

June 18, 2010

HAND-DELIVERED

Glenn von Gonten
Acting Environmental Bureau Chief
Oil Conservation Division
New Mexico Department of Energy,
Minerals and Natural Resources
1220 South Saint Francis Drive
Santa Fe, New Mexico 87505

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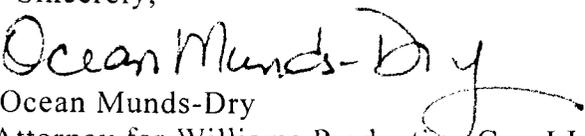
Re: Williams Production Co., LLC – OGRID 120782
Amended Form C-144 Permit Application
Rosa Unit SWD Well No. 2 (API No. 30-039-30812)

Dear Mr. von Gonten:

Please find enclosed Williams Production Co., LLC's Amended Form C-144 Permit Application for the Rosa SWD Well No. 2 (API No. 30-039-30812). Williams submits this amended application for your review and in response to your June 9, 2010 denial letter in order to address certain items in the application that you found incomplete or deficient.

Williams would appreciate your review of this application no later than Thursday, June 24, 2010. If this application is again denied by the Division's Environmental Bureau, Williams must provide notice of its appeal of your decision by Friday, June 25, 2010, in order to be placed on the July 15th Oil Conservation Commission docket.

Thank you for your time and attention to this matter. Williams also appreciates your and Mr. Jones' time and feedback during your meeting with Mr. McQueen earlier this week.

Sincerely,

Ocean Munds-Dry
Attorney for Williams Production Co., LLC

cc: Sonny Swazo

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 S Main Aztec, NM 87410
Facility or well name: Rosa SWD Unit No. 2
API Number: 30-039-30812 OCD Permit Number: _____
U/L or Qtr/Qtr F Section 25 Township 31N Range 5W County: Rio Arriba
Center of Proposed Design: Latitude 36.886951N / 36.88824N Longitude -107.311156W / -107.44499W 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 20 mil LLDPE HDPE PVC Other _____
 String-Reinforced
Liner Seams: Welded Factory Other _____ Volume: 35,000 bbl Dimensions: L 100' x W 100' x D 20'

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: _____ bbl Type of fluid: _____
Tank Construction material: _____
 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 _____ mil HDPE PVC Other _____

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 As per USFS /BLM 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 (**Temporary Pit**)

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. - 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). - 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. (Applies to temporary, emergency, or cavitation pits and below-grade tanks) - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. (Applies to permanent pits) - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" 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. - 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. - 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. - 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. - 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. - 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. - 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 H₂S, 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: _____ Temporary Pit on Rosa 634B Location _____ 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): Ken McQueen Title: Director, San Juan Asset Team

Signature: *Ken McQueen* Date: 18 JUN 2010

e-mail address: ken.mcqueen@williams.com Telephone: 918-573-2889

20.

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

OCD Representative Signature: _____ **Approval Date:** _____

Title: _____ **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 indentify 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: _____

Williams Production Co., LLC
Rosa SWD #2 (API: 30-039-30812)
Drilling and Completion
Closed-Loop & Temporary Pit System

In accordance with Rule 19.15.17 NMAC, the following plans describe the Design and Construction; Operational Requirements, and Closure of a closed-loop and temporary pit system to be used for the drilling and completion of the Rosa Unit SWD #2 by Williams Production Co, LLC (WPC).

The Closed-loop portion of this system will be located immediately adjacent to the drilling/completion rig for solids and fluid handling and to prevent impacts to the immediate environment surrounding the wellsite. The temporary pit portion of the system will be needed to provide additional fluids storage and cuttings disposal. The temporary pit will be located at a less environmental sensitive new drill well location (Rosa Unit #634B: API 30-039-30937). There are no below-grade tanks or permanent pits in this C-144 application. The closed-loop system and the temporary pit will be designed and constructed to contain liquids and solids and prevent contamination of fresh water and protect public health and the environment, Ref. 19.15.17.11A NMAC.

Before constructing the temporary pit or closed-looped system, WPC will strip and stockpile the topsoil for use as the final cover or fill at the time of closure, Ref. 19.15.17.11B NMAC.

WPC will post an upright sign not less than 12 inches by 24 inches with lettering not less than two inches in height in a conspicuous place on the fence surrounding the closed-loop system in a manner and location such that a person can easily read the legend. The sign shall provide the following information: the operator's name; the location of the site by quarter-quarter or unit letter, section, township and range; and emergency telephone numbers. The temporary pit is located on a site where there is an existing well, signed in compliance with 19.15.16.8 NMAC and is operated by WPC, Ref 19.15.17.11C NMAC.

WPC will fence or enclose the temporary pit in a manner that prevents unauthorized access and will maintain the fences in good repair. The temporary pit is not located within 1000 feet of a permanent residence, school, hospital, institution or church. WPC shall construct fences utilizing 48" steel mesh field-fence (hogwire) on the bottom with a single strand of barbed wire on top. T-posts will be installed every 12 feet and corners shall be anchored utilizing a secondary T-post or similar bracing. The temporary pit will be fenced at all times excluding drilling/completion operations, at which time the "front" side of the fence will be temporarily removed for operational purposes, Ref 19.15.17.11D.

DESIGN AND CONSTRUCTION PLANS

Temporary Pit Design & Construction Plan

WPC will design and construct the temporary pit to ensure the confinement of liquids to prevent unauthorized releases, Ref 19.15.17.11F(1) NMAC.

WPC will construct the foundation and interior slopes consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear. The operator shall construct a temporary pit so that the slopes are no steeper than two horizontal feet to one vertical foot (2H:1V) to prevent contamination of fresh water and protect public health and the environment, Ref 19.15.17.11F(2) NMAC.

WPC will design and construct a temporary pit with a geomembrane liner. The geomembrane liner shall consist of 20-milstring reinforced LLDPE or equivalent liner material approved by the District office. The geomembrane liner shall be composed of an impervious, synthetic material that is resistant to petroleum hydrocarbons, salts, and acidic and alkaline solutions. The liner

material shall be resistant to ultraviolet light. The liner material will comply with EPA SW-846 method 9090A, Ref. 19.15.17.11F(3) NMAC. WPC will minimize liner seams and orient them up and down, not across slope faces. WPC will use factory welded seams where possible. Before field seaming, WPC will overlap liners by four to six inches and orient seams parallel to the line of maximum slope, i.e., oriented along, not across, not across the slope. WPC will minimize the number of field seams in corners and irregularly shaped areas. Qualified personnel shall perform field seaming. WPC will weld field liner seams, Ref 19.15.17.11F(4) NMAC.

Construction will avoid excessive stress-strain on the liner, Ref 19.15.17.11F(5) NMAC.

Geotextile will be installed under the liner where needed to reduce localized stress-strain or protuberances that may otherwise compromise the liner's integrity, Ref 19.15.17.11F(6) NMAC.

WPC will anchor the edges of all liners in the bottom of a compacted earth-filled trench. The anchor trench will be at least 18 inches deep, Ref 19.15.17.11F(7) NMAC.

WPC will ensure that the liner is protected from any fluid force or mechanical damage at any point of discharge into or suction from the lined temporary pit through the use of mud pit slides (secondary liner placed over the primary liner), and/or a manifold system, Ref 19.15.17.11F(8) NMAC.

WPC will design and construct the temporary pit to prevent run-on of surface water. A berm, ditch, proper sloping or other diversion will surround the temporary pit to prevent run-on of surface water, Ref 19.15.17.11F(9) NMAC.

The volume of the pit will not exceed 10 acre-feet (77,580 bbl, or 435,600 cubic feet), including freeboard, Ref 19.15.17.11F(10) NMAC.

WPC will not allow freestanding liquids to remain on the unlined portion of the temporary pit used to vent or flare gas, Ref. 19.15.17.11F(11) NMAC.

The C-102 showing the location of the temporary pit is attached.

Closed-Loop Design & Construction Plan

WPC will design and construct a closed-loop system to contain liquids and solids, and prevent contamination of fresh water and protect public health and the environment, Ref. 19.15.17.11A NMAC. The Closed-Loop System will consist of one or more temporary above-ground tank(s) suitable for holding the cuttings and fluids for rig operations and the planned Drilling/Completion activities. The tank(s) will be of sufficient volume to maintain a safe free-board during rig operations.

The closed-loop system will be designed and constructed to ensure the confinement of oil, gas or water and to prevent their uncontrolled releases, Ref. 19.15.17.11H(1) NMAC.

A temporary pit will be used to handle the cuttings generated while drilling the disposal well. The design and construction of the temporary pit is described above, Ref. 19.15.17.11H(2) NMAC.

The Closed-loop System used by WPC will not use a drying pad, below-grade tank or sump, Ref. 19.15.17.11H(3) NMAC.

Fencing is not required for an above-ground closed-loop system.

Haul-off bins or similar containers will be used to temporarily hold dewatered solid before disposal in the temporary pit.

Tanks will be placed on the active and disturbed areas of the SWD well location and within the existing ROW footprint.

Three pages regarding the specifics of the closed loop system are attached to this application and include a schematic.

OPERATIONAL REQUIREMENTS

WPC will operate and maintain the temporary pit and closed-loop system to contain liquids and solids and maintain the integrity of the liner, liner system, or secondary containment system, prevent contamination of fresh water and protect public health and the environment, Ref 19.15.17.12A(1) NMAC.

WPC will recycle, reuse or reclaim or dispose of all drilling fluids in a manner approved by division rules, that prevents the contamination of fresh water and protects public health and the environment. WPC will to the extent practical conserve drilling fluids for reuse by transferring liquids to other pits ahead of the rig. Any excess fluids that are not needed for well control during drilling or completion will be disposed by evaporation or transport to Basin Disposal, Inc in Bloomfield, New Mexico (Permit # NM-01-005), Ref 19.15.17.12A(2) NMAC.

WPC will not discharge into or store any hazardous waste as defined under RCRA 40CFR 261 and 19.15.1.7.W(3) NMAC in the temporary pit or closed-loop system, Ref 19.15.17.12A(3) NMAC.

If any pit liner's integrity is compromised, or if any penetration of the liner occurs above the liquid's surface, then the operator shall notify the NMOCDC Aztec District Office within 48 hours of the discovery and repair the damage or replace the pit liner or closed-loop system, Ref 19.15.17.12A(4) NMAC.

If the temporary pit or closed-loop system develops a leak, or if any penetration of the pit liner or closed-loop system occurs below the liquid's surface, then WPC will remove all liquid above the damage or leak line within 48 hours, notify the Aztec office within 48 hours of the discovery and repair the damage or replace the pit liner or closed-loop system, Ref 19.15.17.12A(5) NMAC.

The injection or withdrawal of liquids from a pit will be accomplished through a header, diverter or other hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes, Ref 19.15.17.12A(6) NMAC.

WPC will operate and install diversion ditches around the location or around the perimeter of the pit to prevent the collection of surface water run-on, Ref 19.15.17.12A(7) NMAC.

WPC will install or maintain on site, an oil absorbent boom or other device to contain and remove oil from a pit's surface, Ref 19.15.17.12A(8) NMAC.

Temporary Pit Operational Requirements

Only fluids used or generated during the drilling and completion will be discharged into the temporary pit. WPC will maintain the temporary pit free of miscellaneous solid waste or debris. WPC will use a tank made of steel or other material, approved by the Aztec District Office, to contain hydrocarbon-based drilling fluids. Immediately after cessation of the drilling and completion operation, WPC will remove any visible or measurable layer of oil from the surface of the drilling pit, Ref 19.15.17.12B(1) NMAC.

WPC shall maintain at least two (2) feet of vertical freeboard for the temporary pit, Ref 19.15.17.12B(2) NMAC.

WPC will inspect the temporary pit containing drilling fluids at least daily while the drilling or workover rig is on-site. Thereafter, WPC will inspect the temporary pit weekly so long as liquids remain in the temporary pit. WPC will maintain a log of such inspections and make the log available for the Aztec District Office when the operator closes the temporary pit, Ref 19.15.17.12B(3) NMAC.

WPC will remove all free liquids from the temporary pit within 30 days from the date that the operator releases the drilling rig. The operator will note the date of the drilling rig's release on BLM form 3160 upon well completion and forward a copy to the Aztec District Office, Ref 19.15.17.12B(4) NMAC.

WPC will not utilize the temporary pit for cavitation, Ref 19.15.17.12B(5) NMAC.

Closed Loop Operational Requirements

The Closed-Loop System will be operated and maintained: to contain liquids and solids, to aid in the prevention of contamination of fresh water sources, in order to protect public health and the environment.

The liquids will be transferred to and from the temporary above-ground rig tanks using vacuum trucks. Liquid levels will be maintained to provide required free-board and prevent overtopping. Surplus liquids will be stored in the above-ground tanks and transferred to and from the Closed-Loop system as needed to effectively drill and complete the well.

Solids in the Closed-Loop tanks will be vacuumed out and transferred to the temporary pit on a periodic basis to ensure effective drilling/completion operations and to prevent over topping.

No hazardous waste, miscellaneous solid waste or debris will be discharged into or stored in the tank(s). Only fluids or cutting intrinsic to, used or generated by rig operations will be placed or stored in the tank(s).

The NMOCD Aztec District Office will be notified within 48 hours of the discovery of compromised integrity of the Closed-Loop System. Upon discovery of the compromised tank, repairs will be enacted immediately.

All of the above operations will be inspected and a log will be signed and dated. During rig operations the inspection will be made daily.

CLOSURE REQUIREMENTS

WPC will close the temporary pit and closed-loop system within the time periods provided in 19.15.17.13 NMAC, or by an earlier date that the division requires because of imminent danger to fresh water, public health or the environment. WPC will close the temporary pit within six months from the date that the operator releases the drilling or workover rig, unless an extension is approved by the NMOCD Aztec District Office.

Closure Method for Temporary Pit

In accordance with Rule 19.15.17.13B(2) NMAC, the following plan describes the in-place closure requirements of the temporary pit to be used with the reference SWD well. The temporary pit location meets the siting requirements in 19.15.17.10C(3), Ref 19.15.17.13F(1a) NMAC.

The surface owner shall be notified of WPC's proposed closure plan using a means that provides proof of notice and is consistent with the BLM-NMOCD MOU, Ref 19.15.17.13F(1b) NMAC.

This closure plan is designed to meet the requirements of 19.15.17.13D(2) and 19.15.17.13B(2) as further described below, Ref 19.15.17.13F(1c) NMAC.

WPC will locate a steel marker at the center of the on-site burial. The steel marker will be no less than four inches in diameter, and will be cemented in a three-foot deep hole at a minimum. The steel marker will extend at least four feet above mean ground level and at least three feet below ground level. The operator name, lease name, and well number and location, including unit letter, section, township, and range, and that the marker designates an on-site burial location shall be welded, stamped or otherwise permanently engraved into the metal of the steel marker. No permanent structures will be located on the burial location without the NMOCD Aztec District Office's written approval, Ref 19.15.17.13F(1d) NMAC.

WPC will report the exact location of the on-site burial on Form C-105 filed with the division, Ref 19.15.17.13F(1e) NMAC.

WPC meets the siting criteria specified in 19.15.17.10C(2) and the waste criteria specified in 19.15.17.13.F(2c) for in-place burial, Ref 19.15.17.13F(2a) NMAC.

All free standing liquids will be removed from the pit at the start of the closure process. To the extent practical WPC will attempt to conserve drilling fluids for reuse by transferring liquids to other permitted pits ahead of the rig. Any excess fluids that are not needed for well control during drilling or completion will be disposed by evaporation or transport to Basin Disposal, Inc in Bloomfield, New Mexico (Permit # NM-01-005). The pit liner shall be removed above "mud level" after stabilization. Removal of the liner will consist of manually or mechanically cutting the liner at the mud level and removing all remaining liner. Care will be taken to remove "all" of the liner (i.e. anchored material). All excessive liner will be disposed of at a licensed disposal facility (probably San Juan Regional Landfill operated by Waste Management under NMED Permit SWM-052426). Solidification of the remaining pit contents shall be achieved by mixing non-waste containing, earthen material. The solidification process will be accomplished using a combination of natural drying and mechanical mixing. Pit contents will be mixed with non-waste, earthen material to a consistency that is deemed safe and stable. The mixing ratio shall not exceed 3 parts non-waste to 1 part pit contents, Ref 19.15.17.13F(2b) NMAC.

WPC will collect a five point, composite sample of the contents of the temporary pit after treatment or stabilization, if treatment or stabilization is required, to demonstrate that benzene, as determined by EPA SW-846 method 8021B or 8260B, does not exceed 0.2 mg/kg; total BTEX, as determined by EPA SW-846 method 8021B or 8260B does not exceed 50 mg/kg; the GRO and DRO combined fraction, as determined by EPA SW-846 method 8015M, does not exceed 500 mg/kg; TPH, as determined by EPA method 418.1 or EPA method that the division approves, does not exceed 2,500 mg/kg; and chlorides as determined by EPA method 300.1, do not exceed 500 mg/kg or the background concentration, whichever is greater, Ref 19.15.17.13F(2c) NMAC.

Upon closure of the temporary pit, WPC will cover the geomembrane lined, filled, temporary pit with compacted non-waste containing, earthen material; construct a division-prescribed soil cover; re-contour and re-vegetate the site. The division-prescribed soil cover, re-contouring and re-vegetation shall comply with Subsections G, H, and I of 19.15.17.13 NMAC, Ref 19.15.17.13F(2e) NMAC.

Closure Method for Closed-Loop

The Closed-Loop System will be closed in accordance with 19.15.17.13 NMAC.

WPC will vacuum any residual cutting and sludge from all temporary above-ground tanks and transport cuttings to the Temporary Pit following rig operations.

WPC will to the extent practical conserve drilling fluids for reuse. Any excess fluids that are not needed for well control during drilling or completion will be disposed by evaporation or transport to Basin Disposal, Inc in Bloomfield, New Mexico (Permit # NM-01-005).

Removal of the above ground tank(s) from the well location will occur with the rig move.

Reclamation

Once WPC has closed the temporary pit, WPC will reclaim the pit location to a safe and stable condition that blends with the surrounding undisturbed area. WPC will substantially restore the impacted surface area to the condition that existed before oil and gas operations by placement of the soil cover as provided in Subsection H of 19.15.17.13 NMAC, re-contour the location and associated areas to a contour that approximates the original contour and blends with the surrounding topography and re-vegetate according to Subsection I of 19.15.17.13 NMAC as well as the Surface Management Agency APD conditions of approval requirements. Re-contouring will attempt to match fit, shape, line form, and texture of the surrounding geography. Re-shaping will include drainage control, prevent ponding, and minimize erosion. Natural drainages will be unimpeded and stormwater Best Management Practices (BMPs) will be used to aid in soil stabilization and to protect surface water quality, Ref 19.15.17.13G(1) NMAC and 19.15.17.13G(1) NMAC.

Soil cover designs

The soil cover for burial-in-place will consist of a minimum of four feet of compacted, non-waste containing, earthen material. The soil cover shall include either the background thickness of topsoil or one foot of suitable material to establish vegetation at the site, whichever is greater, Ref., 19.15.17.13H(2) NMAC.

WPC will construct the soil cover to the site's existing grade and prevent ponding of water and erosion of the cover material, Ref. 19.15.17.13H(3) NMAC.

Re-vegetation

The first growing season after WPC closes the temporary pit and the area associated with the closed-loop system, WPC will seed or plant the disturbed area, Ref., 19.15.17.13I(1) NMAC.

WPC will accomplish seeding by drilling on the contour whenever practical or by other division-approved methods. The operator shall obtain vegetative cover that equals 70% of the native perennial vegetative cover (un-impacted by overgrazing, fire or other intrusion damaging to native vegetation) consisting of at least three native plant species, including at least one grass, but not including noxious weeds, and maintain that cover through two successive growing seasons. During the two growing seasons that prove viability, there shall be no artificial irrigation of the vegetation, Ref. 19.15.17.13I(2) NMAC.

Note: WPC assumes the seeding stipulations including mix and seeding methods specified by the USFS or BLM as the Surface Management Agency and as part of the APD are Division-approved methods unless notified by the Division of their unacceptability.

WPC will repeat seeding or planting until it successfully achieves the required vegetative cover, Ref. 19.15.17.13I(3) NMAC.

When conditions are not favorable for the establishment of vegetation, such as periods of drought, the division may allow WPC to delay seeding or planting until soil moisture conditions become favorable or may require the operator to use additional cultural techniques such as mulching, fertilizing, irrigating, fencing or other practices, Ref. 19.15.17.13I(4) NMAC.

WPC will notify the division when it has seeded or planted and when it successfully achieves re-vegetation, Ref. 19.15.17.13I(5) NMAC.

Closure Notice

WPC will notify the surface owner by certified mail, return receipt requested, that WPC plans to close the temporary pit where WPC has approval for on-site closure, Ref. 19.15.17.13J(1) NMAC.

Notice of Closure will be given to the Aztec District office between 72 hours and one week before the scheduled closure via email or phone. The notification of closure will include the operator's name (WPC) and the location to be closed by unit letter, section, township and range. If closure is associated with a particular well, then the notice will also include the well's name, number and API number. At well abandonment, the site will be reclaimed and re-vegetated to pre-existing conditions and as stipulated by the surface management agency in the APD conditions of approval, Ref. 19.15.17.13J(2) NMAC.

Closure Report

Within 60 days of closure completion, the operator shall submit a closure report on form C-144, with necessary attachments to document all closure activities including sampling results; information required by 19.15.17 NMAC; a plot plan; and details on back-filling, capping and covering, where applicable. WPC will certify that all information in the report and attachments is correct and that WPC has complied with all applicable closure requirements and conditions specified in the form C-105 within 60 days of closing the temporary pit, Ref. 19.15.17.13K NMAC.

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

District II
1301 W. Grand Avenue, Artesia, NM 88210

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

District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised October 12, 2005
Instructions on back
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

*API Number		*Pool Code 97232	*Pool Name BASIN MANCOS
*Property Code 17033	*Property Name ROSA UNIT		*Well Number 634B
*GRID No. 120782	*Operator Name WILLIAMS PRODUCTION COMPANY.		*Elevation 6260'

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
H	22	31N	6W		1485	NORTH	645	EAST	RIO ARRIBA

¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	23	31N	6W		1980	NORTH	20	EAST	RIO ARRIBA

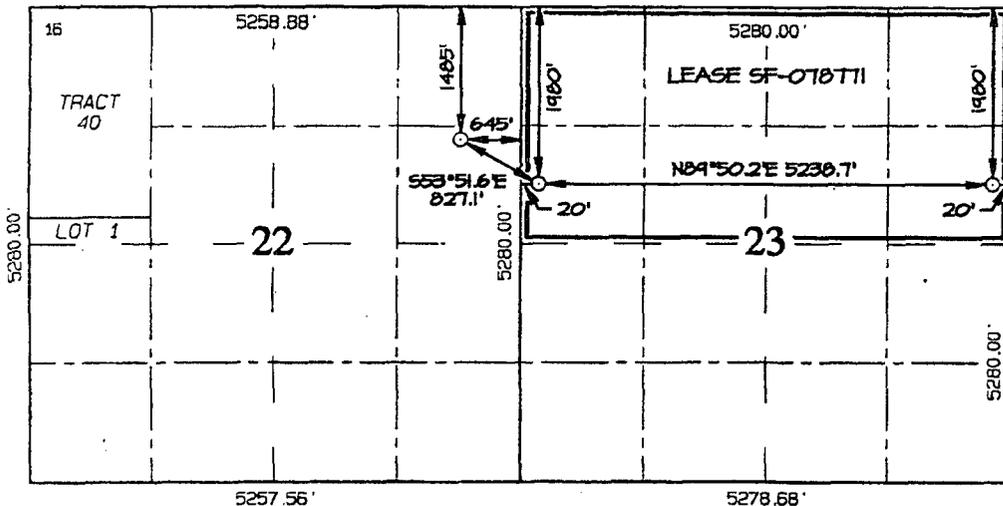
¹² Dedicated Acres 320.0 Acres - (N/2)	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.
------------------------------------------------------	-------------------------------	----------------------------------	-------------------------

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

SURFACE LOCATION
1485' FNL 645' FEL
SECTION 22, T31N, R6W
LAT: 36.88830°N
LONG: 107.44339°W
DATUM: NAD1983

POINT-OF-ENTRY
1980' FNL 20' FWL
SECTION 23, T31N, R6W
LAT: 36.88695°N
LONG: 107.44111°W
DATUM: NAD1983

END-OF-LATERAL
1980' FNL 20' FEL
SECTION 23, T31N, R6W
LAT: 36.88693°N
LONG: 107.42320°W
DATUM: NAD1983



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.

Signature _____ Date _____

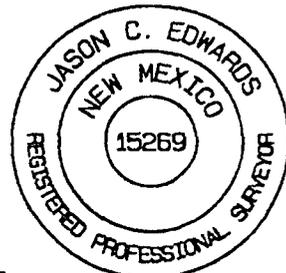
Printed Name _____

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.

Survey Date: SEPTEMBER 11, 2009

Signature and Seal of Professional Surveyor



JASON C. EDWARDS
Certificate Number 15269

THE HORIZONTAL LATERAL REPRESENTED ON THIS PLAT CORRESPONDS TO THE BLACK SEGMENT WHICH VARIES IN THE ELEVATION FROM 6891.0' AT THE POINT-OF-ENTRY TO 6749.0' AT THE END-OF-LATERAL.

Location of Temporary Pit

WILLIAMS PRODUCTION COMPANY ROSA UNIT #634B
1485' ENL & 645' FEL, SECTION 22, T31N, R6W, N4PM
RIO ARRIIBA COUNTY, NEW MEXICO ELEVATION: 6260'

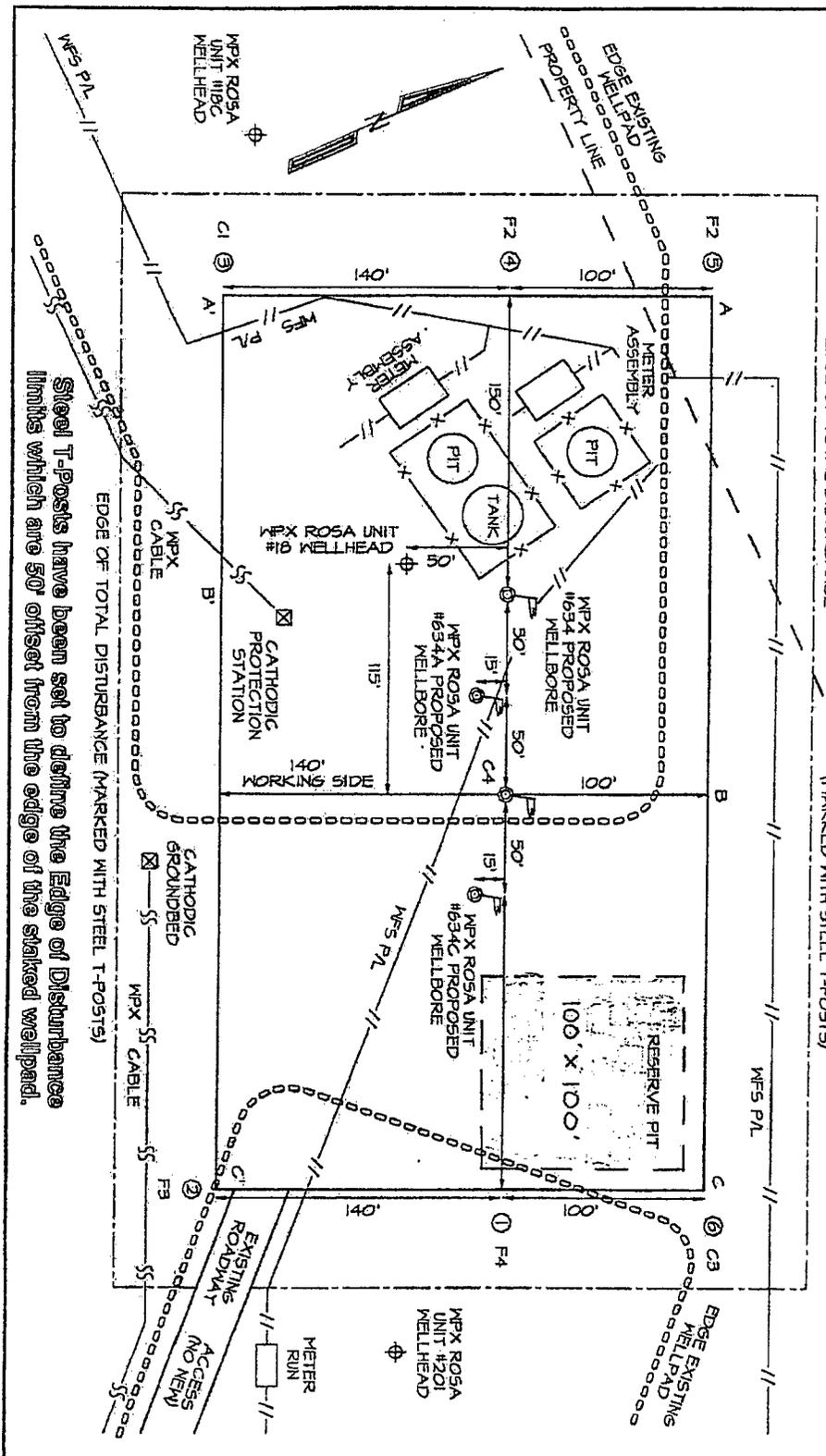


~ SURFACE OWNER ~
 Bureau of Land Management & Bureau of Reclamation

LATITUDE: 36.88830° N
LONGITUDE: 107.44339° W
 DATUM: NAD1983

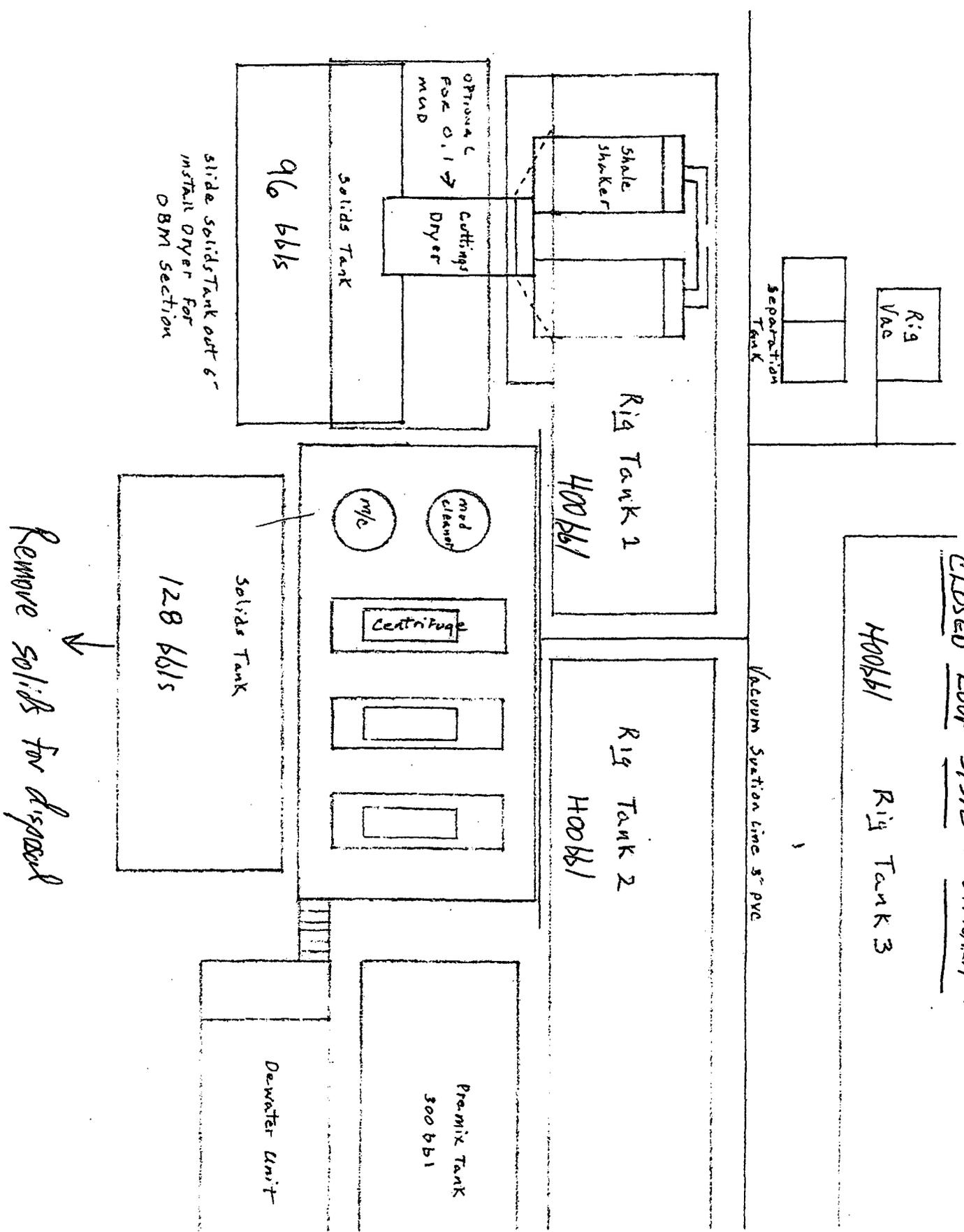
Bureau of Reclamation - 0.30 Acres

Bureau of Land Management - 3.99 Acres



Steel T-Posts have been set to define the Edge of Disturbance limits which are 50' offset from the edge of the staked wellpad.

CLOSED LOOP SYSTEM OPERATION





ZIMMERMAN EQUIPMENT COMPANY

P.O. Box 1459 • Vernal, Utah 84078
435-789-0454

Attn: Gary Sizemore
Subject: Dewatering Systems

Date: 6/15/10

Closed Loop and Dewatering systems are designed for wells that require no reserve pit, environmental sensitive or very limited location sizes. With these type systems the drilling fluid can be stripped and reused or stored for future use. The drilled solids are deposited in Solids Containment Tanks which can be hauled to Disposal sites or stored on location.

The Dewatering process that **ZECO** utilizes to produce Dry Cuttings, Control Mud weight, Reduce Water usage and Lower Drilling costs consists of **ZECO Solids Control Equipment** rigged up in a series. 24 hr service is provided to maintain equipment and manage the solids removal.

- #1: The Drilling Fluid from the Flow Line goes thru the **Shale Shaker** (Vibrating Screening machine) Discharging the cutting into the **#1 Solids Containment Tank**.
- #2: The Fluid then goes to the next compartment in the Mud Tank which the Mud Cleaners Pump from to feed the **Mud Cleaners** (Hydrocyclones mounted over a Fine Mesh Vibrating unit) The over-flow from the Hydro cones discharges to the next compartment in the Mud Tanks the Under-Flow from the Screens goes to the Centrifuge Pump. The solids off the screens go to the **#2 Solids Containment Tank**.
- #3: The Centrifuge Pump goes to the **#1 Centrifuge** which discharges the effluent into the next Compartment and the Solids discharge into the **#2 Solids Containment Tank**.
- #4: The **#2 & #3 Centrifuges** are the Dewatering Centrifuges (Dewatering consists of injecting the fluids with a Polymer to enhance the Solids removal). The Effluent (Usually clean water at this point) is discharged to the next Tank compartment or Storage Tank and the Solids are discharged to the **#2 Solids Containment Tank**
- #5: The Solids are then ready to be hauled off to an approved Disposal Site or stored in a containment area on location.

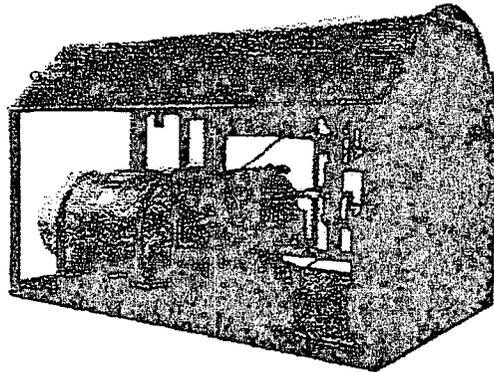
If you have any questions or need more information call (435) 781 1081 or (435)781 0454
Thanks, Wayne

Wayne Henline
Operations Mgr.
ZECO
<wh_zeco@yahoo.com>

SOLUTION CATEGORIES

- Drilling Waste Treatment

DEWATERING WATER-BASED DRILLING FLUIDS



Dewatering Water-Based Fluids

DWU-150 Dewatering



- Description
- Features/Benefits
- Specifications

Rela

FURTHERING THE PROCESSING OF DRILLING FLUID IN SENSITIVE ENVIRONMENTS

NOV® Brandt® provides dewatering equipment and services which can remove almost all colloidal particles, producing nearly clear water by using chemical treatment (polymer), a manifold system and a centrifuge. Most dewatering applications occur in areas of zero discharge, where closed-loop systems are required. In closed-loop systems, dewatering is the final step of the mud-processing process, following the separation of liquid from solids provided by the shale shakers, hydrocyclones and centrifuges.



DW

Dewatering services may also be required where there is a high cost or potential future liability associated with fluid and/or solids disposal. Finally, dewatering may also be performed when the active mud system's volume needs to be reduced. This is done for a cement job, a well change, or displacement.

In a dewatering project, the drilling fluid will be processed from the mud system, and the resulting solids will be discharged for disposal, bio-remediation or landfarming, while the clean fluid can be stored in a frac tank onsite for later use one the existing well or may be brought to a new well for drill-out. In certain instances, the clean fluid may be disposed to ground, if allowed. Whichever situation is encountered, NOV Brandt's dewatering service reduces mud dilution, mud costs and unwanted liquid waste on the location, as well as produces clean, reusable water.



Pro
Tan

The dewatering process uses a precisely-regulated polymer feed, which is used to coagulate and then flocculate the solids, allowing for easy removal by the centrifuge. The dewatering skid (typically a DWU-150) utilizes two polymer tanks (one for back-up) to ensure that no downtime is realized while mixing the polymer. The centrifuge feed pump takes suction from the active mud system, moving the fluid through the injection manifold to the dewatering centrifuge for processing. The manifold system controls the amount of polymer and, if necessary, ph reducer that is injected into the fluid being processed.



From flowline to disposal, NOV Brandt has the solutions to your separation and waste management needs. NOV Brandt is subsidiary of National Oilwell Varco, the industry's technological leader.

Unit
Unit

For more information:

E-mail: brandt@nov.com

or for a location near you [click here](#).

**Hydrogeological Report
Williams Production Company, LLC
Rosa Unit SWD #2 Temporary Pit
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 FEIS, 2008). Elevation of the referenced well is approximately 6256 feet MSL.

General Regional Groundwater Description:

As a portion of the San Juan Basin, the FFO administrative area is underlain by sandstone aquifers of the Colorado Plateau. The primary aquifer of potential concern at this location is the Uinta-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 Uinta-Animas aquifer generally increases toward the central part of the Basin. In this region, 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 proposed pit is located on a mid-elevation, north-facing slope toward Laguna Seca Draw/Navajo Reservoir junction (0.17 miles to the north).

1st 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 are no iWATERS wells with recorded water depth information. However, cathodic data associated with the Rosa Unit Nos. 12B (approximately 1,696 feet from pit), 18 (approximately 110 feet from pit) and 201 (approximately 612 feet from pit) show depth to moisture between 115 and 300 feet (see Siting Criteria Map I for details).

References:

Allen, Erin. Undated. Colorado Plateau Aquifers.

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

New Mexico Office of the State Engineer. 2010. iWATERS Database search. March, 2010.

United States Department of Agriculture, Forest Service. 2008. Final 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. Ground Water 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
Water Column/Average Depth to Water

No records found.

PLSS Search:

Section(s): 22

Township: 31N

Range: 05W

The data is furnished by the NMOSE/ISO and is accepted by the recipient with the expressed understanding that the OSE/ISO make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

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Page 1 of 1

WATER COLUMN/AVERAGE
DEPTH TO WATER



New Mexico Office of the State Engineer

Water Column/Average Depth to Water

No records found.

PLSS Search:

Section(s): 23

Township: 31N

Range: 05W

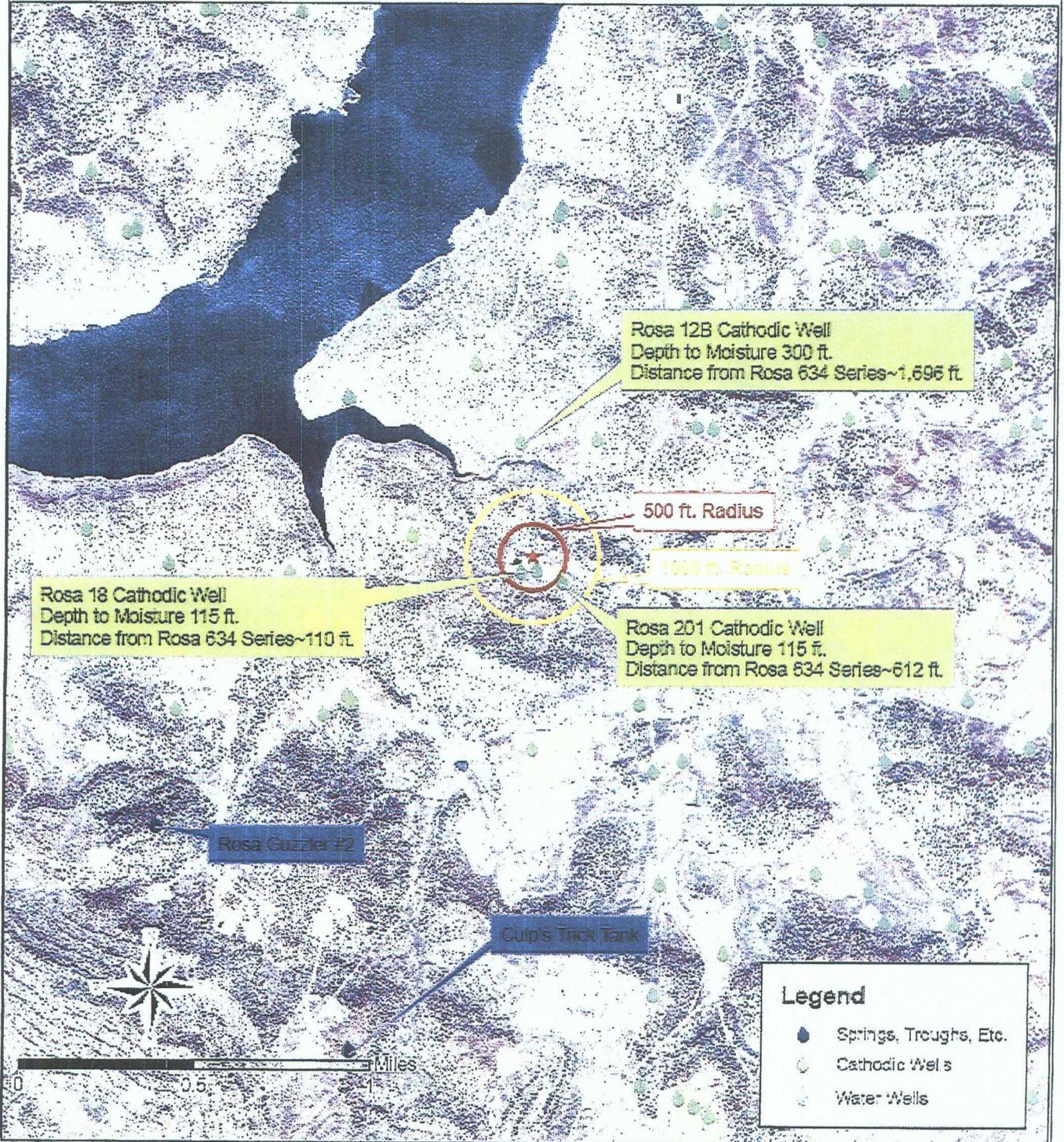
The data is furnished by the NMOSE/ISO and is accepted by the recipient with the expressed understanding that the OSE/ISO make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

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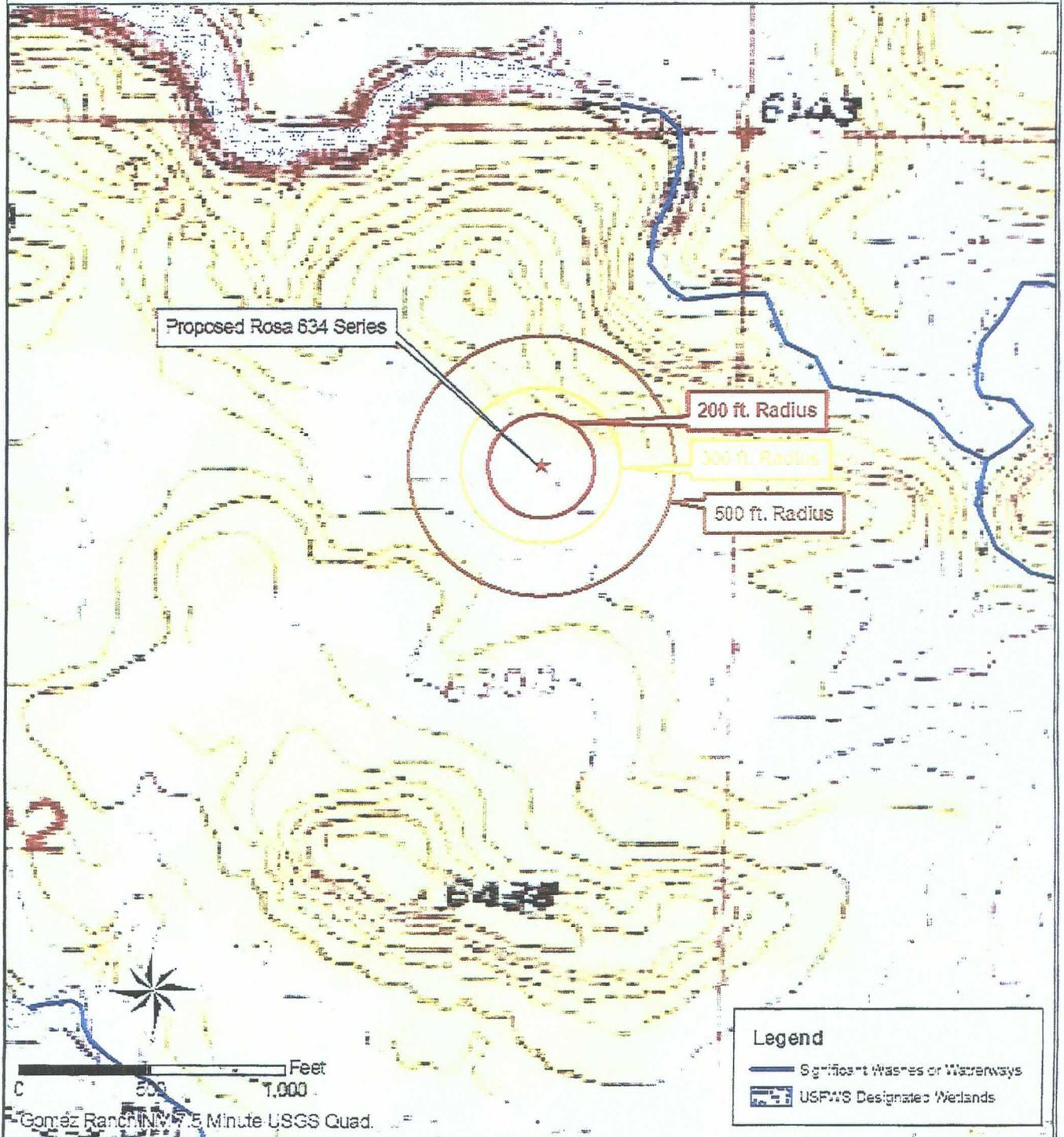
Page 1 of 1

WATER COLUMN/AVERAGE
DEPTH TO WATER

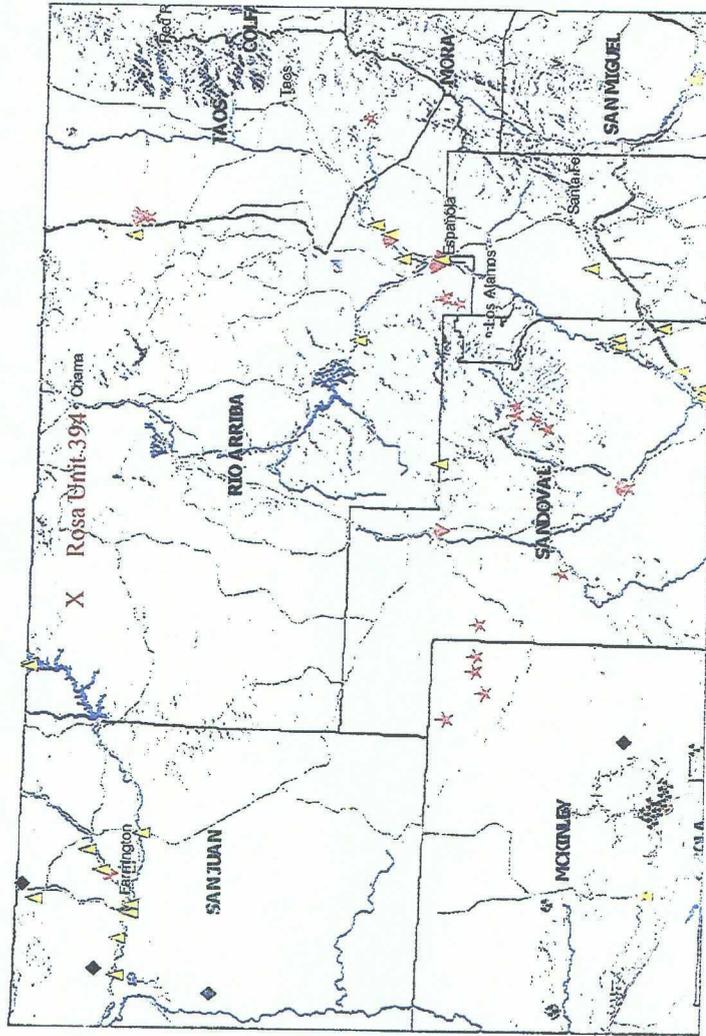
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 Water Wells, Cathodic Wells, & Springs
 Williams Production Company, LLC
 Proposed Rosa Unit # 634 Series
 T31N, R06W, Section 22 NMPM
 Rio Arriba County, New Mexico



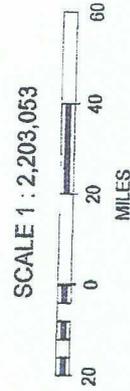
Siting Criteria Map II
Topographic Features
Williams Production Company, LLC
Rosa Unit No. 634 Series
T31N, R06W, Section 22 NMPM
Rio Arriba County, New Mexico



MMQonline Public Version



- Mines, Mills & Quarries Commodity Groups**
- ▲ Aggregate & Stone Mines
 - ◆ Coal Mines
 - ★ Industrial Minerals Mines
 - ▼ Industrial Minerals Mills
 - ▤ Metal Mines and Mill Concentrate
 - ▥ Potash Mines & Refineries
 - ⊠ Smelters & Refinery Ops.
 - ✱ Uranium Mines
 - ⊙ Uranium Mills
- Population**



FEMA Map – 100-Year Floodplain:

According to FEMA records, this site is not located in a 100-year floodplain (see attached FEMA map).

Siting Criteria Compliance Demonstrations:

The location of the Rosa SWD #2 temporary pit is not located in an unstable area. The location is not situated over a mine or a steep slope. 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 site is not within 500 feet of any reported riparian areas or wetlands (see attached USFWS wetland map); 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 proposed 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 proposed pit is not within 300 feet of any permanent residence, school, hospital, institution, or church.

