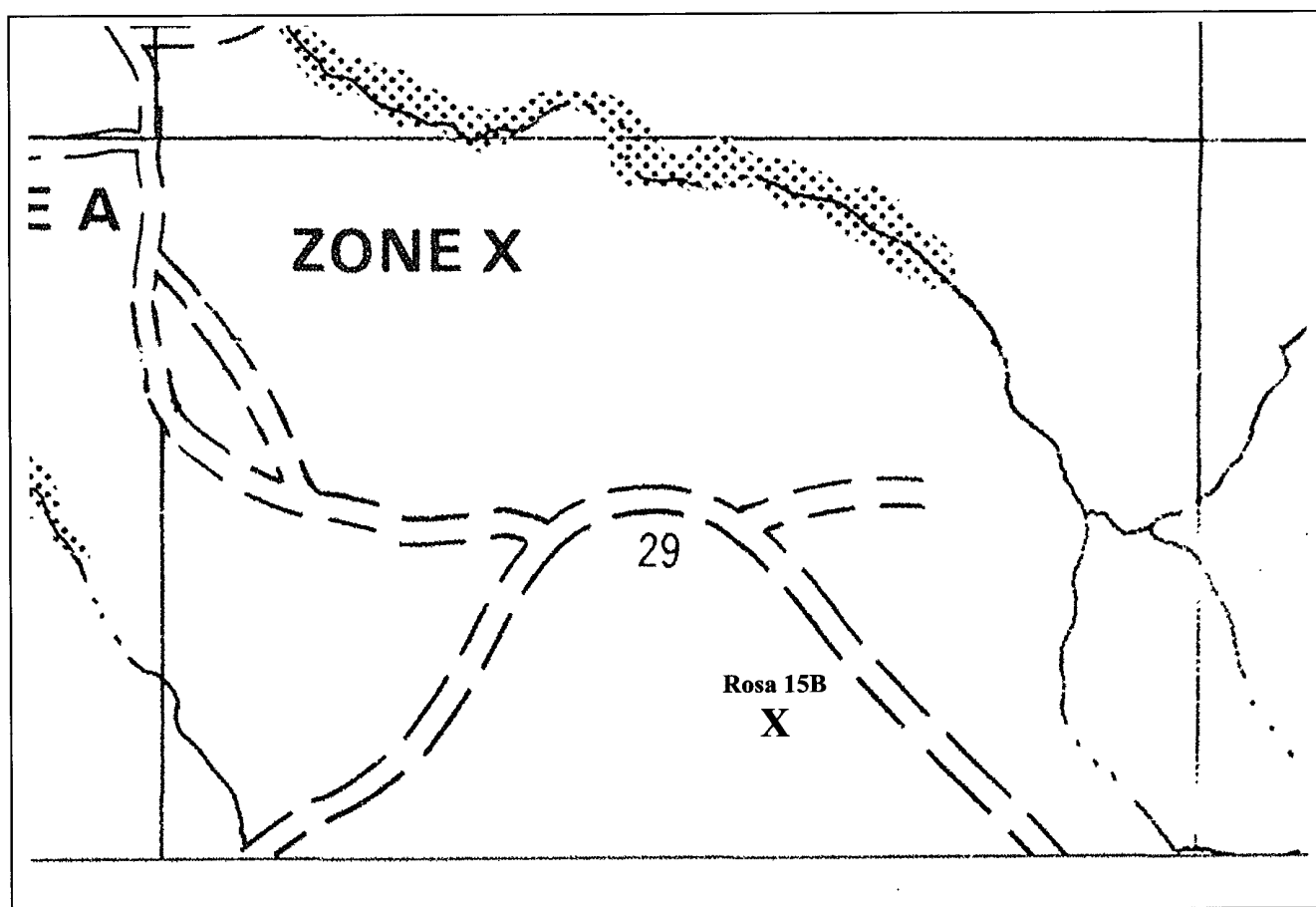


**FEMA Map – 100-Year Floodplain:**

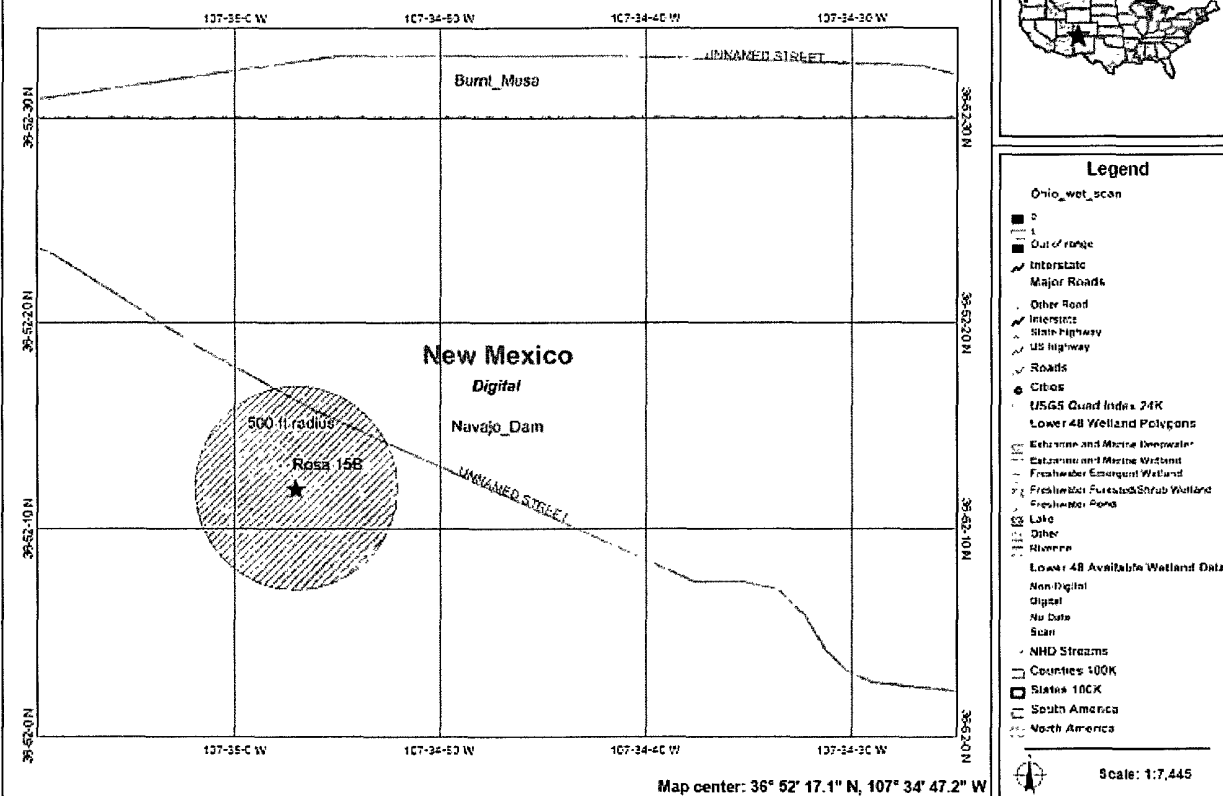
According to FEMA maps, the location is not within a 100-year floodplain (see attached FEMA map).

**Siting Criteria Compliance Demonstrations:**

The Rosa Unit #15B pit is not located in an unstable area. The location is not situated over a mine or a steep slope (see attached New Mexico Mines, Mills, and Quarries Map). Excavated pit material will not be located within 300 feet of a continuously flowing water course or within 200 feet of any other significant water course, lakebed, sinkhole, or playa lake (see Siting Criteria Map II). The pit is not located within 500 feet of any reported riparian areas or wetlands (see attached Wetlands Map). The pit is not within 500 feet of any private, domestic fresh water well or spring or within 1000 feet of any other fresh water well or spring (see Siting Criteria Map I). The pit will not be within any incorporated municipal boundaries or defined municipal freshwater well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. The location of the pit is not within 300 feet of any permanent residence, school, hospital, institution, or church.

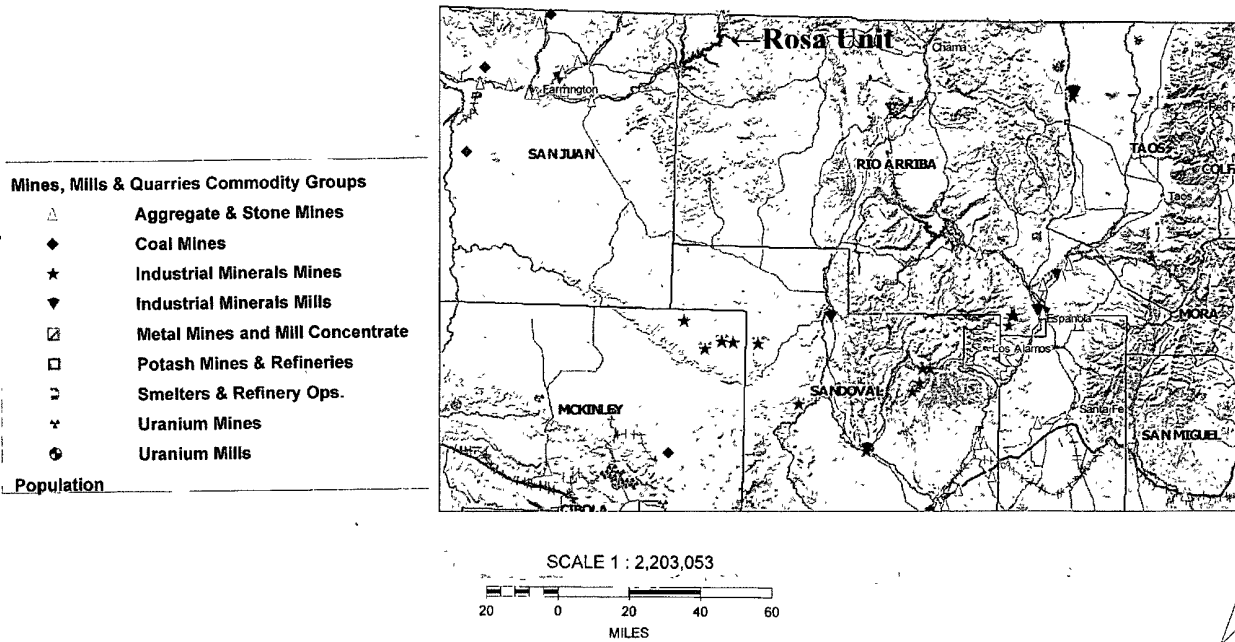


# USFWS-Designated Wetlands: Vicinity of Rosa 15B



This map is a user generated static output from an internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

# MMQonline Public Version



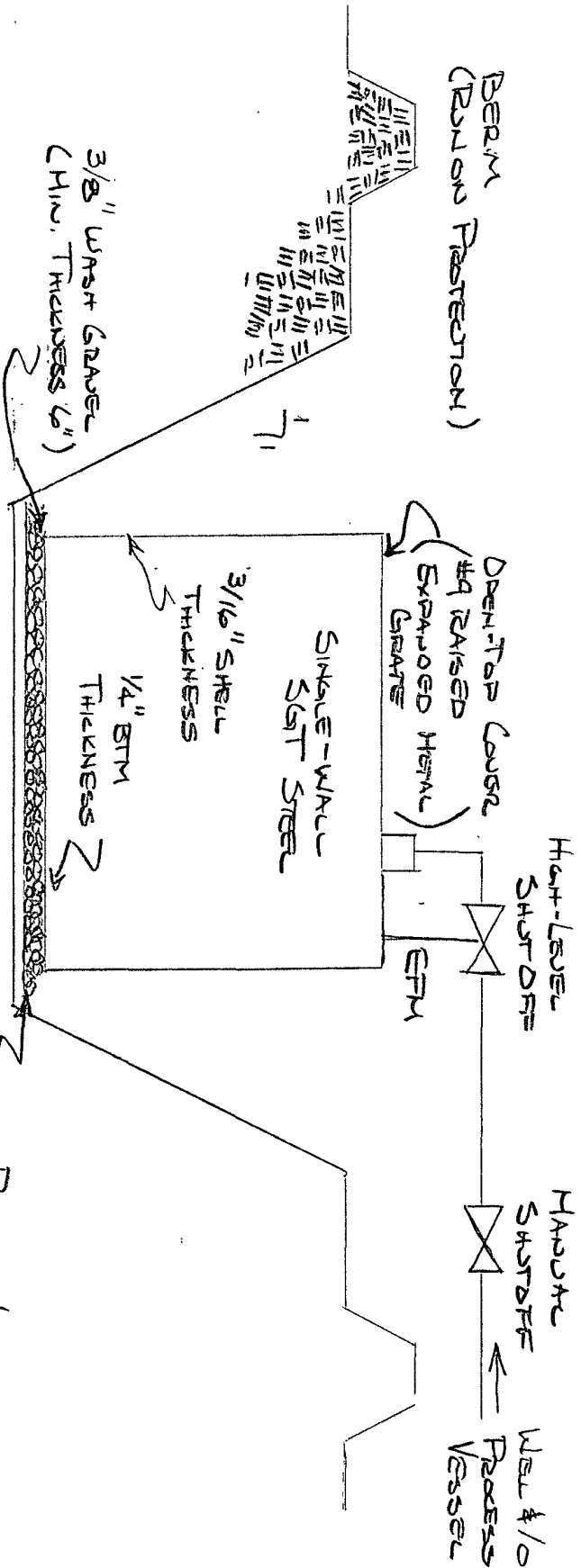
**Williams Production Co., LLC**  
**San Juan Basin: New Mexico Assets**  
Production Pit: Subgrade Tank  
Design and Construction Plan

In accordance with Rule 19.15.17 NMAC, the following plan describes the general design and construction (D&C) of production pits using subgrade tanks on Williams Production Co, LLC (WPX) locations in the San Juan Basin of New Mexico. For those production pits which do not conform to this standard plan, a separate well specific D&C plan will be developed and utilized.

General Plan Requirements:

1. WPX will design and construct a production pit to contain liquids associated with the dehydration and compression of produced natural gas, which will prevent contamination of fresh water resources and protect public health and the environment.
2. The pit will be located as close as possible to the well and associated production/process equipment to minimize surface disturbance. Prior to excavation for the pit, topsoil will be stripped and stockpiled on the well location.
3. The excavation will have a firm compacted bottom and firm sloped sidewalls that are stable for the soil conditions. If necessary the sidewalls will be reinforced with cribbing. The excavation bottom will be covered with a 40-mil LLDPE liner (spec sheet attached) with a permeability of 0.022USPerms ( $1.7 \times 10^{-10}$  cm/sec).
4. The subgrade tank (SGT) will be constructed of single-wall steel, welded following appropriate API and industry codes, coated with an epoxy based paint, covered with a steel #9 mesh screen, and equipped with a EFM to monitor high liquid levels and automatically shut off liquid discharges.
5. A solid riser pipe will be installed to allow withdrawal of liquids by suction. The riser will draw from the bottom of the SGT, capped when not in use and sloped to the pit to allow drainage of liquids not collected during withdrawal operations.
6. The SGT will be placed on a six-inch layer of washed 3/8"+ gravel to allow visual inspection for possible leaks.
7. The excavation and pit will be protected from runoff by the construction of a compacted earthen berm.
8. Fencing will be constructed to protect livestock/wildlife as specified by the federal Surface Management Agency or, if not federal land/minerals, NMOCD rule 17 requirements.
9. WPX will post a well sign in accordance with the federal Surface Management Agency and rule 19.15.3.103.

# TYPICAL SOBERADE TANK INSTALLATION



Notes:

- LINER RAVEN INDUSTRIES TUFFED 4000B (ATTACHED)
- HYDROSTATIC TEST USES TO 3 PSI.
- INSULATE COATING: COAT TARE EPOXY
- EXTERIOR COATING: DURA-PLATE EPOXY
- TANK VOLUME 75-120 BBL

MIKE LANE  
8/26/08

# RUFECO®

# 2000B, 3000B & 4000B

| Properties                                                                      | Test Method                                                                                                                                                | RUFECO 2000B            |                       | RUFECO 3000B            |                       | RUFECO 4000B            |                       |
|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------|-------------------------|-----------------------|-------------------------|-----------------------|
|                                                                                 |                                                                                                                                                            | Min. Roll Averages      | Typical Roll Averages | Min. Roll Averages      | Typical Roll Averages | Min. Roll Averages      | Typical Roll Averages |
| Thickness<br>mils (mm)                                                          | ASTM D 5199                                                                                                                                                | 20.0<br>(0.50)          | 21.0<br>(0.53)        | 30.0<br>(0.75)          | 31.2<br>(0.78)        | 40.0<br>(1.00)          | 41.5<br>(1.04)        |
| Density<br>g/cm <sup>3</sup>                                                    | ASTM D792 or<br>ASTM D1505                                                                                                                                 | 0.939 Max.              |                       | 0.939 Max.              |                       | 0.939 Max.              |                       |
| Tensile Strength<br>lb/in. width<br>(N/mm width)                                | ASTM D638/D6693<br>1. Tensile Strength at Break<br>2. % Elongation at Break                                                                                | 76 (13)<br>800          | 104 (18)<br>875       | 114 (20)<br>800         | 144 (24)<br>875       | 152 (27)<br>800         | 185 (32)<br>875       |
| Hydrostatic Resistance<br>psi (kPa)                                             | ASTM D751<br>(814)                                                                                                                                         | 118<br>(841)            | 122<br>(1206)         | 175<br>(1241)           | 180<br>(1586)         | 230<br>(1724)           | 250                   |
| Puncture Resistance<br>lbf (N)                                                  | ASTM D4833<br>(130)                                                                                                                                        | 30<br>(195)             | 44<br>(200)           | 45<br>(270)             | 60<br>(270)           | 60<br>(334)             | 75                    |
| Tear Resistance<br>lbf (N)                                                      | ASTM D1004<br>(49)                                                                                                                                         | 11<br>(62)              | 14<br>(71)            | 16<br>(89)              | 20<br>(98)            | 22<br>(120)             | 27                    |
| Volatile Loss<br>Method A                                                       | ASTM 1203                                                                                                                                                  |                         | <1%                   |                         | <1%                   |                         | <1%                   |
| Resistance to Soil Burial<br>(% change maximum in<br>original value)            | ASTM D3083<br>1. Tensile Strength at Yield<br>2. Tensile Strength at Break<br>3. Elongation at Yield<br>4. Elongation at Break<br>5. Modulus of Elasticity |                         | ±10%                  |                         | ±10%                  |                         | ±10%                  |
| Low Temp. Impact<br>Failure Temp F (C)                                          | ASTM D746                                                                                                                                                  | < -70                   | < -94                 | < -70                   | < -94                 | < -70                   | < -94                 |
| Dimensional Stability<br>% Change                                               | ASTM D1204                                                                                                                                                 |                         | < 2                   |                         | < 2                   |                         | < 2                   |
| Environmental Stress<br>Crack Resistance<br>Hours to failure                    | ASTM D5397 Appendix A                                                                                                                                      |                         | > 400                 |                         | > 400                 |                         | > 400                 |
| Carbon Black %                                                                  | ASTM D1603 or D4218                                                                                                                                        | 2.0                     | 2.5                   | 2.0                     | 2.5                   | 2.0                     | 2.5                   |
| Perms<br>grains/ft <sup>2</sup> /hr/in. Hg<br>(grams/m <sup>2</sup> /day/mm Hg) | ASTM E96<br>Method A 73° F, 50% RH                                                                                                                         |                         | 0.045<br>(0.030)      |                         | 0.029<br>(0.019)      |                         | 0.022<br>(0.014)      |
| FACTORY SEAM REQUIREMENTS (cm/sec)                                              |                                                                                                                                                            | 3.6 × 10 <sup>-10</sup> |                       | 2.3 × 10 <sup>-10</sup> |                       | 1.7 × 10 <sup>-10</sup> |                       |
| Bonded Seam Strength<br>lb/in. width<br>(N/cm width)                            | ASTM D4545 Mod.*                                                                                                                                           | 40<br>(70)              | 45<br>(79)            | 60<br>(105)             | 68<br>(119)           | 75<br>(131)             | 80<br>(140)           |
| Seam Peel Adhesion<br>lb/in. width<br>(N/cm width)                              | ASTM D4545 Mod.*                                                                                                                                           | 30<br>(53)              | 36<br>(63)            | 45<br>(79)              | 53<br>(93)            | 60<br>(105)             | 69<br>(121)           |

Nominal Weight /Thousand Square Feet: RUFECO 2000B - 105 lbs., RUFECO 3000B - 157 lbs., RUFECO 4000B - 210 lbs.

\* Raven Industries performs seam testing at 12" per minute.

$CLUS PERM = 8.03 \times 10^{-9} \text{ cm/sec}$

Rufco 3000B meets or exceeds ASTM E-1745, Class "A" standard for water vapor retarders used in contact with soil or granular fill under concrete slabs.

Note: To the best of our knowledge, unless otherwise stated, these are typical property values and are intended as guides only, not as specification limits. NO WARRANTIES ARE MADE AS TO THE FITNESS FOR A SPECIFIC USE OR MERCHANTABILITY OF PRODUCTS REFERRED TO, no guarantee of satisfactory results from reliance upon contained information or recommendations and disclaims all liability for resulting loss or damage.

**RAVEN**

**INDUSTRIES**

Engineered Films Division

## PLANT LOCATION

Sioux Falls, South Dakota

[www.rufco.com](http://www.rufco.com)

## SALES OFFICE

P.O. Box 5107  
Sioux Falls, SD 57117-5107  
(605) 335-0174  
(605) 331-0333 - FAX  
**800-635-3456**



ISO 9001:2000 CERTIFIED  
MANAGEMENT SYSTEM

2/08 EFD 1078

**Williams Production Co., LLC**  
**San Juan Basin: New Mexico Assets**  
Production Pit: Subgrade Tank  
Operations and Maintenance Plan

In accordance with Rule 19.15.17 NMAC, the following plan describes the general operations and maintenance (O&M) of production pits using subgrade tanks on Williams Production Co, LLC (WPX) locations in the San Juan Basin of New Mexico. For those production pits which do not conform to this standard O&M plan, a separate well specific O&M plan will be developed and utilized.

1. WPX will only allow produced liquids meeting the RCRA exemption for O&G wastes to be stored in the SGT. WPX will not discharge or store any hazardous waste as defined under RCRA 40CFR 261 and 19.15.1.7.W(3) NMAC in any temporary pit.
2. Produced water will be disposed by evaporation or transport any of the following NMOCD approved facilities depending on the well location: Basin Disposal, Inc in Bloomfield, New Mexico (Permit # NM-01-005), Williams Rosa SWD#1 (Permit # SWD-916), Williams Rosa #94 (Permit # SWD-758), Burlington Resources Jillson SWD#1 (Permit #R10168A), or other NMOCD approved water disposal facilities.
3. WPX shall maintain sufficient freeboard for to prevent overtopping. Discharges to the pit will be shutoff automatically if the high-level alarm is triggered from the EFM or manually if the EFM is not functional.
4. Any oil or hydrocarbon collecting on the pit will be removed. Saleable condensate will be returned to the sales tank. Slop oil from compression will be recycled with Safety Kleen, Farmington, NM or Hydropure, Aztec, NM (No Permit Required).
5. If the tank integrity is compromised:
  - a. All discharges will be shut off to the pit.
  - b. All liquids will be removed as soon as possible but no more that within 24 hours of discovery
  - c. WPX will notify and report to NMOCD as follows:
    - i. If the release is less than 25 bbls, the Aztec District Office by phone or email within 48-hours of discovery and repair.
    - ii. If the release is suspected to be greater than 25 bbls, the Aztec District Office and the Environmental Bureau Chief by phone for immediate verbal notification pursuant to 19.15.3.116.B (1)(d).
  - d. Written Spill/Release reports will be submitted on Form C-141 per 19.15.3.116.C NMAC within 15 days to the Aztec District Office.
6. Berms around the perimeter of the pit, shall be maintained as protection from run-on.
7. WPX will inspect the SGT pit monthly. Electronic copies of the inspections will be kept at the WPX San Juan Basin office for a minimum of five years following completion. Copies of the inspections will be available to NMOCD upon request.

**Williams Production Co., LLC**  
**San Juan Basin: New Mexico Assets**  
Production Pit: Subgrade Tank  
Closure Plan

In accordance with Rule 19.15.17.13 NMAC, the following plan describes the general closure requirements of below-grade tanks (BGT), including Subgrade tanks (SGT), on Williams Production Co, LLC (WPX) locations in the San Juan Basin of New Mexico. This is WPX's standard procedure for all out-of-service BGTs used to store produced liquids during production operations at gas wells operated by WPX.

For those closures which do not conform to this standard closure plan, a separate well/pit specific closure plan will be developed and utilized. All closure activities will include proper documentation and will be submitted to OCD within 60 days of the pit closure on a Closure Report using Division Form C-144. The Report will include the following:

- Plot Plan (Pit Diagram)
- Available Inspection reports
- Sampling Results
- Waste disposal documentation

**General Plan Requirements:**

1. All piping will be rerouted to an alternative produced water storage/disposal location (e.g. surface tanks, temporary frac tank, ...). The well will be temporarily shutin until the rerouting is completed.
2. All produced water will be removed from the BGT following discharge-pipe rerouting. Produced water will be disposed of by injection at one of the Williams Production Rosa Unit Salt Water Disposal wells: Rosa SWD #1 ( API: 30-039-27055) I-23-31N-06W Permit - SWD-916 or Rosa Unit #94 (API: 30-039-23035) K-16-31N-05W, Permit - SWD-758.
3. Notice of Closure will be given to the landowner or SMA, and the Aztec District office between 72 hours and one week of the scheduled closure via email or phone. The notification of closure will include the following:
  - a. Operators Name (WPX)
  - b. Well Name and API Number
  - c. Location (USTR)
4. The BGT and all associated materials will be removed, and recycled, reused, or disposed. of in a Division-approved facility. All materials that can not be recycled or reused will be treated a solid waste and will be disposed of at a licensed disposal facility (probably San Juan Regional Landfill operated by Waste Management under NMED Permit SWM-052426).
5. Following removal of the tank and any liner material, a five-point composite sample will be taken of the excavation and tested per 19.15.17.13(B)(1)(b) NMAC. In the event that the criteria are not met (See Table 1), a release will be reported following Rule 116 and impacted soils will be excavated and hauled to Envirotech Landfarm near Bloomfield, NM (NMOCD Permit NM-01-0011). Approval to haul will be requested of the Aztec District office prior to initiation.

Table 1: Closure Criteria for BGTs

| Components | Testing/Methods                                          | Closure Limits (mg/Kg) |
|------------|----------------------------------------------------------|------------------------|
| Benzene    | EPA SW-846 Method 8021B or 8260B                         | 0.2                    |
| BTEX       | EPA SW-846 Method 8021B or 8260B                         | 50                     |
| TPH        | EPA SW-846 Method 8015 M(Full Range)*<br>or Method 418.1 | 100                    |
| Chlorides  | EPA SW-846 Method 300.1                                  | 250                    |

\* Preferred method

6. Upon completion of the tank removal and any necessary soil remediation, the excavation will be backfilled with non-waste earthen material compacted to native and covered with a minimum of one foot of top soil. The surface will be recontoured to match the native grade.
7. For those portions of the former pit area no longer required for production activities, WPX will seed the disturbed areas the first growing season after the pit is covered. Seeding will be accomplished via drilling on the contour whenever practical, or by other Division-approved methods. Vegetative cover will equal 70% of the native perennial vegetative cover (un-impacted) consisting of at least three native plant species, including at least one grass, but not including noxious weeds, and maintained that cover through two successive growing seasons. Repeat seeding or planting will be continued until successful vegetative growth occurs. *Note: WPX assumes the seeding stipulations including mix and seeding methods specified by the Surface Management Agency (BLM, BOR, USFS, Tribal, etc.) or Land owner as part of a surface use agreement or APD are Division-approved methods unless notified by the Division of their unacceptability.*
8. For those portions of the former pit area required for production activities, reseeding will be done at well abandonment, and following the procedure noted above.